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A LONG TERM TRIAL TO DEVELOP ORGANIC FARMING PACKAGE FOR RICE BASED CROPPING SYSTEM IN GODAVARI DELTA REGION OF ANDHRA PRADESH

Dr. SRINIVAS MANUKONDA, Dr. P.V. SATYANARAYANA, Dr. R.A. RAJU, Dr. A. UPENDRA RAO and Dr. C.V. REDDY

Acharya N.G. Ranga Agricultural University, Andhra Pradesh Rice Research Institute & RARS, MARUTERU, West Godavari District - 534 122, Andhra Pradesh, INDIA

ABSTRACT

A long term trial was conducted for thirteen years since 2003 during kharif and rabi seasons to develop suitable organic farming package for rice based cropping system with a view to enhance the productivity of rice under delta alluvial soils at APRRI, Maruteru. Study comprises of combination of organic and inorganic source of fertilizers. Significantly higher productive tiller count, number of filled grains/panicle and grain yields were realized with 100% inorganic source of fertilizers followed by conjunctive use of 50% NPK through inorganic and 50% nitrogen through organic source. Greater number of system productive tillers/m^2 of 707 and system filled grains number/panicle of 305 were realized with conjunctive use of 50% NPK through inorganic and 50% nitrogen through organic source as FYM next to 100% inorganic fertilizers (722 and 304 respectively). Thirteen years of organic farming experiment revealed that highest mean system grain yield was recorded with 100% inorganic source of fertilizers (10.22 t/ha/year) followed by conjunctive use of 50% NPK through inorganic and 50% nitrogen through organic source as FYM (9.96 t/ha/year). Among organic sources, combination of different organic source manures performed better compared to green manuring and bio-fertilizer combinations. With positive affect of incorporation of organic manures, initial organic carbon content of 0.80 was raised to 1.17 in organic treatments. This clearly indicates conjunctive use of organic and inorganic source of fertilizers not only improves yield attributing characters and also grain yield besides improvement in soil health and there by sustains ecosystem and people.

Keywords: *Organic and inorganic source nutrients, cropping system, productive tiller count, grain yields and organic carbon content.*

INTRODUCTION

Rice is a staple food crop that holds the key for national food security of India which contributes 43% share and also it is a source of livelihood for millions of people across the globe and earns a foreign exchange of > Rs. 33,000 crores. Rice is cultivated in diverse ecosystems spread over 44 million hectares which contributes 22% of total cropped area in India with an annual production of 104.3 million tonnes of milled rice with average productivity of 2372 kg/ha (Govt. of India, 2013). In Andhra Pradesh, rice is grown in an area of 42 lakh hectares with an annual production of 97.5 lakh tones and a productivity of 2930 kg/ha. Godavari delta is the Rice bowl of Andhra Pradesh where rice is cultivated in deltaic alluvial soils under canal irrigated conditions. Rice-Rice is the most predominant cropping system in this region. The response to fertilization in the Indian soils is increasing day by day due to low to medium available status of nutrients in the soil and availability of high yielding fertilizer responsive varieties. Organic farming is one of the better options to improve the nutrient availability in deltaic alluvial soils by way of improving the microbial activity in the soil. Source of nutrients influences the performance of rice through its effect on growth and development. Available literature shows that, more no. of productive tillers/m^2 are produced in organically enriched soils. Nutrient management provides an approach for feeding the plants with nutrients as and when required. But traditional organic farming practices failed to meet the nutrient requirement due to slow release pattern and climatic conditions. Use of organic fertilizers (manures) is as old as agriculture itself and India practiced organic, low external input and sustainable agriculture till early 1960s. With burgeoning rise in population, country became food short (ship to mouth situation) green revolution has increased the food grain production by > 50% by introducing the application of chemical fertilizer. But with time, soil organic content has decreased due to imbalanced fertilization, reduced application of organic manures especially farm yard manure, compost and reduced the availability of animal draught power replaced by mechanization. Then Post Green Revolution has realized that there is a needed to focus on conservation and sustainable agriculture emerges for soil health view as well as quality aspects. Hence, the present experimentation was carried out to find out the development of suitable organic farming package for rice based cropping system for enhancing the productivity of rice and soil health.

MATERIAL AND METHODS

Field experiments were conducted continuously for thirteen years from 2003 to 2015 during both *kharif* and *rabi* seasons at Andhra Pradesh Rice Research Institute (APRRI) and Regional Agricultural Research Station (RARS), Maruteru, Andhra Pradesh, India under coastal irrigated ecosystem in deltaic alluvial soils with a view to develop suitable and sustainable organic farming package for rice and rice based cropping systems under godavari delta region of Andhra Pradesh. The experiment was laid out in randomized block design and replicated thrice. The treatments mainly comprise of combination of organic and inorganic source of fertilizers with eight treatments. The experimental soil was clay loam in texture, slightly alkaline in reaction, low in organic carbon and low in available nitrogen (188 kg/ha), medium in available phosphorus (34 kg/ha) and high in available potassium (305 kg/ha). The experimental test variety is BPT-5204 (Samba Mahsuri) of 145 days duration and which is the national check of the country and also comes under fine grain, long slender group and has a huge potential of export quality.

RESULTS AND DISCUSSION

The results revealed that, significant response was observed among the treatments and within the treatments of organic sources of nutrients. Significantly higher number of productive tillers/m^2 of 722 and higher number of filled grains/panicle of 304 were observed with 100% inorganic source of fertilizers which is significantly superior to organic alone and in combinations (Table 1 and 2). Increasing nitrogen application either organic or inorganic sources will improve tiller number in rice or the same was also reported by Madhav *et al.* (1996). The mean data on system grain yields of rice-rice cropping system revealed that, significantly higher grain yield of 10219 kg/ha/yr was recorded with 100% inorganic source of fertilizers *i.e.,* 100% recommended dose of NPK + micronutrients through inorganic chemicals followed by conjunctive use of 50% inorganic and 50% nitrogen through organic source as farm yard manure of 9957 kg/ha/year (Table 3). Among different organic source treatments, application of 100% nitrogen through different sources of each equivalent of farm yard manure (FYM) + vermicompost (VC) + neem cake organic material recorded significantly higher system grain yield of 8305 kg/ha/year followed by 100% nitrogen supplied through farm yard manure, vermicompost, neem cake + bio-fertilizers treatment (8303 kg/ha/year) in both the *kharif* and *rabi* seasons throuugh out 13 years of experimentation. This clearly shows that, number of productive tillers and number of panicles were improved with conjunctive use of organic and inorganic nutrients which inturn increase the grain and straw yields in both the seasons over the years. Results of several long term fertilizer trials conducted in different parts of the country have also reported that the favorable effects of combined application of chemical fertilizers and organic manures on crop yields and soil eco-systems. These results have conclusively shown the need for meeting the nutrient requirements of plants at least partly through organic manures. This helps ultimately in achieving the goal of environmentally benign sustainable agriculture. The nutrient leaching losses are less because of more intense microbial activity leading to mineralization, immobilization turnover of nutrients in soil by microbes. The increase in grain yield with application of nitrogen through farm yard manure (FYM) could be attributed to increase in photosynthesis since nitrogen is the constituent of chlorophyll, which inturn might have resulted in accumulation of photosynthates in vegetative portion of plants and ultimately enhanced the plant growth, yield attributes and grain yield of paddy (Swarna *et al.*, 2014). These findings are in close accordance with those reported by Singh and Jain (2000) and Aruna and Reddy (2011).

Initial organic carbon (OC) content of the experimental soil was 0.80 which was increased to 1.17 over a period of 13 years when treated with different organic sources like supply of nitrogen through farm yard manure, vermicompost, neem cake *etc.,* followed by sesbania manuring in addition to the above treatment which was recorded as 1.14 organic carbon content. When total nitrogen was supplied in inorganic form of 100% recommended NPK + micronutrients, organic carbon content increase was marginal *i.e.,* from 0.80 to 0.95 (Table 4). This clearly indicates that organic farming package increases soil organic content which is an indication of improved soil health. Network research of All India Coordinated Research Projects on Integrated Farming Systems research (AICRP on IFS) revealed that organic farming increases the soil microbes (fungi, bacteria, actinomycetes), soil organic carbon increased by 22.3% under organic production system over inorganic production systems with 16.9% with higher net rupee returns was found (at 20% premium price). But the only limitation is cost of cultivation was 12.7% higher in organic farming due to bulky nature organic manures and its availability.

CONCLUSION

The long term trial of thirteen years research study revealed that the productivity of rice based cropping system can be enhanced by conjunctive use of organic and inorganic sources of fertilizers with appropriate proportions. But the soil health and quality of rice product can be enhanced only through application of different organic sources. Organic farming package in rice based cropping system is remunerative and sustainable where the availability of organic material is abundant and premium prices are applicable.

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Table 1. System productive tillers/m2 of rice as influenced by organic treatments

Treatments		Number of system productive tillers/m2													
		2003	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Mean**
T_1	50% NPK through inorganic + 50% N through FYM	693	815	796	692	786	714	729	597	670	814	628	627	636	**707**
T_2	Different organic sources (FYM + VC + Neem cake)	607	663	738	560	729	618	632	504	582	685	522	522	544	**608**
T_3	T2+ *Sesbania* green manuring	603	675	694	600	742	616	618	469	592	696	540	566	572	**614**
T_4	T2 + organic sources of weed and pest control	617	674	726	560	738	597	643	455	578	658	502	542	569	**604**
T_5	50% N through FYM + bio-fertilizer + RP + PSB culture	574	627	709	558	738	615	610	468	588	700	550	550	564	**604**
T_6	T2 + bio-fertilizer + rock phosphate + PSB culture	637	680	742	546	762	643	659	520	603	725	564	563	606	**635**
T_7	100% NPK + micronutrients through inorganic sources	658	797	830	734	803	736	735	601	676	880	690	686	560	**722**
T_8	Absolute control	481	663	695	529	722	624	626	493	588	680	522	542	613	**598**

Table 2. System filled grain number/panicle of rice as influenced by organic treatments

Treatments		Number of system filled grains/panicle													
		2003	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Mean**
T_1	50% NPK through inorganic + 50% N through FYM	274	299	322	290	258	246	292	381	436	263	280	295	331	**305**
T_2	Different organic sources (FYM + VC + Neem cake)	237	252	236	260	228	211	251	213	412	250	265	278	284	**260**
T_3	T2+ *Sesbania* green manuring	215	297	291	242	252	204	258	228	408	270	271	297	295	**271**
T_4	T2 + organic sources of weed and pest control	204	305	228	249	231	208	246	204	396	244	261	272	275	**256**
T_5	50% N through FYM + bio-fertilizer + RP + PSB culture	208	302	230	252	232	200	258	194	385	266	286	298	286	**261**
T_6	T2 + bio-fertilizer + rock phosphate + PSB culture	194	271	271	267	249	208	256	239	421	252	273	279	293	**267**
T_7	100% NPK + micronutrients through inorganic sources	252	324	305	323	262	233	281	310	428	288	303	313	329	**304**
T_8	Absolute control	180	251	225	265	235	205	248	240	407	240	263	275	285	**255**

Table 3. System grain yield of rice-rice cropping system as influenced by treatments of organic and inorganic combinations

Treatments		System grain yield (Kg/ha/year)													
		2003	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Mean**
T_1	50% NPK through inorganic + 50% N through FYM	8420	10459	10884	7475	11015	11254	10864	12432	10512	9242	9155	9837	7889	**9957**
T_2	Different organic sources (FYM + VC + Neem cake)	7623	9262	10410	6159	8874	8871	8713	10835	9236	7623	6492	7241	6630	**8305**
T_3	T2+ *Sesbania* green manuring	7243	8622	9329	6032	9266	8947	8343	10666	9159	8222	7091	7623	6495	**8234**
T_4	T2 + organic sources of weed and pest control	7240	7746	9936	5451	8697	8417	8183	10148	8815	7868	6991	7657	7018	**8013**
T_5	50% N through FYM + bio-fertilizer + rock phosphate + PSB culture	6443	7035	9029	5827	8880	8073	8143	10878	8854	8164	7740	7391	6470	**7917**
T_6	T2 + bio-fertilizer + rock phosphate + PSB culture	6920	8457	8756	5536	9660	9102	8672	11082	9559	8385	7491	7524	6792	**8303**
T_7	100% NPK + micronutrients through inorganic sources	8296	10248	9349	8228	11044	10858	10159	12392	10157	11216	10071	11402	9430	**10219**
T_8	Absolute control	5695	8643	8367	6002	8747	8935	8158	10737	9116	8013	6825	7091	6383	**7901**

Table 4. Soil organic carbon content of rice cropping system influenced by treatments of organic and inorganic combinations

Treatments		Soil organic carbon content (%)														
		Initial	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Mean**
T_1	50% NPK through inorganic + 50% N through FYM	**0.80**	0.93	1.01	0.98	1.06	1.00	0.68	0.76	0.94	0.89	0.85	1.21	1.10	1.21	**0.97**
T_2	Different organic sources (FYM + VC + Neem cake)	**0.80**	0.83	1.80	0.89	1.29	0.95	0.84	0.87	1.06	1.02	0.94	1.49	1.68	1.49	**1.17**
T_3	T2+ *Sesbania* green manuring	**0.80**	0.85	2.10	0.73	1.28	1.04	0.82	0.89	0.94	0.99	0.94	1.53	1.40	1.34	**1.14**
T_4	T2 + organic sources of weed and pest control	**0.80**	0.91	2.10	0.68	1.24	0.99	0.95	0.79	0.88	0.97	0.92	1.44	1.36	1.44	**1.13**
T_5	50% N through FYM + bio-fertilizer + rock phosphate + PSB culture	**0.80**	0.87	1.40	0.79	1.16	0.96	0.79	0.82	0.94	0.93	0.89	1.15	1.08	1.15	**0.99**
T_6	T2 + bio-fertilizer + rock phosphate + PSB culture	**0.80**	0.81	1.37	0.85	1.28	1.04	0.85	0.79	1.13	0.94	0.96	1.11	1.21	1.11	**1.03**
T_7	100% NPK + micronutrients through inorganic sources	**0.80**	0.89	0.90	0.93	1.28	0.95	0.75	0.77	0.81	0.91	0.84	1.08	1.18	1.08	**0.95**
T_8	Absolute control	**0.80**	0.88	1.15	0.96	1.28	0.99	0.84	0.82	0.88	0.96	0.86	1.10	1.20	1.22	**1.01**

Adoption of Agricultural Innovations: The Case of Grass silage in the Giresun Province of Turkey

Ismet Boz
Professor Dr., Ondokuz Mayis University Faculty of Agriculture Department of Agricultural Economics 55139 Samsun Turkey

Cagatay Yildirim
Research Assistant, Ondokuz Mayis University Faculty of Agriculture Department of Agricultural Economics 55139 Samsun Turkey

Hatice Turkten
Research Assistant, Ondokuz Mayis University Faculty of Agriculture Department of Agricultural Economics 55139 Samsun Turkey

Abstract
The primary purpose of this study was to determine the possibilities of adoption and diffusion of grass silage among livestock farmers in the uphill lands of the Giresun province of Turkey. More specifically the study was intended to determine socioeconomic characteristics of livestock farmers, describe farming practices applied in the livestock farms, determine problems encountered by livestock farmers, determine the awareness level of grass silage in the region, and describe possible contributions that grass silage will make to the small holder livestock farmers in the locality. It was also aimed to develop recommendations for the region to accelerate the adoption and diffusion process of various innovations. Descriptive statistics including frequencies, percentages, means, and standard deviations were used to analyze data. According to results related to socioeconomic characteristics and farming practices, small holder livestock farmers in the locality operate in a conventional manner, Farmers tend to be older in age, hold an elementary school degree, and mostly not open to innovation due to lack of desire and also possibilities to enlarge farm size and to earn more stable income from animal husbandry. They face serious problems with drying their grass to provide roughage fodders, and lack information about this technology. In order to increase the adoption and diffusion of grass silage and similar technologies of this type, awareness raising campaigns and extension programs must be initiated by the Ministry of Food Agriculture and Livestock.

Keywords: Agricultural innovations, Grass silage, Diffusion of innovations, Adoption of innovations, Technology adoption

Introduction

Adoption of agricultural innovations provide many benefits for farmers. An innovation is defined as an idea or practice which is new for an individual. Adoption of agricultural innovations may reduce production costs, save labor, and play a key role on increasing the quality and quantity of agricultural production. Using new technologies at farm level can be considered as adoption of innovations which increase the competitive power of farmers over their counterparts operating in other regions. Grass silage technology can be considered as an innovation, particularly for the livestock farmers operating in the Eastern Black Sea region of Turkey.

Giresun is one of the provinces of the Black Sea Region in the northern part of Turkey with a total population of 425,007 and total surface area of 6,934 square kilometers. It is bordered by the provinces of Trabzon and Gumushane from the east, Ordu from the west, and Sivas from the south. The Giresun Mountains stretching parallel to the shore of Black Sea caused the formation of two different climatic zones on the provincial lands. The Black Sea coast is warm and rainy. According to the average of long-term observations, the annual average temperature in the center is 14.2 ° C. The coldest month (February) has an average temperature of 6.9 ° C and the warmest month (August) is 22.3 ° C. (Altinkaynak, 2008).

Although the majority of employment in Giresun is mainly agricultural, the production of agricultural products per rural population is below the national average. The main reason for this is the low agricultural productivity. The share of the agricultural output of Garson province in the agricultural output of the country is as low as 0.85%. The fact is that the Black Sea region where Giresun is located remains below the national average in terms of socio-economic development level. Its main reasons are that it has a rugged terrain structure and geographical conditions are not suitable for agriculture and industry. Along with maintaining the weight of the agricultural sector in the provincial economy, the fact that agricultural land is made up of small pieces reduces productivity (on5yirmi5 Genclik Haber Sitesi, 2017).

Although productivity level is quite low in field crops, agriculture is still one of the main occupations providing livelihood to thousands of rural families in the Giresun province. The majority of farms, particularly in the coastal zone are specialized in hazelnut production which is unique for the region. Hazelnut farmers are considerable economically better off as compared with the farmers operating in uphill zones with an altitude of 800-1200 meters. These areas aren’t suitable for hazelnut and therefore farmers grow mostly annual field crops and various fruits and vegetables in their small and fragmented lands. Because the sloppy and fragmented farmland, it is difficult to apply mechanization. On the other hand, because of abundant rainfall the area is rich in pasture and meadows. This gives an opportunity to raise livestock which can grazed at least 5-6 mounts in public rangelands for free. However, stored roughage fodder or silage is needed to feed livestock in the winter season during which all grazing lands are covered by snow.

Grass silage is considered as an innovation for the region. In order to dry moved grass during the harvest season it is necessary to have at least a couple of sunny days consecutively, which rarely occurs in this region. For this reason, grass silage which can be prepared by freshly moved grass would provide a new opportunity for the farmers. If farmers apply this technology they will benefit in two ways. The first one is that they will probably save labor from the hard work of drying their moved grass in the hardly appearing sun among the clouds in the harvest season. The second one is that farmers will

probably produce higher quality of roughage fodder which will make it possible for them to grow their animals healthy.

The primary purpose of this study was to determine the possibilities of adoption and diffusion of grass silage among livestock farmers in the uphill lands of the Giresun province of Turkey. More specifically the study was intended to:

(1) Determine socioeconomic characteristics of livestock farmers.
(2) Describe farming practices applied in the livestock farms.
(3) Determine problems encountered by livestock farmers.
(4) Determine the awareness level of grass silage in the region.
(5) Describe possible contributions that grass silage will make to the livestock farmers in the locality.

Materials and Methods

Target population for this study was defined as small holder cattle owners in Giresun province of Turkey. Two districts from this province, namely Dereli and Guce districts and three villages from each district (total six villages) were selected based on their agricultural potential, distinct from the city center, socioeconomic characteristics of rural communities, and potential of livestock production. From each village a list of small holder cattle owners showing their number of cattle was obtained from the District Agricultural Office. Lists of farmers and their cattle sizes from six selected villages made the accessible population of this study. Considering frequency distributions of the number of animals, accessible population was divided in three strata with 1-5 animals, 6-10 animals, and more than 10 animals. Yamane's (2001) stratified sample size determination formula was used to determine sample size. The equation for this formula is

$$n = \frac{N\sum N_h S_h^2}{N^2 D^2 + \sum N_h S_h^2}, D^2 = \frac{e^2}{t^2}$$

Where
n = sample size,
N = accessible population,
Nh = number of farmers in a stratum,
Sh = standard deviation within a stratum,
D2 = desired variance,
e = accepted error from the mean, and
t = t value corresponding the accepted confidence interval.

Accepting 5 percent error from the mean (*e*) and 95 percent confidence interval (*t* = 1.645), the sample size was calculated as 71. This number was proportionally distributed to three strata, and respondents from each stratum were randomly selected.

Data were collected by conducting face to face interviews with farmers during which a questionnaire was administered. It was included two sections, the first section included questions about socioeconomic characteristics of the respondents while the second section included questions related to present farming systems in the region and adoption possibilities of grass silage. Technically the

questionnaire included both open-ended and closed-ended questions. Earlier work of Boz, 2016; Yildirim et al., 2016; Boz et al., 2015; Boz et al., 2011; and Boz and Akbay, 2005 was taken into consideration in the preparation of this questionnaire. Questions related to socioeconomic characteristics of farmers were mostly modified from Rogers (2010) and questions related to farming practices were mostly modified from Boz et al., 2005. Respondents' opinions and comments were noted for the open ended questions. Data were collected in March and April 2015. It was approximately half an hour to complete a questionnaire.

Descriptive statistics including frequencies, percentages, means, and standard deviations were used to analyze quantitative variables. For the items collected in a five point Likert scale, an interpretive scale was developed by the researchers. During data collection process many notes were taken by the researchers from the respondents' comments in a given issue related to their farming system. If many farmers concerned about similar problems and made comments accordingly, these were also considered in data analysis process.

Results and Discussion

Socioeconomic characteristics of the respondents are presented in Table 1. Thirteen socioeconomic characteristics were considered. It can be seen from the table that almost half of the respondents (47.9%) were older than 50 years of age, the majority (64.8%) were elementary school graduates, 60.6% had no membership of farmers' unions, 29.6% participated in village administration, 79% had land less than 20 decares. The average land size was calculated as 21.11 decares (Standard Deviation (SD) = 25.37). A large majority (92.9%) had social security, 70.4% didn't use credit for inputs, 77.5% didn't use bank loans for investments, 45.1% had yearly income higher than 40 thousand Turkish liras (1 US Dollars = 3.54 Turkish liras in June 10, 2015), no farmers had a farm tractor, 60.6% believed that they cannot change their future with their own effort, 45.0% had farming experience more than 30 years, and 56.3% considered themselves in the medium income level category considering their counterparts in their village. The average numbers of livestock were also calculated and results were 1.20 (SD = 6.0) for improved breeds of caws, 4.72 (SD = 7.33) for hybrid caws, 0.31 (SD = 2.61) for native caws, and 6.34 (SD = 23.92) for native sheep.

Table 2 presents the selected farming practices applied by small holder cattle owners in the region; 54.9% of the respondents provided their live animals from their own production, 54.9% provided dry grass from their own production, 83.1% provided concentrated feeds by purchasing from the market. Almost half of the respondents (49.3%) sold their cattle to neighbors or to animal market. More than half of the respondents (56.3%) yearly observed their cattle for diseases and other problems, 77.5% had concrete barns, 59.2% considered live weight of the animals as the main criterion when decided selling time, 93% thought that meadow areas around their villages were grazed properly by small holder cattle farmers, all of the respondents utilized manure by putting it in their own land, more than three-third reported that meadows were grazed properly, almost all respondent used manure in their own land, 83.1% reported that their number of livestock has decreased recently, Only small portion of the farmers (18.3%) were able to properly dry more than 80% of their mowed grass, 69% thought that silage can be made by grass without drying, 85.9% didn't care about roughage to concentrated feed ratio when feeding their herd, 52.1% never heart of protein content and metabolic energy content of feeds, 78.9% received information about animal diseases from private veterinarians.

Table 1. Socioeconomic characteristics

Age of farmer	N	%	Variables	N	%
Age of farmer			Credit use for inputs		
<35	9	12.7	Yes	21	29.6
35-50	28	39.4	No	50	70.4
50<	34	47.9	TOTAL	71	100.0
TOTAL	71	100.0	Use of long term loans for farm investments		
Level of education			Yes	16	22.5
Illiterate	1	1.4	No	55	77.5
Literate, no degree	1	1.4	TOTAL	71	100.0
Primary school	46	64.8	Annual income		
Secondary school	12	16.9	<20.000	0	0.0
High school	8	11.3	20.000-30.000	15	21.1
College	3	4.2	31.000-40.000	24	33.8
TOTAL	71	100.0	40.000<	32	45.1
Membership of farmers unions			TOTAL	71	100.0
Member	28	39.4	Tractor ownership		
Not member	43	60.6	Yes	0	0.0
TOTAL	71	100,0	No	71	100.0
Participation in village administration			TOTAL		
Yes	21	29.6	Can you change your future by your own effort?		
No	50	70.4	Yes	11	15.5
TOTAL	71	100.0	Partly	17	23.9
Amount of land			No	43	60.6
No land	0	0.0	TOTAL	71	100.0
<5da	9	12.7	Farming experience		
6-10da	17	23.9	<10 years	8	11.3
11-20da	23	32.4	11-20 years	10	14.1
20<	22	31.0	21-30 years	21	29.6
TOTAL	71	100.0	30< years	32	45.0
Social Security			TOTAL	71	100.0
No social security	5	7.1	Income level among all farmers		
BAG-KUR	31	43.7	Low	29	40.9
SSK	27	38.0	Medium	40	56.3
Green card	4	5.6	High	2	2.8
Emekli Sandigi	4	5.6	TOTAL	71	100.0
TOTAL	71	100.0			

Table 2. Farming practices

Variables	N	%	Variables	N	%
Live animals provided by			Whether or not meadows grazed properly		
Own raising	39	54.9	No	5	7.0
Purchase animal bazaar	19	26.8	Yes	66	93.0
Own raising + purchase	12	16.9	TOTAL	71	100.0
Neighbor farmers	1	1.4	Manure used in		
TOPLAM	71	100.0	Own land	71	100.0
Dried grass provided by			Wasted	0	0
Own production	39	54.9	TOTAL	71	100.0
Purchase from market	9	12.7	Resent changes in the number of animals		
Own + purchase	23	32.4	No change	12	16.9
TOTAL	71	100.0	Decrease	59	83.1
Concentrate feed provided by			TOTAL	71	100.0
Own production	7	9.9	Percentage of grass properly dried		
Purchase	59	83.1	0-40%	31	43.6
Own+purchase	5	7.0	%41-%60	17	23.9
TOTAL	71	100.0	%61-%80	10	14.2
Livestock sold to			%81-%100	13	18.3
Not selling	3	4.2	TOTAL	71	100.0
Butcher	23	32.4	Can grass be made silage without drying it?		
Ritual slaughter	10	14.1	No	49	69.0
Market+neighbor	35	49.3	Yes	22	31.0
TOTAL	71	100.0	TOTAL	71	100.0
Observing animals for diseases			Roughage/concentrate feed ratio applied		
Never	3	4.2	Doesn't care	61	85.9
Weekly	1	1.4	1/2 - ½	1	1.4
Monthly	6	8.5	1/3 – 2/3	0	0.0
Seasonally	19	26.8	1/4 - ¾	8	11.3
Yearly	40	56.3	2/3 – 1/3	1	1.4
When necessary	2	2.8	TOTAL	71	100.0
TOTAL	71	100.0	Considering protein content of feeds		
Type of barn			Never hearth of it	37	52.1
Concrete	55	77.5	No	34	47.9
Wooden	16	22.5	TOTAL	71	100.0
TOTAL	71	100.0	Considering metabolic energy content of feeds		
Criteria od slaughtering time			Never hearth of it	37	52.1
Appearance	8	11.3	No	34	47.9
Live weight	42	59.2	TOTAL	71	100.0
Market price	6	8.4	Source of livestock diseases information		
Age of the animal	14	19.7	Elder family members	3	4.2
Other criteria	1	1.4	Extension personnel	12	16.9
TOTAL	71	100.0	Private veterinarian	56	78.9
			TOTAL	71	100.0

Most of the small holder livestock farmers in the research area stressed that the number of livestock has continuously decreasing and young people had no interest in agriculture. The reasons for this decrease was asked in a five point Likert scale with 1 = Not Important at all, 2 = Not important, 3 = Undecided, 4 = Important, 5 = Very Important. As it can be followed from Table 3, the most important factor was "high feed prices", and it was followed by "lack of family members to take care of animals", and "illegal animal entry to the region.

Problems encountered with roughage feed were asked in the same Likert scale above and the results were presented in Table 4 where the most serious problem is harvesting, and it is followed by drying and transportation. Reasons for not practicing grass silage was also asked and half of the respondents (50.7%) stated that they have never hearth of a practice of this type, 28.8% hearth it but didn't have enough information to practice it, 19.7% heart it but their farm conditions aren't suitable for practice, and finally 2.8% hearth it bud didn't believe that it would be a useful practice.

Table 3. Reasons for decreasing number of livestock

Reasons for decreasing cattle size	N	Mean	Standard Deviation
Lack of pasture and meadows	71	1.61	1.65
Low meat prices	71	2.77	1.98
Low milk prices	71	2.37	1.87
Lack of governmental support	71	2.38	1.89
Illegal animal entries	71	3.37	8.14
Lack of family members to take care of animals	71	3.52	2.03
Lack of capital to purchase live animals	71	2.63	1.91
Low income	71	2.99	2.05
High feed prices	71	3.90	1.94

Table 4. Problems encountered with roughage feeds

Problems encountered with roughage feeds	N	Mean	Standard Deviation
Drying	71	3.46	1.75
Harvesting	71	4.01	1.74
Transportation	71	3.13	1.78
Temporary Storage in the field	71	3.21	1.78
Storage in the farm building	71	2.54	1.70

Table 5. Reasons for not practicing grass silage

Reasons for not practicing grass silage	N	%
I have never hearth about this practice	36	50.7
I have hearth it but have not enough information to apply it	19	26.8
I have heart it but my farm conditions do not provide adequate possibilities to practice it.	14	19.7
I have hearth it but I do not believe that it will be useful	2	2.8
TOTAL	71	100.0

Conclusions and Recommendations

Adoption and diffusion possibilities of grass silage among small holder livestock farmers in Giresun province of Turkey was investigated by this study. The average farmer was approximately a fifty years aged male farmer with an elementary school degree. He has low tendency of becoming member of a farmers' organization as well as participating in village administration. He owns an average land of 21 decares, 1.20 improved breeds, 4.72 hybrid caws, 0.31 native caws, and 6.34 native sheep. Ha has social security, doesn't use credit for inputs and bank loans for farm investments, owns a yearly income about 20 thousand liras, doesn't have a tractor, has farming experience of more than 20 years. With this average profile it seems difficult for him to continue farming and to enjoy living in rural areas. However, employment opportunities in the other sectors of the economy are limited and most of these sectors employ highly skillful and talented personnel. For this reasons, measures to improve livestock farmers' economic conditions are necessary.

A traditional farming system prevails in the region. Farmers aren't open to innovations. Farming doesn't really seem to be the future occupation of many respondents. Although they aren't satisfied with their present economic conditions they are still thankful and worrying about less advantaged people.

Because of the unique geographical conditions of the region, there are many physical and infrastructural constraints to apply farm technologies. Limited and fragmented land parcels provide few opportunities for developing a sustainable farming system as compared with the regions without these restrictions.

Providing roughage fodders for animal husbandry is quite problematic, particularly in winter seasons. Due to rainy climate it is hard to get own grass dried, and therefore farmers have to purchase fodder for winter season when price level dramatically goes up. If farmers adopt grass silage technology it will be possible for them to produce cheaper and healthier roughage fodder for their animals. This will probably make contributions to their income and wellbeing in the long term span.

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Comparison of in vitro ruminal fermentations on the different origin of corn grains

C.W. Choi[1,*], D.H. Kim[2], S.K. Park[3], and S.H. Choi[4]

[1]Daegu University, Gyeongsan, Gyeongbuk 38453, Korea
[2]Gyeongbuk Provincial College, Yecheon, Gyeongbuk 36830, Korea
[3]Sejong University, 209 Neungdong-ro, Gwangjin-gu, Seoul 05006, Korea
[4]Chungbuk National University, Cheongju, Chungbuk 28644, Korea

Abstract

This study was conducted to compare in vitro rumen fermentation characteristics among different originated corn grains. Three Holstein steers, each surgically fitted with a ruminal cannula were used. For 48-h in vitro rumen fermentation was measured in a completely random design and incorporated a control (no corn) and each 3.0-g of different originated corns, American, Brazilian, Argentine and Ukarine A and Ukraine B, respectively. Ruminal pH, ammonia-N, volatile fatty acid (VFA) and total gas production were measured at 0, 1, 3, 6, 12, 24 and 48-h post-incubation, respectively. Ruminal pH patterns were different among the treated groups. Similar patterns of ammonia-N appeared till 6-h post-incubation. Higher concentration of that for control than the corn treated groups appeared after 12-h post-incubation despite that for all groups increased. Total VFA was similar between the groups till 6-h post-incubation, but that after 12-h post-incubation was rather different ($P<0.05$). The pattern of total gas production was similar with the VFA patterns. The gas production for the corn treated groups was higher than control except for America after 12-h post-incubation ($P<0.05$). Overall, present results showed that the different originated corns may have different feeding values to ruminants despite similar chemical composition.

Key words: Corn, Ruminal Fermentation, Holstein Steers

Contribution of Improved Cook Stoves (ICS) in Reducing Dependency of Fringe Village Communities on two Tiger Conservation Landscapes (TCL) in India

Indu Kumari[1], Sanatan Deka[1] and Anil Kumar Nair[1]

[1]Wildlife Trust of India, F-13, Sector-8, Noida 201301, India

Abstract

The Manas National Park in Assam, India, a Tiger Conservation Landscape (TCL) - Class I, and the Nagzira-Navegaon National Park including the tiger corridor in Maharashtra, India, a TCL Class IV, (Sanderson et al. 2006) are known for the unique flora and fauna. Despite their importance, these landscapes are under immense anthropogenic pressure. Fuelwood is one of the essential resources extracted from the forest for sustenance and livelihood. This paper presents status of the dependence of the local communities on these two landscapes for fuelwood and the effectiveness of the Improved Cook Stoves (ICS) installed by Wildlife Trust of India (WTI) in these areas.

The study by WTI of 89 village community inhabiting Nagzira – Navegaon tiger corridor showed that an overwhelming majority (92%) of the households were dependent on the forests for firewood extraction (WTI 2006) while 93.46% households of the 142 fringe villages in Manas Landscape were dependent on fuelwood (WTI 2015). This was very high against the all India level of 67.3% firewood usage in rural households (NSS 2011-12). The results in Nagzira-Navegaon landscape indicated a daily fuelwood consumption of 8.9 kgs per household, using Traditional Cook Stoves which averaged to 12.625 kgs in Manas landscape. This totaled to an annual fuelwood requirement ranging of 35100 tonnes for 89 villages and 62,000 tonnes for 142 villages i.e. approx. 178,016 tonnes of CO_2 equivalent per year.

During the last decade WTI, installed 3589 Improved Cook Stoves (ICS) in 83 villages to reduce the amount of fuelwood consumption in these landscapes. These ICS were successful and accepted by villagers for lesser fuel wood consumption, for better health (smokeless) and for faster cooking. The ICS reduced the per household fuelwood consumption by approx. 33% to 40% resulting in saving of 38264 metric tons of fuelwood in Nagzira-Navegaon Landscape and 3500 tonnes in Manas Landscape.

Keywords: Community, Tiger Conservation Landscape (TCL), Traditional Cook Stoves (TCS), Improved Cook Stoves (ICS), Fuelwood, Energy, Forest dependence

Contribution of Improved Cook Stoves (ICS) in Reducing Dependency of Fringe Village Communities on two Tiger Conservation Landscapes (TCL) in India

Introduction

In developing countries, especially in rural areas, 2.5 billion people rely on biomass, such as fuelwood, charcoal, coke and animal dung to meet their energy needs for cooking. In many countries, these resources account for over 90% of household energy consumption **(World Energy Outlook, 2006).** Unlike many other commodities, fuelwood is generally bound to local production and consumption centers and are largely not monetized. Production and consumption characteristics of fuelwoods vary widely according to region or area, but a common and special characteristic is that many consumers are also producers of fuelwood, i.e. farmers and villagers **(FAO, 1997).**

Fuelwood has remained the principal component of rural domestic energy in India. Most of the fuelwood has been reported to be derived from forests with some from trees growing in homesteads, farmlands and common lands outside forests **(Pandey, 2002).** Rural and urban households differ substantially in their levels and pattern of energy consumption. During the last twenty years, the percentage of population using LPG increased from 47% to 65% in urban areas. However, in rural households, the uptake of LPG was much slower and even in 2011, only 11.4% of the rural population used this fuel. Fuelwood was the primary cooking fuel for 75.9% of rural households in 2009-10 in India. In rural areas 83% of households depended on traditional cooking fuels such as firewood, coal, coke and dung cakes. The use of LPG in the households in India had slightly gone up by 11% compared 2001 to 2011 census. However, the use of fuel wood for cooking in the households went down only by 3.5%. In rural India, the scenario of using fuel wood went down slightly by 1.6% **(Census India, 2011).**

Per capita consumption of fuelwood is a dynamic entity and varies in time and space. The factors strongly influencing these variables are income level of the household, availability of clean and convenient form of commercial energy (LPG, kerosene and electricity), use of fuel efficient cooking / heating equipment availability of fuelwood from the forest or other wooded resources, relative price of fuelwood vis-à-vis other energy form, interfuel substitution and climate **(Pandey 2002).**

Anthropogenic pressure, loss of habitat along with poaching of tigers and their prey have caused extensive range contraction of tiger populations globally; restricting them to 13 countries, occupying less than 7 percent of their global historical range **(Sanderson et al. 2006).** Tigers once occupied over 90 percent of the Indian subcontinent but within the last century their range has been estimated to have reduced by nearly 76% **(Karanth et al. 2009).** India still holds about 70% of the global tiger population, with the potential tiger habitats in India is estimated to be about 100,000 km^2 **(Jhala et al. 2008). Sanderson et al. (2006)** delineated three types of ‘‘tiger landscapes’’ in both protected and unprotected lands: ‘‘tiger conservation landscapes’’ (tigers present), ‘‘restoration landscapes’’ (tigers absent, but good quality habitat), and ‘‘survey landscapes’’ (tiger status unknown). The present paper focuses on fuelwood dependency of villages around two Tiger Conservation Landscapes (TCLs) in India.

Project Location:

a. **Nagzira-Navegaon TCL:** The tiger landscape in Maharashtra consists of six Tiger Reserves within the patchily distributed 50,650 km2 of forested area **(State of Forest Report 2009)** of the state. Five of these Tiger Reserves in Eastern Maharashtra along with their forested interconnectivity is recognized as the Vidharba Tiger Conservation Landscape (TCL) by the

State Forest Department. This landscape incorporates, three Class I TCLs; and one Class II TCL. The Nagzira - Navegaon National Park along with the Nagzira-Navegaon corridor (approx. 850 km sq) joins the two Global priority landscapes i.e. the Kanha and the Tadoba landscapes. This corridor including the two PAs falls under the Tiger Conservation Landscape – Class IV and in terms of priority and is listed as an area with insufficient information **(Sanderson et al. 2006)**. Despite its importance, the Nagzira-Navegaon corridor is under immense anthropogenic pressure. The approximately 280 km^2 corridor is also inhabited by about 90,000 people residing in 89 villages **(Census figures, Government of India, 2001).**

- **Manas Tiger Reserve TCL:** The declaration of Manas as Tiger Reserve in the year 1973 covering a total geographical area of 2837.10 sq km followed by its designation as a World Heritage Site (natural) in the year 1985 by UNESCO. In the year 1989, it was declared UNESCO-MAB Biosphere Reserve covering the entire landscape. In the year 1990, the core area of the Manas Tiger Reserve covering 500 sq km was declared National Park. The Manas National Park, a TCL I, harbours atleast 61 species of mammals, 450 species of birds, 42 species of reptiles, 9 species of amphibians, 79 species of fishes and more than 200 species of butterfly and over 100 species of invertebrates **(Tiger Conservation Plan 2014-2020).** The social landscape of Manas TR, with 142 villages, also presents great ethnic variety. People of various ethnic groups belonging to Bodo (majority), Rabha, Garo, Santal, Urao, Koch Rajbangshi, Bengali, Nepali, Muslims and Assamese inhabit the landscape **(Bordoloi et.al 1987).**

Anthropogenic Pressure on Forests

From food to shelter, health to livelihood, the forest is associated and deeply rooted to the habits and social practice of the local communities inhabiting forests, largely influenced by their traditional faith, customs, culture and religious beliefs. But with increase in population and other developmental needs the anthropogenic pressure is negatively affecting these wildlife habitats.

a. **NN Corridor:** Wildlife Trust of India (WTI) conducted a survey of the 89 villages in Nagazira-Navegaon in 2006 which showed villages, dependence on fodder (79%), firewood (92%) and timber requirements (50%) on the forests. Despite this human use, distribution of tiger prey (all species) was extensive and that 92% of the compartments possessed some form of prey evidence. Thus, to maintain connectivity of tiger habitats, it was imperative to reduce this pressure on the connecting areas. As a first step, 54 of all 89 villages situated in the corridor area, were first classified into threat categories of Priority I, II and III; having 16, 13 and 25 villages respectively, based upon the spatial location/proximity in corridor area, extent of animal usage of area around villages, population of villages, nature of primary subsistence occupation of village households, and the extent of dependence of village households on adjoining forest patches (remaining 31 villages were below priority III). WTI's assessment in 2011 was that every household in the 54 villages within the corridor collected fuelwood from the nearby forest. The 100% use of fuelwood for cooking, in priority villages, was significantly higher than the reported national average of 64%. Due to easy availability of fuelwood other sources of biomass like dung cakes and crop straw were not used for cooking. Kerosene purchased from the public distribution system was used only for lighting purposes. As a result of this assessment ICS training and installation

activity was initiated. The objective of the initiative was to reduce the dependence of the project beneficiaries on fuelwood for cooking by minimum 30%.

b. **Manas landscape:** A study by WTI in 2008 revealed that people extracted several types of resources from the forest of which firewood was the major resource (98.84%) followed by timber (85.36%), bamboo (63.78%), grasses (52.22%), cane (1.93%) and medicinal plants (0.77%). Clearly people's reliance on forests was very high and forest plays a significant role to sustain the livelihood of the people of the BTC area **(Menon et.al 2008).** Collection of fuelwood for household use, commercial purpose was one of the major threats to the Manas landscape.

In 2015, WTI identified 142 villages inhabiting a radius of three kms from the forest boundary of Greater Manas landscape and divided it into 21 clusters. These villages were situated from alongside the Pota River to the east boundary of Manas National Park, Baksa district, to the Sankosh River on the west boundary, Kokrajhar district, bordering West Bengal. There were a total 13741 households having a total population of 63640 (average family size 4.63). A total of 3650 households (26.56%) from 142 villages were covered in general during the primary data collection process. Access to LPG among the villagers in the landscape was found to be 6.54 percent compared to the national average 11.4 percent in the rural areas **(Census India, 2011).** Again, 150 household were randomly selected from among 9 villages and daily consumption and cooking tasks pattern were studied for a week to collect the per capita fuelwood consumption in traditional cook stoves. The local markets close to the community where the fuel wood was sold were also surveyed to see the demand of fuelwood for cooking.

Table 1: Consumption of fuelwood in the two landscapes before WTI's intervention

Landscape	**Greater Manas**	**Nagzira Navegaon Corridor**
Villages	142	89
Total Household	13741	18500
Fuelwood Dependent Household	12842 (93.46%)	10720 (92%)
Average per day consumption	12.625 kgs	8.97 kgs
Total consumption per day	162,134.5	96,164
Per year fuelwood consumption (approx. in tons)	62,000	35,100
CO2 equivalent per year (calculation ref. NCASI 2005)	Approx 113667 tonnes of CO2	Approx 64,349 tonnes of CO2

If the annual per household fuelwood consumption was converted in terms of money was roughly Rs. 16362 (the price of fuelwood was Rs.3 per kg in the local market), which was quite high compared LPG. However, since the households in these villages had low income, were close to forest, had easy access to forest resources, and got fuelwood free of cost throughout the year from there; the preference of fuelwood was justified.

Project Intervention for Reducing dependence on fuelwood:

a. **Alternative technology:** WTI addressed the issue by replacement of Traditional Cook Stoves (TCS) with Improved Cook Stoves (ICS) with technical support from ARTI, Pune and Assam Energy Development Agency (AEDA). The major technological difference between traditional and improved cook stove was that; in Improved Cook Stove, a channel was made below the fire box with a cast iron grate on top, this helped in passage of air below the fire box

resulting in proper combustion and the ash formed fell down through the grate, while traditional stoves were placed on the plane surface of the floor due to this complete combustion of wood did not take place and it produced more smoke which spread inside the household. A blow pipe also needed to be used regularly for blowing air in the fire box to keep the wood burning in TCS.

In Nagzira-Navegaon Landscape, WTI piloted the Improved Cook Stove's (ICS) household model at a village on pilot basis in 2011 in Central India with support from JTEF Japan Tiger and Elephant Fund), Ecosystem Alliance and IFAW (International Fund for Animal Welfare).. This was very successful and accepted by villagers' due to less fuel wood consumption, health benefits and faster cooking. Based on the acceptance and success of the improved cook stove model installed previously in priority villages of the corridor in 2011 the installation of improved cook stoves was extended to 23 new villages by 2015 with 1451 ICS, after receiving the consent of individual households.

In Manas Landscape, Wildlife Trust of India-International Fund for Animal Welfare (WTI-IFAW) piloted 183 Improved Cook Stoves among the high forest dependent households. There was mix response from the villagers in the beginning so in the year 2013, 407 Improved Cook Stoves were installed to cover more households. Thus, at the end of March, 2016 a total of 2138 Improved Cook Stoves were installed in 60 villages to see the effectiveness, acceptance and the desired result in reducing the consumption of fuelwood among the intervened households.

b. **Capacity Building of stakeholders for construction of improved cook stoves:** Besides installation of improved cook stoves in villages, 186 members of the village Self Help Groups (SHGs) in NN Corridor and 22 members in Manas Landscape were trained in construction of these cook stoves for replacement and as trained resource persons for expansion into other villages, helping also to serve as an additional earning for women involved. Each trained villages were provided one mould for construction of Improved Cook Stoves.

c. **Use of other energy devices:** Use of LPG was prevalent in some villages and households. The local forest department and the Ujjwala Scheme by Govt. of India was providing LPG connections on subsidy in villages with preference to BPL families. Those who were economically well off bought their own connections. The projects started linking the community with the schemes but the LPG was used sparingly in households, mainly when there was a sudden need of a stove (guest to a house). It appeared that since firewood was available free of costs, people wanted to save on the LPG refills.

Impact Evaluation:

a. **Methodology in NN Corridor:** Post survey for fuelwood consumption and use of traditional and improved cook stoves was carried out after establishing a benchmark on the use of fuelwood in traditional cook stoves. Two select user groups (family of 1-5 members) and (family 6-10 or more members) were monitored. The monitoring was done for a sample of 30% of total households a period of 10 - 15 days (extrapolated to 30 days, to know the monthly consumption). Using a spring balance of 50 kg capacity each days fuel consumed was weighed by handing out a quantity of fire wood to the household and weighing the remains from the lot provided 24 hours later. This measure was continued for 15 days. The average fire wood consumed was then compared with consumption of firewood using a normal stove where consumption had been measured likewise. Along with weight,

information on number of members present, food items made and any other use were also noted for the same day.

A questionnaire was prepared on number of traditional and improved cook stoves in each household, frequency of fuelwood collected, distance travelled for collection, extent of availability of the buffer stock created, utilization of time saved from fuelwood collection and availability and use of other energy sources. The survey was done in the month of June by visiting households during morning hours before they left for employment work.

b. **Manas Material and methods:** A survey was conducted covering 1520 households (71%) out of 2138 improved cook stoves installed during the period from 2012 to 2015. The study also included the no of improved cook stoves in use, not in use, purchase of LPG connection after installation of improved cook stoves and the improvement of kitchen of the intervened households. An efficiency test was also carried out among 46 households to find out the efficiency of improved cook stoves in comparison to traditional cook stoves

Result and Discussions:

a. **Fuelwood consumption monitoring:** In Nagzira Navegaon Corridor the pre-project survey showed an average daily fuelwood consumption in traditional cook stoves to be around 8.97 kgs per household and comparative study after installation of improved cook stoves was done in the beneficiary villages which showed saving of 42% fuelwood. This summed up to per annum fuelwood consumption of 66144.65 metric tonnes in Traditional Cook Stove and 38264.61 metric tonnes in Improved Cook Stoves in 23 villages. The efficiency of the ICS was around 28.

In Manas Landscape, the fuelwood consumption of traditional cook stove was calculated among 150 households continuously for one week before installation of ICS which showed an average daily fuelwood consumption of 13.50 kg. After installation of the ICS, the fuelwood consumption was calculated among the same households and it was found the fuelwood consumption reduced to 9 kg i.e. by 33%. Also, an efficiency study of the improved cook stoves was carried out among 46 households. The average efficiency was found 28.81 in Improved Cook Stoves compared to 13 in Traditional Cook Stoves. This contributed to annual saving of 3500 ton of fuelwood assuming the functioning of 2138 Improved Cook Stoves.

b. Cook Stoves in each Household: In Nagzira-Navegaon Landscape, 44% of the surveyed households had two, 42% had one while 3% did not have Traditional Cook Stoves. The number of improved cook stoves had remained the same as provided by WTI. The traditional cook stoves were used for heating water during rainy and winter season; for cooking food outside during summers or during sowing period, when they had to cook food for agriculture labor and additional family members.

In Manas landscape, the surveyed 150 households, had one to three Traditional Cook Stoves used for various purposes. 15.33% had one traditional cook stoves and the rest 84.67% had two. It was also observed that most of the households, especially among the Bodo and tribal community there was large Traditional Cook Stoves outside the main kitchen, mostly used for preparation of country

liquor. The Traditional Cook Stoves were also used for heating purpose during winter and smoking of fish, meat, betelnut, maize etc for preservation. Therefore, smoke was a part of culture among rural households in this landscape.

c. **Frequency of Fuelwood collection:** In the Nagzira Landscape there was a decline in frequency of fuelwood collection while using improved cook stoves. The number of one time collectors increased from 38% to 49.7% and decline of twice a day collections from 39.6% to 35.3%. There was a 50% decline in those who collected thrice from 14.4% to 6.6% whiles the frequency of collection higher then these remained approx. 2%. A few collected (1%) yearly from felling of plantations of Forest Development Corporation (FDCM) and had their own tractors for transportation.

   In Manas Landscape the frequency of visits reduced. But the collection continued to be done mainly by hand cart due to livelihood needs. This issue was being addressed by providing skill development training to the beneficiaries for Alternate Livelihood.

d. **Availability of Fuelwood stock:** In the Nagzira Landscape every households kept a buffer stock of fuelwood in their house which was used during the rainy season, agriculture harvesting and during the collection of NTFPs in summers. In traditional cook stove their stocks lasted for 3 – 4 months while using the improved cook stove the same stock lasted for more than 4 months (evident in increase from 8.2% to 52.2%).

   In Manas Landscape every household kept a buffer stock of fuelwood in their house which was used during the monsoon. In Manas landscape, monsoon was also the busiest period for the people engaged in paddy and jute cultivation. The pressure of collection of fuelwood was found high from November to March every year. However, this was not relevant to those households whose primary livelihood was collection of fuelwood for sale in the market. They used to collect fuelwood throughout the year and therefore, did not worry for the stock.

e. Utilization of saved time: In Nagzira Landscape majority of the beneficiaries spent the spare time in daily household works (70.8%), followed by household plus agriculture work (17.7%). Devotion of time to children was 2 % while it was 2.9% for additional income purposes.

f. **Other Energy Resources:** In Nagzira Landscape Liquefied Petroleum Gas (LPG) was being provided at 40% subsidy by the state forest department in the corridor villages under the *Shyama Prasad Mukherjee* scheme. But since but since Scheduled Tribe and Scheduled Caste Communities were given priority its reach was limited. Accessibility of refill was also another issue. 21.9% of the surveyed households had LPG connections, of which majority (89.6%) had been provided by the government scheme while 10.4% were self-financed. Majority of LPG users 60.4% refilled their cylinders in three months, 31.3% refill in every two months.

   In Manas Landscape the access to LPG was limited to only 6.54% much below the national average 11.4% in rural areas. The biogas plants were found not in use. The use of kerosene for cooking of food was also not recorded during the study.

g. **Tree species preference for fuelwood:** The preference of the species for use of fuelwood varied from place to place within the landscape based on the availability of the species in their area. Usually, the collectors preferred those species which were easy to collect, highly flammable and had demand in the local market.

   24 tree species were collected as fuelwood by women from the Nagzira-Navegaon corridor. The most preferred species were Garadi (*Cleistanthus collinus*)38.3% followed by Yen/Saja (*Terminalia elliptica*) 29.4%, Dhavada (*Anogeissus latifolia)* 13.7% and Aanwala (*Phyllanthus officinalis*) 4.3%.

   In Manas Landscape some of the preferred species were Sal (*Shorearobusta.),* Sidha (*Lagerstroemia parviflora.*), Simalo (*Bombaxceiba*), Iron red wood *(Cedrela febrifuga),* Oxi *(Dillenia pentagyna),* Larobandha *(Pterospermum acerifoium)* and Bhelkor (*Tetramelesnudiflora*).

h. **Sale of Fuelwood:** In Nagzira-Navegaon study our study assumed that the fuelwood saved by using improved cook stoves would have been sold in market for additional incomes but, all the surveyed households denied selling fuelwood in market.

   In Manas landscape, a market survey was also carried out for understanding the demand of fuelwood for sale covering 20 markets in three districts viz- Kokrajhar, Chirang and Baksa. The survey was done in the markets situated in the rural areas near the forest boundary, in the semi-urban and in urban areas at 20 kms from the forest boundary. The daily number of people coming with fuelwood for sale in the local markets was quite high, standing at 43, including both non-market and weekly market days.

i. **Health Benefits:** On the question of any noted health benefit from Improved Cook Stoves all of them unanimously said they felt relief from eye irritation as there was very less or no need to use a blow pipe to keep the fuelwood burning hence less smoke, lesser heat stroke from the cook stove during summers when cooking inside and a few said now they didn't have headaches as there was very less smoke inside their cooking area.

Challenges and Opportunities

It was observed that improved cook stoves were a boon for households who were dependent on labor work for livelihood, as they must go for work early morning they couldn't devote more time in gathering fire wood for daily use. Although majority of women accepted that Improved Cook Stoves were effective and helpful, initially they were still tempted to use the Traditional Cook Stoves due to the following reasons:

a. **Perceptions**

   i. Belief that use of thick and more firewood cooked food faster than the ICS required thinner wood so they had to cut the larger firewood to fit in the fire box and people didn't want to devote time for this too.

   ii. Fear that edge above the firebox in Improved Cook Stove might crack with use as in Traditional Cook Stove the firebox was open.

   iii. Women believed that it was their responsibility to bring firewood each day from the forests and due to less visits to the forest they might be considered lazy.

b. **Efficiency:** Due to high efficiency of ICS, women had to be present while cooking else the food burnt and while cooking in Traditional Cook Stove, women could do other work.

Thus, although there was acceptance of the ICS by women for its benefits but change in mindset towards regular use of the Improved Cook Stoves was inculcated through regular monitoring of the use and incentivizing those who used it regularly. Free availability of firewood and unrestricted collection was another barrier in shifting the use towards ICS. A little more restriction by the forest department in collection of firewood quantity would strengthen the use of the ICS.

Recommendation and conclusion

Since the two project landscapes were different geographically and socially, there was difference in consumption of fuelwood, its usage and in acceptability of the ICS. While the usage of Improved Cook Stoves in Nagzira-Navegaon Landscape was almost 100%, the acceptance of ICS in Manas Landscape was 70%.

In Nagzira-Navegaon Lanscape, the Improved Cook Stoves effectively reduced the extraction pressure of fuelwood from the forest areas. Now, there was a need to reduce the usage of additional Traditional Cook Stoves in households. Regular interaction and live demonstrations along with awareness and training programmes on using Improved Cook Stoves would have to be initiated to achieve it. Similarly, low cost technological intervention for TCS used for heating water could be provided to reduce the fuelwood extraction pressure further.

In Manas Landscape, since the attachment to forest and wildlife of the fringe villagers was deeply rooted to their habit, culture and livelihoods, it was a serious concern for the project to address the issue of the communities dependence on forest resources. This small intervention of ICS brought a major change in consumption and gave women relief from unbearable smoke. Though the initiative of WTI was nominal compared to the desired result to make an impact and bring visible change among the targeted community. Therefore, the Bodoland Territorial Council (BTC), Assam could replicate the successful ICS model to sizeable households with technical guidance from reputed technical institute.

The reason behind the low access to LPG among the fringe villagers in both the landscapes was that the villagers especially the poor families found it difficult to pay about Rs.6000 (Rupees six thousand) for the new LPG connection. The government schemes could solve the problem by free or subsidized LPG connection and by provision for refilling for few years to the poor families. This would not only help in improving the general health and hygiene but also reduce going inside the forest for collection of fuelwood.

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Democratic Governance and Conflict Resolution for Rural Development

Enojo Kennie Enojo Ph.D
Department of Political Science, Faculty of Social Sciences
Kogi State University Anyigba, Nigeria

Abstract

The paper is based on the premise that politics, economics and society cannot be divorced from one another and that to do so is artificial, misleading and preposterous thesis. Consequently, countries are categorized according to the structure of government, the relationship between government and the people, the role of the media, prevailing political ideologies, popular ideas about the role of the state in the economy, relative levels of stability and political legitimacy, records of human rights and the channels available for representation and participation. For instance, we have noticed that government in the United States has more legitimacy (public acceptance) than government in Nigeria, which has yet to develop roots or to earn the widespread respect of its people. The broad aim of the paper is to investigate and analyze the organic linkage between democratic governance and rural development in Kogi State. Some of the findings includes weak institutions, corruption, poverty, insecurity, unemployment, ethno-religious conflict, political violence, lack of internal democracy, intra- and inter political party crisis. There is therefore a synergy between good media reportage and deepening democratic space or platform. The theories adopted are the structural-functional approach and the relative deprivation, frustration and aggression. Deriving from the above, we recommend the following that governments at all levels should take the issue of human capacity development, vocational and qualitative education, science and technology seriously. The political class and electorate should be ideologically rooted, and emphasis should be on due process, justice and equality.
KEYWORDS: Governance, rural development, the state, economy, and pork barrel politics

Determinants of Farmers Choice of Improved Maize Seed Variety and Supplier in Rural Blantyre, Malawi

[1]Chrispin Namwera, Program Manager, Cotton Platform, African Institutive of Corporate Citizenship, Private Bag 382, Lilongwe 3, Malawi

Abstract
This paper investigates determinants of choice of improved maize variety and identifies factors influencing household preference for a seed supplier in Lilangwe Agriculture Extension Planning Area in Blantyre district, Southern Malawi. The analysis was done based on data collected from 1500 randomly and purposively selected maize growing household heads. A Multinomial Logit model and Garrett Ranking technique were used in the analysis. Improved maize adoption was found to be significantly influenced by price of maize seed, farm size, and access to credit, education, and anticipation to receive subsidized fertiliser and age. Extension was found to negatively affect adoption choices of improved maize seed varieties. In addition, the Garett rank technique identified easy availability of seed; brand image of the company; high yield and; better quality of the seed as factors influencing households to prefer a particular seed supplier. The study shows that adoption of improved maize seed varieties goes beyond extension services which is was not a priori expectation.
Key Words: **Farm Input Subsidy Program** **Farmer Preference** **Seed** **Buyer Behaviour**

Introduction

Malawi government has been implementing the Farm Input Subsidy Program (FISP) since 2005/06 and continues to receive full support from the government despite recent withdraw of donor aid. The program aims at increasing productivity and food security at different levels by increasing access to improved seed and fertiliser. The program has been lauded particularly for its success in raising maize yields and bringing about food security in Malawi (Holden and Lunduka, 2010; Shively and Ricker-Gilbert, 2013; Chirwa and Dorward, 2013, Dorward *et al*, 2013).

National level impacts of the program include improved economic growth, with agricultural and national GDP purportedly expanding by more than seven percent per annum in real terms during 2004–2010 (NSO, 2011). Despite the success, the program continues to stir technocratic debate in various amongst development practitioners with respect to its efficiency issues. Proponents of the program argue that FISP is marred by corruption, fraud, late distribution and access of inputs and high administration cost among others.

While the program structure has evolved over time, each beneficiary receives a set of four coupons which enables them to buy a pack of 2Kg of any legume seed, 5 Kg of improved hybrid maize seed (or 8 Kg of open pollinated varieties) and two 50 kg bags of basal and top dressing fertilisers for maize, respectively. Farmers' access seed through a network of agro dealers whom seed companies subcontract while fertiliser is retailed through government enterprises and private agro dealers. Continued emphasis on maize in agricultural technology development, extension and marketing policies has limited opportunities for farmers to grow other higher value crops. The main option for farmers to sustain and expand income is therefore to increase yields of crops that they already grow. The use of improved seed has the potential to increase yields and contribute to household food security, but its contribution is limited for most farm households as they have limited access to improved seed.

Seed system in Malawi may be broadly categorized into formal and informal where the former implies use of seed from previous growing season by beneficiaries either through own production or exchange while the latter category is characterized by the presence of both national and multinational seed companies. Local seed companies are mainly involved in direct seed multiplication while multinational seed companies- Monsanto, SeedCo and Pannar- apart from seed multiplication (through contract farming with smallholder farmers) also engages in varietal development and breeding, seed testing and evaluation, in collaboration with Department of Agricultural Research Services which is responsible for quality control and certification.

Objectives of the study

1. Examine the determinants of farmers' choice of improved maize seed variety
2. Identify factors influencing farmers preference of maize seed supplier

Practical Utility of the Study

Several studies have investigated household and national level impacts of FISP in Malawi. Studies conducted on FISP include whether subsidies crowd out use of organic manure in Malawi (Holden and Lunduka, 2012), performance of private sector in FISP in Malawi (Chirwa and Dorward, 2012) and measuring FISP farm level impacts (Shively and Ricker-Gilbert; Chibwana *et* Fischer, 2011). Many of these studies have employed econometric approaches in measuring the impact of FISP with little focus on structural approaches such as farmer behaviour which if studied in detail can provide some meaningful insights on FISP. This study helped to understand purchasing motives of farmers.

Literature Review

Maize seed purchase choices are influenced by a number of factors such as government policies, infrastructure, prices of substitutes, farmers' socioeconomic circumstances as well as farmers' anticipation of free seed. Aidoo et al (2014) identified farm size, education level, extension contact and access to credit as the main factors that significantly influenced use of certified maize seed by farmers in Ejura-Sekyedumasi Municipal Area in Ghana.

Beshir and Wegary (2014) identified age, years of formal education, farmland size, proportion of farmland allocated to maize, frequency of extension visit, grain market distance and altitude as factors affecting adoption of hybrid maize seed while (Temesegen *et al*. 2008; Di Falco *et al.* 2011) identified access to information, households financial capacity, education, age, marital status, gender , farm characteristics, access to extension, credit, and input and output markets as factors that affect the decision of farm households to choose among crop adaptation strategies.

Extension services are very critical in adoption of any technology and the rate at which innovations are used by farmers largely depend on sensitisation, mentoring and demonstration by extension agents (Lawal & Oluloye, 2008). When farmers adopt a technology, they are essentially buying it after undergoing an evaluation process. Another important factor influencing adoption of a technology is the behaviour of neighbouring farmers or by agro-ecological characteristics (Langyintuo and Mekuria, 2008; Holloway, Lapar and Lucila, 2007). The prior expectation is that wealth will positively influence farmers' adoption decision because access to more resources increase farmers risk bearing ability (Morris *et al*., 1999). Another farmer characteristic not frequently mentioned in literature on adoption but could have an effect on adoption of agricultural technology is the age of the farmer. Adesina and Baidu-Forson (1995) argues that older farmers may be experienced in crop production and more exposed to the potentials in modern technology than younger generation but may be more risk averse than younger farmers hence having a lesser likelihood of adopting improved technology.

Armstrong (1991) observed that consumer behaviour is difficult to predict and the study of customer behaviour is premised on consumer buying behaviour where the customer plays the role of user, payer and buyer. Often times consumers rate products according to the 'real' product and extended product as opposed to their core attributes (Foret & Procházka, 2007). When purchasing decision is considered very risky, buyers may attempt to reduce the risk by either splitting orders between several alternative suppliers or purchase from well-known suppliers with whom they have dealt in the past (Shapiro and Bonoma 1984). Kool (1994) observes that farmers usually simplify the purchasing task and reduce perceived risk by purchasing inputs successively from the same supplier(s). Such a purchasing strategy may be pursued for a number of reasons including; (i) limited time to make purchasing decision and ii) the convenience of having a reliable supplier in mind from where to purchase. It is very unlikely for farmers to evaluate alternative suppliers whenever they want to purchase a commodity perceived to be important such as seed. Purchase decisions are further complicated by information (Bunn, 1993) which leads to uncertainty and eventual increase in perceived risk. Farmers may reduce risk by either gathering more information about the product (McQuiston, 1989) or purchase from well-known and preferred suppliers (Anderson, Chu and Weitz 1987). However, a farmer's decision to buy seed may also be expressed in rational economic terms such as value-for-money (Kool, Meulenberg and de Broens 1997) or value-in-use (Hutt and Speh 1995). Seed which is pathogen free will cost more to produce

and therefore it will cost more to purchase (Monares 1981). Suppliers should provide the quality specified, deliver on time, at an acceptable price and react to unforeseen needs. Suppliers ought to develop strategies and attempt to find new ways of developing products and services which will allow customers to perform their operations more economically (Leenders and Fearon, 1993)

METHODOLOGY

Data Collection and Study Area

The data were collected using both structured and semi questionnaires administered to both FISP and non FISP beneficiaries in Lilangwe Extension Planning Area in Blantyre District, Southern Malawi. The data were collected in November 2014/15 agriculture season. A combination of purposive and simple random sampling techniques was used to select 1500 farm households. The study used a mixed methods approach found in many research designs to address the objectives. Data collected included socio-economic characteristics of farmers, production patterns and input use, farmers that had used improved maize varieties and associated technologies and the reasons for preference of seed supplier in the cropping season under review.

Determinants of Farmers Choice of Improved Maize Seed

Multinomial logistic regression was used to model the adoption options of improved maize seed and the parameters were estimated using maximum likelihood method.

Econometric Model Specification

The study framed the estimation determinants within the general theory of utility maximization. The economic model of utility maximization theory is premised on the assumption that adoption of a technology depends on the expected benefit (Norris and Batie, 1987). Economically, an individual j makes a decision to adopt if the utility associated with that adoption choice (V_{1j}) is higher than the utility associated with the decision not to adopt (alternative choice), (V_{0j}). Following Koop (2003), the difference in utility of the two choices is stated as $y_j^* = V_{1j} - V_{0j}$ and the econometric specification of the model is given in its crude form as:

$$y_j^* = X_j\beta + \varepsilon_j \quad (1)$$

Where y_j^* is an unobserved (latent) random variable that defines farmer's binary (adoption) choices, X_j are sets of explanatory variables associated with individual j, β is a vector of coefficients associated with the explanatory variables while ε_j represents the random error term defined as: $\varepsilon_j \sim N(0, 1)$. The relationship between the unobserved variable y_j^* and the observed outcome (y_j) can be specified as:

$$y_j = 1 \quad if \quad y_j^* \geq 0$$
$$y_j = 0 \quad if \quad y_j^* < 0$$

Description of the dependent and independent variables employed for analysis in this study were based on the ones used by Temesegen *et al*. (2008) and Di Falco *et al. (*2011) as shown in Table 1.

Table 1: Description of Variables used in the Models.

Variable		Unit	Variable Description	Expected Sign
Y	Adoption	Dummy	D=1 if farmer adopts; 0 Otherwise	
X_1	Price of seed	MK/Kg	Price of maize seed	-
X_2	Household sex	Dummy	D=1 if Household head is male; 0 Otherwise	+/-
X_3	Education	Years	Level of education of household head	+
X_4	Farm size	Hectare	Size of farm of Household head	+
X_5	Farmer group	Dummy	D= 1 if belong to farmer group; 0 otherwise	+
X_6	Fertiliser	Dummy	D=1 if used fertiliser; 0= Otherwise	+
X_7	Extension	Dummy	D=1 if Access extension visit; 0 Otherwise	+
X_8	Access to Credit	Dummy	D=1 if access to credit; 0=Otherwise	+
X_9	Distance	Kilometer	Distance to nearest agro dealer	-
X_{10}	Age	Years	Age of Household head	+/-

Consumer Behaviour Conceptual Framework

The famous black box model depicts the interaction among stimuli, consumer characteristics, decision processes and consumer responses. The stimuli can be between interpersonal stimuli or intrapersonal stimuli.

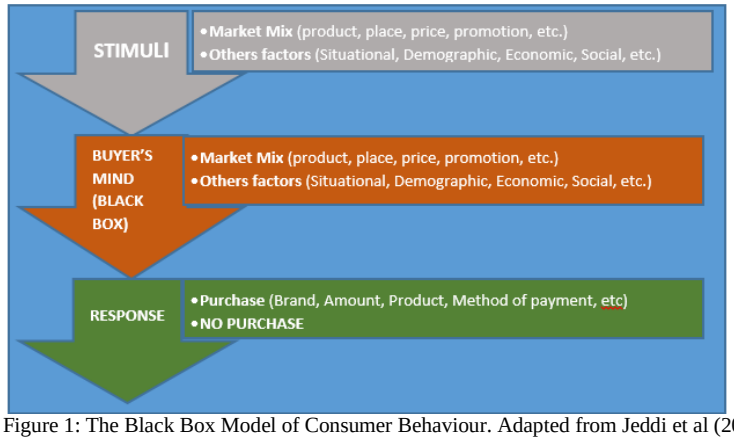

Figure 1: The Black Box Model of Consumer Behaviour. Adapted from Jeddi et al (2013)

The black box model is related to the black box theory of behaviourism, where the focus is not on the processes inside a consumer but the relationship between the stimuli and consumer responses. Marketing stimuli are planned and produced by firms, whereas the environmental stimulus is generated by social factors, based on the economic, political and cultural circumstances of a society. The buyer's black box contains the buyer's characteristics and decision processes which determine buyer's response. In the above model, marketing and other stimuli enter the customer's black box and produce certain responses. The aim of marketing management is to discover what happens in the mind of the customer which is like a black box. The buyer's characteristics influence how they perceive the stimuli and the decision making process that determines what buying behaviour is undertaken. The first step in understanding buyer behaviour is to focus on the factors that determine the buyer's characteristics in the black box. In this study, the black box model was applied to provide insight in identifying factors that might influence farmers in preferring a particular seed supplier. Ten factors were identified that influence farmers' preference in the selection of

seed supplier for the purposes of this study. The factors are presented in Table 5. Respondents were asked to rank the factors influencing the selection of seed supplier according to their choice. The preferences were analysed using Garrett Ranking Technique.

Garett Ranking Technique

Garret Ranking Technique was used to analyze the factors influencing farmer preference for the particular seed supplier. Garrett's Ranking Technique unlike common psychometric scales considers all elements of a dimension. In the study, all respondents were asked to rank all factors in order of priority and relevance to them then an overall percentage position was calculated using the Garrett Technique as provided in the formula:

$$\text{Percentage Position} = \frac{100(R_{ij} - 0.5)}{N_j}$$

Where R_{ij} = Rank given for ith variable by the jth respondent.

N_j = Number of variables ranked by the jth individual

RESULTS AND DISCUSSION

Determinants of Farmers Choice of Improved Maize Seed Variety

The estimation of the multinomial logit model was done using adoption of improved maize variety (whether open pollinated or hybrid) options as dependent variable and the unimproved varieties as the reference state. Successive growing of improved maize for at least three years by responding households was used as a proxy for improved maize seed adoption. Multinomial logit models lack the ability of giving the magnitude of the generated probability as they only give direction of the independent variables on the dependent. The problem was overcome by calculating the marginal effects which measure the expected change in the probability of a particular choice. The Chi^2 statistics was highly significant ($P<0.00001$) indicating that the model had strong explanatory power. Tables 2 and 3 provides a summary of the findings.

Table 2: Descriptive Statistics

	Mean	Standard Deviation	Percentage
Price of maize seed	3455	351.2	-
Household Sex	-		83.2
Education	8.67	1.23	-
Farm size	0.67	0.21	-
Farmer group	-	-	45
Fertiliser	-	-	57.4
Extension	-	-	68.9
Access to Credit	-	-	26.7
Distance	4.5	1.6	-
Age	38.14	13.54	-

Table 3: Marginal Effects of a Multinomial Logit Model

Variable	Improved Maize Varieties	Unimproved Maize Varieties
Price of Maize Seed	-0.053 (1.20)***	0.144 (2.68)***
Education	0.043 (1.72)*	-0.526 (-2.041)***
Farm Size	0.155 (1.89)*	0.591 (5.23)***
Farmer Group	-0.01 (0.06)	-0.06 (-0.05)
Fertiliser	0.287 (1.93)**	0.16 (1.33)
Extension	-0.327 (-1.48)	0.081 (0.55)
Access to Credit	0.245 (1.91)**	-0.4531 (-2.01)**
Distance	0.242 (1.08)	-0.0556 (-0.39)
Age	0.0532 (1.21)*	-0.6357 (-2.54)**

Figures in parenthesis denote t-statistics. ****, ** and * denote significance at 1%, 5% and 10% levels, respectively.*

Price of maize seed significantly influences the probability of farmers to grow different maize varieties. Increase in maize seed prices increased the probability of growing unimproved varieties which are readily available to farmers from previous growing season and subsequently decreased the probability of growing improved varieties. A unit increase in the price of maize seed resulted in about 14 percent increase in the probability of growing unimproved varieties and 5 percent decrease in probability of growing improved varieties. Since most of the targeted respondents live in rural areas and mainly depend on agriculture for household income, an increase in the price of maize seed makes it unaffordable hence rural farmers are compelled to grow unimproved varieties.

Sex of the household, and degree of commercialization (proportion of marketable maize actually sold on the market) were found to be significant in the initial model diagnostics and were dropped along the way.

Education of household decreased the probability of farmers growing unimproved maize varieties and increased their probability growing improved varieties. A unit increase in schooling (expressed as number of years, where a year represented a single class. Repeats were taken as single class) resulted in about 53 percent decrease in unimproved maize varieties production and a 4 percent change in growing improved varieties.

Another factor that was significant in determining choice of type of maize variety by farmers was **farm size**. A unit increase in farm size increased the probability of growing unimproved maize and improved varieties by 59 and about 16 percent, respectively. This is a prior expectation because when the farmers have larger pieces of land, their focus is usually not on efficiency but effectiveness.

Membership to a farmer group and distance were not significant factors in determining farmer choice of maize seed variety to grow. However, it was found that group membership had a negative effect on the probability of farmer choice on growing maize seed whether improved or otherwise.

Farmer anticipation of accessing fertiliser either under government supported FISP or any other means increased the probability of farmers growing both unimproved and improved maize varieties. However, the significance of this factor was more pronounced in improved maize seed varieties. A unit increase in fertiliser receipts, increased the probability of farmers to grow improved maize varieties by about 29 percent.

Access to credit was another significant factor that influences farmer choice on the type of maize variety to grow. A unit increase in access to credit by farming households increased the probability of growing different maize varieties. A unit increase in credit access decreased the probability of growing unimproved maize variety by 45 percent and increased growing of improved maize varieties by about 25 percent. Despite the important role credit plays in household choice decisions, the study found out that only 26.7 of households had access to credit mainly the village savings and loans scheme. The credit facility to farmers will enable farmers afford certified seeds which are highly productive.

Age of household head which represent farming experience influenced the choice of maize variety to grow in Lilangwe, Blantyre. A unit increase in age of household head decreased the probability of growing unimproved maize varieties but increased the probability of growing improved maize varieties. The study found that when age of household increased by a unit, choice of growing unimproved varieties decreased by about 64 percent and increased the probability of growing improved varieties 5 percent.

Attributes Influencing Farmers' Choice of Improved Maize Seed Supplier

Ten factors were identified for the purposes of studying the factors influencing the preference for a particular maize seed supplier and households were asked to rank the ten factors in order of their preference. The calculated percentage positions for the ranks 1, 2, 3, 4, 5, 6,7,8,9 and 10 and their corresponding Garrett table values are given in Table 4.

Table 4: Percentage Positions and Garett Table values

Rank	Percentage Position		Corresponding Garrett Table Values
1	100(1-0.5)/10	= 5	81
2	100(2-0.5)/10	= 15	70
3	100(3-0.5)/10	= 25	63
4	100(4-0.5)/10	= 35	57
5	100(5-0.5)/10	= 45	52
6	100(6-0.5)/10	= 55	47
7	100(7-0.5)/10	= 65	42
8	100(8-0.5)/10	= 75	36
9	100(9-0.5)/10	= 85	29
10	100(10-0.5)/10	= 95	18

Table 4 shows the percentage positions for the ranks 1, 2, 3,4,5,6, 7, 8, 9 and 10 and their corresponding Garrets table values. For instance, the calculated percentage position for rank 2 is 15 and the corresponding Table value is 70. The Garrett Table value is given in the Garrets ranking table for the percentage position 15, which is approximately 70. The remaining rankings are calculated in the same manner. Table 5 shows the number of respondents ranking the factors as 1, 2,3,4,5,6,7,8, and 10 for their preference for the particular maize seed supplier and Table 5 also shows the total and mean scores.

Table 5: Preference for Maize Seed Supplier

			I	II	III	IV	V	VI	VII	VIII	IX	X	$\sum f$	$\sum fx$	$\frac{\sum fx}{\sum f}$	Rank
Attribute		**Garrett Value (x)**	**81**	**70**	**63**	**57**	**52**	**47**	**42**	**36**	**29**	**18**				
I	Fair Price	*f*	105	99	109	246	134	179	100	240	78	210				
		fx	8505	6930	6867	14022	6968	8413	4200	8640	2262	3780	1500	70587	47.1	**8**
II	High Yielding	*f*	207	131	179	120	93	130	169	200	125	146				
		fx	16767	9170	11277	6840	4836	6110	7098	7200	3625	2628	1500	75551	50.4	**4**
III	Pest and Disease Resistant	*f*	206	108	138	106	187	106	105	98	201	245				
		fx	16686	7560	8694	6042	9724	4982	4410	3528	5829	4410	1500	71865	47.9	**6**
IV	Drought Tolerant	*f*	140	80	150	184	101	141	201	101	289	113				
		fx	11340	5600	9450	10488	5252	6627	8442	3636	8381	2034	1500	71250	47.5	**7**
V	Easily Available	*f*	213	189	140	145	177	201	198	89	98	50				
		fx	17253	13230	8820	8265	9204	9447	8316	3204	2842	900	1500	81481	54.3	**2**
VI	Attractive Packaging	*f*	198	301	234	221	106	203	72	45	74	46				
		fx	16038	21070	14742	12597	5512	9541	3024	1620	2146	828	1500	87118	58.1	**1**
VII	Better Quality	*f*	135	201	144	119	140	105	95	200	201	160				
		fx	10935	14070	9072	6783	7280	4935	3990	7200	5829	2880	1500	72974	48.6	**5**
VIII	Good after sale service	*f*	72	109	89	159	142	136	203	151	234	205				
		fx	5832	7630	5607	9063	7384	6392	8526	5436	6786	3690	1500	66346	44.2	**9**
IX	Palatable	*f*	34	80	190	50	225	194	164	191	134	238				
		fx	2754	5600	11970	2850	11700	9118	6888	6876	3886	4284	1500	65926	44.0	**10**
X	Brand Image of Company	*f*	190	202	127	150	195	105	193	185	66	87				
		fx	15390	14140	8001	8550	10140	4935	8106	6660	1914	1566	1500	79402	52.9	**3**
		$\sum f$	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500				

As can be observed from Table 5, the top five attributes influencing household preference for a particular choice of a seed company were attractive packaging; easy availability of seed; brand image of the company; high yield and; better quality of the seed. Quality as per households included 'big' grain size and the way the seed was stored in selling points. Brand image of the company was found to consist to components which were closely interrelated; the credibility and ability of seed supplier to provide seed which satisfied the farmer's needs.

CONCLUSION AND RECOMMENDATION

The study has unearthed factors that influence household whether to grow improved varieties or not. The results further unearthed the latent factors that influenced households to prefer a products from a particular seed company. The price of maize seed, farm size, access to credit and age were found to significantly affect the probability of households growing a particular type (improved or non-improved) of maize variety. In addition, the Garett rank technique identified easy availability of seed; brand image of the company; high yield and; better quality of the seed as factors influencing households to prefer a particular seed supplier. All farmers sought to procure seed which was competitively priced, substantially free of pests and diseases, of the desired size and physiological age. This would suggest seed companies to lower prices and improve product quality. However, such a marketing strategy is considered unsustainable (Berry and Parasuraman, 1991) as no single product can satisfy the needs of all potential buyers likewise no one marketing strategy will appeal to all buyers. Lehmann and O'Shaughnessy (1974) argued that supplier reputation comes an important buyer decision variable when the purchase involves high capital outlay. Batt (2001) citing Jackson (1985) noted that the risk is low when buyers purchase from known suppliers

As pressure on arable land continues to increase, maize farmers in Lilangwe, Blantyre are actively seeking methods of increasing productivity per unit area. However, these farmers are constrained by lack of access to credit among others. It was also be noted that the farmers are unwilling to purchase seed from relatively unknown suppliers without having first seen the crop. Here, product demonstration, trials and electronic information sources such as audio visual can reduce the potential buyer's perceived risk of adoption. While the need for technical support is always important, (Matthyssens and van den Bulte 1994) suggests that advice and technical support are most appreciated by inexperienced customers. Experienced farmers while seeking to procure the most price competitive and reliable seed, were considered the most likely to appreciate superior quality seed and the most willing to pay for it. This provides an opportunity to seed suppliers to also focus on this target group of farmers especially now when government which has been a major buyer of maize seed under FISP is undergoing structural changes. This group of experienced farmers can easily influence the buying decisions of their fellow farmers.

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Emerging Trends in Rural Tourism: Evidence from the Eastern Black Sea Region of Turkey

Ismet Boz
Professor Dr., Ondokuz Mayis University Faculty of Agriculture Department of Agricultural Economics 55139 Samsun Turkey

Osman Kilic
Assoc. Professor, Ondokuz Mayis University Faculty of Agriculture Department of Agricultural Economics 55139 Samsun Turkey

Cevahir Kaynakci
Research Assistant, Ondokuz Mayis University Faculty of Agriculture Department of Agricultural Economics 55139 Samsun Turkey

Abstract
Utilizing rural tourism opportunities can be considered one of the key elements of rural development for developing countries. Rural tourism creates many job opportunities for local people, increases living standards, alleviates poverty, and therefore prevents migration from rural to urban areas. For these reasons, every country must utilize its potential of rural tourism. The primary purpose of this study is to examine emerging trends and possibilities of sustainable rural tourism in the Eastern Black Sea Region of Turkey. Main material was information provided by an extensive review of the related literature, governmental repots, and experiences and observations of the researchers. According to the results of this study the region has a remarkable rural tourism potential and it will make significant contributions to rural development in Turkey. Particularly highlands, thermal areas, and farms attract many domestic and international tourists. However, environmental dimension of rural tourism seems to be under risk if long term plans aren't prepared, particularly for housing and road constructions. To increase the contributions of rural tourism makes to rural development, it is important to take adequate measures to ensure economic, socio-cultural, and environmental sustainability in the region.

Keywords: Rural development, Rural tourism, Black Sea Region, Sustainability

Introduction

In order to explain the emerging trends of rural tourism in the Eastern Black Sea Region of Turkey, it is useful to begin with the definitions of tourism and rural tourism concepts, identifying rural tourism activities, and the meaning of sustainability in these activities. Tourism is the whole of the activities carried out for the temporary separation of tourists from their homes and businesses, the provision of space for them during this period and the fulfillment of their needs (Mathieson and Wall, 1982). According to the World Travel and Tourism Council, the tourism sector accounts for about 10.2% of the total gross domestic product generated and directly or indirectly employs about 292 million people. According to different forecasts, the number of tourists in the world, the travel frequency of tourists, the amount of income generated from tourism, and the number of people to be employed in this sector will increase annually (WTTC, 2017).

The Black Sea Region is in the northern border of Turkey. The eastern, central and western black seas are divided into three parts. This region stretches along the black sea from the western side of Turkey's northern border. The region continues from the east of the Sakarya province to the border of Georgia.

On the shores of the Black Sea region the mountains extend parallel to the sea. Because of this, moisture cannot go to the inner zone, so there is a lot of rainfall in the black sea region. Due to over-precipitation it is often covered with forests and there is a lot of greenery. As there are many rivers and lakes in the Black Sea region, streaming tourism is developed and widely used. It is very beautiful in nature compared to other regions because it is rich in greenery. For this reason, nature tourism is highly developed and there are many rivers, lakes and parks that need to be seen and visited. There are also many historical beauties in the Black Sea region. For example, the Monastery of Sumela is famous as the place where the graves of the kings are located. The rivers are very convenient for sports such as rafting. Rafting tourism has developed in the river Coruh. Historical monuments in Trabzon (Sumela Monastery) and Amasya (King's graves) constitute important tourism potentials of the Eastern Black Sea Region.

The primary purpose of this study was to examine the present situation of rural tourism in the Eastern Black Sea Region of Turkey. The specific objectives were to specify rural tourism concept within the general concept of tourism, identify rural tourism destinations in the region, summarize the indicators of sustainable tourism for the region, examine future trends and opportunities, and develop recommendations for sustainable rural tourism in the region.

Materials and Methods

Main material for this study was information provided by a review of the related literature. Journal articles, books, institutional reports, and the Internet were extensively utilized. Design of the paper was organized considering the objectives of the study. Therefore, the concept of rural tourism was explained within the framework of conventional tourism at large. Then rural tourism destinations, region’s potential of rural tourism, and sustainable tourism indicators were examined. The study concludes with a set of recommendations for developing a long term sustainably rural tourism sector in the region.

The Concept of Rural Tourism

Tourism is divided into two main categories as (1) mass tourism and (2) alternative tourism. Mass tourism is often known as conventional tourism. In this context, people visit popular places where they consider suitable for their economic possibilities, tastes, and cultures. Alternative tourism, unlike mass tourism, is defined as nature tourism or eco-tourism in some sources and includes tourism activities that are made with more specific purposes and desires. This type of tourism includes (1) cultural tourism, (2) educational tourism, (3) scientific tourism, (4) adventure tourism and (5) agro-tourism. Agro-tourism includes rural tourism and farm tourism activities

(Mieczkovski, 1995). Alternative tourism is conducted on a smaller scale and generally in more local level than mass tourism. The negative impacts on the environment and social life are expected to be minimal. It contributes to the development of local economic activities such as agriculture and village handicrafts. It also contributes to the development of the tourism industry by allowing local people to participate in the decision-making process (Cater and Lowman, 1994)

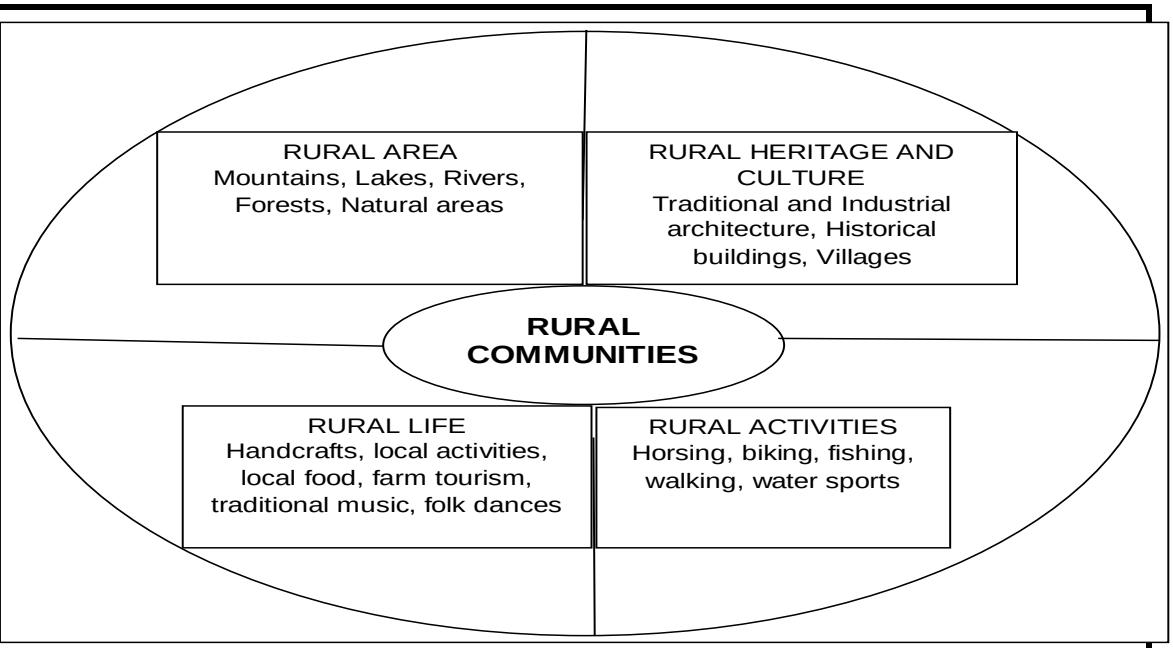

Figure 1. Concept of Rural Tourism
Source: Rural Tourism in Europe: Experiences, Development, and Perspectives. © World Tourism Organization.

Rural tourism, a sub-category of alternative tourism, is an important sector which plays an important role in the country's economy and makes contributions to rural development. Being consistent with rural culture, natural environment, and agricultural life, rural tourism is able to integrate very easily with other types of tourism. Therefore, rural tourism, enriched with various local, national and international initiatives, attracts people to the countryside for vacation in many countries of the world (Soykan, 1999). According to another definition, rural tourism is mostly a type of farming and nature oriented tourists participating in activities such as farming, fishing, horse riding, trekking, etc. (Yarcan, 1998). According to the World Tourism Organization (WTO), rural tourism is composed of four main elements in which rural communities are located in the center. These are (1) rural areas, (2) rural heritage and culture, (3) rural activities and (4) rural life (WTO, 2003). Figure 1 shows the elements of each item.

The characteristics of rural tourism are (Lane, 1994):

(1) Activities are carried out in rural areas.
(2) It is functionally operated with small scale enterprises which have interactions with nature, cultural heritage, traditional society, and traditional practices.
(3) The buildings and residential areas are small scale and represent rurality.
(4) It shows a traditional character. Growth is natural and slow. It is linked to rural families. It should be tightly controlled locally and developed for the benefit of the rural community in the long run.
(5) Contains a structure that incorporates the concepts of rural environment, rural economy, rural history, and rural settlement.

Sustainable rural tourism should primarily cover tourism activities that do not allow the above features to deteriorate. In this context, by using the economic opportunities of the rural areas, it

increases the quality of life of the people living there, protects the natural environment and ensures that the tourists visiting the rural areas have a good time here. According to the related literature, sustainable rural tourism must include three main dimensions; (1) economic dimension, (2) sociocultural dimension and (3) environmental dimension (Sillingnakis, 2008; Rifai, 2011; Dragulanescu and Drutu (Ivan), 2012).

Economic dimension: Small-scale accommodation facilities and commercial establishments should be able to provide tourists with high level satisfaction from their visits. These enterprises are largely established by the local people and the personnel they employ are also selected from the locality. With this dimension, rural tourism contributes to the economy by increasing the attractiveness and creating employment opportunities. In addition, tourists who visit rural areas purchase agricultural products and village handicrafts. In this respect, rural tourism supports economic development by contributing to the generation of demand for the products produced locally.

Socio-cultural dimension: Social and cultural coexistences between rural and urban people are increasing with the development of rural tourism. First of all, an information exchange is possible when people living in urban areas arrange visits to the rural areas. Both sides become familiar with their lifestyles, traditions and cultures (Esengun et al., 2001). On the other hand, international visitors increase the tolerance of rural people towards different cultures and traditions (Sertkaya, 2001). Moreover, with the increase of new job opportunities in rural areas, the migration from villages to cities is decreasing and therefore the problems of immature urbanization and housing in urban areas can be solved (Ucar et al,, 2012).

Environmental dimension: While trying to increase the contribution of rural tourism to the country's economy, natural resources and the environment are faced with extreme pressure, particularly where the demand for visitors is high. If short-term profitability is kept in the foreground, in the long run, areas where small-scale rural tourism can be done in the current conditions may have been eliminated. The pressure to develop rural tourism intensively has led to the transformation of tourism into mass tourism and has led to the establishment of new parks, conference centers, holiday villages and recreational areas in rural areas. The insatiable desires of mankind to utterly capitalize on the natural features of rural areas with capitalist thinking, over time, cause these areas to deteriorate and face significant environmental problems.

Rural Tourism in the Black Sea Region

Tourism establishments in the Eastern Black Sea Region are presented in Table 1. Trabzon is the most developed and attractive city in the region as the numbers of establishments, rooms, and beds are quite higher than other cities. The provincial and district municipalities in the region also have many establishments which aren’t included in this table. Trabzon is a metropolitan city with an international airport, harbor, universities, and many historical and natural places. In addition to two state and one private university in Trabzon, every other city in the region has a state university. The second international airport in the region constructed two years ago between the provinces of Ordu and Giresun. Another one is being built on the coast of Rize. Since the region is expected to attract more domestic and international tourists in the future, more establishments and facilities are needed.

The number of domestic and international tourists visiting the region is increasing from year to year. As it can be followed from Table 2 in 2015 the number of tourist checked in the tourism establishments exceeded 1.6 million. In addition to the natural beauties it has, the availability of cultural, historical and local components, and the sincerity of the local people, will make this region more attractive for tourists in the future. The region welcomes millions of local and foreign tourists, especially for the tourists coming from the Gulf countries, it has become a shining star of tourism

by reaching a capacity of 7 thousand beds (including the municipality establishments) with 4-5-star hotel investments made in the last few years.

The Eastern Black Sea Region has many rural tourism centers some of which are presented in Table 3. Different themes, such as winter tourism, plateau tourism, beaches, and thermal tourism are possible. In terms of conventional tourism the region isn't as attractive as the southern and western coast cities of Turkey, but in terms of plateaus and mountains it has quite more advantages than those cities of other regions.

Table 1. Number of tourism establishments in the Eastern Black Sea Region

City	Tourism Investment Licensed			Tourism Operation Licensed		
	Number of Establishments	Number of Rooms	Number of Beds	Number of establishments	Number of Rooms	Number of Beds
Trabzon	18	1207	2467	38	2189	4476
Ordu	8	514	1004	27	1162	2331
Giresun	9	362	760	17	560	1091
Rize	7	448	910	13	531	1064
Artvin	4	103	206	9	515	1021
Gumushane	2	145	301	5	159	306
Total	48	2779	5649	60	5116	10289

Source: Cokisler and Turker, 2015

Table 2. Number of tourists visited the Eastern Black Sea Region

Places Stayed	Entered Establishment			Spent Night		
	Foreign	Domestic	Total	Foreign	Domestic	Total
Hotels	116,042	889,73	1,005,115	215,130	1,147,574	1,362,704
Motels	2,899	29,467	32,366	12,105	38,135	50,240
Pensions	11,456	117,461	128,917	15,985	179,520	195,505
Holiday village		6,171	6,171		6,171	6,171
Camping	936	20,728	21,664	1,202	20,958	22,160
TOTAL	131,333	1,062,900	1,194,233	244,422	1,392,358	1,636,780

Source: DOKAP Eylem Plani 2014-2018

Sustainability Indicators for Tourism Sector

In order to evaluate rural tourism opportunities for a region in a long term span various sustainable tourism indicators are used. The World Tourism Organization (WTO) determined 140 sustainable tourism indicators which can be used to measure the sustainability of different destinations. After the indicators are selected for some specific destinations, they can be maintained so that comparisons between the destinations can be made.

For the Black Sea Region four dimensions of sustainable tourism such as economic, social, environmental, and physical planning and control were determined in advance. Then seven indicators under economic dimension, nine indicators under social dimension, seven indicators under environmental dimension, and two indicators under physical planning and control dimension were selected from the WTO's list. A sustainable tourism performance index was developed considering all of these indicators. The sustainable tourism indicators for the Black Sea region include the following (Calik and Batman, 2014):

Economic Indicators: Improvements in number of days spent; transportation by airway and railroads; accommodation diversity; tourism investments; quality of indicators predicting economic efficiency; producing local tourism services; management of available tourism facilities by local actors.

Table 3. Tourism centers in the Eastern Black Sea Region

Name of the Center	Province	District	Theme	Area (Kilometer square)
Artvin Kackar Tourism Center (TC)	Artvin Rize Erzurum	Yusufeli Camlihemsin Ispir	Winter	19,549
Artvin Kafkasor	Artvin	Artvin	Winter	1,652
Bayburt Kop Mountain TC	Bayburt	Bayburt	Winter	4,170
Giresun Aksu TC	Giresun	Giresun	Beach	9
Giresun Kumbet Plateau TC	Giresun	Dereli	Plateau	825
Giresun Yavuzkemal Plateau TC	Giresun	Giresun, Dereli	Plateau	610
Gumushane Cakirgol Winter Sports TC	Gumushane	Gumushane	Winter	6,000
Gumushane Suleymaniye Winter Sports TC	Gumushane	Gumushane	Winter	794
Gumushane Zigana TC	Gumushane	Torul	Winter	301
Ordu Akkus Argin Plateau TC	Ordu	Akkus	Plateau	220
Ordu Aybasti Persembe Pleteau TC	Ordu	Aybasti	Plateau	975
Ordu Aybasti Toygar Kabaktepe TM	Ordu	Aybasti	Plateau	60
Ordu Bolaman TC	Ordu	Ordu	Beach	4,250
Ordu Cambasi Plateau TC	Ordu	Kabaduz	Plateau, Winter	320
Ordu Mesudiye Keyfalan Plateau	Ordu	Mesudiye	Plateau	730
Ordu Mesudiye Yesilce-Topcam Plateaus	Ordu	Mesudiye	Plateau	17,000
Ordu-Fatsa-Cerkezler	Ordu	Fatsa	Beach	23
Rize Anzer TC	Rize	İkizdere	Plateau	5,600
Rize Camlihemsin Ayder Thermal TC	Rize	Camlihemsin	Plateau, Winter, Thermal	550
Rize Cayeli TC	Rize	Cayeli	Beach	465
Rize İkizdere Ovit Mountain Winter Sports TC	Rize	Ikizdere	Winter	5,123
Trabzon Arakli Pazarcik Plateau TC	Trabzon	Arakli	Plateau	320
Trabzon Arakli TC	Trabzon	Arakli	Beach	190
Trabzon Arakli Yesilyurt Yilanta Plateau TC	Trabzon	Arakli, Surmene, Dernekpazari	Plateau	27,600
Trabzon Giresun Sis Mountain TC	Trabzon	Salpazari	Plateau	379
Trabzon Macka Solma TC	Trabzon	Macka	Plateau	230
Trabzon Tonya Armutlu, Gumushane Kurtun Erikbeli	Trabzon, Gumushane	Tonya, Kurtun	Plateau	1,178

Source: DOKAP Eylem Plani 2014-2018

Social Indicators: Women employment; social effects of tourism on employment; education level of employees in tourism businesses; information on local culture and protecting cultural heritage; the nature, variety, and numbers of cultural settings; net migration rate; general status of contemporary, traditional, and monumental heritage; tourism services provided for disabled; general status of health services.

Environmental Indicators: Gathering, reusing, and recycling of solid wastes; emission level and pollutants of the Atmosphere; sustainable management of reforestation and erosion control work; ecosystem sensitivity; capacity and usability of renewable energy reserves and networks; quality of drinkable water; natural resource use in tourism areas;

Physical planning and control indicators: Efficiency in planning, control and management systems; institutional consultancy and communication effort.

Conclusion and Recommendations

The recent developments in rural tourism sector of the Eastern Black Sea Region imply that this sector will make significant contributions to local people and to Turkey at large. However, long term plans and programs must be developed considering the impact of each sustainable tourism indicator. Otherwise, excessive and intensive use of rural areas can disrupt ecological balance by destroying agricultural, natural and cultural sites. This may end up with changes in agricultural production patterns, and diminishes in yield and productivity. Reduced productivity in agriculture can accelerate rural tourism, which is one of the alternative income sources in the beginning. However, not planning rural tourism in a sustainable way in the beginning period may cause serious environmental problems and begin to destruct the potential of rural tourism.

Above all, successful planning, management, monitoring and evaluation of the rural tourism sector is very important for sustainable economic, socio-cultural and environmental aspects of the country's economy. It cannot be said that rural tourism in the Eastern Black Sea Region has sufficient infrastructure. The sector generally consists of small businesses with sustainable income at risk. Therefore, implementation, monitoring and evaluation of various projects in this sector is essential.

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How can socio-economics crisis promote sustainable behavior in rural regions?

The case of the farm M. Libânio S.A. in Brazil

Givago Barreto Martins Dos Santos, Ph.D. SupAgro-moisa

2 Place Pierre Viala, 34060 Montpellier- France, cedex 1

Abstract

In this paper, we aim to discuss what are the motivations that drive companies to adopt sustainable development principles. Precedent literature shows that the main motivations rely on contextual, organizational and individual factors that are directly related to the companies' leaders. In the production of cocoa in Brazil, a severe economic crisis linked to phytosanitary disease causes damage to crops but also to the social level by an explosion of unemployment of many small producers who have lost everything. The group M. Libânio took the initiative to propose partnerships contracts with 40 families to welcome them on the farm and to share the results of the production. This initiative also served the group to legitimize its commitment in sustainable production that has certified products by Rainforest Alliance and opened the North American market.

Keywords: Rural development, sustainable production, socio-economic crisis, cocoa, Brazil.

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Introduction

Environmental and social certifications have increased in recent years (Faure et al., 2012). In the Cocoa sector, major firms have relied on demand from consumers in North countries to develop strategies that integrate certifications taking into account environmental and social criteria (Soto and Le Coq, 2011). These certifications are carried by the public sector (organic farming), by the voluntary sector (Fair Trade, Rainforest Alliance), or by the private sector (thanks to real commitments to certified cocoa from manufacturers such as Mars, Ferrero and Hershey).

Certification provides a fair remuneration to producers for the efforts made to take sustainable development into account in their production (Nazaire, 2016). Although CTA's recent report shows that the positive impacts on the incomes of certified farmers are difficult to quantify, industrial customer pressure has fostered the development of the market share of certified cocoa (CTA, 2013).

The literature shows that incentives for public policies, expected benefits (brand image and customer loyalty) and the values of the organization's leaders are motivated by the adoption of sustainable development standards by organizations. In Brazil, cocoa production is ruled by conventional production sold in bulk to multinational industrial firms. Some certification initiatives have appeared in the northeast of the country, more precisely in the southern state of Bahia. Base on a single case study of the farm (M. Libânio S.A). We show in this paper that a context of agronomic crisis linked to the cocoa disease "witch broom" leaded some farms to introduce new ways of organizing production that legitimize an environmental and social certification of its Cocoa production that can open the US market. This new organization brings benefits for the enterprise and too for the planet.

After a literature review on legitimacy and sustainable development, we will present the context or the research and the methodology of the case study. Results analysis and discussion will lead to some recommendations and research avenues.

1. The different ways of legitimizing the sustainability of production processes

Strategic decisions always involve choices and trade-offs between several dimensions, between multiple demands, a priori non-convergent. Sustainable development considers that it is possible to reconcile three essential but often unequal concerns in the value given to each: the satisfaction of human needs by the economy, the rational management of resources and natural ecosystems and the duty of social cohesion and inclusion. If the objective of sustainable development is unanimous, the question of how to achieve this aim remains to be under question Kahn (2015). Commonly, there are three major routes presented in the literature:

The first one is the path of political ecology. And it consists on changing more or less gradually the development model itself by moving towards a soberer economic model.

The second orientation can be described as production or industrial ecology. It does not advocate a radical change from the existing model to a different model, but a rearrangement of the current model.

The third major way to reach the objective of sustainable development is named market ecology. This orientation renews its confidence less in the virtues of technical progress than in those of markets and financial innovation to overcome the apparent contradictions between the three purposes. It claims the supremacy of economic rationality over the two other spheres and advocates pushing even further the market logic, by allocating a price to the services provided by nature. It sees sustainable development as an opportunity to carry out radical innovations that can offer new ranges of goods and services and generate new growth, now known as green growth.

It is this last path that agriculture has developed the most, thanks to numerous innovations that have been introduced to "green" production systems and move from intensive farming to agroecology. The goal is to transform the actual systems and also win the trust of customers and consumers.

1.1. Building the legitimacy of Cocoa producers in Brazil

The companies of the Brazilian Cocoa sector are mainly recognized for manufacturing processes that do not respect the environmental and social good practices (Rangel and Tonella, 2013). They are recently engaged in the course of legitimizing their activities (Rhouma et al., 2014). The theory of legitimacy refers to neo-institutional approaches describing environmental pressure conveying a set of norms, beliefs, and rituals with which the company must comply if it does not want to face criticism and attacks from Stakeholders (Trébucq, 2006). A company may engage in a legitimization process to regain or extend its real legitimacy or to repair and defend its lost or threatened legitimacy (O'Donovan, 2002). Legitimacy is defined as the perception that "the actions of an entity - the organization, the brand - are desirable, proper or appropriate within a system of socially constructed norms, values, beliefs" (Suchman, 1995).

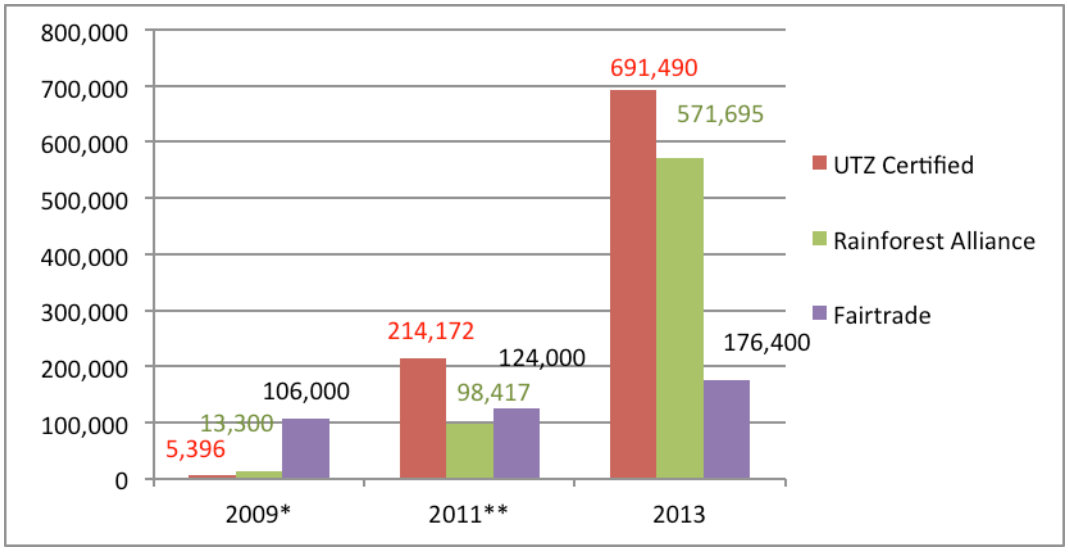
Legitimacy can be described as the behavior adopted by organizations, companies, and brands to improve the relationship between business and society, but also to ensure reputation and services in a social context (Weber, 1978, Chauvière and Godbout, 1992, Gabriel, 2003, Doney and Canon, 1997). Different typologies have been proposed to identify the multidimensional nature of legitimacy (Beylier et al., 2011). Suchman (1995) distinguishes between logical, moral and cognitive forms. In the field of entrepreneurship, Marchesnay (1998) proposed a typology that distinguished competitive legitimacy, based on efficiency and effectiveness, and territorial legitimacy related to the role of the organization in a territory.

The Cocoa market has made significant efforts to make the production processes more sustainable. Over the past decade, consumers have become increasingly aware of the issues surrounding sustainable cocoa production. Fueled by some campaigns focusing on child labor and trafficking, public and media awareness is now one of the main sources of motivation for the adoption of more stringent

standards and a certification system for the chocolate industry (Fountain and Hütz-Adams, 2015)

As far as socio-environmental certifications for cocoa are concerned, the three most important references are Rainforest Alliance, Fairtrade, and UTZ. Figure 1 shows the evolution of cocoa production certified by standardization bodies in recent years. One can say that a significant trend in the current cocoa market is based on two approaches: The social performance that engages in protection against slavery, child labor and producer poverty. The environment component is concerned with protecting and raising awareness towards production methods that are more harmonious with nature, bringing more and more knowledge and publicity to the stakeholders from the cocoa chain.

Figure 1: Cocoa production in tons certified by Organizations of the Ecolabels certifications.



Source: Fountain, et Hütz-Adams, baromètre du cacao 2015 * Figures from 2010 Cocoa Barometer/ ** Figures from 2012 Cocoa Barometer

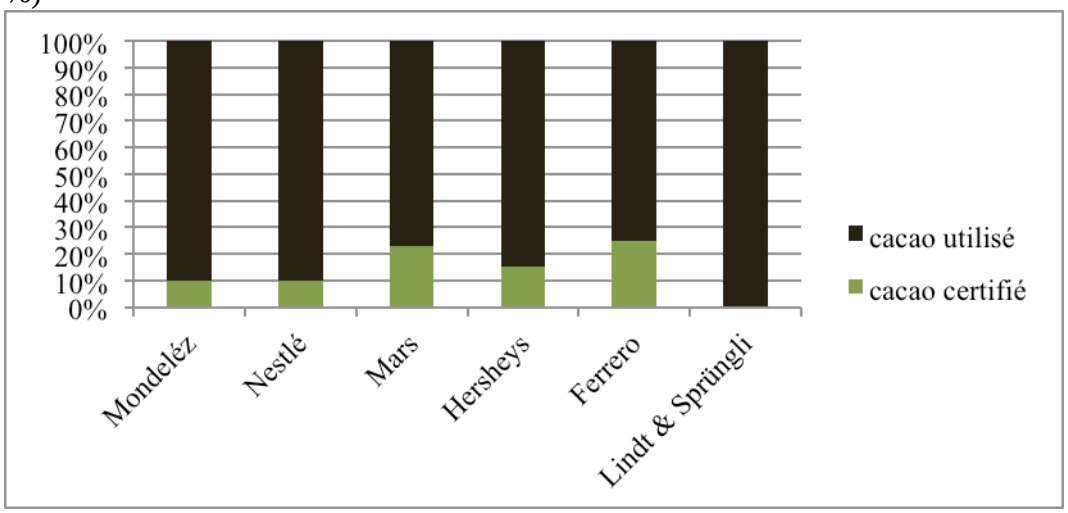
The growth of certified cocoa production is very rapid and sustained. Currently, there is a demand for the cocoa market associated to sustainable development, but the labels presented in figure 1 concern only the three international standardization bodies, Fairtrade, UTZ Certified and Rainforest Alliance, together they certify close to 1.4 Million tons of cocoa, about 30% of the world's chocolate market. There is a major predominance of Rainforest Alliance and UTZ certifications. UTZ is a certification originated in the Netherlands. It began certification of cocoa in 2007 and opened up the European market for sustainable cocoa. The UTZ certification was realized on its standards and traceability system for a sustainable cocoa. Rainforest Alliance is a North American certification that develops its sustainability label for cocoa. It is present in several countries of the world and is recognized by all consumers interested by sustainable chocolate. Fairtrade, which has its origins in the United Kingdom, has undergone a period of rapid development but has lost some ground today due to difficulties in attracting players in the Cocoa Sector and the slowing down of the dynamics of this label in the chocolate market.

Worldwide, 57 different companies manufacture chocolate. Among the leading players in the market, there are some multinationals such as Nestlé, Mondelēz,

Mars and Hershey's; the others are local brands (Camargo and Nhantumb, 2016). Most major chocolate manufacturers, except Mondelēz and Nestlé, have committed to using 100% sustainable and certified cocoa by 2020 (Fountain and Hütz-Adams, 2015). Figure 2 presents the percentage of certified cocoa used in the production of the leading industries.

It can be observed that only two manufacturers use more than 20% of certified products (Mars, Ferrero), the majority uses between 10% and 15% of cocoa with an eco-label. The company Lindt & Sprügli has none at all.

Figure 2: Certified Cocoa share in the production of chocolate manufacturers (in %)



Source: Fountain et Hütz-Adams, Baromètre du cacao 2015

It is in this context of the growth of chocolate socio-environmental certifications in the world's market that some important properties in Brazil have perceived the interest to engage in the implementation of Eco-labels and thus position themselves on this niche of the cocoa market. Due to the economic crisis associated to the cocoa disease vulgarly named "witch's broom" in Bahia, which resulted in significant production losses, and the need of producers to innovate in order to rebuild a new identity of the Brazilian product, some large farms are seeking to legitimize their commitments in sustainable cocoa production.

1.2. The economic crisis, driving the adoption of the principles of sustainable development

Factors	Determinants
Contextual factors	Location, internationalization, sector of activity and tangibility of activities, position in the value chain

Organizational factors	Size, shareholding (ownership structure), economic performance, age, capacity for innovation
Individual factors	Gender, age, education (level), training (specialization), attitude towards profit, design of company performance (values)

According to Labelle and St-Pierre (2015), sustainable development suggests the adoption of economic activities that respect environmental capacities and limitations and thus contribute to the social well being and human development. The literature shows that corporate sensitivity can be seen as a precursor of concrete and future commitment (Naffziger, Ahmed and Montagno, 2003, Moquet and Pezet, 2006, Kuckertz and Wagner, 2010). Labelle and St-Pierre (2015) propose to group the determinants of the adoption of the principles of sustainable development into three main factors (Table 1).

Table 1: the determinants of the adoption of SD approaches

The analysis grid here proposed distinguishes between external determinants that exert a real influence on the motivation of the company and its manager to integrate sustainable development proposals (contextual factors). The determinants that affect an organization's ability to adopt sustainable development practices (organizational factors). Finally, the personal determinants that act on the intentions of the leader towards the expectations addressed to him to preserve the legitimacy of his organization (individual factors).

The case study proposed in this paper circumscribes into the contextual factors on the adoption of more sustainable behaviors. Indeed, the economic crisis linked to the cocoa disease has not only resulted in the search for technical solutions but also for new organizational forms to limit their effects. To compensate the losses, the farms tried to differentiate the product through eco-labels, which opened up remunerative markets in the United States and Europe.

In the case of the Fazenda M. Libânio group in Bahia, Brazil. We show that this process led the company to welcome on its farm former cocoa workers dismissed because of the crisis with their families and to offer them a sharing of the Value created in return for their work, justifying a commitment in the social aspects demanded by the ecolabels.

2. Context and Methodology

For more than 200 years the southern region of Bahia, was dominated by a cocoa monoculture implied towards the international market to strengthen the trade balance of Brazil (Chiapetti, 2009).

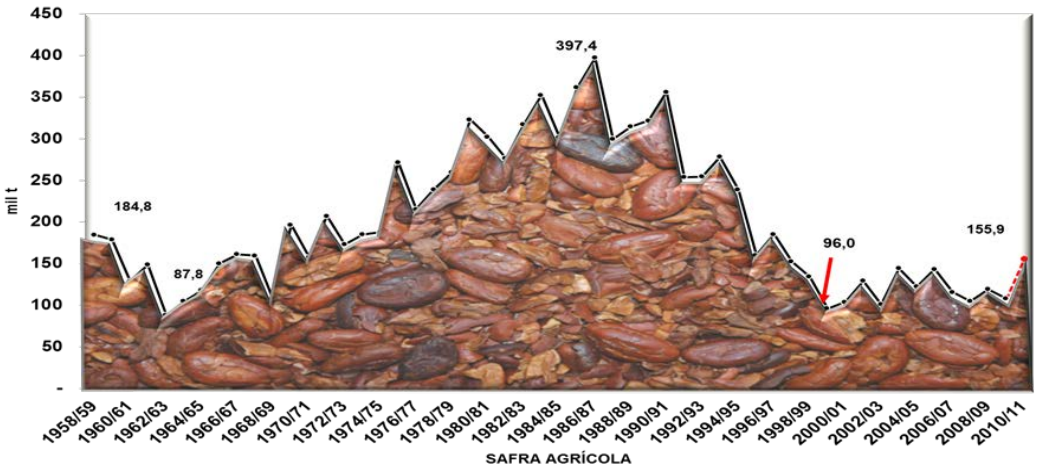
In this region, the cultivation of cocoa has always had an important economic and social role. Besides, it has also opened up for foreign trade. But a series of crises

has severely undermined the prosperity of the crops. The most recent dating from the 80s is known as the "witch broom crisis." A disease that attacks cocoa plantations and it is still present in the region (Menezes and Carmo-neto, 1993). In the late 1980s, in Bahia, cocoa was attacked by a fungus which reduced production by 70%, affected the image of the product on the international market, caused an alarming wave of unemployment, devalued firms and destabilized the regional economy (Vargens, 1999). In this context of crisis and in parallel with technological innovations in the process of cocoa production, a new contract system based on partnership is emerging. The principle is to barter the wages of small producers against participation in output cocoa product and income sharing. Motivated by these organizational innovations and by the possibility of beneficial effects on their productions, a group of farmers is engaged in a more sustainable production certified by international labels like Rainforest Alliance.

2.1. Economic crisis and rural exodus

The phytosanitary crisis in the south of Bahia has created a difficulty to three local government assets: cocoa, labor, and land. There has been a sharp drop in cocoa production, accompanied by a decline in the price of cocoa kernels on world markets (Chiapetti, 2009). Figure 3 show the moment of fall in cocoa production in the southern region of Bahia.

The cocoa production in Bahia – 1958 to 2011



Source: (CEPLAC 2012)

One consequence of this crisis is the emergence of changes in labor relations, and interpersonal relationships have been more strictly governed by the consolidation of labor laws (CLT). The workers, dismissed from the cocoa plantations, migrated to the cities or left the region. During the period between 1980 and 2010, there was a rural-urban migration in the cocoa-producing region, higher than that of the State of Bahia and Brazil (IBGE, 2016). According to Rangel and Tonella (2013), cocoa farmers who have left the rural area do not want to return, the old workers are now elderly, and their children have other ambitions than being cocoa producers. According to the authors, there is a shortage of skilled labor ready to work under the conditions and wages offered by the cocoa farmers. At present, the cocoa economy in Bahia shows a reorientation, which leads to the innovation and restructuring of certain production units but also to the emergence of new forms of work organization, including the system named "Agricultural partnership."

2.2. Agricultural partnership in Brazil indicator of social sustainability

The structural crisis and mass unemployment of cocoa workers are the basis for the emergence of new forms of work organization. In Brazil, there are three ways of organizing agricultural labor:

• Traditional work relationship - the worker is an employee, and follows the work instructions determined by the owner.

• L'arista - The owner divides his property into small delimited parcels of cultivated land and delegates to the worker to manage the area that has been assigned to him. In this system, the employee is attached to a plot and remunerated by a fixed wage regardless of production performance.

• Partnership – The rural partnership was first regulated by the Brazilian Civil Code in 1916. The owner and the employer firm a partnership by a contract recognized by the law. The landlord makes available delimited parcels of land for the worker and his family, and the income is shared according to negotiated and contractual rules.

Among these options of labor relations regulated by Brazilian law, the partnership is now privileged to land owners that pursuit to overcome the cocoa crisis by proposing at the same time a socially responsible behavior that legitimizes a commitment to sustainable development.

The Law on Rural Partnership in Brazil was revised and regulated in 1964. Until that moment, the rural properties were proud of the employment relationship for showing their power over the rural worker and also for possessing the remuneration resources. These practices (the partnership and the arista) had gradually disappeared in the cocoa cultivation in the south of Bahia after the arrival of large properties based on agricultural wage labor and a growing international market.

After the advent of the phytosanitary cocoa crisis in Bahia, owners decided to take the opportunity to set up new working relationships in the framework of a more socially sustainable production and reinvested the context of the agricultural partnership.

The partnership is part of the more general Land Statute Law (1964 Acts that regulated the relationships, rights, actions of the state on agricultural labor in Brazil). It consists of a contract of a civil nature in which the rural workers and the land owner define a share of the results of the production intended for each of the partners. The amount is calculated basing on the results and the risks associated with economic and climate fluctuations. Unlike an “Arista” system, the partnership corresponds to a prospect of progress and social mobility. The former worker becomes a sort of social partner and no longer a conventional employee, which derives on a psychological outcome for the employee (Gomes and Couto, 2000).

Rural partnerships are instruments created by the "Statute of the land". This instrument has become a standard practice among stakeholders from the rural area, becoming the most efficient on reducing the distinction between worker and owner (Ribeiro, 2017).

The partnership contract in Brazil is ruled by the Statute of the Land and stipulates that:

• The minimum duration is three years, but the contract can be renewed annually according to the interests of the partners.

• The share of the partner or of the owner can alter between 25 to 75%, depending on the investments made in the area and the agreement between the parties.

• The owner must provide the partner with a residence on the rural property, including a small animal husbandry and breeding area

• The contract must be writing, signed and legalized

• The costs of purchasing the implanting material will be divided in the same proportion of the income's distribution.

• It is forbidden to have an employment contract with the land owner to carry out working activities in other parts of the farm.

This system of agricultural partnership has enabled many owners to resume their production activities by reducing the cost of labor, to reduce rural exodus and to improve their image. Welcoming workers' families in the farm is thus used as a mean to legitimize the commitment of large landowners with the principles of sustainable development. This system of agricultural partnership has enabled many owners to resume their production activities by reducing the cost of labor, to curb the rural exodus and to improve their image. Welcoming families of workers on the farm is thus used as a means to legitimize the commitment of large landowners in the principles of sustainable development.

We present the case of the Fazenda M. Libânio group to discuss the modalities of this partnership and analyze the results.

2.3. The experience of the Fazenda M. Libânio group in Bahia

The case study is a widely used research technique in management sciences and marketing. Indeed, the use of a case to illustrate qualitative research is validated by the literature (Eisendhart, 1989; Gombault, 2005). Choosing the case study as a research method allows one to understand, describe, explain, predict and control individual or collective phenomena (Woodside and Wilson, 2003, Thomas, 2011). Merriam (1998) considers that the interest of the case study lies mainly in the research process which favors "discovery rather than confirmation" of new knowledge and provides a rich understanding of the realities considered.

According to Ait Mouloud, (2016), the use of the case method is justified on four grounds:

• The research question aligns with its standard questions;

• The case study associates the phenomenon and the context in the analyses, which suits our conception where the context is an integral part of the phenomenon studied;

• Finally, the case study is appropriate for explanatory research (Yin, 2008).

3. Results and discussion:

The M. Libânio S.A. Group in Bahia, Brazil has set up a new working relationship on its territory based on the agricultural partnership. This organization has allowed the improvement of the relationship between the company and society and the legitimation of a more socially sustainable production posture. For Ballet and Adam-Lachéze (2012) the reflection on corporate responsibility aims to

question the place of the company in society. Corporate responsibility refers to the idea of obligations about global problems such as climate change or local problems as the impact of a productive activity on the local populations. More and more traditional firms are integrating Fairtrade into their social responsibility strategy.

The new working relationship adopted by the M. Libânio group has fostered a social improvement for workers and the adoption of a new philosophy of sustainable production with more socio-environmental attention in its properties. This innovation in the territory led the group to seek a socio-environmental certification, Rainforest Alliance, to enhance this sustainable commitment to foreign markets.

3.1. The Rainforest Alliance certification process in Brazil

Sustainable certification in Brazil begins for Certification Body Imaflora, officially recognized and recognized in Brazil in 1995. Is becoming an important factor for international environmental certifiers, because the Brazilian Institute proposes a partnership with international sustainable labeling organizations. And this way of action the Imaflora helps the institutes that certify in Brazil to the harmonization of law and the national standards that allow the execution of certification throughout the national territory.

Rainforest Alliance is a non-governmental organization (NGO), founded in 1987 to promote productive activities (agriculture, forestry, and tourism); to conserve biodiversity and to improve social conditions (the welfare of workers and their communities). Based in New York, Rainforest Alliance Certified is present on all continents (Imaflora, 2016).

The rural properties are evaluated according to 90 criteria, divided into ten general principles:

1. Social and environmental management system.

2. Conservation of ecosystems.

3. Protection of wildlife.

4. Conservation of water resources.

5. Fair treatment and safe working conditions.

6. Occupational health and safety.

7. Relations with the community.

8. Integrated crop management.

9. Handling and conservation of soil.

10. Integrated processing of residues. Some of these criteria are essential.

Any property that does not fulfill an important requirement will have its certification canceled (Ferraz et al., 2000). This certification guarantees a production ethic close to Fairtrade. Since 1996, there has been a partnership between Imaflora Brazil, the FSC, and the Rainforest Alliance. Imaflora, a Brazilian certification body, is responsible for monitoring the FSC certification (Forest Stewardship Council, a US NGO specializing in forest management) and Rainforest Alliance.

3.2. The organization chosen by the Fazenda

In 1920 the group M. Libânio Agrícola S. A. was founded by two brothers, Durval and Manoel Libânio da Silva, who participated in the preparation and implantation of cocoa cultivation in several cities in the southern region of Bahia, Brazil.

The company is located in the heart of the Atlantic Forest, an area of extraordinary biodiversity and environmental preservation, protected by Brazilian law since 1965. The group owns a total area of 2,298 hectares and has currently 627 hectares of Cocoa plantation. Its political and institutional commitment has always been to satisfy its customers throughout technology that is supported by new practices and modern techniques. They promote a balance between soil, plant and man (clean technologies) for the emergence of sustainable development.

This group was one of the pioneers in the years 1998, on the implementation of the terms of employment relationship and partnership, benefiting more than 40 families who are assigned with plots from 5 to 10 hectares. These parcels were shared between the families according to the availability of agricultural family labor and land productivity.

The structure set up by M. Libânio ensures proper living conditions for the families who have adopted the partnership system. In such cases, families have substantial houses in good condition without paying rent and have access to a school, which offers training for adults and children and fights against illiteracy. There is also a health post located on the farm. The partnership system also enables families to improve their incomes, which relies in part on their involvement in production systems. Finally, on the psychological level, it increases workers's personal satisfaction through the feeling of responsibility and commitment alongside the big landowners.

On the owner's side, this partnership makes it possible to lighten the management and the negotiation of the wages, to better manage the economic crises and to share the financial and technical risks. The group's commitment with the poor workers enables the company to apply for Rainforest Alliance certification. Undeniably the protection of the environment is already ensured because of the geographical position of the company in the Atlantic forest certified FCS.

4. Conclusion and discussion

For the M. Libânio group, the crisis has encouraged the development of lasting behavior in an area used to producing cocoa extensively. The team M. Libânio succeeded on bringing back the reflection of sustainability and its importance in the cocoa region in Bahia and brought the theme of cocoa certification by the regional producers. The group showed the economic, ecological and social viability of sustainable cocoa production in the Bahia region of Brazil.

Table 2: Synthesis of production conditions before and after the phytosanitary crisis.

	M. Libânio before the crisis of the cacao	The posture of the group after the crisis
Production structure	1920: large land area 2,298	1989 - A serious moment of the

	hectares. Between 150 and 200 employees Primary and seasonal contract wage	phytosanitary crisis. The trigger for a change of posture for the group M. Libânio 90 employees and 40 families under partnership contracts (certified plots).
Main internal impacts	Standard production of cocoa sold in bulk (cocoa bulk), quantity-oriented for the conventional market. Workers' income based on base salary.	Smaller quantity salaries to pay. Cleaner management of the property. The Technical innovation in cocoa production. The beginning of sustainable cocoa production towards quality. For a specific market. And get differentiated prices for their products. Increasing wages and employment Family income increases twice as much and increases self-esteem.
Relationship to work	Relationship of work, employer employed. Power and Conflict.	The innovation of the employment relationship, the rural partnership put in place ensures peaceful relations.
External Impacts	Attention to the minimum environment provided for by law. Mass unemployment and small producers in	Perception of the importance of sustainable cocoa production to overcome the regional crisis. Creation of the Possibility the work

	difficulty	Improvement of the image of Bahia cocoa. Promotion of more sustainable behavior of all landowners. Soothe the social climate A stakeholder commitment to the protection of the regional ecosystem.

Without going so far as to recognize the benefits of the pest crisis on Cocoa production in Brazil, we show in this paper that it served as a catalyzer for the development of more sustainable behavior for several reasons. On the one hand, through the need to value the quality of the product in order to compensate the decreases in quantity. For this reason, achieving a certification by an ecolabel was necessary. On the other hand, through the requirement of social responsibility from most ecolabels, more specifically the Rainforest Alliance.

Despite the limitations of this unique case study, which reduces its external validity, our research shows that sustainable development issues can be transformed into formidable opportunities for reviewing production systems for the benefit of environmental and social well being.

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How Would Personal Traits, Creativity and Social Capital Affect Social Entrepreneurial Intentions of Agriculture Students in Taiwan?

Mei-Ling Kung
Department of Bio-Industry Communication and Development,
National Taiwan University, Taipei, Taiwan

Jiun-Hao Wang
Department of Bio-Industry Communication and Development,
National Taiwan University, Taipei, Taiwan

ABSTRACT

Prior research indicates that personality traits, social capital, and creativity are the key factors influencing social entrepreneurial intention. In this study, 239 valid samples were collected from Taiwan college students studying agricultural majors. Results were analyzed using SPSS, adoptive descriptive statistics, exploratory factor analysis, and multiple regressions. The demographic variables tested included personality traits, creativity, social capital, and social entrepreneurial intentions. The influences of personality traits, creativity, and social capital on social entrepreneurial intention were analyzed. The results revealed that the originality of creativity significantly influenced the social entrepreneurial conviction of agricultural students.

Keywords: personality trait, social enterprise, social capital, creativity, entrepreneurial intention, agricultural student

1. Introduction

Due to global food shortages and food safety problems, the social enterprise of agribusiness is becoming a hot issue. The Taiwanese Department of Agriculture has long engaged with agriculture-related expertise. In order to solve the shortage of agricultural manpower, attracting young generations of farmers becomes an important policy.

Entrepreneurs have a significant impact on their entrepreneurial intentions if they have the social capital when opportunities arise (Liñán & Santos, 2007). However, comparing with non-agricultural knowledge trainees, the Department of Agriculture students have more social capital, and might increase the entrepreneurial intentions of their agricultural enterprises. Additionally, creativity is one of the key factors affecting business intentions (Olufunso, 2010), as entrepreneurs need excellent creativity (Doboli, Kamberova, Impagliazzo, Fu, & Currie, 2010). Furthermore, Ayob, Yap, Sapuan, & Rashid (2013) found that students with social entrepreneurial intentions are more likely to be social entrepreneurs and are engaged in work related to social responsibility cooperation. The new studies find that the highly intimate and harmonious personality traits can predict students' entrepreneurial intentions (Wang, Chang, Yao, & Liang, 2016).

Therefore, this research tries to explore the possibility of the establishment of social enterprises among Taiwan Agricultural College students. The purpose is, first, to study the characteristics of personality, creativity, and social capital among Taiwan Agricultural College students; second, to evaluate the characteristics of personality traits, creativity, and social capital; and, third, to analyze the remarkable talents of the students of Taiwan Agricultural College to create social enterprise intentions.

2. Literature Review

2.1 Social enterprise with entrepreneurial intention

Social enterprises refer to individuals or organizations using business strategy and business models to operate in the same times, to pursue social welfare, and to create social value for the organization (Narangajavana, Gonzalez-Cruz, Garrigos-Simon & Cruz-Ros, 2016). In the case of global food shortages and food safety, agribusiness enterprises use social business models, establish new market operations value, improve the social quality of life, and solve social problems such as urban and rural development.

Social entrepreneurs, who usually have strong entrepreneurial intention while facing resource shortage and risk, make good use of their ability to efficiently solve problems (Thompson, 2002). Social entrepreneurs are good at combining personal knowledge and mission with social capital and opportunity to change status quo and achieve social enterprise goals and values. (Nga & Shamuganathan, 2010)

Entrepreneurial intention refers an individual’s preparation for faith-based entrepreneurial action, and the following implementation of that entrepreneurial behaviour. (Krueger, 2000). Entrepreneurial intention can be defined as “a self-acknowledged conviction by a person who intends to set up a new business venture at some point in the future” (Thompson, 2009). Intentional behaviour assists in explaining why entrepreneurs would like to establish a business long before they scan for opportunities (Krueger, Reilly, & Carsrud, 2000).

Noboa (2006) suggested that empathy, moral judgment, self-efficacy, and social support are important elements in operationalizing social entrepreneurial intention. Moreover, Hockerts (2015) claims that prior experience with social problems should also be a predictor of social entrepreneurial intention.

Based on the above theories, this study refers to the research results of Mair and Noboa (2006), Wang et al. (2014), and Hockerts (2015). This study further explores the scale in terms of reliability and validity, and

investigates and analyzes agriculture students' intention of social enterprise.

2.2 Personality traits and entrepreneurial intention

Personality has a stable and lasting character that shows the individual's consistent thinking, emotion, and action (Costa & McCrae, 1992). Personality traits have a significant impact on entrepreneurial intentions, with outward and open experience, diligence and prudence, emotional stability and low affinity, and harmony as the five personality traits. These traits factor into a strong entrepreneurial intent (Brandstätter, 2011; Collins, Hanges, Locke, 2004; Zhao, Seibert, & Lumpkin, 2010). Personality traits are innate characteristics, developed through socialization and education development, and formatted to personal values or beliefs. Therefore, personality traits may affect the intentions and decisions of individual conduct.

Nga and Shamuganathan (2010) used the five personality traits to study the students of the College of Agriculture and found that the students had harmonious, outgoing, and prudent personality traits. These personality traits had a positive effect on the participation of social enterprises.

"Five-factor model or Big Five model" is a very stable personality theory, and is often used in in the field of personality and entrepreneurial spirit (Zhao & Seibert 2006). Personality trait theory covers five main factors such as openness to experience, extraversion, agreeableness, conscientiousness, and neuroticism (Thompson, 2008).

At present, there is a lack of relevant empirical literature which can clearly refer to the personality traits of entrepreneurial intentions. In contrast, there are a lot of literatures that have sorted out the entrepreneur's personality traits. Besides personality traits, social capital and entrepreneurial beliefs also influence entrepreneurial intentions (Liñán & Santos, 2007; Martin et al., 2010). Moreover, entrepreneurial intentions are most often related to self-directed, open-minded, and prudent traits (Brandstätter, 2011; Zhao, Seibert, & Lumpkin, 2010).

Movahedi, Jalilian and Armand (2013) also found that agricultural students in different agricultural areas of education, or different departments of the agricultural college, have significant differences in their personality traits, but some scholars hold different views. According to Pouratashi (2015), education, personality traits, and their skills and other factors will affect the entrepreneurial intentions of agricultural students.

2.3 Creativity and entrepreneurial intention

Colleges and universities are the source of new knowledge development and technological innovation. Education can stimulate the rapid growth of creativity (Movahedi, Jalilian& Armand, 2013) . In addition, teachers and students‘ entrepreneurial intentions can enhance the innovative atmosphere on campus (Lee, Wong, Foo, & Leung, 2011). The developments and innovations of the campus are beneficial to entrepreneurial activities and help students to develop their own business (Shane, 2004).

Stein (1953) and Barron (1955) think that the core of creativity is "originality" and "usefuless". Barron and Harrington (1981) define creativity in two parts: one is “creativity as a socially recognized achievement in which there are novel products to which one can point as evidence” (product-oriented view), and the other is “creativity as an ability manifested by performance in critical trials” (ability-oriented view). In terms of creativity in the product perspective, the two core concepts are “originality” and “usefulness.”

Originality is one of the key elements of creativity (Guildford, 1950). Creativity is the key to influencing entrepreneurial ideas and entrepreneurial intentions (Hayton & Cholakova, 2011). Smith, Bell, and Watts (2014) found that social entrepreneurs exhibit significant creativity.

Therefore, this study uses creativity as a factor to analyze the entrepreneurial intentions of college students, and uses Lin et al. (2014) and Cropley (2015) to design the creativity content of this questionnaire.

2.4 Social capital and entrepreneurial intention

Social capital means the "actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition, or in other words, to membership in a group" (Bourdieu, 1986). Williams (2006) adopted the concept of bridging and bonding social capital and developed a scale to operationalize it. He also developed twenty questions to evaluate social capital, which this study also uses as a basis of analysis.

Social capital represents a certain degree of social network, cooperation, information exchange, and mutual trust, all of which become the basis of social relations (Nizar, Ali, Salman, & Demmalino, 2016). However, social capital can be divided into two categories: individuals and organizations. From an organizational point of view, social capital is not only an important factor for improving poor communities (Middleton, Murie, & Groves, 2005), but it also strengthens the quality of community life and sustainable development of essential elements. (Kay, 2006; Newman & Dale, 2005). From an individual point of view, the social capital of an individual can determine his or her position in the group, the type and quantity of the social resources he or she encounters, and his or her opportunities to access social resources.

Moreover, having social capital suggests certain effects on entrepreneurial intention (Liñán & Santos, 2007). Sharma (2014) found a higher social capital network would have an impact on career intentions, especially a strong impact on young people's entrepreneurial intentions and career choice. Nizar et al. (2016) applied the concept of social capital and deduced that social capital was significantly associated with entrepreneurial intentions and agricultural development.

3. Method

3.1 Measure

This study uses a total of five parts of the scale. The first part is demographics, such as gender, year of study, age, major of study, birthplace, and academic performance. The second part is based on the Thompson's (2008) model of big-five Mini-Markers. From forty options in the original model, twenty with higher factor loadings were selected (four items for each dimension) as our survey questions. The third part is creativity, divided into two dimensions of originality and usefulness. A total of twelve items were revised from Lin, Hsu, and Liang's (2014) study and were included in our survey. The fourth part is social capital, which adopts Williams' (2006) model and includes bridging and bonding, as well as ten items (five from each dimension) with higher factor loadings to measure social capital. The fifth part is social entrepreneurial intention, which was operationalized into dimensions of conviction and preparation, and was measured by eight items in reference to Mair and Noboa (2006), Wang, Peng and Liang (2014), and Hockert's (2015) studies. The respondents answered on a 6-point Likert-type scale which ranged from 1 (strongly disagree) to 6 (strongly agree). Unanswered questions were set as missing values.

3.2 Samples and procedures

The purpose of this study is to explore the creation of social enterprise business intentions among agricultural college students in Taiwan. The first step was an investigation of agricultural college students in terms of social demographic characteristics in order to understand students' personality traits, creativity, and social capital, as well as other characteristics. The second stage was to analyze the relationship between the personality traits, creativity, social capital, and the intention of creating social enterprises. The data was collected from September to October 2016 in both online and offline channels. Our target respondents included agriculture students in Taiwan. Respondents were junior and senior undergraduate, master, and doctoral degree students. A total of 254 questionnaires were received. Participation was voluntary and anonymity guaranteed. After excluding 15 questionnaires with high proportion of incompletion or contradictory views, the total number of valid questionnaires (both online and offline platforms) was 239. Using SPSS statistical software for data analysis, principal components analysis with varimax rotation was first used to test the dimensionality of the concepts (eigenvalues greater than 1). Descriptive statistics, independent sample test, one-way ANOVA, and multiple regressions were also used.

Among the valid questionnaires of the sample, the majority (50.2％) were female, with 49.8% being male. Characteristics of student age distribution were: 43.5% under age 20, 40.2% 21-30, 6.7% 31-40, and 9.6% over age 41. In terms of academic year, 72.4% were undergraduate, 24.3% were master degree, and 3.3% were doctoral degree students.

4. Results

4.1 Exploratory factor analysis

Regarding personality traits of the twenty questions, the Kaiser–Meyer–Olkin (KMO) value was 0.741. Bartlett's test of sphericity is statistically significant ($p = 0.000$, $\chi^2 = 1535.323$, $df = 190$), suggesting that it was suitable for factor analysis. In Table 1, five factors are proposed, including extraversion, openness to experience, neuroticism, conscientiousness, and agreeableness, with total variance explaining 58.592% and indicating adequate validity. The study provided the scale for analysing personality traits for Chinese-speaking university students on the basis of Thompson's (2008) International English Mini-Markers.

The creativity part included twelve questions and the Kaiser–Meyer–Olkin (KMO) value was 0.911. Bartlett's test of sphericity is statistically significant ($p = 0.000$, $\chi^2 = 2356.188$, $df = 66$), suggesting that it was suitable for factor analysis. The part of creativity proposes two factors: originality and usefulness, with total variance explaining 69.591%, which indicates adequate validity. Hsu et al. (2014), Lin et al. (2014) and Cropley's (2015) provided the tools for analysing creativity and supported the two factor (originality and usefulness) concept of creativity.

The social capital portion included ten questions and the Kaiser–Meyer–Olkin (KMO) value was 0. 827. Bartlett's test of sphericity is statistically significant ($p=0.000$, $\chi^2 = 1104.968$, $df = 45$), suggesting that it was suitable for factor analysis. Two factors were proposed, including bonding and bridging social capital, with total variance explaining 57.784%, which indicates adequate validity. Hence, the study verified the tool for analysing social capital and supports the two factors (bonding and bridging) of creativity, based on Williams' (2006)

study.

The social entrepreneurial intention included ten questions and the Kaiser–Meyer–Olkin (KMO) value was 0.892. Bartlett's test of sphericity is statistically significant (p=0.000 , χ^2 = 1204.225, df = 28), suggesting that it was suitable for factor analysis. Two factors are proposed, including conviction and preparation. The total variance explained is 61.775%, which indicates adequate validity.

Factor analysis of personality traits		1.	2.	3.	4.	5.	***M***	***SD***
1. Extraversion	Talkative	0.75					4.00	1.09
	Outgoing	0.85					3.77	1.10
	Reserved	0.79					3.29	1.00
	Shy	0.82					3.48	0.94
2.Opennessto experience	Creative					0.67	4.00	0.99
	Philosophical		0.46			0.46	4.32	0.97
	Unimaginative					0.81	3.84	0.88
	Unintellectual					0.60	3.79	1.17
3. Neuroticism	Anxious				0.69		3.69	1.22
	Jealous				0.69		2.90	1.12
	Unworried				0.61		3.47	1.23
	Unenvious				0.63		3.40	0.71
4. Conscientiousness	Systematic		0.86				4.02	0.93
	Careful		0.81				3.97	0.97
	Disorganized		0.43				4.48	1.28
	Inefficient		0.53				4.07	0.99
5. Agreeableness	Sympathetic			0.72			4.55	0.95
	Not harsh			0.73			4.26	1.03
	Unkind			0.73			4.49	1.02
	Rude			0.65			3.76	1.07
Total variance explained 58.592%								

Factor analysis of personality creativity		1.	2.	*M*	*SD*
1. Originality	Be able to work out a business plan that is unconventional	0.85		3.70	0.98
	Be able to work out a business plan that is unique from others	0.90		3.69	0.96
	Not be able to good at identifying new market needs	0.64		3.55	0.93
	I am good at proposing innovative ideas based on market needs	0.64	0.49	3.84	0.92
	Can work out a business plan and let it become market spotlight	0.87		3.61	0.85
	Be able to work out a business plan that can lead the market	0.86		3.55	0.93
	Can work out a business plan and know the target market's demand	0.41	0.71	4.11	0.78
	Can work out a business plan that can attract investors' attention		0.69	3.83	0.93
2.Usefulness	I am able to understand diverse needs of various customers		0.79	4.44	0.78
	I am unable to adapt flexibly to market changes	0.69	0.49	3.90	0.88
	I am able to consider the preference of target consumers	0.70	0.45	3.76	0.90
	My business plan can adapt to different markets after adjustments	0.55	0.66	3.77	0.79

Total variance explained 69.591%					
Factor analysis of social capital		1.	2.	***M***	***SD***
1. Bonding	There are several people I trust to help solve my problems	0.74		4.49	0.90
	Someone can give advice about making very important decisions	0.77		4.56	0.80
	If I needed an emergency loan of Nt$10000, No one I can turn to		0.47	3.75	1.20
	The people I interact with would put their reputation on the line for me	0.51	0.55	3.68	1.05
	The people I interact with would help me fight an injustice	0.73		4.36	0.90
2. Bridging	Interacting with people makes me interested in things that happen outside of my town	0.82		4.64	0.91
	Interacting with people online/offline makes me want to try new things	0.83		4.68	0.93
	Talking with people does not make me curious about other places in the world			4.36	1.10
	Interacting with people makes me feel like part of a larger community	0.63		4.37	0.91
	Interacting with people makes me feel connected to the bigger picture	0.68		4.68	0.84
Total variance explained 57.784%					
Factor analysis of social entrepreneurial intention		1.		***M***	***SD***
1. Conviction	I wish to start a social enterprise that assist in alleviating environmental issues	0.60		4.45	1.04
	I will create a social enterprise that will help vulnerable groups in the future	0.75		3.61	1.14
2. Preparation	I have a preliminary idea for a social enterprise on which I plan to act in the future	0.85		3.39	1.13
	My professional goal is to become a social entrepreneur	0.88		3.50	1.16
	I am going to do anything to become a social entrepreneur	0.85		4.00	1.09
	I will create a social enterprise that will promote the sustainable development of the environment in the future	0.76		3.92	1.03
	I will be the role of professional managers, and gradually promoted to obtain the right to operate social enterprises	0.83		3.72	1.07
	If I am going to inherit my family's business, I will plan to transform it into a social enterprise	0.74		3.80	1.16
Total variance explained 61.775%					

Note1: A factor loading less than .4 is not included. Note 2: Since only 1 component is extracted with eigenvalues greater than 1, factor loadings of social entrepreneurial intention can only be shown as the result of principal component analysis.

4.2 The demographics on independent and dependent variables

Independent t-test was used to test whether male and female would show different effects on personality traits, creativity, social capital and social entrepreneurial intention (Table 2). It was found that males showed a higher originality and usefulness of creativity than female student.

Table 2：Independent T-test of gender differences on variables

Variables		Male (n = 119)		Female (n = 120)		t
Dimensions		*M*	*SD*	*M*	*SD*	
Creativity	Originality	3.83	0.83	3.52	0.69	-3.15 *

	Usefulness	4.07	0.73	3.95	0.55	-1.33 *

Note1: * $p < .05$, ** $p < .01$, *** $p < .001$.

ANOVA was adopted to analyse the effect of the other two demographic variables (degree of study and age) on dimensions of independent (extraversion, openness, neuroticism, conscientiousness, agreeableness, originality, usefulness, bonding and bridging social capital) and dependent variables (social entrepreneurial intention).

Table 3 used ANOVA to compare means of degree of study, which suggested a significant effect on openness, originality, and usefulness. The doctoral degree students showed more openness of personality traits and the originality of creativity. Additionally, it followed that students who have master degrees exhibit more usefulness and have greater social entrepreneurial intention.

Table 3：ANOVA of differences of degree of study on variables

Variables	A.(n = 173)		B.(n = 58)		C.(n = 8)		F	Scheff's
Dimensions	*M*	*SD*	*M*	*SD*	*M*	*SD*		
Personality Traits								
Openness	3.91	0.69	4.15	0.75	4.52	0.52	5.050**	C > B >A
Creativity								
Originality	3.56	0.73	3.94	0.86	4.13	0.59	6.875**	C > B >A
Usefulness	3.95	0.62	4.19	0.70	3.97	0.50	3.059*	B > C >A
Social entrepreneurial intention	3.72	0.84	4.04	0.86	3.86	1.22	3.090*	B > C >A

Note1: $p < .05$, ** $p < .01$, *** $p < .001$.

Note2: A = College or university, B. = master's degree, C = Doctor degree.

ANOVA comparisons of means on age groups (Table 4) suggested a significant effect of age groups on Extraversion (F =2.854, $p < .05$), Openness (F= 5.465, $p < 0.01$), and Neuroticism (F= 6.784, $p < 0.001$). In addition to the creativity part, the Originality (F =9.391, $p < 0.001$), and the Usefulness (F =4.354, $p < 0.01$) were also significant. The social entrepreneurial intention was also significant.

The 31-40 age group exhibited more Extraversion and Openness personality traits, as well as more originality and usefulness. The 21-30 age group exhibited greater Neuroticism. The 41 and over age group exhibited greater social entrepreneurial intention

.

Table 4：ANOVA of age differences on variables

Variables	A：n = 104		B：n = 96		C：n = 16		D：n = 23		F	Scheff's
Dimensions	*M*	*SD*	*M*	*SD*	M	*SD*	*M*	*SD*		
Personality Traits										
Extraversion	3.56	0.86	3.56	0.88	4.02	0.75	3.98	0.70	2.854*	C>D>A>B
Openness	3.84	0.66	4.01	0.74	4.48	0.71	4.24	0.66	5.465**	C>D>B>A

Neuroticism	3.41	0.70	3.51	0.79	2.88	0.88	2.90	0.56	6.784***	B>A>D>C
Creativity										
Originality	3.49	0.61	3.64	0.82	4.29	0.73	4.17	0.93	9.391***	C>D>B>A
Usefulness	3.90	0.54	4.01	0.68	4.35	0.73	4.31	0.73	4.354**	C>D>B>A
Social entrepreneurial intention										
Intention	3.62	0.82	3.81	0.85	4.21	0.91	4.25	0.87	4.993**	D>C>B>A

Note1: $p < .05$, ** $p < .01$, *** $p < .001$;Note2: A=under 20years old, B = 21-30years old ,C = 31-40 years old, D = more than 41yearrs old

4.3 Multiple regression analysis

Table 5 shows the results of using multiple regression to analyse the effect of personality traits, creativity, and social capital on social entrepreneurship. The unstandardized regression coefficient of Originality on social entrepreneurial intention reached 0.59 ($p < .001$). Originality was found to be significantly related to social entrepreneurial intention. Since originality significantly predicted social entrepreneurial intention while usefulness could not, H2 was partially supported. Moreover, the R^2 of independent variables to social entrepreneurial intention reached 34.9%, while an F-test also presented a level of significance ($p < .001$), indicating an appropriate regression model.

Table 5：Multiple regression analysis of Personality Traits, Creativity and Social Capital on Social Entrepreneurial Intention

Variables		Social Entrepreneurial Intention(n = 239)		
		Beta	t	p
	(Constant)	0.68	1.19	0.233
Personality Traits	Extraversion	-0.09	-1.37	0.173
	Openness	-0.09	-0.97	0.332
	Emotional Stability	0.00	-0.07	0.942
	Conscientiousness	0.09	1.29	0.199
	Agreeableness	0.05	0.74	0.462
Creativity	Originality	0.59	5.48	0.000***
	Usefulness	0.01	0.11	0.914
Social Capital	Bonding	0.12	1.46	0.147
	Bridging	0.10	1.25	0.212
	R^2		0.349	
	F		13.572	
	p		0.000***	

* $p < .05$, ** $p < .01$, *** $p < .001$.

4.4 Discussion

These results, based on the dimensions of personality traits (extraversion, openness to experience, neuroticism, conscientiousness, and agreeableness), creativity (originality and usefulness) and social capital (bridging and bonding) support the research of Thompson (2008), Lin et al. (2014) and Williams (2006).

The results of the differences caused by the demographics of samples on independent and dependent variables provided several implications. First, it was found that males showed higher originality and usefulness of creativity than females. Because of males shoulder the heavy responsibility of the family in Taiwan, at the same time it follows that men exhibited "original" and "practical" invention work more than women. Moreover, Taiwan men engaged in "original" and "practical" work more than women. That's the reason why the males are more originality and usefulness in Taiwan.

Second, the doctoral degree students exhibited more openness of personality traits and the originality of creativity. Additionally, having a master's degree exhibited more usefulness and social entrepreneurial intention, which suggests that higher education can develop professional knowledge and ability.

Third, students between 21-30 years old are young and lack social experience, so they exhibit greater neuroticism. Between ages 31 and 40, students exhibit greater extraversion and openness, and exhibit greater originality and usefulness. It shows that people of this age have social work experience and thus exhibit greater "outgoing" and "open experience" traits. Because they may have greater work experience and may have saved more money to start a new business, the students age 41 and over exhibited more entrepreneurial intention.

Multiple regression analysis showed that among the factors of personality, creativity, and social capital, only originality was significant. This result enforces the fact that originality is one of the key elements of creativity and that social entrepreneurs have significant creativity (Guildford, 1950; Hayton & Cholakova, 2011; Smith, Bell and Watts,2014).

In terms of research constraints, the sample of this study was taken from students of the College of Agriculture and should not be generalized towards students in other disciplines. Additionally, because the social, cultural, and educational systems are different in Taiwan, the result of this research should not account for other countries or regions.

Conclusion

The aim of this study is to explore the entrepreneurial intentions of social enterprises and their influencing factors. Results showed that males exhibit higher originality and usefulness in terms of creativity. In terms of educational background, having a master's degree exhibited greater usefulness and more social entrepreneurial intention. Additionally, doctoral students exhibited more openness and originality then undergraduate or master degree students. In terms of age, older students exhibited more extraversion, openness, originality, and usefulness entrepreneurial traits. From an age perspective, older students may have more extraversion, openness, originality, and usefulness entrepreneurial of traits.

This study is aimed at researching personality traits, creativity, social capital, and entrepreneurial intention among students of Taiwan Agricultural College. These factors are the main human resource for development of agricultural enterprises. The intended contribution of this research is to provide Taiwanese agricultural educators with greater understanding of their students. Additionally, it aims to support the future of education reform and adjust the basis of personnel training. For policy, this study can provide agricultural education and policy planning units to further understand agricultural students in terms of human resource management and advanced personnel training. Finally, this research hopes to provide reference indicators for the selection of

agricultural enterprises.

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Implementation of Incentive-Based Education for People in Rural Areas Where Education is Less Prioritised: A Case Study of illiteracy rate reduction in Jayawijaya Region, Papua, Indonesia

GILANG A. FAUZI

Master of Development Studies, Murdoch University, Western Australia

Abstract:

This desk-based study examines the implementation of incentive-based education through Reading Eating Attending Developing and Incentive (READI) program in rural Jayawijaya where education is less prioritised. This READI program, where the term I have come up with and considered as bottom-up approach, targets improving the students' school attendance, increasing literacy rate, and changing parents' attitude of the importance of education by providing incentive to students, parents, and the community. The top-down approach is also pivotal in which the government takes responsibility in providing support on funding, making policies and improving the education facilities including school buildings, access, and human resources.

Through theories of change by Krznaric (2007), I analyse what changes are created, who involve in the change, what strategies used to create the change, what contexts affecting how change happens, and the process of change. By combining these theories and power analysis particularly its relationship to the stakeholders, I found that this intervention recognises the multi-dimensional nature of poverty such as education, household economy, food security, and health issues. Moreover, "responsible exit" strategies by Hayman et al. (2016) are required for the program sustainability. Consequently, this program can improve people's lives and get them out of the poverty cycle.

Key words: child labour, community incentives, education, illiteracy, incentives, parent incentives, poverty, power analysis, theories of change, student attendance

I. INTRODUCTION

It is widely accepted that education provides a strong foundation for improving lives. The Millennium Development Goals (MDGs) made significant headway improving literacy rates globally (United Nations 2017). Consequently, the Sustainable Development Goals (SDGs) continue to address education as apriority. As part of the 17 United Nations Sustainable Development Goals (SDGs) Goal 4 - the education goal - is the primary goal to derive other SDGs including goals on health, growth employment, sustainable consumption and production and tackling climate change related issues (UNESCO 2017). To obtain good quality education, basic literacy skills including reading and writing skills are required. In some developing countries, the illiteracy level has reduced. However, according to UNESCO Institute for Statistics (2015), 757 million adults globally are still illiterate. Indonesia, classified as a developing country, faces this problem, particularly in rural areas.

Illiteracy in Indonesia has reduced significantly in the last decade. From 2005 to 2015, the percentage of illiteracy has fallen by nearly half for each age group (Badan Pusat Statistik 2017). However, the illiteracy level in Papua, a province in the Eastern part of Indonesia, has remained the highest since 2005. The illiteracy rates in Papua are over 25% in all age groups, even reaching nearly 30% in 2015 (Badan Pusat Statistik 2017). The geographical condition of Papua particularly the Jayawijaya region is considered the main contributing factor that maintains the high illiteracy level. Other factors such as poor infrastructure and low household incomes also play important roles in maintaining the low literacy levels. In addition, poor student attendance and teacher absenteeism are also factors for high levels of illiteracy and these factors point to education being poorly valued by families in Jayawijaya. These are issues that will be explored throughout this thesis. In addition, other issues concerning policy interventions that will address illiteracy in Jayawijaya.

Lack of awareness of the long-term benefits of education is a compounding issue that needs attention if illiteracy is to be addressed in this region of Papua. Although the Indonesian government has made a huge effort in making education more easily accessible with policies such as the 12-year old compulsory period and the Indonesian Smart Card program or *Kartu Indonesia Pintar*, education is not a priority for many of the rural families living in Papua. While children are crucial to contributing to labour in poor rural families because they directly contribute to improving household income, this research proposes that by educating the children of Jayawijaya can become far more economically valuable to poor rural families, and strategies need to be developed to encourage families to invest in the long-term benefit of their children's education and to be assisted in clever ways that encourage this and contribute to the household economy.

In addition, this research recommends a new strategic approach to address the ongoing high levels of illiteracy in Jayawijaya. Based on the findings from a desktop literature review and critical analysis of the issues identified as contributing to illiteracy in Jayawijaya, READI (which stands for reading, eating, attending, developing and incentive) is a program targeting illiteracy in the Jayawijaya region that provides incentives to families to send their children to school, which includes providing children a free meal, improving nutrition, regular free health checks at school, and for parents agricultural incentives such as training in farming skills and agricultural inputs such as fertilizer to increase farming production. This will improve the household level economic benefits. These incentives are expected not only to motivate children to go to school, but also to change parents' attitudes of the importance of education for their children.

II. RESEARCH/CASE STUDY AIM

The aims of this study are:

1. To identify more deeply the causes of the low literacy rate in Jayawijaya, Papua, Indonesia.
2. To explore the challenges in increasing the literacy rate and improving the quality of education in Jayawijaya, Papua, Indonesia.
3. To conceptualise incentive-based education implemented in rural areas where education is less prioritised, especially in Jayawijaya region.
4. To recommend strategies for the sustainability of incentive-based education through READI program in the rural Jayawijaya region.

III. APPROACH/METHOD

This study is a desk-based study drawing on scholarly literature, secondary data such as policy documents regarding the special autonomy of Papua and Indonesian laws, government reports, and NGO reports. This research focuses on Papua as the province that has the highest illiteracy rate in Indonesia (Badan Pusat Statistik 2017). It also specifically focuses on the Jayawijaya region because it has the highest number of poor people from 2010 to 2015 (Badan Pusat Statistik Provinsi Papua 2017). The literacy level in this region has remained low at slightly over 50% since 2008 (Badan Pusat Statistik Provinsi Papua 2017). This research will consider the policy interventions as a means of providing strong enabling environment by which the proposed READI program will be implemented. The enabling environment is interrelated conditions that support development actors to run the development projects from local to national level for the program sustainability (World Bank 2003, 4). This strong enabling environment will support the READI program implementation and sustainability.

IV. Causes of High Illiteracy in Jayawijaya

a. Remote Rural Livelihoods in Jayawijaya

Jayawijaya has the largest number of people living in poverty across Papua since 2010 (Centre of Papua's Statistical Bureau 2017). Most people in Jayawijaya grow their own staple food to consume and sell the extra produce they have to the market. To address food security of the subsistence livelihoods of farmers in Jayawijaya, the government has introduced new cash crops including cabbage, lettuce, carrot, peas, cauliflower, and spring onion. In addition, Jayawijaya produces Arabica coffee beans as a primary crop.

The Jayawijaya region is geographically located in the central highland of Papua province, which lies in the eastern part of Indonesia. Jayawijaya can be reached only by air transportation because the jungle is very compact and mountainous (Jalal and Sardjuani 2005, 21). Hence many villages in the region can only be reached by foot. The remote location is one factor contributing to the limited number of school buildings, the insufficient number of teachers, the low numbers of student attendance and the high levels of teacher absenteeism (Shah 2015) and these issues will be expanded on below.

b. Disparity between Urban and Rural Districts

In the Jayawijaya region, people living in urban areas tend to be more literate than those who are living in rural areas. According to data from the Centre of Statistical Bureau of Jayawijaya (2016, 24), 94.70% of people aged between 15 and 24 who live in the city can read and write, while only 72.09% of those who live in rural areas are literate. This disparity is also of a gendered nature. In the city, 100% of males aged between 15 and 24 can read and write, while only 86.92% of females in the same age group are literate (Badan Pusat Statistik Jayawijaya 2016, 24). In rural areas, literacy is lower. The percentage of literate males in the same age category as above in rural Jayawijaya region is slightly over three-quarters while the percentage of literate females is only 66.22% (Badan Pusat Statistik Jayawijaya 2016, 24).

This gender disparity in Papua can be understood in terms of the prevailing patriarchal system where the male is the head of the family and where women have less freedom than men (Yektiningtyas-Modouw and Karna 2013, 88). Women experience many restrictions and are expected to obey their husbands. In addition, the main responsibility of women is cooking and taking care of the family; education is therefore considered less important for women. In the patriarchal system, the men have more responsibility for household income, so boys are prioritised when it comes to education.

c. Insufficient Numbers of Teachers

Mollet (2007, 158) claimed that there is a teacher shortage in the highland area of Papua, where Jayawijaya region is located, especially at the primary and secondary levels. He argues that a lack of facilities, social services, accommodation and limited health care services and facilities mean teachers are unwilling to teach especially in rural areas. The remote location, lack of incentives, and irregular salary payments are also factors in the lack of motivation to teach in Papua. The challenging geographical location of Jayawijaya makes it difficult and unappealing for teachers to bring their families to live there. Mollet (2007, 158) also points out that lack of teachers directly impacts the low numbers of people who had neither completed nor attended primary school. In 2015, 21.65% of people in Jayawijaya aged between 7-24 had never attended school while 11.16% of those do not attend school anymore (Badan Pusat Statistik Kabupaten Jayawijaya 2016, 88).

d. High Level of Teacher Absenteeism

According to the literature, one of the major problems of education in Jayawijaya is the teacher absenteeism (Mollet 2007; Anderson 2013; Shah 2015). Outside the Papua area, such as the urban like Jakarta, absenteeism is defined as skipping one to two days of teaching during the school week (Anderson 2013). However, due to the remoteness of the location, absenteeism can mean skipping teaching classes for a semester in Papua, particularly in rural Papua (Anderson 2013). This happens when teachers live in the city or urban areas instead of in the rural areas where they teach (Shah 2015, 238). Research also indicates that a lack of support is the main reason for high levels of teacher absenteeism in rural Jayawijaya (Mollet 2007; Anderson 2013; Shah 2015). The teachers do not receive adequate support including social services, transportation to access rural areas, and additional incentives (Mollet 2007, 159). Anderson (2013) also stresses six problems that cause the high level of teacher absenteeism including teacher placement is geographically distant from where they

reside, penalties for not applied for teacher absenteeism, no on-site payment, insufficient salaries/incentives, lack of additional supports such as workmates and administrators, and insufficient housing.

The Analytical and Capacity Development Partnership (ACDP) in Indonesia (2015, 2), refers to teacher absenteeism in two categories: the absence rate from school and the absence rate from class. The absence rate from school means that teachers are not attending school at all while the absence rate from class is defined as teachers not teaching although they are at school. Based on the ACDP's research (2015), the percentage of absence rate from school is lower than the percentage of absence rate from class in the western part of Indonesia (Java and Sumatra) while the opposite occurs that the percentage of absence rate from school is higher than the percentage of absence rate from class in the eastern part of Indonesia (Bali, Nusa Tenggara, Kalimantan, Sulawesi, Papua, and Maluku). The percentage of teachers not attending school in Papua is 12% compared to the absence rate of teachers not teaching classes while being at school (ACDP 2015, 2).

e. Low Percentage of Student Participation Level

The percentage of student participation in Papua especially in Jayawijaya has never reached 100% (Kementerian Pendidikan dan Kebudayaan 2017). It remains low especially in the higher level of education. Only 75.36% of students in Jayawijaya attend primary school, and nearly 50% in both junior high school and senior high school level (Kementerian Pendidikan dan Kebudayaan 2017, 32 and 46). In senior high school level, student attendance was only 41% in 2016 (Kementerian Pendidikan dan Kebudayaan 2017, 60). Many rural families who work either at the local coffee plantation or at the family garden take their children to work rather than sending them to school.

The low percentage of student attendance is strongly connected to poor economic conditions and rural poverty (Ahmed and Zeshan 2014, 135; Bhalotra and Heady 2001 cited Mukherjee and Sinha 2009, 113; Shafiq 2007, 955). During harvest, students are not able to attend school because they are expected to assist their parents on the farms (Mollet 2007, 160). In fact, Munro's research (2013, 26) indicates that students are more enthusiastic about participating in rural labour with their parents rather than getting wet when crossing the cold We River and going to school hungry because of not having had breakfast.

School-aged children also typically assist their parents to search for firewood because rural families in Jayawijaya practise the traditional method of cooking using firewood instead of Kerosene. 94.77% of people use firewood as cooking fuel while 53.84% of people in urban area cook use kerosene to cook (Badan Pusat Statistik Provinsi Jayawijaya 2016, 91). Kerosene is unaffordable for the rural poor and it is difficult to distribute because of lack of good transportation access to those rural areas. This high reliance on firewood for fuel means families rely on children to collect firewood.

The challenging geographical location in Jayawijaya exacerbates the low student attendance. Some schools are located very close to the main road that connects each district. This asphalted road provides good access to cars, trucks and other types of transport. School students can sometimes hitch a ride from the empty trucks passing along the main road. If they are unlucky, they have to walk all the way along the main road to reach school. However, some schools are located in very remote areas and

walking through mountainous areas to attend school can take hours (Yektiningtyas-Modouw and Karna 2013, 84). This too impacts on school attendance rates.

f. Unaffordable Education

Parents cannot afford to send their children to school because of their subsistence livelihoods. People lack money to pay for registrations, school fees, uniforms, or to bribe teachers (Munro 2013, 40). Because of the low incentives for teachers to work in remote rural Jayawijaya, they often resort to corrupt activities to enhance their own situation despite the impact this has on families and children's education.

Munro (2013, 40) also provides an example that a young man named Petrus who needs to pay the teacher a pig or 500,000 rupiahs (approximately AUD$65) to get his diploma. Students sitting exams also cost parents a pig, a chicken and 250,000 rupiahs (approximately AUD$35) (Shah 2015, 238). These costs are major barriers for the rural poor to send their children to school (Munro 2013, 40).

V. Parents as a Major Barrier

Living in poverty means rural people focus on subsistence efforts to feed their family. In rural Jayawijaya, although education is pivotal to improve their quality of life, and a "child's education is an investment" (Mollet 2007, 161), parents cannot see the instant benefit of education in terms of supporting household income, so they decide not to send their children to school. Shah (2015, 243) found that rural parents are willing to pursue education for their children and are aware of the long-term benefits of education for themselves and their community.

However, poor parents make cost-benefit analyses whereby they calculate the economic impact of the loss of labour their children provide if they were to send them to school. In addition, they will incur costs associated with school fees, uniforms, books, stationaries, and teacher bribery (Shah 2015, 243). However, Munro (2013, 26) found that some parents and their children consider education less important than working in the family garden. In this case, parents are a major barrier to children's education for not allowing them to attend school. Despite this, they cannot be blamed because Shafiq (2007, 947) suggests that poverty and low parental education are causes of low school enrolment and high levels of child labour in the agricultural sector.

There is a strong connection between poverty and parental decisions about what they want their children to do. Shafiq (2007, 955) argued that poverty encourages households to rely on child labour rather than sending children to school. In Bhalotra and Heady's research (2001 cited in Mukherjee and Sinha 2009, 113), many households prioritise child labour rather than education precisely because of their subsistence conditions.

Research also indicates that the education of parents plays an important role in their decision-making around educating children. Educated parents tend to have more income and realise the importance of education, particularly the long-term impact of their economic returns, so they are more likely to send their kids to school rather than encouraging them into labour activities (Dar et al. 2002, 31).

VI. The Importance of Education

It is widely accepted that quality education is important to improve people's lives and reduce poverty. According to the UN (2017), education is also the foundation to achieve other Sustainable Development Goals (SDGs). Ahmed and Arends-Kuenning (2006, 665) elaborate that quality primary education will give an opportunity for developing countries to reduce poverty and to improve economic growth by equipping poor children with skills including literacy, numeracy and basic problem-solving skills.

Furthermore, education can reduce inequality and eliminate gender disparity (UN 2017). In the rural setting, parents' decision to send their children to school depends on the economic and social benefits that they will get investing in their daughter's in education (Ahmed and Zeshan 2014, 134). If parents see a benefit in terms of future income from educating their daughters, they will enrol them in school (Ahmed and Zeshan 2014, 134).

In the context of rural Jayawijaya, Shah (2015, 243) found that while parents recognise that formal education can improve a family's status in society and increase the opportunity for educated children to gain higher paid-jobs compared with their subsistence rural livelihoods. In addition, Munro (2013, 33) explores the benefits of education to help other people in terms of gaining influence and funds for community development through representing the society in negotiation processes in the political system. In her thesis, Munro (2009, 10) points out that educated graduates can help other people in rural Jayawijaya to avoid being humiliated, judged and ignorant, and prevent people seeing themselves negatively. Moreover, Munro (2013, 33) also elaborates that education is seen as a tool to overcome the stigmas that people in Papua are primitive, backward and have the poorest quality of human resources in Indonesia.

VII. Neither the Shortage of Teachers nor the School Buildings are the Problem, but Teacher Absenteeism

Anderson (2013) found that rather than the number of teachers and school buildings, teacher absenteeism plays a big role in creating problems of education in Papua as explored in the previous section. Anderson (2013) also reveals that there is a false assumption that Papua lacks of teachers and school buildings due to its location. In fact, Papua, especially the Jayawijaya region has a sufficient number of both teachers and school buildings (Anderson 2013; Badan Pusat Statistik Provinsi Papua 2016; Kemendikbud 2016; 2017).

According to the Indonesian Ministry of Education (2017), Jayawijaya region has 170 school buildings out of 3626 school buildings across Papua. This number has increased slightly in which it was 167 school buildings out of 3584 last year (Indonesian Ministry of Education 2016), and subsequently, Jayawijaya has retained its rank as the ninth region with the most school buildings across the Papua province. Wamena district, the capital city of Jayawijaya, has the most number of school buildings in the region at 52 out of a total of 170 school buildings, followed by Asologaima district and Kurulu district at 24 and 19 school buildings respectively. The special autonomy budget of Papua education in rural areas is mostly spent on salaries and building new schools without balancing the provision of the education (Anderson 2013, 5) including providing support for the teachers to deliver education. Although more school buildings are built, the school will not be functioning without the presence of teachers.

Furthermore, the distributions of school buildings are not equal especially those located in rural Jayawijaya. All schools are centred in the urban areas, while there are only few numbers of schools in rural areas. There are no school buildings in eight districts of the Jayawijaya region, including Wame, Hubikiak, Molagalome, Tagime, Piramid, Muliama, Asotipo, and Maima districts (Indonesian Ministry of Education 2017). From the total number of schools, the primary school has the highest number, and it gets fewer as the level rises to junior and senior high school (Indonesian Ministry of Education 2017). Senior high school is even available only in 5 districts where Wamena has the highest number with a state senior high school and six private senior high schools (Indonesian Ministry of Education 2017).

The literature reveals there are a sufficient number of teachers in the Jayawijaya region (Anderson 2013; Badan Pusat Statistik Provinsi Papua 2016). According to the ideal ratio of teachers and students, there should be one teacher for every 40 students in primary school level, and one teacher for every 21 students both in junior and senior high school levels (Badan Pusat Statistik Provinsi Papua 2016, 11). In Jayawijaya, the ratio between teachers and students in primary school level is 1:36, which means that one teacher is teaching 36 students on average, while it is 1:23 in Junior High School level (PDSPK 2016, cited in Kemendikbud 2017). Meanwhile, the ratio between teacher and students in the Senior High school level and Vocational School level is 1:15 and 1:21 respectively (PDSPK 2016, cited in Kemendikbud 2017). From the ratios above, it is apparent that there are a sufficient number of teachers in Jayawijaya although there are a slightly high number of students in the Junior high school level.

However, similar to the distribution of school buildings, there is also unequal distribution of the number of teachers and teacher-student ratio in urban and rural areas. Most teachers are centred in the urban areas including Wamena district (798 teachers), Asologaima (146 teachers), Kurulu district (139 teachers) and Hubikosi (110 teachers) (Kementerian Pendidikan dan Kebudayaan 2017). For example, the average teacher-student ration in Wollo district is 1:40 which means one teacher teachers 40 students in average.

VIII. Policy Interventions to Improve Literacy

The government has created some programs to respond to this problem, and assist parents to send their children to school. The President launched a new policy for compulsory 12-years of study for all Indonesian children building on the previous nine-year compulsory education program, (Natahadibrata 2013). The Ministry of Education is funding this program with 1 million rupiahs (US$100) in school operational assistance for each high school student and 1 million rupiahs (US$100) of finance scholarship for 1.7 million high school students (Natahadibrata 2013).

The Indonesian government has also introduced “Kartu Indonesia Pintar” (an Indonesian Smart Card) that allows all children to access education up to senior high school. This Smart Card allows those who have a Family Welfare Card to receive some funds based on the level of education of their children. According to The National Team for the Acceleration of Poverty Reduction (2017), elementary school students or children aged 7-12 years old will receive 225,000 rupiahs (AUD$25) per month while junior school students or children aged 13-15 years old will receive 375,000 rupiahs (AUD$40) per month. Meanwhile, senior/vocational school or children aged 16-18 years old will receive 500,000 rupiahs (AUD$55) per month. Once they are registered in a formal or non-formal

education institution, the targeted children will receive this Indonesian Smart Card and be ensured that they will also receive this grant.

This program is essential to improve the quality of education in Papua, especially in Jayawijaya because the budget that government has allocated for education in their annual regional budget plan is not sufficient. Papua has allocated Rp 100 billion ($10,000,000) from the Annual Local Budgeting Plan, which is only 0.84% of the total regional budget plan of $1,1 billion (Erdianto 2016). This amount is not efficient because each student will only receive the equivalent of $16 annually. It will be very challenging to improve the quality of education in Papua, especially in Jayawijaya if each student receives only $16 for their education incentive.

In addition, the provincial government of Papua has allocated a budget for education. This budget does not only come from the Annual Local Budgeting Plan, but also comes from the Special Autonomy Budget since Papua has been declared as one of the Special Autonomy Provinces of Indonesia. According to Chapter One Article 1B of the Special Autonomy Law for Papua Province, the Special Autonomy is the authority and responsibility given by the Government of Indonesia to the Papua province to manage their budget and programs based on the rights and aspirations of the people of Papua (Indonesia 2001 cited in Refworld 2017). The Special Autonomy Law for Papua province obliges the local government to allocate 30% of the total budget to educational programs (Indonesia 2001 cited in Refworld 2017). This allocated budget is used to provide free education, scholarships for indigenous students, and the renovation of education facilities (Mollet 2007, 163).

Munro (2013) and Shah (2015) state that teacher corruption particularly bribery is endemic in Jayawijaya for a whole host of reasons. This endemic is caused by lack of supports for teachers. Teachers are not provided with transportation costs particularly those who are assigned from other areas and their salaries are not sufficient (Anderson 2013, 6). The teacher corruption practices are problematic because it will weaken the capability of parents to afford education. In addition, this bribery will also impact the household economic condition in terms of failing to fulfill their basic need because the wealth they have is used to bribe teacher. If this policy intervention is to be successful, government will also need to address the issue of teacher bribery. This will ensure a strong enabling environment.

IX. Positive Impact of Incentive-Based Education

Increasing literacy rates in Jayawijaya can be undertaken in a variety of forms including through such an incentive-based program as READI. This incentive-based education, which is the term I have devised but where there are many examples of such incentive programs, is a holistic program to provide incentives at multiple levels for students, parents, and the community. The incentives are expected to be able to change parents' attitudes about the importance of education whereby parents will be encouraged to send their children to school.

In the incentive-based education program, students who attend school will be provided with free meals once a day to address what Munro identified as an issue of children attending school hungry (Munro 2013, 26). Thus, they can concentrate when at school. In addition, they will also get regular health checks once a month on Fridays. Health service

faces similar challenges as the education does. The health service might not be available in rural Jayawijaya because healthcare workers will not go to remote area if the school does not operate (Anderson 2013, 6). Therefore, the regular health checks which is supported by the Department of Health of Jayawijaya in the READI program will be beneficial incentives for people in rural Jayawijaya.

The agricultural inputs will substitute the loss of the direct impact of child labour that their children provide. There will need to be some knowledge sharing with parents about the long term benefits of this intervention to also encourage them as it will take at least a full season for them to see benefits of surplus produce. In addition, the community will also receive incentives if they can encourage parents to increase school attendance to more than 75%. This incentive is a reward for the community to support change.

Some developing countries have practised providing incentives to improve literacy levels through increasing school attendance. In Bangladesh, a program call Food for Education (FFE) was introduced in 1993 (Meng and Ryan 2010, 416). This program offers free monthly food grain rations for poor families if they send their children to school not only to improve the school enrolments, but also to "benefit short-run food and nutrition security" (Meng and Ryan 2010, 416). From the previous research, this program had a significant impact on improving primary school enrolments. Alam et al. (1999 cited in Meng and Ryan 2010, 416) found that the FFE program increased the enrolments by 53% in grade I and 30% in grade IV. A study by Ravallion and Woodon (2000) also shows positive impacts on school participation rates where the enrolment rates are 0.15% higher if treated by FFE program than those who are not. Besides, the FFE program also impacts the child labour rate reducing it to 0.05% lower than those who are not involved in the FFE program (Ravallion and Wodon 2000, 168).

Meanwhile, in Mexico, PROGRESA designed to provide poor mothers with food grants if they send their children to school regularly and receive medical check-ups regularly (Schultz 2000) aims to increase school enrolment among youth in rural communities. Schultz found this lead to reduced poverty and the increase in productivity as well as household welfare (Schultz 2000, 1). Schultz (2000,3) stated that by joining the PROGRESA program, poor rural youth are encouraged to continue their education to secondary level or even higher. The economic returns from continuing their study to secondary level are large, and consequently the youth break out of the poverty cycle (Schultz 2000, 6). This program has successfully increased the enrolment for boys and girls both at the primary school level and at the secondary school level although the impact on primary school enrolments is not as significant. At the primary school level, this program has increased the school enrolments 1.2% for girls and 0.5% for boys while it has raised the school enrolment rate of 11% for girls and 7.5% for boys at the secondary school level (Schultz 2000, 35).

X. Theory of Change

Krznaric's theories of change in *How Change Happens* (2007, 31) draws on several questions "to create a tool for thinking about how change happens." The questions include actors involved in the change, strategies used to create the change, what contexts affecting how change happens and the process of change (Krznaric 2007, 6).These questions can articulate more on how and why change happen particularly when we run a program like the READI that involves change to tackle low illiteracy issue in Jayawijaya. This theory

of change is strongly correlated to the stakeholders and the power analysis because it is pivotal to understand the relationship of power when to bring the change. Some stakeholders can be seen as powerful actors, while others are powerless (Gaventa 2006, 23). Power and the relation to its stakeholders can be described using the term "power over, power to, power within, and power with" (VeneKasen and Miller 2002, cited in Gaventa 2006, 24). 'Power over' refers to the ability of the powerful over the powerless while 'power to' refers to the capacity to act (VeneKasen and Miller 2002, cited in Gaventa 2006, 24). 'Power within' often refers to gaining self-confidence and capacity before the strategies are implemented while 'Power with' refers to collaboration and partnership with other stakeholders to support the program implementation (VeneKasen and Miller 2002, cited in Gaventa 2006, 24).

Power can also take in different forms including "visible" which can be observable, "hidden" which can be inserted with an agenda and "invisible' which includes norms, beliefs, socialisation and ideology" (Lukes 1974, cited in Gaventa 2006, 25). In addition, power can also be analysed by different spaces they create which include "closed, invited and created" (VeneKlasen and Miller 2002, cited in Gaventa 2006, 26). Moreover, power can occur in various levels including household, local, national and global level (Lukes 1974, cited in Gaventa 2006, 25). These dimensions of power can assist development practitioners to identify the types of power and implement the strategies to bring about change (Gaventa 2006, 25).

XI. Incentive-based Education through READI Program

READI program stands for "Reading, Eating, Attending, Developing, and Incentive." It is proposed that Wahana Visi Indonesia, the local based International NGO named World Vision in Jayawijaya, will implement the READI program. This program is designed to encourage people in rural Jayawijaya to access education. Wahana Visi Indonesia will run the program for three years which consists of a six month-period pre-treatment program, a two year-period treatment program, and a six month-period post-treatment program when the incentive is stopped. The six month-period pre-treatment program will include the community sensitisation where they will be informed continuously about the importance of education, encouraged continuously to send children to school, and explained about the new intervention during the implementation of READI program through the provision of incentives for children, parents and the community. In addition, during this period, parents and the community will be required to send their children to school if they want to benefit from this program. This will create a stronger enabling environment.

After that, READI program will be implemented for two years. It is proposed that this program will operate as a partnership between an NGO based in Wamena, Jayawijaya and the government in the regional level. The NGO including Wahana Visi Indonesia, will get involved directly on site to manage and supervise the program while the regional government will be involved in funding, policies and the provision of education facilities such as school buildings, teacher and administration staff to strengthen the enabling environment for this program. It is proposed that another NGO called Yayasan Kristen Wamena will provide materials such as books, teacher training, and suitable curriculum developed for the local students.

There are three categories of beneficiaries in the READI program, including students, parents, and the community. The students who attend the school will be provided with

morning tea and lunch every day because students often go to school hungry (Munro 2013, 26) and need to walk for hours to attend school (Yektiningtyas-Modouw and Karna 2013, 84). This food for the student program is also aimed to help parents to reduce their expense to provide meals for their children, so they can save the money or sell the stock of their staple food for extra cash. In addition, this food for the student program is also expected to improve children's nutritional level.

Parents will be targeted via an agricultural input incentive program whereby parents will receive fertiliser and good quality seeds and training to improve their farming productions. Most parents work as farmers (Mollet 2007, 160), so it is expected that the agricultural inputs will benefit them in terms of increasing their farm production that can lead to better economic conditions. The incentive to parents will be given under the condition of maintaining the school attendance of their children for more than 85% every two months.

This incentive-based education program also provides an incentive to the community. The targeted community is involved in this program to support this initiative in changing parents' attitudes regarding the importance of education. Targeted communities represented by the community leader will receive livestock as their reward if they can encourage their community especially the parents to send the children to school as well as to maintain the school attendance for more than 85% every six month-periods. The Government particularly the Department of Agriculture will involve in providing this livestock.

In Jayawijaya, being wealth is valued in terms of ownership of livestock such as pigs (Anderson 2012). Pigs are important and valued livestock for traditional people in Papua (Nugroho et al. 2015, 495). Pigs are potent symbols used in many socio-cultural activities such as religious ceremonies, weddings as dowry, pig feast parties, rituals, and even compensation for murders (Muller 2009, cited in Nugroho et al. 2015, 495). According to Badan Pusat Statistik Jayawijaya (2016, 155), people cultivated nearly 10,000 pigs in 2016, three times higher than beef cattle. Cows were the second highest livestock being cultivated. In Jayawijaya, the productivity of pig farms is relatively poor which may be caused by poor farming and husbandry practices (Nugroho et al. 2015, 501). Therefore, agricultural extension will provide training to the community to improve their pig productivity.

After that, the six month-period post-treatment program will be focused on evaluating the implementation of this program and the measuring the impact on parents attitude and behaviour toward education, the farming production, the quality of education, the student attendance, the illiteracy level, and the household economic condition. The exit strategy will also be applied after the incentives are stopped in this stage to ensure the sustainability of the program.

It is believed that through this incentive-based program, the literacy rate will increase because parents will change their attitudes toward education and prioritise sending their children to school. This will lead to the increased number of school enrolments and student attendance. Drawing on the work of Krznaric (2007) and Eyben's study (2008) about how change happens, the READI program will utilise incentives to affect change. The questions that can be related to this incentive-based education program include the actors involved in the change, strategies used to bring about change, and the contexts that affect how change happens (Krznaric 2007, 31) as the following:

Table 1: The rough guide to how change will happen in rural Jayawijaya

GOALS	OUTCOMES
WHAT CHANGES • Attitude and priority of parents • motivation of students and students school attendance • Literacy rate • Improve farming technique and production • Reduced poverty • Improved food security • Increased literate children • Eradicated corruption of teachers in the form of bribery	• Parents change their attitude and prioritise sending children to school rather than involving them in labour activities on farm • Students are more motivated to go to school, which leads to the increase of school enrolment and attendance • The increase of school enrolment and attendance, supported by a reading program can increase the literacy rate in rural Jayawijaya • Students can fulfil their basic needs in terms of food. • Parents reduce their expense on meals and use it for food productions. • Parents can improve their farming skills and production. • The increased farming outputs will help household food supply and provide extra cash by selling surplus produce. • More children will be literate and educated • The teacher corruption will be eradicated to maximise the READI program main objectives.
WHO AND WHAT WILL BE INVOLVED IN THE CHANGE • Children in rural Jayawijaya • Parents in Rural Jayawijaya • Community members • NGO activists • Leaders (Governor, Mayor of Jayawijaya Region) • Department of Agriculture • Department of Health	• Children and parents will be the priority target • However, parents will be the most resistant actor to the change especially if they still consider the cost-benefit analysis pointed out by Shah (2015). • NGO including Wahana Visi Indonesia and Yayasan Kristen Wamena will be the active agents of this change. • Community leaders are also the facilitator and supporters • Governor and Mayor of Jayawijaya will be the supporter in terms of budget and training (particularly from the Department of Agriculture)
STRATEGIES TO BRING ABOUT CHANGE • Changing individual behaviour of parents and student towards education by the provision of incentives. • Encouraging grassroots participation (bottom-up approach) by involving the targeted	• Parents' attitudes will be changed, so they prioritise to send their children to school more than sending them for the child labour. Students' motivation will be improved, so they go to school more often leading to the increase of school enrolment and attendance. • Grassroots participation will support this incentive-based education program. • Wahana Visi Indonesia, focusing on running the program, will ensure that the READI program will be implemented effectively.

community. • Involving local NGOs including Wahana Visi Indonesia and Yayasan Kristen Wamena to facilitate this change. • Local authorities including the mayor of Jayawijaya region will be asked to support to maximise the budget for education • READI program • Regular Feedback from parents using questions related to SWOT analysis about the program implementation that also checks the teacher bribery case. • Propose the government to provide sufficient support for teachers to prevent them to corrupt. • Coordination with community leaders to implement the tribal punishment for teacher corruption, in this term the bribery	• Yayasan Kristen Wamena will involve providing the appropriate curriculum and materials for students in rural Jayawijaya and training for local teachers from the targeted area. • The increasing amount of budget will support this program to improve the quantity and the quality of education • READI program will change parents' attitude followed by the changing of their behaviour toward education. • Program budgeting and expenses will be evaluated • This feedback from parents will assist in evaluating, improving the program and preventing the teacher bribery issue. • Teacher corruption occurs because of lack of support for teachers including insufficient salary and transportation cost (Anderson 2013, 6). Ensuring the teachers are well paid and supported will reduce the level of teacher corruption. • Tribal punishment, such as paying fine with livestock, is still practised in Jayawijaya, and this is such a strong punishment. The tribal punishment application will prevent the teacher corruption particularly if they are found to force parents to bribe them.
CONTEXT ALLOWING CHANGE TO HAPPEN (ENABLING ENVIRONMENT)	• Social context including access and levels of education and health of people in rural Jayawijaya. • Economic context including supply chain in the form of more staple food both to consume and to sell for extra cash crops. • Cultural context including the permission of parents for children to not attend the cultural ceremony if it is held during school hours

According to power cube analysis by Gaventa (2006, 25), this READI program can be analysed as the following:

Table 2: Power Cube Analysis on READI program

Elements	Description
Level	• Local level • National level
Space	• Invited space
Form	• Visible • Hidden

The READI program is the intervention to tackle illiteracy issue in local level because it mostly involves local resources such as local organisations, local communities, and government in local level. This program can also involve stakeholders from national level, such as involving the governor of Papua to put aside few percentage of the national budget of education to support this program. If this intervention succeeds, it will be implemented in provincial level. Moreover, this program can also be implemented in national level with the adjustment of conditions in the targeted area. For example, the type of living stock, such as pigs, provided to communities in Jayawijaya is not appropriate if it is provided to areas in the other part of Indonesia.

According to the analysis of space, this intervention refers to "invited space" because beneficiaries especially children, parents and communities are invited to participate to involve in this program. During the first six month-period pre-treatment program, parents and communities will be informed the importance of education and encouraged to send their children to school. They will also be informed that they will receive incentives if their children' school attendance remains over 85% during the program. Government is also "invited" to support through their capacity in providing budget and agricultural training.

In terms of form, this initiative is considered as visible because the whole process and aspects are visible and "definable" which include the process of community sensitisation, the program implementation, the incentives, the evaluation, and the procedures of decision making. However, this program can be a "hidden" power form particularly when the Mayor of Jayawijaya will be one of candidates in the next governor election. This can be beneficial for the mayor's political agenda to increase his image in the governor election in 2018.

According to power and stakeholders' relationships (VeneKasen and Miller 2002, cited in Gaventa 2006, 24), this incentive-based education program can be analysed as the following:

Table 3: Stakeholders and Power Relationship

Elements	Description
Power Over	• The Mayor of Jayawijaya over the Department of Agriculture, Department of Education and Department of Health • Parents over children
Power To	• Local NGOs to the community and parents

	• Department of Agriculture to Parents • Department of Health to children, parents and community
Power Within	• Local community • Parents • Children
Power With	• Mayor of Jayawijaya • Local NGOs • Department of Agriculture • Department of Education • Department of Health • Community leaders

I analyse that there are various power relationships among stakeholders based on Venekasen and Miller power analysis (2002, cited in Gaventa 2006, 24). The Major of Jayawijaya has the power over the Department of Agriculture, Department of Education, and Department of Health in order to involve them to support this intervention. Moreover, parents also have the power over their children to send them to school. Meanwhile, the local NGOs including Yayasan Kristen Wamena and Wahana Visi Indonesia have the power to communities and parents to inform and encourage them to participate in this program. The Department of Agriculture has the power to the parents to provide them useful knowledge to improve their produce. In addition, the Department of Health has the power to invite children, parents and the community to get regular health checks during the two-year treatment period.

Furthermore, local communities, parents and children have their power within because they have been informed of the importance of education for their future and they will be provided with incentives to substitute their children contribution on household economy for sending them to school. This is important to increase their self-confidence and change their attitude toward education. It is also expected that they will decide to send their children to school. Moreover, “power with” is analysed by finding out this intervention has involved synergy between stakeholders to make this program successful. We have the power with the Mayor of Jayawijaya, local NGOs, Department of Agriculture, Department of Education, Department of Health, and community leaders.

In addition, I also analyse the READI program using Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis (see appendix 1). I found that several factors such as cultural values, teacher bribery, and policy intervention can be inserted in those categories, so I can analyse the READI program and the implemented strategies to achieve the objective. It is proposed that SWOT analysis can also make the program work effectively and give good outcomes. Moreover, the stakeholders and their influence will also be analysed to find out the supporters, the blockers and the swingers.

Moreover, I also identify these changes using the label of archetypes by Eyben et al. (2008, 203). In this incentive-based education program, the success of the program can be measured by observing the change that parents change their attitudes and prioritise sending their children to school rather than ask them to assist at the farm or search for firewood. Eyben et al. (2008, 203) state that changing of parents attitudes about the importance of education can be identified by what is called an “archetypes” framework

consisting of “the ladder, enlightened elites, and a good example.” In the incentive-based education program, the ladder can be identified as the change caused by fulfilling what the participants need including meals and health checks for students, agricultural incentives for parents, and livestock as a reward for the community because ‘the ladder’ is one of the archetypes in which the change can be achieved through the provision of immediate needs (Eyben et al. 2008, 203).

Meanwhile, according to the enlightened elites framework (Eyben et al. 2008, 203), the change can be achieved by “shifting the hearts and minds of the people in power.” In this program, the change is achieved by analysing the benefits of this program for building trust with the leaders in regional and provincial levels besides considering their support as the obligation to improve the quality of education and lives of their people.

In addition, the change, according to a “good example” framework, is achieved through demonstrating to the people in rural Jayawijaya, especially parents and the community about the successful experience of other districts related to the benefits of education. The benefits have been pointed out by Munro (2013, 313) that people can gain influence on community development by representing their community in the negotiation process. Moreover, successful local people from their community can also involve in inspiring them to follow their successful path. People in rural Jayawijaya trust locals more than outsiders, so those successful examples can be their role model.

XII. The Sustainability of the Program and the “Exit Strategy”

An incentive-based education program can result in benefits in terms of increasing school enrolment and attendance of students. This incentive can also change parents’ attitude of the importance of education by providing direct benefit in the form of meals, agricultural incentives, and livestock. However, there are potential challenges in terms of sustaining such a program. For example, the likelihood that beneficiaries (the parents) of the incentives will not value education any more or less but that the incentives only act as a short-term solution while the parents are receiving incentives such as agricultural inputs. If the incentive-based program is offered over a long term period, however, then it is possible that production will have increased significantly and subsequently will have increased household income based on families being able to sell their surplus produce at the market.

One study pointed out that the incentive program called Food for Education Program (FFE) in Bangladesh, although having the positive outcome of increasing school enrolment, resulted in negative outcomes where the increase of the school attendance was not followed by the improving quality of education (Ahmed and Arends-Kuenning 2006, 666). This could be seen from the results through test scores where they were lower in FFE schools than in non-FFE schools (Ahmed and Arends-Kuenning 2006, 672).

Another study in providing incentives through the enrolment subsidy program also shows positive impact to increase schooling (Ravallion and Wodon 2000). In addition, Conditional Cash Transfer (CCT) program in South America is also criticised for its sustainability after the termination of the program. Handa and Davis (2006, 531) criticised that it is unclear that the CCT program is cost-efficient and sustainable to tackle the development problems that developing countries have.

Therefore, it is necessary to take a careful approach with exit strategies to shut down the program. A development organisation named United Nations World Food Programme (WFP) (2003, 5) have six elements of exit strategies including "the setting of milestones for achievement; government commitment; community contributions; technical support; management and communication; and involving the private sector." These elements suggest arranging the time to stop the incentives, strengthens the partnerships with stakeholders such as government, private sectors, local NGOs and the targeted communities (WFP 2003, 58). Moreover, the elements propose knowledge transfer through "training and capacity building," and creating leadership communication process to ensure all stakeholders understand their role after the exit (WFP 2003, 58).

Meanwhile, EveryChild, one of UK-based NGOs used an approach what they call as a "Responsible Exit" (Hayman et al. 2016, 12). Responsible basically means that sustainability of the program is prioritised although it is risky and needs "responsible entry" (Hayman et al. 2016, 12). Hayman et al. (2016, 12) also point out that exit strategies focus on "genuinely sustainable development" that allows the exit to happen, rather than fostering dependency. This exit program is best planned as soon as the program starts (Hayman et al. 2016, 18). Starting the exit plan early will allow READI program to have time for planning, implementing and evaluating the program as well as developing the local capacity for program sustainability (Hayman et al. 2016, 18). These "responsible exit" strategies are as the following:

1. Participatory planning for exit
   Hayman et al. (2016, 16) explore that at this stage, communicating the exit plan is very pivotal, so partners and communities can create their sustainable program plans. It is essential that all stakeholders are supported including NGOs (Wahana Visi Indonesia and Yayasan Kristen Wamena), parents, and targeted rural community. In addition, facilitative role should be played during this stage and leave the decision and priority to them (Hayman et al. 2016, 16).
2. Rigorously sustainable programming and partnering
   Partnering is a key to support the sustainability of this intervention. At this stage, the sustainable program plans are handed to the communities, local authorities, and government to achieve a "healthy exit" (Hayman et al. 2016, 16). This incentive-based education program should be handed to the local partners such as the teacher and administrators from the targeted local communities, NGOs, and the Department of Education (Hayman et al. 2016, 16). The unsustainable program such as providing incentive from unsustainable resources should be stopped. The main character from this incentive-based education program is providing meals for students and incentives for parents and the community. The most unsustainable resource of this program is the resources to provide lunch for students where it comes from the trading transaction in the market. Thus, it has to be stopped, and the sustainable sources, then, should be created such as establishing school gardens planting the vegetables and sweet potatoes as their staple food to fulfil the resources need for the lunch program.
3. Capacity development of local partners
   Strengthening the capacity of local partners is pivotal for an effective handover before exiting especially in several initiatives including "participatory action research with beneficiaries, leadership, strategy, resource mobilisation, and financial management" (Hayman et al. 2016, 16). Teacher and administrators' capacity can be developed and improved through training facilitated by Yayasan Kristen Wamena incorporated with the Department of Education of Jayawijaya, while the capacity of the local community, especially in the school community garden and the productivity of the

livestock, can be trained by Wahana Visi Indonesia together with the Jayawijaya Extension, Agricultural, Livestock, and Co-operative Offices (local government) to improve the productivity.

4. Influencing wider stakeholders at community, district and national level
   Sustainability can be achieved through increasing attention from other stakeholders in greater level (Hayman et al. 2016, 17), and in this context, it refers to the attention from the government in the provincial and national level. The local government can propose funding from the government in the provincial level because Papua has allocated 30 per cent of the Special Autonomy budget for education program (Indonesia 2001 cited in Refworld 2017).
   To support this program, universities can also be involved by proposing voluntary teachers through a student community service program. University students in Indonesia are obliged to undertake the community service program in their final year before they graduate. It can help the targeted community to fulfil the demand of the required numbers of teachers to assist the local teachers teaching the class when the number of students increases, so the teacher and student ratio is still in balance.
5. Systematic learning, documentation and sharing a good practice
   The sustainable plans need to be monitored very carefully before the exit occurs, and it has to be done regularly to ensure this exit strategy is well implemented (Hayman et al. 2016, 17). The program implementation also needs to be evaluated to find out what works and what needs to improve including the achievement and the challenges during the implementation of this incentive-based education program. By doing so, it is expected that the sustainability can be achieved even before the incentive is taken away from the program.

Both organisations, WFP and EveryChild, use similar elements of exit strategies which are communicated in different terms. These elements are comprehensible and visible to implement. Moreover, these elements are also reliable and can make the program sustainable after the exit. Thus, it is highly recommended to use the exit strategies whose elements can make the program sustainable as these organisations offer with their exit strategies.

XIII. CONCLUSION

Although the illiteracy rate in Indonesia has reduced significantly over the last decade, illiteracy has remained the highest in the most eastern part of Indonesia, especially rural Papua province (Badan Pusat Statistik 2017). In Jayawijaya region, specifically, factors including the geographical condition of Papua, lack of infrastructure, low household income, poor student attendance, teacher bribery, and teacher absenteeism play important roles in maintaining the low level of literacy. Moreover, parents' lacks of awareness of the long-term benefits of education, the low economic conditions of the rural poor in Jayawijaya, and children's crucial contribution to labour in poor rural families also compound the issues illiteracy in Jayawijaya region.

This incentive-based education program through Reading Eating Attending Developing and Incentive (READI) is proposed as an intervention to address the low levels of literacy. While READI program focuses on improving literacy level of children in Jayawijaya, it recognises the multi-dimensional nature of poverty by using incentives to tackle food security via agricultural inputs that will lead to increased household incomes from surplus produce sold at

the market, health issues by regular health checks at school, and nutrition of children by ensuring children have one healthy meal a day. From the literature, incentive-based intervention such as Food for Education Program in Bangladesh (Alam et al. 1999 cited in Meng and Ryan 2010; Ravallion and Woodon 2000) and PROGRESA in Mexico (Schultz 2000) also have positive outcome of increasing school enrolment and attendance.

Using Krznaric's rough guide to how change happen (2007, 31), I focus on questions that become main tools for this change including what the change is, actors involved in the change, strategies to create the change and contexts that affect how change happens. I found out that parents' attitude toward education and the increased literacy rate are not the only changes created by this incentive-based education program, but other changes including motivations of students, increased school attendance, improved farming technique leading to improved food security and the increased of household economic level. The analysis of stakeholders, power, power relationship and influence, and SWOT analysis are pivotal to effective strategies to achieve program objectives.

However, it is questionable when it comes to the sustainability of the program. Therefore, a strategic "Responsible Exit" through several stages of sustainable exit planning programs are required which include "participatory planning for exit, rigorously sustainable programming, capacity development of local partners, influencing wider stakeholders at community, district and national level, systematic learning, documentation and sharing a good practice, and institutional/partnership closure activities" (Hayman et al. 2016). As a result, this program can improve people's lives and get people in rural Jayawijaya out of the poverty cycle.

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APPENDICES

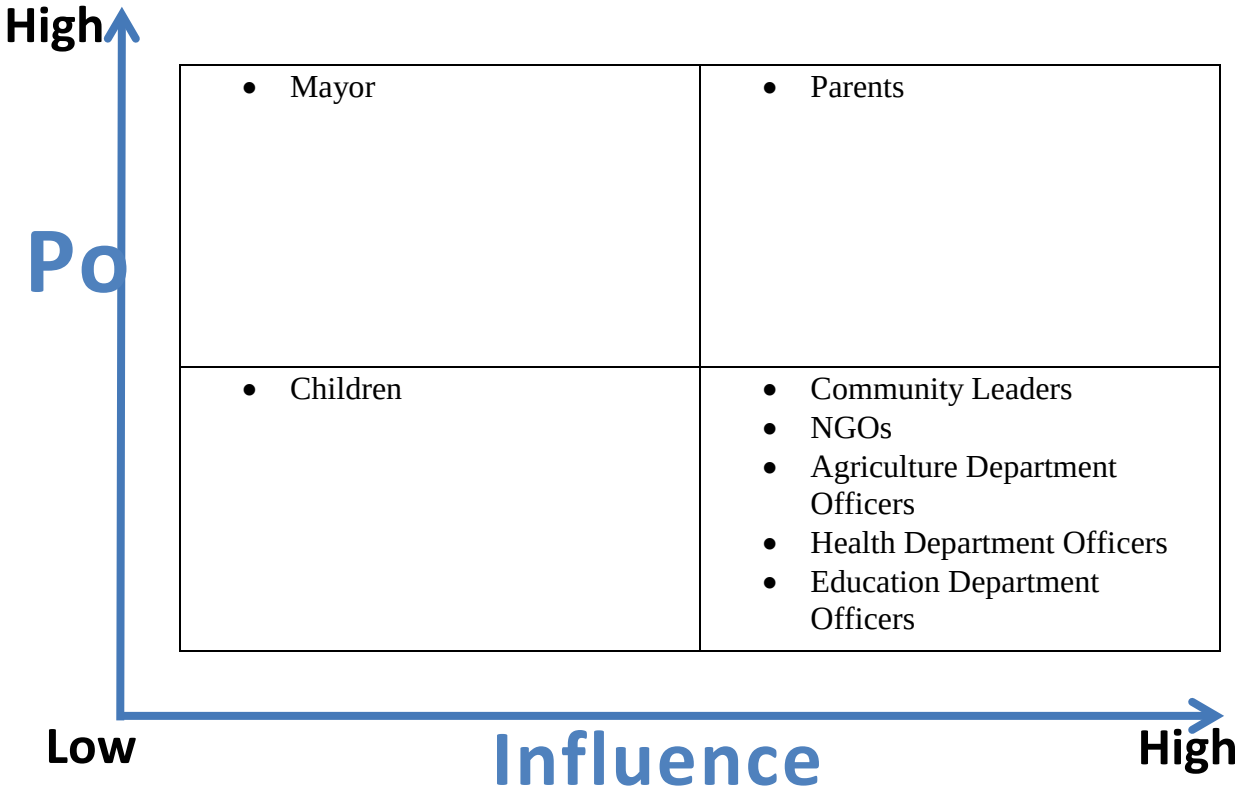
APPENDIX A. Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis on READI Program

STRENGTHS	WEAKNESSES
- While tackling illiteracy issue in Jayawijaya region, READY Program can recognise multi-dimensional nature of poverty to tackle food security, health issues, and children nutrition.	- It requires big amount of budget to provide livestock, and one meal every day for 2 years.
OPPORTUNITIES	**THREATS**
- Policy interventions will support this incentive-based education program. - One meal a day will help boosting children's nutrition. - Agriculture training will provide knowledge to improve the produce so it can give benefits economically and tackle food security issue.	- Teacher corruption in the form of bribery will be the barrier in this program because it will give economic burden to parents - Cultural values and traditions will also be a barrier because children have to attend these ceremonies even during the school hours.

APPENDIX B. Stakeholder analysis in terms of power and influence

STAKEHOLDERS

- Children
- Parents
- Community Leaders
- NGOs
- Agriculture Department Officers
- Mayor
- Health Department Officers
- Education Department Officers



• Mayor	• Parents
• Children	• Community Leaders • NGOs • Agriculture Department Officers • Health Department Officers • Education Department Officers

Influence of Rock's Chemical Composition to Groundwater Quality in Jakarta Basin

T. Listyani R.A.
Geological Engineering Department
STTNAS Yogyakarta, Indonesia

Abstract

The quality of groundwater in the region in general is influenced by the local geological conditions, for example in terms of the type of rock. The study of the quality of groundwater in Jakarta Groundwater Basin has been done to see how far the relationship between chemical characteristic of the rocks and the quality of groundwater. The existence of a wide variety of rock and groundwater quality in the study area prompted the author to determine the correlation or the influence of rock to groundwater, particularly in the chemical aspect. The analysis was conducted based on some field and laboratory data and supported by secondary data such as geological and hydrogeology data. Sampling of rocks and groundwater in the field were taken from Babakan and Sunter drilled wells, and then performed the chemical constituents of rocks and groundwater testing. The results showed that the quality of groundwater in the study area is quite influenced by the chemical content of rocks at studied area. The content of the studied groundwater is dominated by the major cations Na^{+} *and* Ca^{2+}*, as well as the major anion* HCO_3^{-} *and* Cl^{-}*, while rocks showed the dominant element of* Fe^{3+} *(4,460-107,000 ppm) and* CO_3^{2-} *(0.14 to 2.22)%. Difference of dominant composition in rocks and groundwater is highly influenced by the ease of minerals to dissolve in certain geological conditions. The content of cations and anions in the groundwater under study supplied by the result of rock minerals weathering that are interpreted primarily derived from the weathering of silicate minerals. Thus, sedimentary rocks that consist of the studied basin usually have a role in determining groundwater quality, and supported by geological and hydrogeological conditions as well as mineral stability factor. However, correlation between chemical composition in rocks and groundwater is not clearly significant.*

Key words: groundwater, quality, chemical composition.

I. Introduction

The research area is Jakarta Groundwater Basin which is a Quaternary groundwater basin. This area is spread from Jakarta and surrounding areas to Bogor in the south, in the northwestern part of Java Island, Indonesia (Figure 1). The groundwater basin has various lithology, with varying chemical characteristics of rocks.

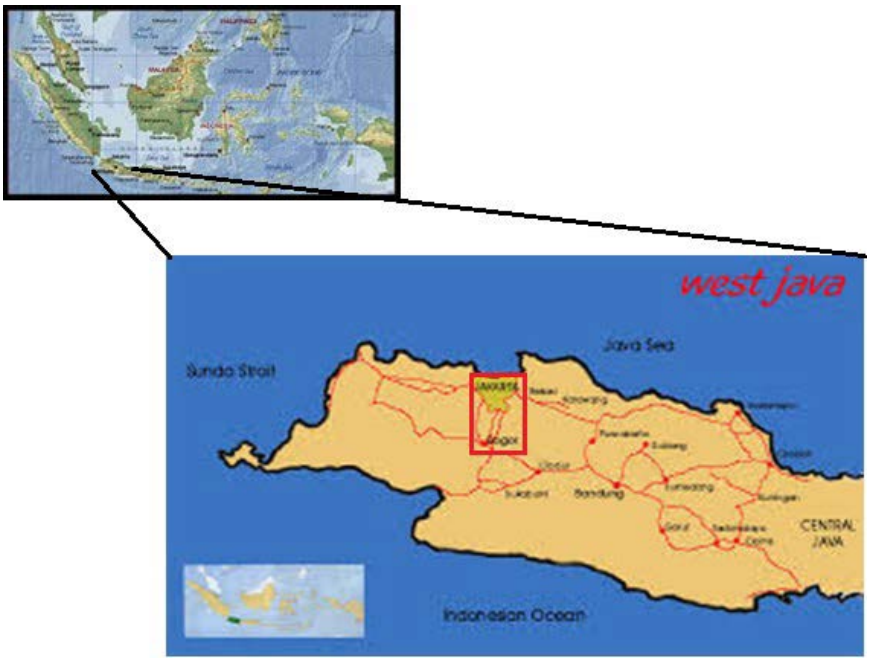


Figure 1. Research area indicated by red rectangle.

This paper is going to review the chemical composition of rocks relationship to the chemical composition of groundwater in the basin. The chemical compositions of rocks are usually highly dependent on the mineral composition of the rocks in the basin, both as aquifer or aquiclude. The quality of groundwater is generally varied in the different rock. The rock has a diverse mineral composition, but not all of the chemical composition can be dissolved in the groundwater.

Listyani (2016) stated that the content of cations and anions in the groundwater in the basin under study is affected by mineral composition of rocks composing. Elements that are easily dissolved in groundwater will dominate the composition of groundwater. The number of Ca, Na and silica elements in groundwater are affected by the weathering of silicate minerals eg feldspar / albite and anortite plagioclase form and clay minerals, both derived from Na-montmorillonite and Ca-montmorillonite. The number of elements dissolved in the groundwater is also controlled by geological and hydrogeological conditions of local area. Mineralogy composition affects the quality of groundwater, but the chemical composition of rocks also needs to be assessed in relation to the groundwater quality.

Relationship between hydrochemistry and geochemistry of rock in its path at Ungaran geothermal area has been examined by Budiadi & Listyani (2008). The results of research showed a fairly good correlation between the chemical content of groundwater from springs with rock geochemistry. This means that the chemical content of the water is strongly supported by the presence of rock's minerals in geothermal prospect area. Referring to the study, research on rock geochemistry and groundwater developed in Jakarta in this study. It needs to assess the extent of the chemical composition of rocks factor affecting groundwater chemistry in the studied area, in order to interpret the solubility of minerals that contribute to the quality of groundwater in the area.

II. Method

The study was conducted at several places in Jakarta Groundwater Basin, especially around the exploration wells. The field survey as well as groundwater and rock chemistry laboratory testing performed on the same period, i.e. in 1997. The field geological survey done to see hydrogeological condition of the study area, equipped with rock and groundwater sampling. Laboratory testing conducted to determine the chemical content of groundwater. Two groundwater samples taken at Babakan well in the southern part of the basin, representing groundwater in the shallow and deep aquifer; whereas the three groundwater samples taken from Sunter well in the northern part of basin, each representing a shallow, intermediate and deep aquifer zones. The primary data in the form of groundwater samples were conformable with regional groundwater flow which generally runs from south to north so that samples from Babakan well expected to show initial process, while samples from groundwater Sunter well represent the end of the groundwater traverse. Secondary data such as geochemistry of rocks used in the analysis were taken from coring of Babakan and Sunter wells.

III. Geological Setting

The research area is the Quaternary groundwater basin which is included in the Coastal Plain physiographic region of Jakarta, Bogor and Volcano Quaternary Anticlinorium according to Van Bemmelen (1949). This groundwater basin is consisted by rock which has a thickness of up to 250 m and deposited in a marine, delta and fluvial environments (Maathuis et al., 1996).

Mining Agency (Disbang) Jakarta and the Institute of Community Service (LPM) - ITB (1997a) developed Jakarta Groundwater Basin stratigraphy based on a compilation of the Jakarta Sheet Geological Map (Turkandi *et al*, 1992). Rock's constituent of aquifer are generally Quaternary sediments such as debris of young volcanoes, fluvial and beach sediments, overlay unconformable on Tertiary rocks (Figure 2). The Tertiary rocks that restrict Jakarta Groundwater Basin are outcropped at the west – southwest area, namely Serpong, Bojongmanik Formations and basalt intrusion; at the southern part around Bogor found Klapanunggal Formation; while at the southeastern region found outcrops of Serpong, Jatiluhur and Klapanunggal Formations.

Quaternary sediment boundaries in Jakarta Groundwater Basin in three dimensions haven't been clear yet. Data from Disbang Jakarta and LPM-ITB (1997b) indicate the presence of Tertiary rocks at a depth of 69.5 in Babakan Pond. Based on geological map and wellbore data seen lower limit of Quaternary sediment is uneven making a block of horse and graben of Bogor until Depok which deeper in the direction of the north-northeast (Disbang Jakarta and LPM-ITB, 1997b).

The division of the aquifer system in Jakarta Groundwater Basin used in this study refers to Soekardi (1982, in Soekardi, 1986) as follows.

1. Group of unconfined aquifer (Aquifer I) at a depth of 0-40 m.
2. Group of upper confined aquifer (Aquifer II) at a depth of 40-140 m.
3. Group of middle confined aquifer (Aquifer III) at a depth of 140-250 m.

The division was done based on their aquifer marine facies clay layers that separate the third of the aquifer system.

IV. Basic Theory

During its path from local recharge to discharge area, the chemical element of groundwater change due to various geochemical processes (Freeze and Cherry, 1979). Groundwater chemistry has the evolution as long as its travel time. Hydrochemistry evolution results change of groundwater quality due to change of its chemical compositions. Changes in

groundwater quality are not only caused by processes that occur during the groundwater evolution, but also because of the aspect of the chemical elements availability in rocks in its path.

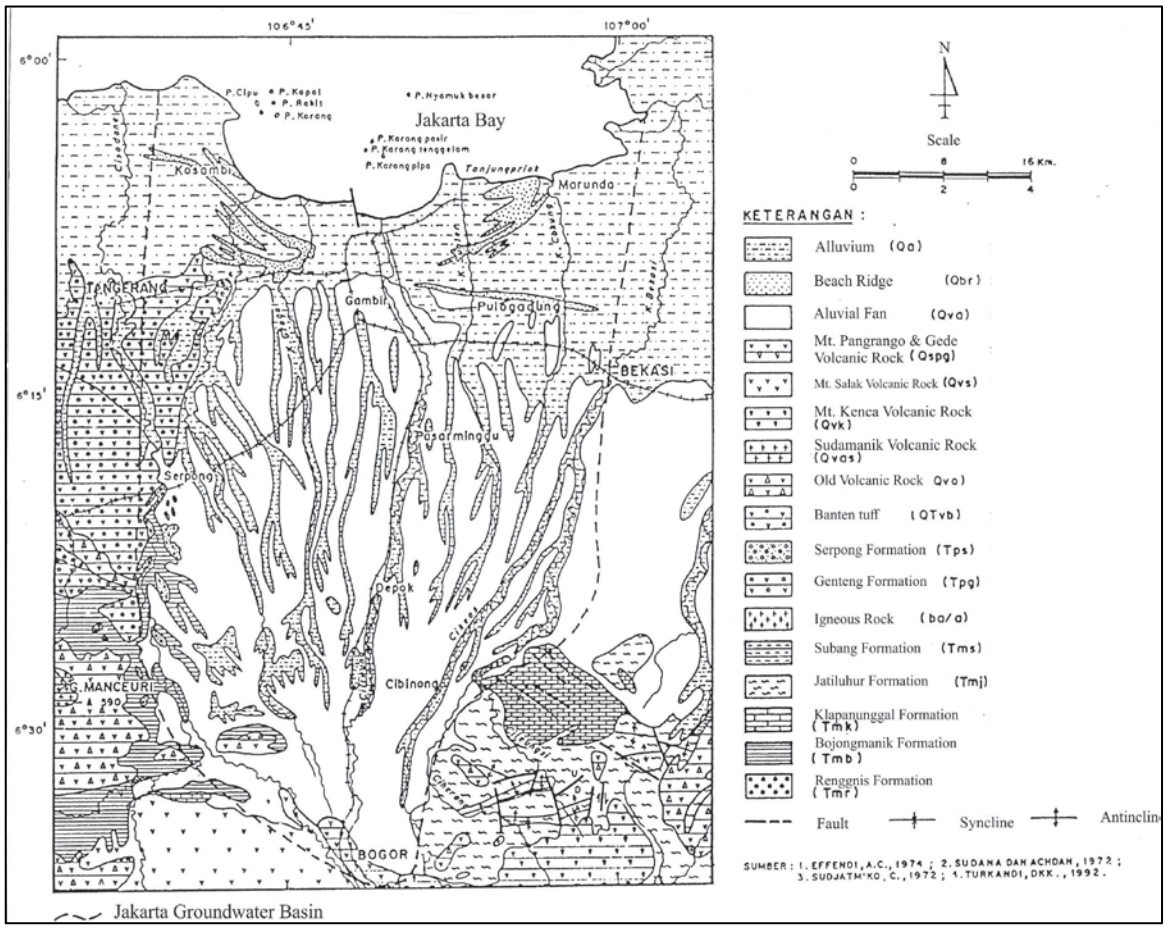


Figure 2. Regional geological map of Jakarta and surrounding area (Turkandi *et al*, 1992).

Groundwater quality is affected by the rock material in its path. The quality of groundwater reflected in its chemical properties is highly dependent on mineral availability and mineral solubility (Davis and De Wiest, 1966). The researchers also reveal relationship between constituent ions of groundwater with rock minerals. Ease of dissolved minerals in rocks is often supported by the weathering process. The more weathered rock the easier ions loose from rocks and dissolved in the groundwater. Geochemical composition of terrigenous sedimentary rocks have been used extensively to perform interpretation of weathering conditions (Qiu *et al*, 2014 vide Armstrong -Altrin *et al*, 2016). This rock weathering conditions will affect the level of solubility of ions, in addition to environmental factors along groundwater flow. This is supported by Ako *et al* (2012) which explained that CO_2-driven silicate weathering and reverse cation exchange are the most important processes affecting the hydrochemistry of the spring waters.

V. Result and Discussion

5.1. Chemical Composition of Groundwater and Rocks

Groundwater in the Babakan drilled well has a composition as fresh groundwater, represents the initial phase of groundwater flow in recharge area, while groundwater in

Sunter was in advanced phases or near the discharge area. Groundwater chemistry data were tested at the Directorate of Environmental Geology, Bandung to determine the content of major chemical elements (Table 1). The groundwater is dominated by the major cations Na^{+} and Ca^{2+}, as well as the major anion HCO_3^{-} and Cl^{-}, while rocks showed the dominant element of Fe^{3+} (4,460-107,000 ppm) and CO_3^{2-} (0.14 to 2.22)%. Moreover, the chemistry data of studied rocks presented in Table 2-3.

Table 1. Hydrochemical data.

Element (mg/l)		Babakan Well		Sunter Well		
		Aquifer I	Aquifer II	Aquifer I	Aquifer II	Aquifer III
Cation	Ca^{2+}	20.3	24.8	950.8	248.4	191.2
	Mg^{2+}	8.5	5.9	544.3	120.5	73.8
	Fe^{3+}	0.0	0.0	0.25	1.58	0.78
	Mn^{2+}	0.0	0.0	9.3	1.65	1.08
	K^{+}	2.5	6.5	59.0	26.0	18.0
	Na^{+}	20.0	47.0	4490.0	1346.0	942.0
Anion	CO_3^{2-}	7.8	10.2	0.0	0.0	42.3
	HCO_3^{-}	121.4	183.0	790.5	560.6	443.4
	Cl^{-}	7.6	6.4	9255.0	2276.4	1590.6
	SO_4^{2-}	3.3	6.8	330.8	183.0	148.0
	NO_2^{-}	0.0	0.01	0.4	0.3	0.2
	NO_3^{-}	1.5	1.1	2.8	1.6	1.2
pH		8.58	8.32	7.52	7.88	8.12

Tabel 2. Chemical rock constituents of Babakan well (Disbang DKI Jakarta dan LPM-ITB, 1997b).

Element		Sunter Well					
		1A	1B	2A	2B	3A	3B
Cation (ppm)	Ca^{2+}	3,750	790	2,860	1,460	2,950	3,150
	Mg^{2+}	27,500	20,960	21,940	13,840	19,860	25,640
	Fe^{3+}	51,130	51,070	48,580	45,180	4,460	48,760
	Mn^{2+}	1,221	914	1,011	614	1,049	1,187
	K^{+}	7,080	11,230	10,460	10,480	11,000	11,070
	Na^{+}	11,160	6,840	11,900	14,260	10,860	11,260
Anion (%)	CO_3^{2-}	1.6	0.78	0.14	0.36	2.22	1.68
	HCO_3^{-}	0.11	0.11	0.14	0.14	0.14	0.11
	Cl^{-}	0.02	0.01	0.01	0.01	0.01	0.02
	SO_4^{2-}	0.35	0.25	0.23	0.04	0.14	0.18

The chemical composition of groundwater could be affected by the chemical composition of the rocks that compose the groundwater basin. How far is the chemical composition of rocks affect the quality of groundwater can be understood through Figure 3-4 below.

Tabel 3. Chemical rock constituents of Sunter well (Disbang DKI Jakarta dan LPM-ITB, 1997b).

Element		Sunter Well					
		1A	1B	2A	2B	3A	3B
Cation (ppm)	Ca^{2+}	3,750	790	2,860	1,460	2,950	3,150
	Mg^{2+}	27,500	20,960	21,940	13,840	19,860	25,640
	Fe^{3+}	51,130	51,070	48,580	45,180	4,460	48,760
	Mn^{2+}	1,221	914	1,011	614	1,049	1,187
	K^{+}	7,080	11,230	10,460	10,480	11,000	11,070
	Na^{+}	11,160	6,840	11,900	14,260	10,860	11,260
Anion (%)	CO_3^{2-}	1.6	0.78	0.14	0.36	2.22	1.68
	HCO_3^{-}	0.11	0.11	0.14	0.14	0.14	0.11
	Cl^{-}	0.02	0.01	0.01	0.01	0.01	0.02
	SO_4^{2-}	0.35	0.25	0.23	0.04	0.14	0.18

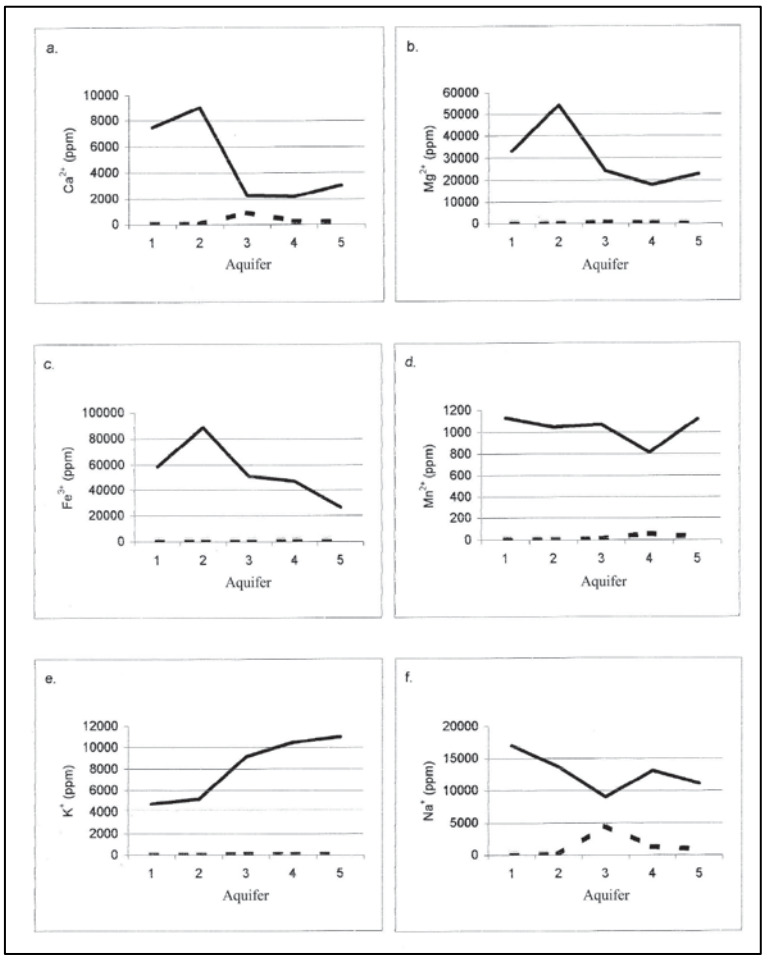


Figure 3. Cations content of groundwater and rocks.

Cations of rocks.

Cations of groundwater.

Aquifer 1: Aquifer Zone I Babakan Well
Aquifer 2: Aquifer Zone I Babakan Well
Aquifer 3: Aquifer Zone I Sunter Well
Aquifer 4: Aquifer Zone II Sunter Well
Aquifer 5: Aquifer Zone III Sunter Well

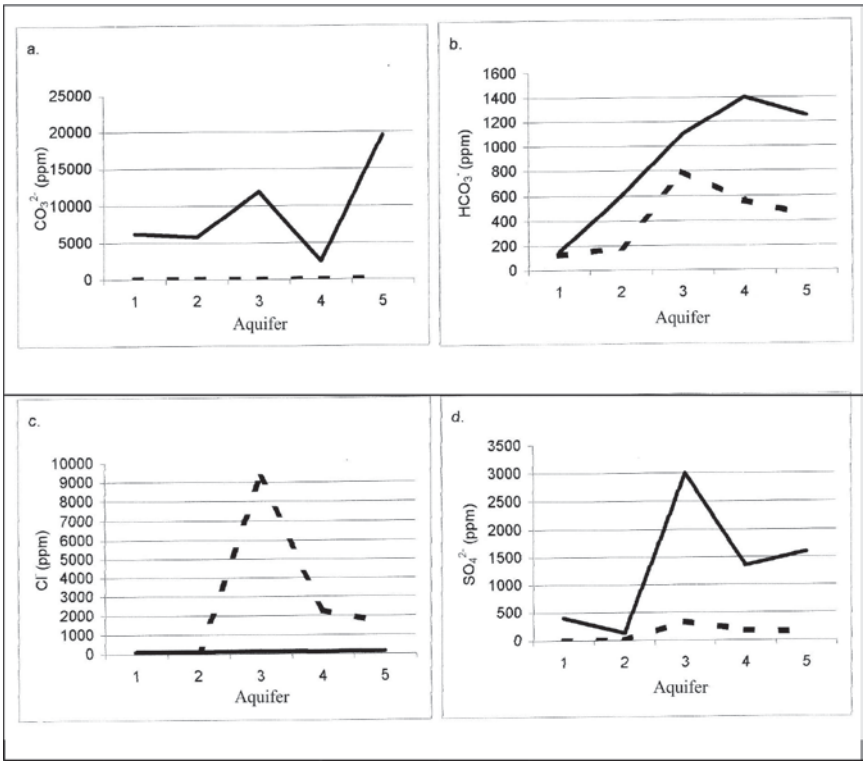


Figure 4. Anion content of groundwater and rocks.

Anion of rocks.

Anion of groundwater.

5.2. Cation Characteristics

Rocks affect the chemical composition of the groundwater, as evidenced by the similarity of cations that are present in rocks and groundwater. However, the shape of the cations content graph in rock samples and groundwater is not too significant, meaning that the composition of cations in groundwater are not fully influenced by the content of these elements in the rock. Some of the trends that seem to decline in groundwater is not followed by a declining trend in rocks, on the contrary, there is a decrease in cations content in rocks followed by a rise in cations content of groundwater. This suggests that the cation composition of groundwater is not fully influenced by the amount of cations of rocks.

Figure 3 shows that all samples of rocks have cations content greater than that of the groundwater, especially phenomena that occur in iron (Fe^{3+}) element. This shows that the dissolution process occurs slowly in a quite long geological time. In fact, some groundwater samples show iron element content of 0 ppm. This fact can be explained by looking at Figure 5 below.

Figure 5 shows that the abundance of the iron element in the aquifers studied did not affect the chemical content of groundwater. This can occur due to groundwater chemistry environmental conditions (eH, pH and carbonate activity) does not permit the dissolution of iron.

Furthermore, Matthess (1982) explained the absence or less amount of iron element dissolved in the groundwater below.

- Ion Fe^{3+} usually precipitates at pH above 3.
- Fe^{3+} ions start to precipitate at pH 5.1 as hydroxide ions but not entirely precipitated even in neutral solution (pH 7).

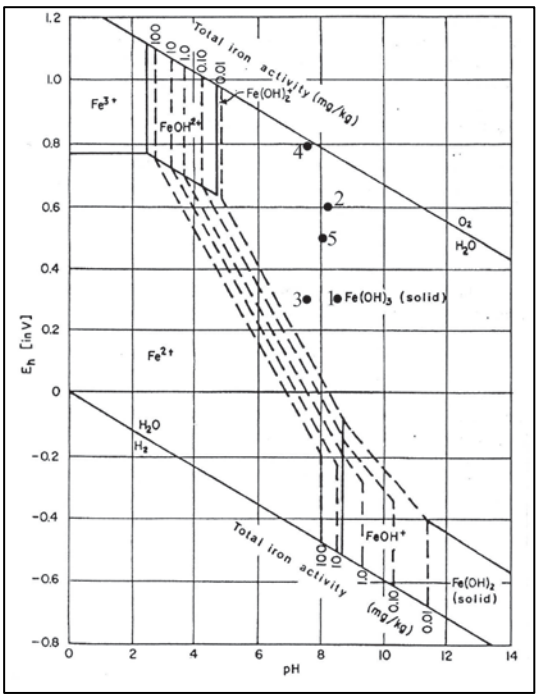


Figure 5. Plot some groundwater samples on the iron element stability diagram.

From the explanation above it appears that the rocks are not fully accounted for the chemical composition of groundwater. This may occur because not every element existing in the rock dissolves readily in groundwater. Besides the mineral stability factor, dissolution of minerals in groundwater rock heavily influenced by the physical and chemical environmental factors in groundwater such as temperature, air pressure and is indicated by the physical / chemical properties of groundwater such as pH, eH and degree of saturation elements in the groundwater itself.

Some reason that lead to a less significant correlation of the relationship between rocks and groundwater, i.e.:

1. Weathering conditions of sedimentary rocks consist the groundwater basin do not fully support the release of ions into the groundwater.
2. Less obvious correlations may occur because confounded by other factors, such as the occurrence of some hydrochemical processes which quite dominant in the groundwater basin.
3. The composition of groundwater is not solely influenced by the chemical content of rocks, but also for their hydrochemical evolution along the groundwater flow. According to Freeze and Cherry (1979) main cations variations in groundwater system is generally quite large because of cations exchange so the cations generalization likes Chebotarev anion sequence is rarely used. Matthess (1982) suggests the geochemical zonation based on cations evolution of the following: $Ca^{2+} \rightarrow Ca^{2+} + Mg^{2+} \rightarrow Na^{+}$. In groundwater flow, Mg^{2+} ions tend to increase relative to Ca^{2+}. In the recharge area, groundwater tends to be saturated with $Ca(HCO_3)_2$. Furthermore, Mg^{2+} will increase due to exchange of Mg^{2+} - Ca^{2+}. Finally, the concentration of Na^{+} ions will emerge as the dominant ion such as geochemical zonation above.
4. The wide variation of aquifer rock samples in Babakan and Sunter were not much different so it was difficult to detect differences of rock influence in both places.
5. Differences in the composition of the groundwater in two places are more influenced by other factors than rocks, for example because of the chemical evolution of groundwater or seawater intrusion in the northern part of the study area.

1.3. Anion Characteristic

Similar with groundwater cation characteristics then from the four kinds of major anion content of groundwater as shown in Figure 4 appears that the correlation of rock to groundwater is generally less clear, except in Figure 4b where the increase in the content of the anion HCO_3^- in several rock samples followed by increasing of this ion content in groundwater. The other difference is not all rock anion content always exceeds in number compared to that of the groundwater. This phenomenon is seen in Figure 4c where the Cl ion is very much higher in the groundwater than the amount in the rock (the example in the aquifer zone I at Sunter well). This is possible because of the influence of sea water intrusion that occurred in the zone, rather than hydrochemical evolution process. This is confirmed by Listyani (1999), which revealed the presence of the intrusion at shallow aquifer zone in the Sunter area. However, the hydrochemistry evolution process also greatly affects the chemical composition of groundwater in the study area.

Based on hydrochemical evolution anion expressed Chebotarev (1955, vide Freeze and Cherry, 1979), the longer the groundwater salinity will increase, therefore, saline groundwater can occur because of hydrochemical evolution. Chemical evolution of groundwater causes major anion content changes during the journey. Groundwater tends to evolve along groundwater flow toward the sea water composition. This evolution is followed by regional changes of the dominant anions as follows: $HCO_3^- \rightarrow HCO_3^- + SO_4^{2-} \rightarrow SO_4^{2-} + HCO_3^- \rightarrow SO_4^{2-} + Cl^- \rightarrow Cl^- + SO_4^{2-} \rightarrow Cl^-$. The anion evolution also marked with age increasing.

Although the hydrochemical evolution process is quite dominant in the study area, the availability of anions in rock certainly play a role in contributing to the chemical composition of groundwater. This was evidenced by the presence of these ions in the rock and groundwater.

HCO_3^- ions present in considerable numbers in some instances groundwater from Babakan and Sunter. HCO_3^- ion domination compared with CO_3^{2-} in groundwater can be described in Figure 6 below.

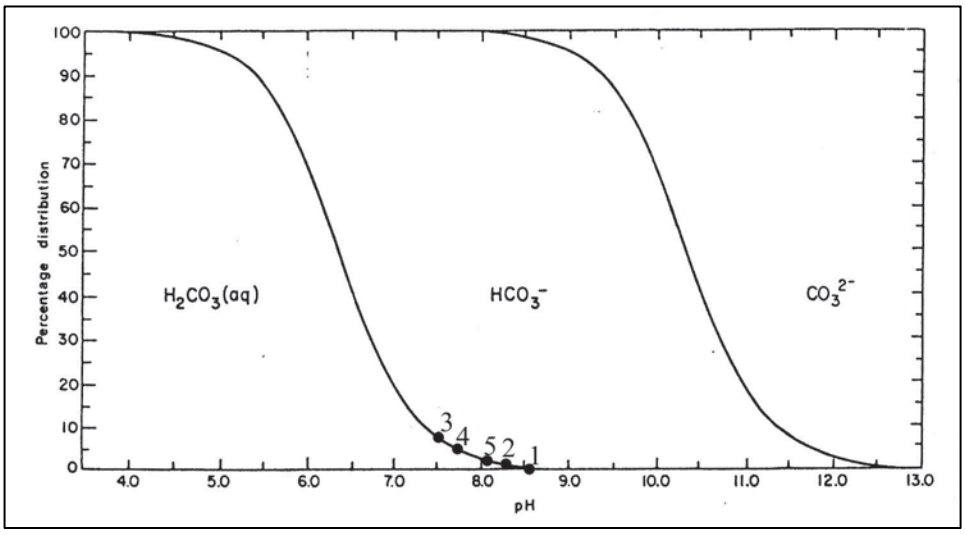


Figure 6. Plot some groundwater samples in the dissolved carbonate percentage diagram as a function of pH at standard temperature and pressure (Matthess, 1982).

The chemical analysis of groundwater as shown in Figure 6 shows that the content of CO_3^{2-} very little due to dissolved carbonate is a function of pH, temperature and pressure. The conditions allowing the carbonate ion may be dissolved in the groundwater are

bicarbonate ion (HCO_3^-). This ion is more dominant than CO_3^{2-} ion as the pH of groundwater ranged from 7.52 to 8.58.

Sedimentary rocks of the basin certainly affect the quality of groundwater, especially driven by mineral solubility factors. This solubility level will also be influenced by the weathering of rocks. However, in general, the correlation of cations and anions in the composition of rocks against the groundwater is not clearly visible. The increase in the chemical content in rocks is not always followed by a rise in the amount of groundwater. This indicates that the chemical composition of groundwater is not the dominant factor affecting the quality of groundwater in the study area.

VI. Conclusion

Jakarta Groundwater Basin is a Quaternary basin composed of marine, volcanic, coastal and fluvial sedimentary rocks. Some of the elements in these rocks have influence on the quality of groundwater in this basin. The content of groundwater is dominated by the major cations Na^+ and Ca^{2+}, as well as the major anion HCO_3^- and Cl^-, while rocks showed the dominant element of Fe^{3+} and CO_3^{2-}. However, the content of cations and anions in the groundwater are sometimes less clear correlated with the chemical content of rocks. This may occur because of the solubility of elements of different rock minerals, and depending on weathering conditions. Elements that are easily dissolved in groundwater will dominate the composition of groundwater. Furthermore, poor correlation between the chemical content of rocks and groundwater show that many factors affect the quality of the groundwater.

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LAND DEGRADATION A THREAT TO SUSTAINABLE RURAL DEVELOPMENT IN NORTHERN HIGHLANDS OF PAKISTAN

Muhammad Israr*, Asif Yaseen** and Shakeel Ahmad***
* The University of Agriculture, Peshawar, Amir Muhammad Khan Campus, Mardan
** School of Agriculture and Food Sciences, University of Queensland, Australia
*** Department of Environmental Sciences, COMSATS Institute of Information Technology, 22060 Abbottabad, Pakistan

Abstract

Land degradation is a serious and rising worldwide problem affected all sectors of human wellbeing but the most important are agricultural resilience, new crop diseases, food security, climate change, increasing poverty, drought tolerance and loss to biodiversity. This research seeks answer to the question of that how poverty index level leads to the land degradation at the farm level. Four districts of northern highlands of Pakistan were selected due its top positions in the poverty. Primary data was collected from randomly selected farm level 80 household head and were analysed by parametric and non-parametric tests and the Probit logistic regression models. The findings revealed that sheet, water, splash, rill erosion affected the land of the respondents and the significant factors responsible for this was deforestation and human activities. Important types of land degraded existed in the area was land degraded by water, decline in soil fertility, water logging, loss of vegetation cover, increased stoniness of land and its extents varying from moderate to very high. Causes of the land degradation were the finishing of terraces, reduce soil reserve of moisture and nutrients, reduced seedling emergence and deforestation, loss to biodiversity, reeducation in crop yields, organic matter and nutrient depletion and loss to flora and fauna. To overcome this there is a need for the sustainable land management practices at the farm level and policy formulation at the national level at the large scale in order to overcome this growing problem.

Keywords: Land degradation, land management practices, extent of degradation

1. INTRODUCTION

Land degradation is a main hazard to climate change and food security pliability of rural societies everywhere the world. Land degradation have become major contemporary challenges to the development agenda of the global community in one form or the others as it is growing in sternness and degree in many parts of the world, with over 20% of all agribusiness arrive, 30% of forests and 10% of rangeland experiencing debasement (Thomas et al., 2015; Masto et al., 2015; Bai et al., 2013; Jafari and Bakhshandehmehr, 2013; Jones et al., 2010; Thomas et al., 2013). Land debasement is serious especially for poorer individuals that don't have the accessible intends to remunerate loss of land profitability and experience the ill effects of the made land shortage, sustenance frailty and henceforth it prompts to harmed human culture and biological systems (Rao, 2015; Izzo et al., 2013). This is additionally coupled by changes of biogeochemical and hydrological cycles in the earth framework and ruins advancement of new soil (Brevik et al., 2015; Berendse et al., 2015) which are vital for the supportability of human progress and to defeat the issues of nourishment security, biodiversity and monetary improvement (Lal, 2011). Debasement of land having suggestions for various key approach territories, including sustenance security, environmental change, surge chance administration, dry season resistance, drinking water quality, farming flexibility despite new product ailments, biodiversity and future hereditary assets administration (Young, et al., 2015).

The land is a crucial asset for the eventual fate of humankind. It should be ensured and improved. Rather, the greater parts (52%) of all rape, nourishment creating soils all inclusive are currently named corrupted, huge numbers of them extremely debased (UNCCD 2015). All through mankind's history, no less than twelve past civic establishments have bloomed on rich land and made tremendous advances and just to vanish after some time as their territory dynamically debased and could no longer encourage their populaces (Young, et al., 2015). Farming and the nourishment we eat rely on upon soil. Under suitable administration, soils are an interminably renewable asset, while under a wrong administration they are viable an extremely limited asset. Under the common condition, it can take 500-1,000 years to frame an inch of soil from parent shake (UNCCD, 2015). Besides it is computed that dirt corruption is costing amongst $6.3 and 10.6 trillion dollars for every year all inclusive, however, these expenses could be decreased by improving soil and receiving more practical cultivating strategies (Young, et al., 2015).

Land degradation has direct and indirect impacts on the livelihood and economic opportunities of the rural poor. Direct anthropogenic factors such as overgrazing, over-cultivation, inappropriate land use and deforestation are the major causes and/or drivers of land degradation and desertification. Factors such as poverty associated with total dependency on natural resources by the poor are some of the indirect causes driving land degradation (UN, 2015). The immediate effects incorporates loss of biological community administrations, diminishes in biodiversity, soil richness, supplement exhaustion, creature grub, wood generation, groundwater revive, brushing, chasing openings, tourism, brought down rural profitability, and so forth., increments in salinization, alkalization, water logging, soil disintegration, soil compaction, and so on while the backhanded effect are the increments in tidy tempests, changes in stream and unwavering quality of water system water stream, brought down drinking water quality, siltation of water frameworks (waterways, dams, lakes, reefs), rustic destitution, sustenance uncertainty and ailing health, respiratory maladies (from clean storms),food/water-borne illnesses (from brought down water quality and poor cleanliness), irresistible sicknesses (from populace relocation), struggle over common assets, constrained movements, open distress, commitments to/diminished versatility against environmental change (ELD, 2015; UNCCD, 2012; WBCSD, 2015).

Land degradation main drivers are soil erosion (Adugna et al., 2015), salinity and absence of vegetation cover which are probably going to impact neighboring oceanic frameworks through dregs stacking and supplement exhaustion and loss of natural matter, fermentation and salination (Haile and Fetene, 2012). Arrive debasement is the decrease in any or the greater part of the qualities which make soil appropriate for delivering sustenance. Soil corruption happens through the crumbling of the physical, substance and organic properties of soil that out comes in soil compaction, salinization, fermentation, and soil misfortune from wind and water disintegration (Young, et al., 2015). Disintegration is a basic procedure and inordinate disintegration brings about critical topsoil misfortunes, prompting to decreases in horticultural efficiency (Rabalais et al. 2010). Arrive debasement jeopardizes families and groups as well as is a danger to more extensive peace and steadiness. This can appear as struggle amongst pastoralists and subsistence ranchers going after more beneficial land or neighbors battling about progressively rare water and fuel assets. At the point when land gets to be distinctly ineffective, individuals are frequently constrained into inner or cross-outskirt relocation; now and again, whole towns leave their tribal land for packed urban territories (UNCCD, 2015).

Land degradation needs to be recognized, alongside climate change, as one of the most pressing problems facing humanity (Young, et al., 2015) and this exploration will add to the present civil argument of soil protection by accomplishing the adequacy and maintainability in sustenance generation, counteractive action of misfortune to biodiversity and cutoff the an unnatural weather change and will likewise help the approach creators in accomplishing the objectives of manageable advancement identified with environment, nourishment security and biodiversity. This review will add to the "proposed objective of passage 207 sets out a wide structure for national, provincial and global activity to screen arrive corruption and to reestablish debased terrains in dry, semi-bone-dry and dry sub-sticky ranges expressed that: to ensure, reestablish and advance reasonable utilization of earthbound biological communities, economically oversee woods, battle desertification, and end and switch arrive corruption and stop biodiversity misfortune.

Land disparagement is not kidding in both low-and high-pay nations and in most creating nations it's turning into a noteworthy requirement to future development and advancement of supportable provincial occupations. Around 40-75% of the world's rural land's efficiency is lessened because of land corruption (Baylis et al., 2012; UNCCD, 2013). Like different nations arrive debasement likewise posturing progressively genuine difficulties to feasible advancement in Pakistan. As lion's share of its kin specifically or in a roundabout way subject to horticulture for their occupation and furthermore destitution is still a prevailing issue for the country individuals and this poor are particularly influenced via arrive corruption, on the grounds that their employments vigorously rely on upon characteristic assets. Pakistan is isolated into three noteworthy geographic zones: the northern good countries, the Indus River plain and the Balochistan Plateau. The northern good countries contain the Karakoram, Hindu Kush and Pamir mountain ranges, which contain a portion of the world's most elevated pinnacles, including five of the fourteen "eight-thousanders" (mountain tops more than 8,000 meters), which pull in globe-trotters and mountain climbers from everywhere throughout the world, quite K2 (8,611m) and Nanga Parbat (8,126m). The northern good country locale of Pakistan is known as a standout amongst the most zones helpless through disintegration, because of overwhelming emissions of erosive rain, falling on soak slants with delicate soils influenced by surge and earth fast. Thusly, huge numbers of these zones have touched hazardous biological conditions that now and again are irreversible. Horticulture is still the noticeable area of the economy in Pakistan and offering the most achievable system to advance financial advancement additionally offers the wanted pathway to destitution lessening and nourishment weakness change. In any case, horticulture is one of the area’s

most noticeably bad influenced via arrive corruption, disintegration, environmental change and desertification. Unless these difficulties are truly tended to, accomplishing the maximum capacity of the horticultural division in numerous social and monetary points of view could demonstrate troublesome.

Land management hones that prompt to soil debasement place soil into a condition of weakness prompting to short and long haul suggestions for feasible advancement. At last this may prompt to the dirt getting to be distinctly corrupted to a point that it might stay away forever to its unique state and capacity (Koch et al., 2015). Human exercises are the essential drivers of the procedures of land debasement, desertification and environmental change. Despite the fact that exceptionally mind boggling and hard to foresee, cooperations between environmental change and land debasement are probably going to influence a scope of various biological community capacities and the administrations they convey, with resulting impacts on sustenance generation, occupations and human prosperity (UNCCD, 2015). Unsustainable land administration hones in Pakistan are bringing about huge ecological issues, including soil disintegration, loss of soil fruitfulness and related yield efficiency, streak surges, sedimentation of water courses, and deforestation and the related loss of carbon and biodiversity resources. The northern mountain areas are liable to substantial soil disintegration brought about by huge scale deforestation in the catchments prompting to siltation of real water supplies, along these lines diminishing the limit of force era and accessibility of water system water. Unless these issues are tended to, land debasement will proceed at a quickened pace with antagonistic effects on the basic and useful trustworthiness of biological systems, biodiversity and individuals' employments. In Pakistan, agribusiness is the overwhelming part as it utilizes more than 65 percent of the aggregate populace and it represents around 33 percent of the nation's GDP (GOP, 2015). In any case, the division is helpless against repeating atmosphere related occasions, for example, streak surges, avalanches, extreme downpours, dry seasons, hailstorms, frosty and warm waves, soil disintegration and mass developments. These occasions have extremely undermined grain generation in the nation. Pakistan's Poverty Reduction Strategy Paper (PRSP) additionally stresses the need to address issues of deforestation, soil disintegration, desertification, and over the top utilization of pesticides, and to limit the effect of these on neighborhood employments.

Information exchange should be encouraged at all levels i.e. between nearby groups, common society, the private area and policymakers on national and global scales and amongst specialists and partners influenced by environmental change and land corruption. This can help construct trust and comprehension while accommodating the requirements of nearby groups, purchaser requests, inquire about and political plans, empowering coordinated activity and decreasing the time-slack between information era and application (UNCCD, 2015). The ebb and flow pattern research will have a critical effect ashore debasement at a sectoral level and in restricted geographic ranges of the northern good country district of Pakistan. By looking into the above dialog the review close by is plan with the accompanying destinations.

OBJECTIVES OF THE RESEARCH

1. To study the soil erosion and its type during the last 10 years and poverty level of land degradation.
2. To study the issues related to access and management of resources.
3. To pinpoint the unsustainable land management root causes of land degradation.

2. METHODS AND DATA

2.1. Why Pakistan was chosen

This study is a case study of the four purposively selected districts of northern areas of Khyber Pakhtunkhwa province of Pakistan. The region of Khyber Pakhtunkhwa included 26 regions having distinctive culture and dialects and is the littlest as far as territory among the four Provinces of Pakistan and the third biggest regarding populace. The zone is exceptionally different, including the high heap of the Hindu Kush in the North and Indus plain in the south. Khyber Pakhtunkhwa secured luxuriously differing environmental frameworks, from the blanketed, woodland secured mountain to parched rangelands and structures the desolate slopes of the tribal territories to the fruitful rural Peshawar valley. In Pakistan destitution is a long haul issue as it occurrence 28% in Pakistan and 38% in the chose areas (BISP, 2011) and its shifts among the territories, regions and districts and furthermore among the gatherings, sub-gatherings of the populace; families headed by uneducated people, functioning as untalented work force are poorer than family units headed by educated people occupied in generously compensated occupations (Arif, 2013) likewise coupled by various natural zones and cooperation in the societal advancement exercises.
Universe of the study comprised the four purposively selected Districts i.e. Shangla, Battagram, Kohistan and Tor Ghar of Khyber Pakhtunkhwa, due its top positions in the poverty and other development indicators of Human Development Index among the 26 districts of the province and also here 100 of the population are rural and dependent mainly on subsistent farming and the allied activities for the livelihood. The household was selected through Google mapping for ensuring the randomness in the household's selection through random sample method in those areas where there were maximum numbers of development interventions during the last one decade from the government and different development organizations with multiple objectives through participatory development for poverty reduction. The unit of analysis was the randomly selected household head. From each district, 20 households (total 80) were selected through random sample techniques and were interviewed by means of a questionnaire through face to face interview through survey technique. Questionnaire schedule having both closed and open-ended question were used to collect the data from the respondents. Primary data collection through questionnaire which is the widely known techniques for the survey methods of data collection. During designing the questionnaire all the essential aspect of the standard questionnaire was kept under consideration to solicit the most important and reliable information and also to ensure accuracy in the data collection and analysis. The data were analyzed by using descriptive statistics, parametric and non-parametric tests and the Probit logistic regression models.

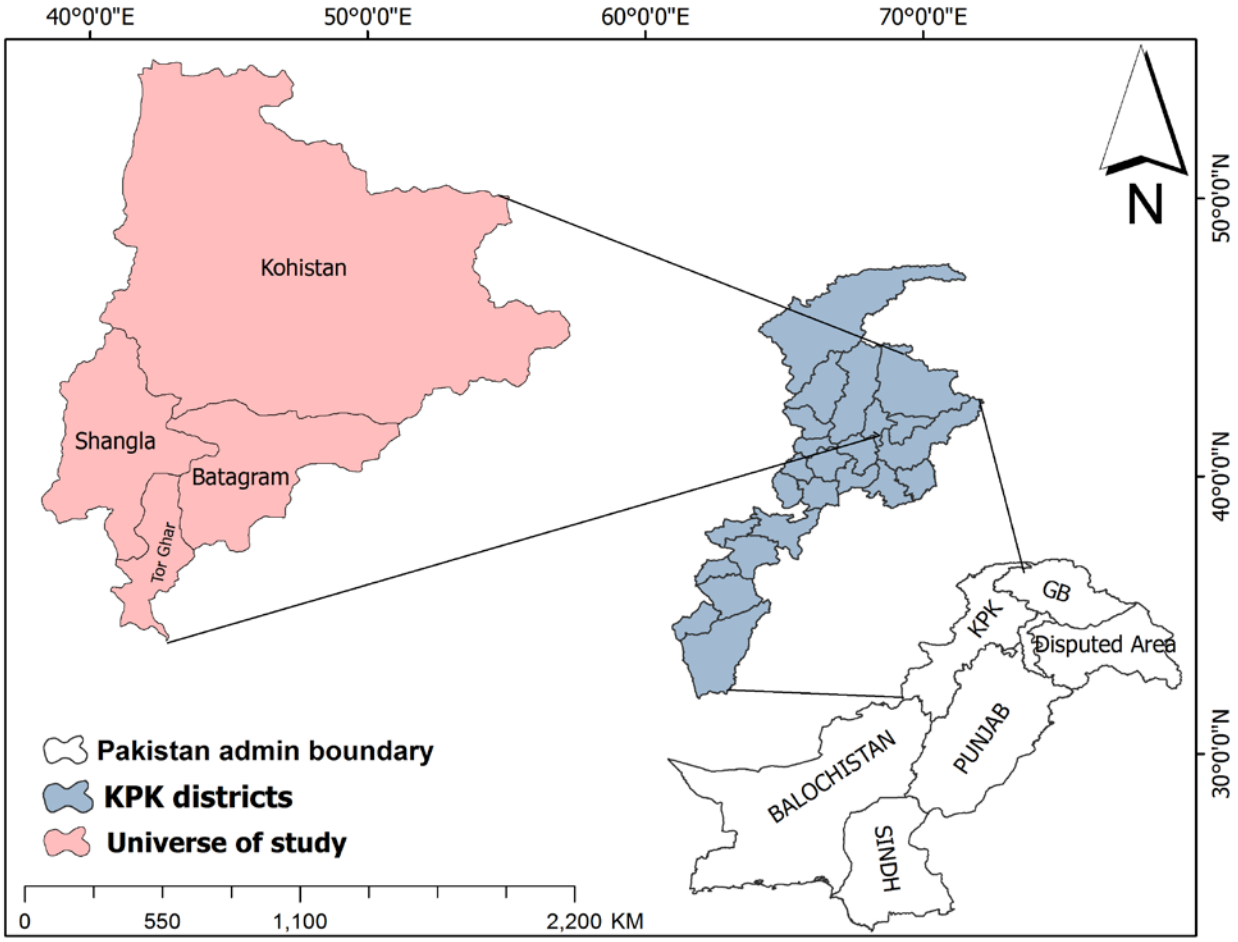

Figure-1: Map of Pakistan and Khyber Pakhtunkhwa showing the universe of the research

Probit Model

Following the work of Nagler (1994) in this research, the fundamental assumption is that a response function exits of the form that the X_s are observed but not Y^*. Y^*, represent a continuous variable that represents the tendency of a household's having degraded land in the last 10 years that is not observable at the large scale. Also, there is another assumption that there is the existence of the critical level of Y^*. Since Y^* is unobservable, a fuzzy variable Y of the censored poverty that takes the value between 0 and 1 for determining the extent of poverty among the household. Probit regression techniques allow us to estimate the effects of the X_s on the underlying Y^*. They can also be used to see how the X_s affect the chance of being in one category of the pragmatic Y as contrasting to another (Paul, 1999).

$$Y = \alpha + \lambda X_i + \varepsilon_i$$

$$Y^* = \alpha + \lambda X_i + \varepsilon_i$$

$$If Y^* > 0, Y = 1$$

$$If Y^* < 0, Y = 0$$

Where λ_s are the parameters to be predictable, and ε_i is the error term. The predictable parameters of the likelihood function thus yield results indicating the relative importance of the explanatory variables in determining of the households relation to the degradation of land

RESULTS AND DISCUSSION

Types of land erosion

Land erosion continues is an important environmental concern all over the world. Land management is important to accomplish economical advancement and long haul rural profitability. Arrive administration is accomplished when the state of land empowers it to bolster the progressing creation of sustenance and fiber and proceed with its part in cycling of crisp water, atmosphere control, and general biological community flexibility (McBratney, 2014). In the developing world most of the rural households are engaged in subsistence agriculture for their food and livelihood and thus the erosion having a very drastic affect their all spare of life. The data in table-1 identified the types of land erosion on the land of the households and its type. In the literature the researcher agreed that the land erosion accelerated where historical agriculture extended and predominantly where ploughing was used. The data shows in the area sheet, water, splash, rill erosion affected the land of the respondents in one form or the others. Sheet and water erosion was reported by the majority of the respondents with a standard deviation of 0.50 and variance 0.25. This shows that these two types of the erosion affected the land in the area more than the rest of the two one due to the land topography, mismanagement of land, variability in climate change and severe moon soon in the area couple by a declared seismic zoon to natural hazardous from the last 10 years are the major driving forces responsible for the land degradation in the area.

Table- 1: Erosion on the farm, its types and percent of land degraded during last 10 year

Erosion on land: Yes= 46(57.51) and No=34(42.5)					
TYPES	Yes (%)	**Mean**	**S. Dev.**	**Variance**	**C.V**
Sheet erosion	44 (55.0)	0.55	0.50	0.25	91.02
Water	45 (56.3)	0.56	0.49	0.25	88.75
Rill erosion	31 (38.8)	0.39	0.49	0.24	126.52
Splash erosion	27 (33.8)	0.34	0.48	0.23	140.99
Percent quantity of land eroded					
10-30	19 (23.75)	20.20	23.83	568.03	117.99
31-50	14 (17.5)				
51 and above	10 (12.5)				

Source: Survey data, 2016

Empirical model results of causes of land erosion

A censored poverty is specified to determine the causes of land degradation. The model was chosen due to the nature of the dependent variable, which may have a value from zero to one. It was hypothesized that the poorest household's members land will be more degraded than the above poverty line and within the line. This is because of the non access of the poor to the land conservation services and awareness about the different development programmes. Taking this in to account this study assessed land degradation in relation in the context of land users, while local knowledge is necessary to fully appreciate the effects of land degradation on livelihoods and human well-being. The empirical results in the table-2, shows that deforestation and human activities contribute to the land degradation in the area significantly, at 5% level of significant. This may be due to the growing division between the poorest and the rest of the inhabitants are predominantly evident in patterns of land possession, with such ownership in decline across the poorest, poor and median income groups and more of the land is allocated for the construction of houses and other commercial

buildings, which leads to the disturbance of land surface and hence to degradation. While the results of the climate change and thunder storm surprisingly pointed that it not contributed to the land degradation in the area. This may be due to the lack of knowledge of the respondents about the climate change process and hence land degradation is reducing the resources available to all species, making us all less resilient and more vulnerable to the impacts of climate change.

Table-2: Empirical results of Probit regressions model of censored poverty (fuzzy value) and causes of erosion

Variables	Estimated Coefficient	Standard Error	t-ratio
Climate change	-0.009	0.092	-1.557^{ns}
Deforestation	0.194	0.100	1.771*
Human activities/ Physical	-0.011	0.057	-2.288**
Thunder storm	-0.230	0.048	-0.539^{ns}
Poverty censored value **(Constant)**	2.177	0.019	1.984**
N=80, ns = not significant, *,**, ***= mean significant at 10% level; 5% and 1% respectively,			

Source: Own survey, 2016

Types, causes and Impact of land degradation

Arrive develops sustenance, give covers, and through and crosswise over it the new water we drink is cleaned and conveyed, so all human life straightforwardly or in a roundabout way relies on upon land and the land assets. However, toward the begin of the 21st century; our territories are no longer ready to stay aware of the weights set on its constrained assets (Stewart et al., 2015). It is assessed that around 33% of the world's arable land is thought to have been influenced by corruption and desertification to date (UNCCD, 2015), demonstrating that it is across the board, on the ascent, and happening in all land cover sorts and agro-ecologies (Bao et al., 2014). Arrive corruption imperils biological system benefits comprehensively, including agrarian items, clean air, new water, unsettling influence control, atmosphere direction, recreational open doors, and fruitful soils (Walker at al., 2002; UNEP, 2012; Von et al., 2013). Corrupting practices connected to the 'deplorability of the hall (Hardin, 1968) in which the requests of individual intrigue take need over shared, manageable utilization of land assets, prompting to its overexploitation. In this regards data in table-3 pointed that an overwhelming majority of the respondents reported for the degradation of land in the area. The most important types of land degraded existed in the area was land degraded by water, decline in soil fertility, water logging, loss of vegetation cover, increased stoniness of land and rock cover and the degraded of land by thundering with a mean of 3.10, variance 8.80 and coefficient of variation 95.69. The most important types contributing to the land degradation in the area was land degradation by water and decreased in soil fertility due to the direct or indirect reasons of the degradation. The extents of degradation in the percpectives of the respondents were varying from moderate to very high. The direct causes of the land degradation were the finishing of terraces (22.5%), reduce soil reserve of moisture and nutrients (23.8%), reduced seedling emergence (15.0%) and deforestation (25.0%). While the indirect causes were the land structured weekend and finished (15.0%), loss to biodiversity (18.8%), reeducation in crop yields (12.5%), organic matter and nutrient depletion (15.0%) and loss to flora and fauna (23.8%). The table also pointed the respondent’s perception on the impact of land degradation on the ecosystem services in the area. They reported that due to the land degradation process there is a loss to medicinal plants (13.8%), loss to fresh water (13.8%), reduction to animal feed (13.8%), loss

to recreation and rural tourism (15.0%), no nutrient recycling (12.0%), loss to aesthetic values and biodiversity (10.0%) and decrease in agriculture production (10.0%). This concludes that land degradation affected all spare of the human and animal life in the area.

Table-3: Land degradation its types, extent, causes and impact on the ecosystem in the area

Land degraded in the area; {Yes= 71 (88.8%) and No= 9 (11.3%)}, n=80					
TYPES OF LAND DEGRADATION	Yes (%)	**Mean**	**S. Dev.**	**Variance**	**C.V**
water degraded soil	29 (36.3)	3.10	2.97	8.80	95.69
Wind degraded soil	0 (0.00)				
Soil fertility decline	21 (26.3)				
Water logging	4 (5.0)				
Salt increasing	0 (0.00)				
Sedimentation	3 (3.8)				
Ground water table lowering	0 (0.00)				
Vegetation cover loss	8 (10.0)				
Increased stoniness of land and rock cover	2 (2.5)				
Soil degraded by thundering	4 (5.0)				
EXTENT OF DEGREDATION					
Very high	14 (17.5)	2.01	1.03	10.06	51.25
High	23 (28.8)				
Moderate	33 (41.3)				
Not at all	1 (1.3)				
DIRECT CAUSES OF DEGREDATION					
Soil erosion/finishing of terraces	18 (22.5)	2.88	2.14	4.59	74.53
Reduce soil reserve of moisture and nutrients	19 (23.8)				
Decrease nodulation of legumes	2 (2.5)				
Reduced seedling emergence	12 (15.0)				
Increase risk of water logging	0 (0.00)				
Result deforestation	20 (25.0)				
INDIRECT CAUSES OF DEGREDATION					
Structured weekend and finished	12 (15.0)	3.23	2.14	4.58	66.37
Biodiversity reduced	15 (18.8)				
Reduced crop yield	10 (12.5)				
Possible nitrate contamination of spring and stream	3 (3.8)				
Organic matter and nutrient depletion	12 (15.0)				
Loss to flora and fauna	19 (23.8)				
IMPACT OF LAND DEGREDATION OF ECOSYSTEM SERVICES					
Remove the medicinal plant	11 (13.8)	3.35	2.19	4.79	65.31
Loss to fresh water	11 (13.8)				
Reduction in animal food	11 (13.8)				
Loss to recreation and rural tourism	12 (15.0)				
No nutrient recycling	10 (12.0)				
Loss to aesthetic values and biodiversity	8 (10.0)				

Decrease agriculture production	8 (10.0)				

Source: Survey data, 2016

Land management farming practices

Farmers cultivating practices can be utilized to enhance soil quality and increment soil carbon, including ideal preparation, edit field revolution, hedgerow planting and creature compost application. Arrive gives a wide range of multi-practical administrations that collaborate and add to human prosperity and each of these administrations has a financial advantage that is of incentive to society all in all (ELD, 2015). The biological community benefit structure has a few orders of environment administrations for a scope of purposes (Haines, et al., 2013; de Groot et al., 2012) however four general sorts of biological community administrations i.e. provisioning administrations, controlling administrations, social administrations and steady administrations are more vital (Turner et al., 2015). This examination considers the sub-segments of these strong administrations to be practices at the group level for the reasonable land administration in the zone. Maintainable land administration is for the most part expected to bring about enhanced land administration for present and future eras. Rural land that is overseen unsustainably could turn out to be reasonably overseen if requests that expansion weight for large amounts of creation are decreased, corrupting practices are changed to more manageable ones, or if a land utilize is changed for an option one that lessens weight. Maintainable land administration can be sought after by means of numerous pathways, utilizing a scope of intercession alternatives. The data in table-4 show the respondent's on-farm management practices for the sustainable land management in the area. It is evident from the data 16.3% of the respondents reported for the burning of crop residue at the field and this is unsustainable management paretic of land management. Also 30% of the respondents reported for the retained of the crop residue after harvest. All crop residues retained permanently (throughout the year) for the feeding of animal were reported by 41.3% of the sample respondents. Mulching, intercropping and mixed cropping and crop rotation practices were also performed by the respondents for the management of land. Also the use of animal manure, use of green manure/improved fallow system, trees forming farm boundary for the prevention of wind crop damage and terraces/ contours, composite use and lime application were performed by the respondents in the area for the management of land ecosystem in the area on small scale basis.

Table- 4: On-farm practices application by the farmers for the sustainable environment

TYPES OF ON-FARM PRACTICES:	Yes (%)	**Mean**	**S. Dev.**	**Variance**	**C.V**
Crop residue burnt	13 (16.3)	0.16	0.37	0.14	228.45
Crop residue retained after harvest	24 (30.0)	0.30	0.46	0.21	153.72
All crop residues retained permanently (throughout the year)	33 (41.30)	0.41	0.49	0.45	120.09
Mulching	6 (7.5)	0.06	0.27	0.07	353.09
Intercropping	22 (27.5)	0.28	0.45	0.20	163.39
Mixed cropping	31 (38.8)	0.39	0.49	0.24	126.52
Crop rotation (maize/legume) practised	42 (52.5)	0.53	0.50	0.25	95.72
Use of animal manure	38 (47.5)	0.48	0.50	0.25	105.79
Use of green manure/improved fallow system	5 (6.3)	0.06	0.24	0.06	389.74
Trees forming farm boundary	25 (31.3)	0.31	0.47	0.22	149.26

Terraces/ contours	30 (37.5)	0.38	0.49	0.24	129.91
Application of lime	17 (21.3)	0.23	0.42	0.17	186.76
Composite Use	6 (7.5)	0.08	0.27	0.07	353.40
Application of ash	35 (43.8)	0.44	0.49	0.25	114.10

Source: Survey data, 2016

CONCLUSION AND RECOMMENDATIONS

Land degradation poses potentially permanent and serious threats to the economic and social development. It was concluded that sheet, water, splash, rill erosion affected the land and the significant factors responsible for this was deforestation and human activities. Important types of land degraded existed in the area was land degraded by water, decline in soil fertility, water logging, loss of vegetation cover, increased stoniness of land and its extents varying from moderate to very high. Causes of the land degradation were the finishing of terraces, reduce soil reserve of moisture and nutrients, reduced seedling emergence and deforestation, loss to biodiversity, reeducation in crop yields, organic matter and nutrient depletion and loss to flora and fauna. To overcome this there is a need for the sustainable land management practices at the farm level and policy formulation at the national level at the large scale in order to overcome this growing problem. Also human activities are the principal drivers of the processes of land degradation, therefore lessen these stresses through innovative approaches will reduce the process of the land degradation. Also there is a need of the control practices to control sheet and rill erosion modify one or more of the factors affecting erosion processes.

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LIVELIHOOD STRATEGY AND VULNERABILITY ON HH FORMER PLANTATION LABOURS IN SPESIAL ECONOMIC ZONE SEI MANGKEI NORTH SUMATRA, INDONESIA

RADEN PRAMIGA ADITYA
HARIYADI
SETYAWAN SUNITO

BOGOR INSTITUTE OF AGRICULTURE

ABSTRACT

The conversion oil palm plantation land to The Special Economic Zones Sei Mangke it gives essential impact to the basic problems in livelihood strategies of HHs in the community of former Plantation labours in Sei Mangkei. The Landscape changes affected the vulnerability of the HH system. This research about the vulnerability of the former labours is done using a five LVI method of capital (financial, physical, human resources, natural resources, and social). The research question is: 1. How is vulnerability Former Plantation Labours who is depend their livelihood on the first section Sei Mangkei PTPN III. 2. How can adaptability of former Plantation Labours livelihood strategy with the change in the landscape to the Special Economic Zone. The Result of this study shows the pressure on the livelihood strategies of agricultural labours in the village of Sei Mangkei. The study was conducted in District Sei Mangkei (witch 2.022.77 Ha square area) District of Bosar Maligas, Simalungun, North Sumatra Province, Indonesia. This method using a survey method. 30 respondents selected through random sampling. Analysis of the results using the method of Livelihood Vulnerability Index (LVI) obtained a value of 0.687 means that the community of ex-labours plantation in the village of Sei Mangkei have a high susceptibility of the main component of human capital (0.497), physical capital (0.667), capital Social (0, 715) natural capital (0.860), financial capital (0.834), the sub-components of Human Capital witch is education and skills (0,323) and the livelihood strategy (0.670).

Key Words: Sei Mangkei, LVI, Vulnerability, Labours

INTRODUCTION

The palm oil industry in Indonesia has grown rapidly since the growing of Palm plantations to more than 6.3 million hectares, about 60% is cultivated by large company and 40% by conventional plantation. The geographical conditions of Indonesia are very well suited for the development of oil palm plantations. The data from Ministry of Agriculture shows that the development of oil palm plantation area in Indonesia in the period of 1970-2011 was increasing from 133,300 ha in 1970 become 8.9 million ha in 2012 and then become 11.5 million hectares in 2015. The increasing of the area significantly increased palm oil production in Indonesia, from 216.8 thousand tons in 1970 to 26.5 million tons in 2012, and 31 million tons of CPO by 2015 (DG 2015). In the year 2011, the Indonesian government issued the Master Plan for the Acceleration and Expansion of Indonesia's Economic Development (MP3EI), as the superior national commodity, palm oil is included in the MP3EI program to increase the utilization of CPO (Crude palm Oil) Industry in Indonesia, which is still relatively low, around 27.41% of total CPO production (Crude Palm Oil) nationwide (Rifai et al 2014).

One of the main activities as the centre of MP3EI Corridor I (Sumatera), already stipulated in the RPJMN 2015-2019 as the National Special Economic Zone (SEZ) is SEZ Sei Mangkei which is integrated with the main business is palm industry and latex industry (Book 1 Agenda National Development of RPJMN 2015-2019). SEZ Sei Mangkei is developed on an area of 2.002,77 Ha, as the land of PT. Perkebunan Nusantara III (Company). Changes affecting diverse forms of one country to another depend on local potential, in addition they also involve a transnational dimension in terms of regional and capital labour flows, trans boundary and global environmental impacts (Cramb and Curry 2012). According to Peterson et al. (2013) that individual economic activities as well as groups are generally associated with landscape changes. Landscape changes have an impact on HH livelihood systems in the region (Amalia 2015). In fact The livelihood system HH of the labour due to the landscape changes. This problem finally forced these former plantation labour to adopt a livelihood strategy using five capital (financial, physical, human, natural and social resources) enable the former plantation labour to decrease the vulnerability they faces.
Vulnerability is the degree to which a system experiences experiencing losses due to exposure to a hazard and a disturbance or pressure (Turner et al. 2003 in Berkes 2007). Therefore, this research needs to be done to see the extent of vulnerability of livelihood and livelihood strategy of ex-plantation farmer's HH in Sei Mangkei Village, Bosar Maligas Sub-district, Simalungun Regency, North Sumatera Indonesia.
The development of oil palm plantations is certainly open the new business field, because in general oil palm plantations cultivated on newly opened land that have not been cultivated before. The immediate impact of the presence of oil palm plantations is the emergence of employment opportunities. The absorption of man power in the plantation and palm oil sectors produces considerable numbers compared to other industries. Beyond that, there are community groups that directly or indirectly depend on oil palm plantations. In this case, the change of landscape of oil palm and rubber plantation of 2,000.27 Ha which is a plantation land owned by PTPN III (Company), Kebun Dusun Ulu, into a special economic area (SEZ) Sei Mangkei industrial cluster affect the livelihood of former Plantation labour Afdeling I in Sei Mangkei Village which mostly depends heavily on the source of their livelihood as a plantation labour.

The purpose of this study is as follows:
1. Analyzing the Livelihood Vulnerability Index (LVI) of former plantation labour in afdeling I PTPN III (Company), Sei Mangkei Village.
2. Analyzing livelihood strategy (livelihood strategy) of former plantation labour in afdeling I PTPN III (Company), Sei Mangkei Village.

The conditions and characteristics of the former labour in the conventional plantation village closely associated with colonialism so the former plantation labourers living in the isolation of plantation systems which everything are organizing by government. This certainly affects various aspects of social life as well economic, social, and political aspects. The former plantation labourers live under the shadow of plantation company that preserve the colonial heritage system. Almost all sources of information in the plantation area is controlled and regulated by the State.
Consequently, the communities are facing limited access to information and livelihood opportunities outside the plantation sector in this village. There are two sources of income in afdeling Sei Mangkei which is the source of the livelihood from the plantation sector, and the non-plantation (industrial) sector. Both of these livelihoods contributed to the vulnerability of HH as well the livelihood of the plantation workers in Sei Mangkei. The limited access to all socio-economic access has an impact on the variation in the implementation of livelihood strategies adopted by the HHs former plantation workers.

METHODS

Location

The research was conducted in Sei Mangkei Village, Bosar Maligas District, Simalungun, North Sumatra, Indonesia. This research was conducted in two locations, namely Village IV and Village V, Sei Mangkei Village. The selection of the research location was conducted intentionally (purposive sampling) with the consideration located in afdeling I PT. Perkebunan Nusantara III Sei Mangkei Village. This research was conducted for 7 (months) starting from April 2016 for the preparation of the proposal until the completion of the data collection in October 2016.

Types and data sources

The data analysis was collecting from the former plantation labour (respondents). This is because the former plantation labour has an important role in decision-making and resources allocation that related to the application of livelihood strategies. Data were collected for this study at one particular time. Data sources in this study include primary data and secondary data. The primary data, was taken using questionnaires, interviews and depth interviews to the subjects. We did quantitative approach supported by qualitative data to enrich the data and information obtained, so the social phenomenon that happened in the field can be better understood. The quantitative approach is done by using census method with the instrument in the form of questionnaires that given to respondents.

Data analysis

The data and information obtained will be measured according to variables that determined during the data collection such as structured interviews with the help of questionnaires, interviews and in depth interview. The Analysis method that used to

measure the vulnerability of the former labour HH livelihoods is LVI (livelihood vulnerability index), and to know the former labour livelihood strategy is done descriptive qualitative analysis.

Table 1. Matrix Method Data Analysis

No	Purpose Research	Variable measured	Method Data collection	Analysis Technique
1.	Analyzing the vulnerability of family livelihood of former plantation workers	capital : 1) Nature capital 2) Physic capital 3) Financial capital 4) Human capital 5) Social capital	Questioner	*Livelihood Vulnerability Index* (LVI) Descriptive qualitative
2.	Analyzing HH livelihood strategies of the former plantation workers	Livelihood strategy :) Engineering) Diversification) Migration (spacial)) Survival	interview *In depth interview*	Descriptive qualitative

Analysis Livelihood Vulnerability Index

In this research LVI (livelihood Vulnerability Index) is the analytical technique to calculate the vulnerability of HHs former plantation labour due to landscape changes. Vulnerability is the indicators to monitoring vulnerabilities of time and space, identifying vulnerability processes and prioritizing strategies to reduce vulnerabilities. The LVI calculations in this study determine the main components and sub-components of education and skills, livelihood strategy, land, social relations, housing and facilities, savings and income. According to Hahn et al. (2009) and Can et al. (2013) using the balanced mean average approach in which each subcomponent contributes equally to the overall index even though each major component has a different subcomponent. LVI in this study used a simple approach which applies the same quality to all major components. The value of each major component is determined using indicator numbering. So ascertain all the major components contribute equally to the LVI

Table 2. Major component, sub component and Indicator/ variable LVI (modification from Hahn et al (2009) and Can et all (2013)

Major component	Subcomponent	Indicator/variable
Human	Education and skills	A. Percent HH that entering elementary school B. Percent HH that entering middle school C. Percent HH that doesn't have formal education
	Livelihood strategy	A. Percent HH without safety training B. Percent HH that have another income beside plantation labour
Nature	Land	A.Percent HH that doesn't have land B. Percent HH with land (0,1-0,5 ha) C. Percent HH that have access to plantation land
Social	Social relation	A. Percent HH that have access to production tools B. Percent HH that have link to business capital loan C. Precent HH that have a family PTPN III D. Percent HH that have a family in KEK Sei Mangkei
Physics	House facilities	A. Percent HH that have a house B. Percent HH that have a house with land C. Percent HH that have a vehicle D. Percent HH that have electronic devices E. Percent HH that have a jewellery
Finance	Saving and income	A. Percent HH that have bank account B. Percent HH that have saving money at home C. Percent HH that have business investment D. Percent HH that have income beside plantation labour

LVI is calculated by weight balancing averages, in which each subcomponent gives the same contribution to the overall index value although it has a number of different main components because the subcomponent is measured on a certain scale then normalized in the form of index. The LVI values range from 0 to 1, where a value near 0 indicates the least vulnerability while a value close to 1 indicates the greatest vulnerability (Shah et al., 2013).

$$indeks_{sv} = \frac{S_v - S_{min}}{S_{max} - S_{min}}$$

Where:

S_v : is the value of sub component for village

S_{min} *dan* S_{max} : is the minimum and maximum value for both data Sub component for both village

After the normalized sub-component values, the value of each major component is calculated by (2) as follows

$$M_{vj} = \frac{\sum_{i=1}^{n} indekx_{svi}}{n}$$

……2)

Where:

M_{vj} : is the value of the main component j *for* village

$indekx_{svi}$: is the value of sub-component *s* which indeks by *i* on the main component Mj ; and *n* is the amount subcomponent at the main component Mj

The value of the main component can be directly calculated by using equation (3) or aggregate value of five assets of livelihood of H (Human capital), N (Nature capital), S (Social Capital), P (Physics Capital) and F (Finance Capital) the mean weighted of LVI:

$$LVI_v = \frac{w_H H_v + w_N N_v + w_S S_v + w_P P_v + w_F F_v}{w_H + w_N + w_S + w_P + w_F}$$

……(3)

Where:

LVI_v :is the livelihood vulnerability index village *v*

w_{mj} :is the value of major component *j*

w_H, w_N, w_S, w_p, w_F : is the value of H (*Human Capital*), N (*Nature Capital*), S (*Social Capital*), P (*Physics Capital*) and F (*Finance Capital*)

This study is intended to develop examples of assessment tools of various components, subcomponents and variables / indicators. The LVI formula uses a simple approach of applying the same weight to all the major components. This weighting scheme can be customized by future users as needed. Since each subcomponent is measured on a different scale, therefore the result of the formulation assessment is standardized as an index. The formulations used for this conversion were adapted from those used in the risk prediction index of vulnerability to flood risk of climate variability, a case study of the Vietnamese Mekong Delta (Hahn et al. 2009 modified Can et al.

RESULTS AND DISCUSSION

1. Vulnerability Analysis of Livelihoods of Ex-Plantation Farmers

Measuring the vulnerability level of livelihoods due to changes in landscape of oil palm plantations afdeling I of village Ulu Garden of PTPN III into Sei Mangkei Special Economic Zone in Sei Mangkei Village using Livelihood Vulnerability Index (LVI) modification method from Hahn et al. (2009) and Can et al. (2013). Livelihood susceptibility is a condition when an individual or HH experiences the pressure and shocks of its livelihood sources, so that the sustainability of livelihood and life is threatened (Hahn et al., 2009). The value of the Livelihood Vulnerability Index (LVI) component is 0.0 has the lowest vulnerability and 0.5 means the highest vulnerability. There are 5 (five) main components of livelihood capital used by ex-plantation farmers to maintain their lives. Human capital includes subcomponents: education and skills, livelihood strategies. Natural capital includes subcomponents: land. Social capital includes subcomponents: social network relationships that can be exploited. Physical capital includes subcomponents: HH facilities, and home ownership. Financial capital includes subcomponents: the availability of savings, deposits and other income.

Table 3. *Livelihood Vulnerability Index* (LVI) household former plantation labours in Sei Mangkei, village 2016.

Major component	Index major component	Sub component	Index Subcomponent	LVI
Human capital	0.497	Education and skills	0.323	
		Livelihood Strategies	0.670	
nature	0.860	Land	0.860	
Social	0.715	Social relationship	0.715	
physic	0.667	House and facility	0.668	**0.687**
Financial	0.834	Financial and income	0.834	

Livelihood Vulnerability Index……..0.687

From the calculation of the value of the main components are obtained, the value of LVI for ex-plantation farmers' HHs in Sei Mangkei Village is 0.687 where the value gives the meaning that the ex-plantation workers in Sei Mangkei Village have a high vulnerability due to SEZ Sei Mangkei development. Values of vulnerability of ex-plantation HHs in Sei Mangkei Village have high vulnerability value because the main components are human capital (0.497), physical capital (0.667) followed by social capital (0.715), and natural capital (0.860) and financial capital 0.834) belong to the highest value of vulnerability.

While the human capital consisting of education and skill subcomponents (0.323) and livelihood strategy with value (0.670) is the value of the lowest main component.

Values of vulnerability in the components of natural capital and financial capital have the highest value of vulnerability, this is due to natural capital of land subcomponent (0.860), financial capital subcomponent of savings and income (0.834) of ex-plantation workers in Sei Mangkei Village. The main components of natural resources in the form of land can be demonstrated through demographic profile of Sei Mangkei Village 2014 with details:

(1)Residential area of 115.64 ha, (2) crooked land (0.5 ha), (3) dry land / (4) public facilities 0.6 ha and social facilities 1 ha, (5) public cemetery of 1 ha, (6) plantation area of 1875.53 ha, and (7) protected forest area of 1 ha. So based on the data clearly shows the absence of land ownership in the village of Sei Mangkei shows LVI value of natural resource component in the form of land is the highest capital component of it is vulnerability. From the data (Table 4.) shows the respondents of Sei Mangkei Village community do not have business investment (100%), people who have no income outside (labour) is 71%. In addition to people who do not have cash deposits at home and do not have savings in the Bank of 81.25%. The data illustrates the vulnerability financially (economically) as a result of the change of landscape of PTPN III (Company) plantation into Special Economic Zone (KEK) Sei Mangkei. The stakeholders of KEK, namely the government (State), the company (industry players / investors) and the SEZ governing and managing bodies (Administrators and PTPN III) must have an applicable option to support the community livelihood strategy in Sei Mangkei Village.

Table 4. Sub component and indicator variable LVI (*Livelihood Vulnerability Index*), Households of former plantation workers in Sei Mangkei Village 2016

Sub component	**Indicator**	**Index**	**∑Index**
Education and skills	A. Percentage HH entering middle school	0.273	0.323
	B. Percentage HH entering elementary school	0.667	
	C. Percentage HH that have no formal education	0.030	
Livelihood strategies	A. Percentage HH without safety training	1.000	0.670
	B. Percentage HH that have another income beside plantation labour	0.340	
Land	A. Percentage HH that doesn't have land	1.000	0.860
	B. Percentage HH with land (0.1 ha - 0.5 ha)	0.580	
	C. Percentage HH that have access to	1.000	

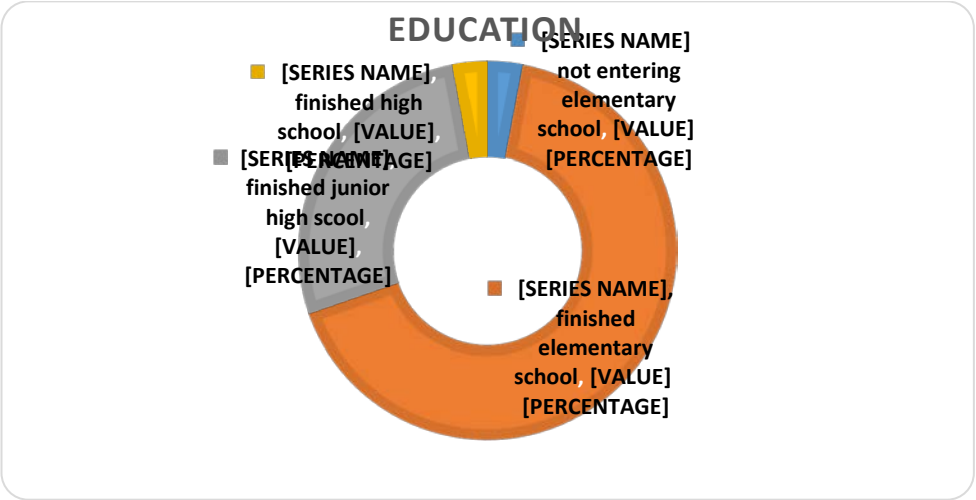
	plantation land		
Social relationship	A. Percentage HH that have access to the production tolls	0.600	0.715
	B. Percentage HH with financial business capital loam	1.000	
	C. Percentage HH that have a family in PTPN III (company)	0.730	
	D. Percentage HH that have family KEK Sei Mangkei	0.530	
House and facility	A. Percentage HH that have a house	0.813	0.668
	B. Percentage HH that has a house with land	0.650	
	C. Percentage HH that have a vehicle	0.938	
	D. Percentage HH yang that have electronic stuff	0.938	
	E. Percentage HH that have a jewellery	0.000	
Financial and income	A. Percentage HH that doesn't have bank account	0.813	0.834
	B. Percentage HH that doesn't have saving money at home	0.813	
	C. Percentage HH that have another income beside plantation labour	1.000	
	D. Percentage HH that doesn't have another income beside plantation labour	0.710	
Total mean of LVI (*Livelihood Vulnerability Index*)			**0.687**

Sub components that give the greatest contribution to vulnerability are savings and income (0.875), followed by land subcomponents (0.820), and social relations (0.715). While the subcomponents that contribute very little to the vulnerability index are education and skills (0.323)

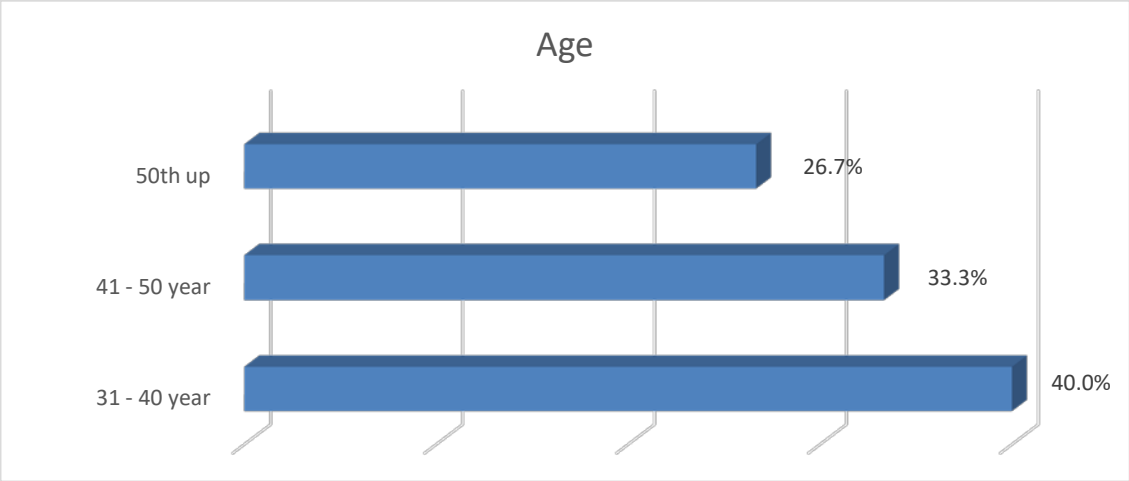
Descriptive data analysis Subcomponent-Variables / indicators

Descriptive analysis in this study includes analysis of human capital, physical capital, social capital, information home, and financial capital. Here is the result of the analysis.

1. Human Capital (Human Capital Capital)Human capital in this study only focus on the level

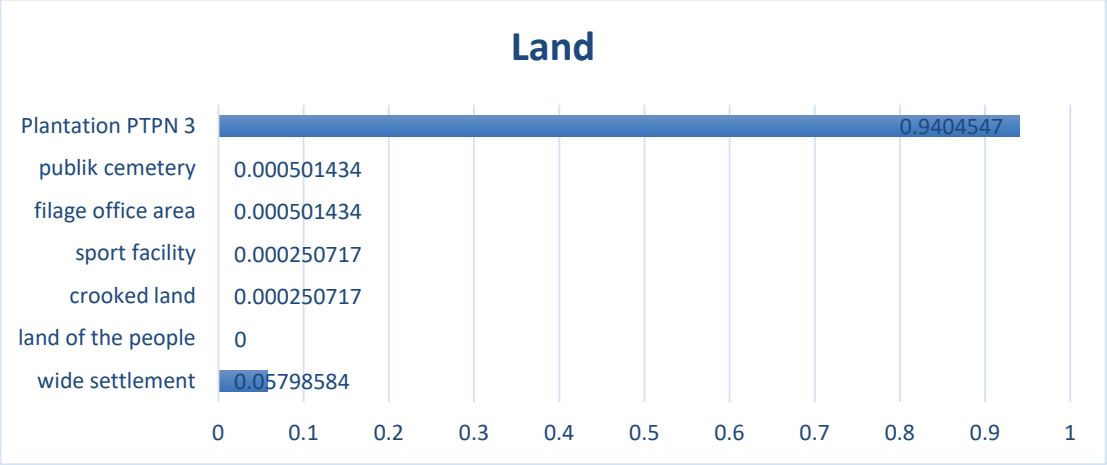


Can be seen in the picture above, education level of majority of society in that hamlet is finished elementary school equal to 67%. Furthermore, junior high school education level of 27%. People who do not entering elementary and high school graduate are equal to 3%. Human capital in education is still very low. It affects the people's ability to adapt to changes that occur in the livelihood sector of the community. It is likely that communities will face difficulties in the face of change if there is no special handling from stakeholders or companies involved education level of 27%. People who do not entering elementary and high school graduate are equal to 3%. Human capital in education is still very low. It affects the people's ability to adapt to changes that occur in the livelihood sector of the community. It is likely



Picture 5. Graph of Data of respondent of age level of HUTA society (village) 4 and 5 From the graph 5 can be seen the data of respondents at the age of 50 years and over by 26.7%, at the age of 41 years old to 50 years old of 33.3% and at the age level 31-40 years old of 40.05 This bias shows the respondents at the level Productive age that has not had experience and work period is very big and potential to be increased.

2. Nature Capital



Picture 6. Graph of nature capital

Natural resources in the form of land can be demonstrated through demographic profile of Sei Mangkei Village 2014 with details: (1) residential area of 115.64 ha, (2) crooked land (0.5 ha), (3) dry land /) Public facilities 0.6 ha and social facilities 1 ha, (5) public cemetery of 1 ha, (6) plantation area of 1875.53 ha, and (7) protected forest area of 1 ha. So based on the data clearly shows the absence of land ownership (landless) they own field in the Village Sei Mangkei

3. Social Capital

Social capital under study includes access to PT. PN III Company and capital access.

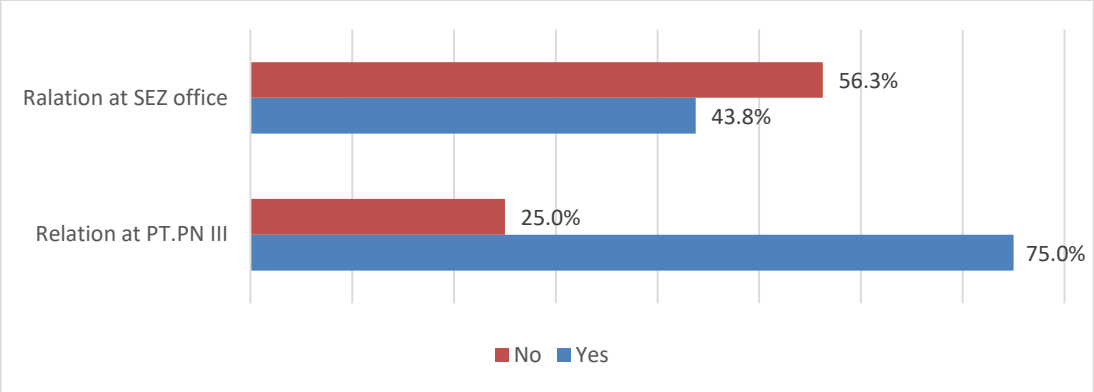


Figure 7. Graph of education capital of the community in terms of social capital we can see in figure 7, people who have acquaintance in PT. PN III of 75% and who have acquaintances in the area manager of 43%.

4. Finance Capital (Modal Financial)

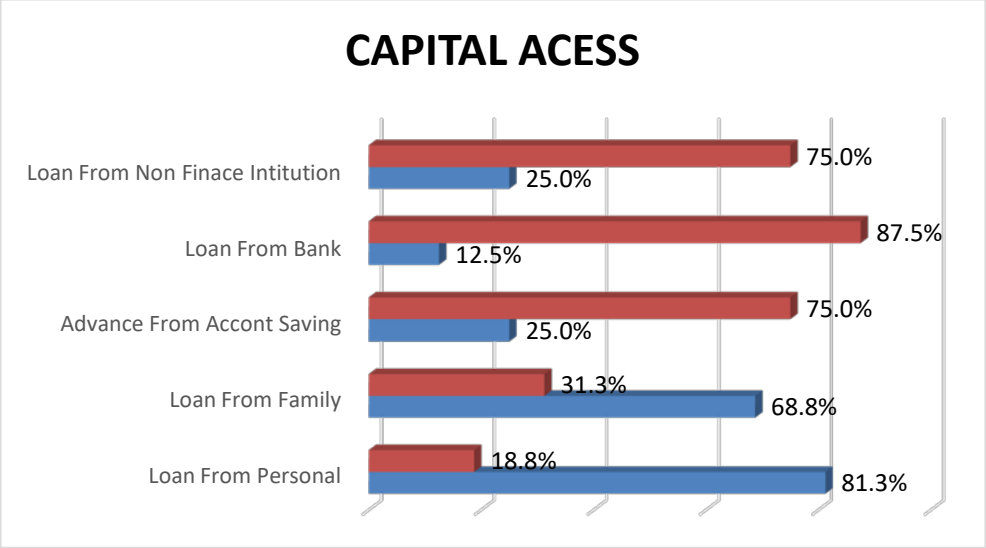


Figure 8. Graph of community capital access

In term of capital access, the majority community only can borrow money to individuals and relatives. Only few people have access to banks and cooperatives. This indicates that the community is vulnerable to the capital channel. This becomes a serious consideration if the conversion of plantation land to SEZ, because the community will lose the main source of income and will be difficult in getting start their own business

5. Physics Capital (Physical Capital)in terms of home ownership, the majority community already owns their own homes. Only 6% are rented and 13% free of rent or loan.

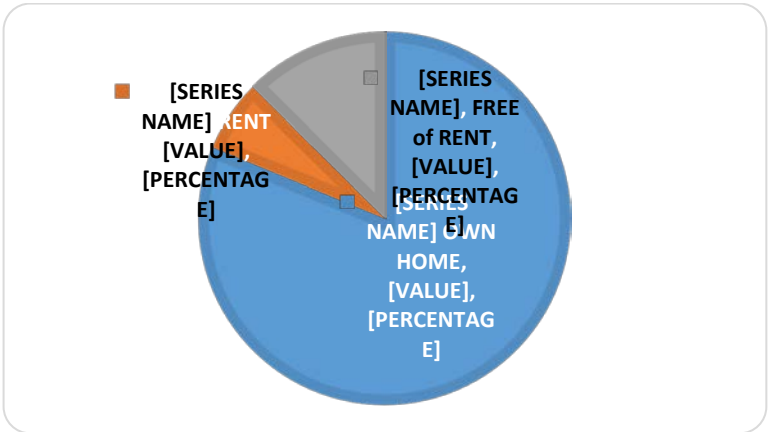


Figure 9. Graph of property ownership

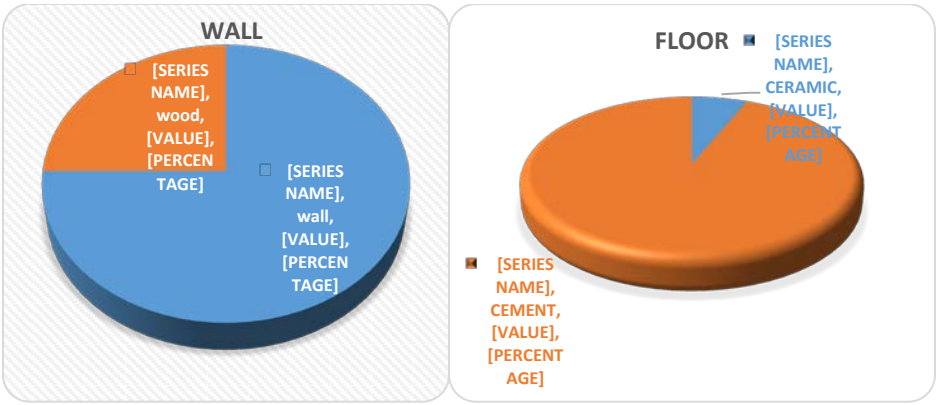


Figure 10. Graph of wall and floor

description the community house in the hamlet is already 75% walled and the rest is still wood. As for the floor, 94% are still using cement only and only 6% of the ceramic floor.

CONCLUSION

The livelihood vulnerability rate resulting from the changing landscape of PTPN III palm oil plantations into the Special Economic Zone (SEZ) of Sei Mangkei using the Livelihood Vulnerability Index (LVI) method. From the calculation of LVI the value of the main components is obtained, the LVI value for ex-plantation farmer's HHs in Sei Mangkei Village is 0.687 where the value gives the meaning that the ex-plantation workers in Sei Mangkei Village have high vulnerability due to SEZ Sei Mangkei development. Values of vulnerability of ex-plantation HHs in Sei Mangkei Village have high vulnerability value because the main components are human capital (0.497), physical capital (0.667) followed by social capital (0.715), and natural capital (0.860) and financial capital 0.834) belong to the highest value of vulnerability. While the human capital consisting of education and skill subcomponents (0.323) and livelihood strategy with value (0.670) is the value of the lowest main component

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Organtech: an information system for organic agricultural production in the peri-urban area of Mexico City

Authors:
Daniel Martínez Espino and Gabriela Ramírez de la Rosa

Affiliation:
Universidad Autónoma Metropolitana – Cuajimalpa
Av. Vasco de Quiroga 4871,
Cuajimalpa Santa Fe, 05348, Ciudad de México, México

Organic agriculture today represents an alternative for small agricultural producers' due to the characteristics offered, such as health which is reflected in the generation of products with a superior quality, the positive impact on the environment by eliminating risks associated with the use of agrochemicals, and finally, promotes local consumption of food generated in the same community. This method of work takes advantage of local resources in a rational way, promoting self-sufficiency.

We find a group of farmers who are relocating to this type of production mentioned above, this peri-urban community of Mexico City, located geographically beyond of the urban area, having access a lot of many of the services as a large city; one of the characteristics is that they have a small-scale production, which is why we found a case study suitable to work together.

Following a methodology participatory action research, which has as a characteristic the solution of a problem detected in a community together with the group or community involved, it was created a multidisciplinary group that was created to work together from the detection, development and completion of this draft.
Thus, within this methodology an initial diagnosis was generated, which showed as a greater area of opportunity, the lack of systematized information about the organic production. Once the problem was identified, a viable solution was proposed that would answer the following research question: Is it possible to build an information system that facilitates the decision-making in the organic agriculture of the peri-urban producers of Mexico City?

The following article describes the development of this initial proposal that became a useful prototype; In the first chapter describes why organic agriculture is considered as a viable solution in the Mexican countryside, what kind of families are working already in this procedure and their characteristics, the impact on their community, reasons that leading us this investigation; In the second chapter, we describe the participatory methodology that was proposed, which served as a guide to make an initial diagnosis in the community, this was carried through a series of instruments where the users helped us to detect and conceptualize the problems, with this, it was able to generate possible solutions, which were generated in conjunction with the actors involved in the research; the third chapter describes the points found in the previous session which are transformed into a prototype, which meet the needs of the farmers and finally in the last chapter the conclusions of the project are provided, as well as the findings in the tests with the farmers, In the same way we add a series of points that are considered as future work.

Keywords:
Interdisciplinary, technologies, agriculture, information technologies, Participation Action Research.

México and Agriculture
CHAPTER 1

Currently Mexico is suffering from a problematic food supply in the big cities, what is generating, a poor quality in the products that arrive, as well as high prices of them. According to FAO, food security exists when the following criteria are met:
• Availability of sufficient quantities of food of adequate quality and produced in the same country or through imports
• Access to them at all times and the resources to acquire them
• Biological use to achieve a nutritional well-being that satisfies physiological needs

By 2015, there were 795 million people who did not have the necessary food to lead an active and healthy life, so the supply issue has become relevant in recent years. On the other hand, in Mexico there are 28 million people with poor diet from early ages, according to figures from 2014 (Fuentes, 2015).

It is for this reason that new alternatives should be find it to help this problem, one of them is organic agriculture, which allows adequate land use and a greater variety of contaminant-free crops (International Atomic Energy Agency, 2007). In addition, it promotes farmers' self-sufficiency, makes better use of their resources and produces more and better food, which will result in a decrease in environmental deterioration.

To inquire about organic agriculture as a system of production that bets to combat the damages that has generated the model agroindustry of exploitation of the earth to produce foods in great quantities, as well as the improvement in the quality of the production and the generation of foods for A self-subsistence, was the starting point for our research project, in which we seek to solve real difficulties of those working in the field.

According to the definition of the Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentos (SAGARPA), secretariat in charge of the agriculture theme in Mexico, expresses that this agricultural form "tries to make maximum use of the resources of the farm, giving it emphasizing soil fertility and biological activity and at the same time minimizing the use of non-renewable resources by reducing or eliminating the use of synthetic fertilizers and pesticides to protect the environment and human health "(SAGARPA, 2009).

In this way, we visualize the organic process as a means to achieve sustainability in production and thus an impact on the social and economic levels of the community; some of its characteristics are (SAGARPA, 2009):
- Eliminates the use and dependence of pesticides, fertilizers, fungicides and other synthetic products whose residues contaminate crops, soil and water.
- It favors the health of farmers, consumers and the natural environment, by eliminating the risks associated with the use of bioaccumulative and artificial agrochemicals.
- Give prominence to the knowledge and management of natural balances aimed at maintaining healthy crops, working with causes through prevention and not with symptoms.
- Understands and respects the laws of ecology, working with nature.
- Protects the use of renewable resources and decreases the use of non-renewable resources.
- Reduces the leaching of mineral elements and increases organic matter in the soil.
- Work with appropriate technologies using rational local resources.

Organic agriculture is now an opportunity for small producers, as the marketing model is more open and benefits local consumption. The Food and Agriculture Organization of the United Nations (FAO) considers that "organic agriculture is a development strategy that seeks to change some of the constraints found in conventional production. More than a technology of production, organic agriculture is a development strategy that is based not only on better management of the soil and a promotion of the use of local inputs, but also a greater added value and a fairer marketing chain"(FAO, 2003, 6).

In addition, the international organization points out some conditions for the success of this model: farmers' motivation, labor availability, land tenure system, producer organizations and market linkages (7-8). It is, then, a way to reactivate the field, to generate greater economic benefits and to contribute in the food security.

Based on the above, we chose to work our project for peri-urban communities, defined as integrated rural areas with a growing population and employment based on the industry sector and services. Agriculture plays a key role, despite being clearly threatened; (JIMÉNEZ, 2009), being these the ones that supply of diverse foods to the city, in this case of Mexico City, it is there where the research was conducted; these groups are geo-localized in a region with 16 thousand people in 11 thousand 543 units of family production. Some 22 thousand 800 hectares of land are dedicated to the production of crops, mainly in the delegations of Tlalpan, Milpa Alta, Tláhuac and Xochimilco (FAO, 2012).

In these lands corn, fruit trees and vegetables are produced for family self-consumption and, on a larger scale, cactus, amaranth, herbs and ornamental plants.

With the purpose of delimiting our investigation we chose the town of San Pablo Oztotepec, located in Milpa Alta, specifically to a group of farmers tutored by the Master Luis Rodríguez, agronomist who belongs to the university Universidad Autónoma Metropolitana (UAM) to the department of agronomy, who is in charge of supporting, providing information and relevant training to change the model of organic production in vegetable gardens.

Detecting the problem together
CHAPTER 2

For the present research, we took as a methodological basis the Participatory Action Research (IAP), through which we built, together with the farmers of the San Pablo Oztotepec community, the diagnosis of their problems and the design, implementation and evaluation of possible solutions.

We understand that this methodology, in addition to "promoting the participation of people and creating conditions for the strengthening of grassroots organizations, presupposes a political project and a model of society that, in general, we could call democratic and participatory" (Ander -Egg, 2003, 35).

Among the substantial aspects of this proposal, we take aspects that seem important to our work (2003):
• The object of study is decided based on the interests of a group of people or group.
• The purpose is to transform the problem situation that affects those involved.

• It articulates research and practice, this means, it not only stops at knowing reality, it is acting on it.
• It promotes the participation of people and places them as an agent or fundamental factor for social change.
• Emphasizes the overcoming of hierarchical relations in the production of knowledge (theoretical and methodological contribution of the researcher vs the experience and knowledge of the people).
• It requires communication between equals to carry out the work in common.
• It involves the researcher's commitment to the community.
• Its scale of application is limited (neighborhood, rural community, organization).
In this way, communication for social change becomes relevant in our project, because it aims to retake the dialogical nature of communication, affirm values and give voice to those who do not have it; Is based on "tolerance, respect, equity, social justice and the active participation of all" (Gumucio, 2010, 37).

The interdisciplinary proposal resulting from collaborative work will be based on communication "as an instrument of dialogue and a facilitating element in the process of citizen participation, a guarantee for a sustainable, culturally and technologically appropriate human development" (COSUDE,2004, 4).

In this sense, we return to the Guide for Communication for Development (C4D), made by the Swiss Agency for Development and Cooperation (SDC), and a definition of Participatory Design to systematize our research.

We understand the C4D as "a tool for social and political advocacy. It promotes participation and social change with the methods and instruments of interpersonal communication, community media and modern information technologies. C4D is not an addition but a transversal activity in project management to strengthen the dialogue with partners and beneficiaries in order to increase citizen participation and promote ownership and sustainability "(COSUDE,2014, 10).

The guide proposes four phases of the communication cycle that we deal with in general (COSUDE,2014, 14).:
1.- Identify objectives and needs
2.- Designing Strategy
3.- Monitor and Evaluate
4.- Implement

Participatory Design is an approach to the evaluation, design and development of technological and organizational systems. Its purpose is to "encourage the active involvement of current or potential users in the design system and in the decision-making process" (Allen, s / f). Due to the participatory nature of the project involving different actors, it was summarized in four steps, which arise from the requirements of the research and based on the C4D guide for the creation of a model that fit the needs of the same as described below.

In the first phase of our project we detected the needs of the farmers of San Pablo Oztotepec through instruments of qualitative research, which we understand as "an approach to the 'world that is outside' and to understand, describe and sometimes explain a social phenomenon in different ways. By analyzing:
- Individual or group experiences in the form of biographical stories, life stories or day-to-day practices.
- Interactions and communications based on observation and recording of practices.

-Documents (texts, images, videos or music) "(Flick, 2007, ix).
Likewise, Quevedo and Castaño (2002) point out that a qualitative study
"Attempts to systematically describe the characteristics of variables and phenomena (in order to generate and perfect conceptual categories, to discover and validate associations between phenomena or to compare constructs and postulates generated from observed phenomena in different contexts" (Quevedo, 2002, 12).

All the information collected through the different qualitative instruments will be interpreted under an ethnographic approach, since it "is based on the conviction that the traditions, functions, values and norms of the environment in which they live are internalized little by little. Little and generate regularities that can explain individual and group behavior in an appropriate way (...) It tries to understand the current relationships, social entities and human perceptions, as they exist and present themselves, without any intrusion or contamination of formal measures or preconceived problems" (Guba, 1978, 3).

In the second, it used quantitative methods, which are used to explain cause and effect phenomena (Reichardt, 1982), to systematize the organic production process and obtain feedback from users about the system. This model requires the use of a unified language and the possibility of quantification of the objects studied and / or validated by a scientific method or by other means.

This form of research used instruments such as interviews, observations, surveys and records. One of its advantages is the variables obtained that can become primary factors (Ugalde and Balbastre, 2013).

In the third phase, "monitoring and evaluating the quality and scope of our communication for the purpose of driving and learning is a constant task" (SDC, 2014), for that reason an evaluation was generated in specific periods of research, for example, at the end of each phase, at the middle of the project, during the implementation of communication strategies, design and systems, and finally at the end of our research, which gave us feedback from users.

The evaluations were designed with different instruments that helped us to achieve purposes in each one of the tasks; some of them were: focus groups, individual or group interviews, surveys, logical frameworks, among others, or other tools that were elaborated with techniques of social sciences, design and information systems.

Finally, the fourth phase refers to the implementation of the prototype, this is made in the context of the user, where it is expected to have an experiment and detect the positive operation and the areas of opportunity of work as well, which are recorded for correction. This part involves changes in the way users work and inconveniences that could have arisen or obstacles detected. Thus, this section is used to secure the use of the final product.

Phase methodological approach: instruments in a hybridization field
Because the project involved three disciplines, our methodological proposal will use the combination of design tools, computational systems and social sciences, so that the problems, sketches or prototypes of solutions, their implementation and evaluation result from the interaction thereof.

Under this context, our first contact with the community, responded to the implementation of phase one and had as objective to know the needs of farmers and search for solutions after questioning, helped by the Method of Reporting Concerns (CRM) for the acronym in English. This method is an

IAP strategy designed to identify problems, brainstorm solutions and act from the perspective of the people involved (Arellano, 2015, 1197).

Some of Arellano's CRM features are reliability, feasibility, simplicity and systemicity. It also promotes critical awareness among the participants and keeps them active throughout the research and application process.

Two visits were made to implement Phase 1. In the first, we performed a diagnosis and individual interviews with farmers. The result of this approach allowed us to plan a second meeting, in which delimited our information objectives and designed a workshop where we applied the techniques of brainstorming, classic ethnographic interview and forced connections.

From these two visits were detected we were able to specify in a series of points with which it was decided to work: lack of Information on the organic agricultural process, share experiences of the field work, follow the work in the field through a blog and finally obtain access to reliable and verified information; concepts with which a solution was developed according to the needs of the actors.

Resource information system

In order to propose the possible solution to the problems of the farmers of San Pablo Oztotepec, we propose the creation of a technological tool that systematizes the organic agricultural process, it was found that the use of the internet would be an ideal platform, because it is used by the predominantly for information and communication purposes. Climatic and price information seem to be the main areas of interest in the search for farmers' information (FIA, 2009a; Interviews, 2011), thus concluding that our proposal would have to be a web-based tool for Its use and diffusion due to characteristics such as feasibility and usability for users.

One of the characteristics of our user is that they are farmers who have access to technology, computers, internet, because the communities to which our project is focused are located in a nearby area of the big city, but without belonging to it, not for that reason we leave aside to all public that could be interested in this type of production and that would like to take advantage of this project to him.

Organtech and its composition

This project is born from and with the user. With the help of the farmers they begin to delimit what their needs are and their interests as well. It is important to mention that the more involved the beneficiary, the better interaction with the product will get, because the emergence of the same will be accepted and developed as a symbiosis of their activities.

This is how Organtech is born, described as an information system made up of two large sections: informational and interactive. We understand information systems as a set of related components that collect (or retrieve), process, store and distribute information to support decision making and control in an organization (Laudon, 1996).

The information module provides a description of the organic farming process in orchards and give space for users to collaborate with their experience in the field through photographic and audiovisual contents.

The interactive module calculates the approximate expenses and profitability of an annual production in an organic orchard and visualize the temporality of each crop.

First contact
With the objective of obtaining feedback from the potential users of Organtech, we made a mockup and work sessions where farmers, researchers and amateurs in the subject supported us with the feedback of the proposal. The design of the proposal was based entirely on the points previously identified in the needs of the farmers of San Pablo Oztotepec, Milpa Alta.

According to the Encyclopedia of Engineering Production (2014), the development of a new technological product is composed of several phases to arrive at a prototype, such as the definition of the product and its concept, as well as conceptual design and analysis of the parties. A mock up shows a part of a system; is a copy in which the characteristics and functions are evaluated before beginning the production of the same.

In the case of Organtech, the initial prototyping design consisted of the following interfaces:
-Home
-User Registration
-Organic agricultural process
-Material shared on the organic agricultural process
-Sharing material (photography and video)
-Calculate your production (data entry)
-Calculate your production (information output)
-Calendar of crops and garden design

The tasks with which the user became familiar in this first version were:
-Recording personal data.
-Visualizing the entire organic agricultural process, by phases and sub-phases.
- Choose one of the phases or sub phases of the process to be able to access information shared by other users.
- Find information through a search space or a tag cloud.
-View videos and photos shared by other users.
-Comment about material shared by others.
-Submit photos or videos about a phase or sub-phase of the organic agricultural process.
- Calculate the production by filling some input data.
-View an approximate estimate of production and a crop calendar and an orchard design.

After the pre-production of the interfaces that would conform Organtech, it was necessary to carry out tests on the sketch together with the user, in order to obtain comments to improve, modify or change the design proposal that is presented.

From this exercise we obtained changes in important aspects that modified our first draft, as it was access to tabs, where they were modified due to the complications to reach the desired tasks; Another aspect were the definitions used, it was found that the terminology used to define phases described in bibliographies was ambiguous or unclear, likewise some of the phase titles found difficulty in understanding what was meant, finally encountered issues Of navigation, where it was commented that it was difficult to identify what was the objective of the buttons.

After an analysis of the information gathered in the sessions and after evaluating them in the consultations with the group of tutors, with whom the changes were discussed, the pertinent and convenient ones with which the prototype of Organtech was developed.

Developing the proposal
CHAPTER 3

After considering the comments, we proceeded to the prototyping which obeyed the detected needs of our community (figure 1), which became requirements for the development of our web platform.

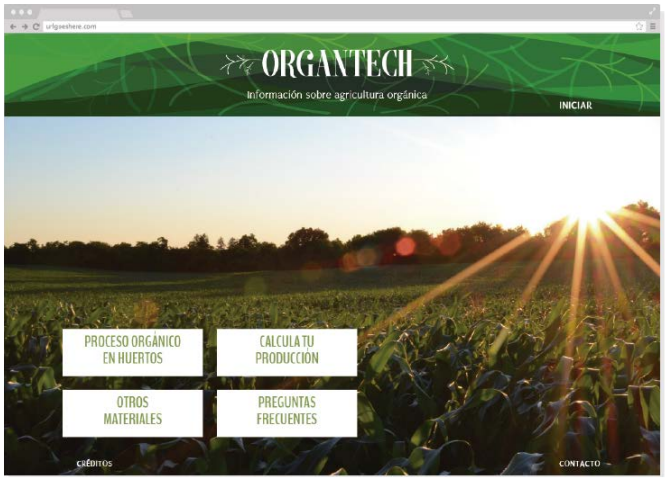

Figure 1.

As mentioned before, the system consists of two main sections, which describe the organic agricultural process and go hand by hand with the farmer through a series of steps that will help him with his work.

The initial road

The first module or information section, provides the user with a description of each phase of the organic farming process (figure 2), and in turn the sub-phases of the same, explaining and showing videos and photos reinforce the content; this section solves the detected need to have a more precise knowledge of what organic agriculture is, to identify the steps that must be followed (figure 3).

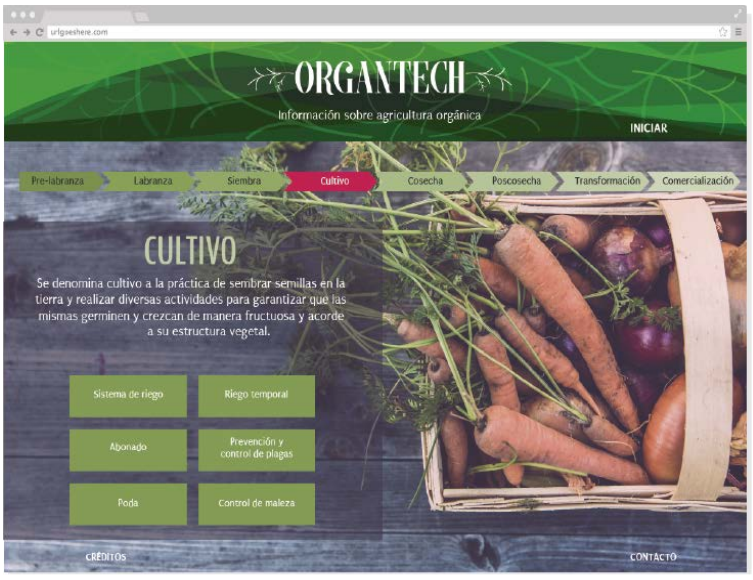

Figure 2.

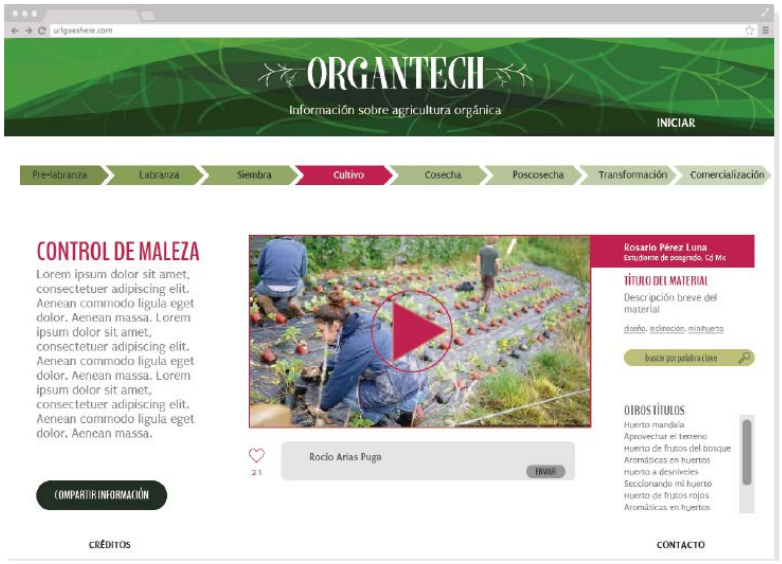

Figure 3.

In this module, also was located the section of share your experiences, which gives attention to the need of the farmers to share their knowledge, whether it is technical questions to make some optimization in the way of working, experiences when implementing practices in their field, or simply ways of working, that is why was created the module "share your material", where users can upload material generated by them, which describes the steps to develop an activity in the plots.

Oriented in three steps

Our system aims to generate a suggestion, as accurate and concise as possible so that our final user can decide as conscientiously as possible about the crops that can be planted in their territory, for them we have incorporated a module that solves another farmers' concern, which is the follow-up by means of a blog; this section begins with a series of questions that give us an input of information, with which the system begins to work. The first question is: where do you plan to plant?, this information shows us the geolocation of the user, the system has a wealth of information with which begins to generate a suggestion and this is based initially on crops suitable for geographical location in Mexico, with this an initial list of crops to be suggested is generated, the second question is when will the planting be started?, the month in which the production starts, increases the list of options and then segregates those crops that have no chance of growing in the selected month and finally the third question, what is the extent of land?, the system needs to know what the dimensions of the land in which the sowing take place in order to create a prototype map of the arrangement of crops to be planted, so the dimensions are required (figure 4).

Figure 4.

After the requested information has been entered, the system displays the list of available crop options, which were generated based on the information previously provided; The user chooses the first crop and later the system refines the generated options, where the aggregated crops are combined and thus offer the user up to ten possibilities (Figure 5).

Figure 5.

After completing the previous step, the system requests data on costs that the farmer performs at the time of starting his production, (if he has them), this part is in order to have a perspective of the areas in which the farmer has an investment and maybe he does not have them conceived (figure 6).

Figure 6.

The data that the user introduced, become a set of representative information for farmers, the first of which is an approximate investment made by workers, this information is generated from the crops introduced on the page, where you get a calculation of the total investment, approximate kilograms to obtain, a percentage of reduction and what would be the investment by product; this section shows the need of farmers to know what the expense could be generated by their work, this in order to have a closer conception of the monetary value of their work from beginning to the finish (figure 7).

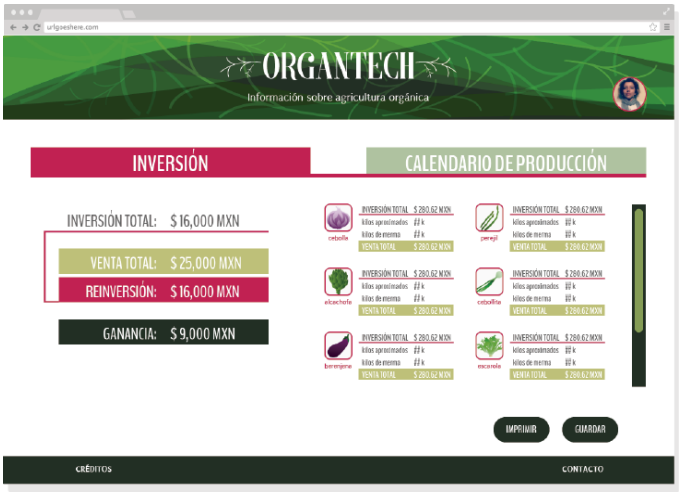

Figure 7.

A second output of the information, is a map of the accommodation of crops, this graph shows how to order the crops, when they have to start planting and when to harvest them as well; this representation of the product distribution, is available for printing. This need arises because the users required to have a blog that supports them with the follow-up of their work, the main objective of this is to generate an advance planning of his work (figure 8).

Figure 8.

It should be mentioned that the information provided by the portal is a suggestion, which is supported by a large amount of information that comes from the Secretaría de Agricultura, Ganadería, Pesca y Alimentos (SAGARPA), a specialized agency in this area in Mexico, as well as a group of agronomists, a group of farmers and, lastly, internet sites specialized in agriculture that are led by farmers who are knowledgeable about this subject; with all this information, a database was generated, which is the engine of the site.

Concluding in the field of work
CHAPTER 4

Organic Agriculture is proposed as a form of cultivation that helped peri-urban communities not only by implementing a system that helped in the restoration of their land, but also allowed them to generate self-consumption, extra income by selling the surplus, and finally, to know other crops that were not consumed in the region, as several farmers commented.

Our proposal is incorporated as one more tool with which the users count, which use diverse means to increase the possibilities of obtaining a crop with optimal conditions.

The peri-urban zones struggle to contain the growth of the city, but the interest of the farmers who are certain to generate a commercial activity to subsist cause that this type of projects has a positive impact and that they become a model that can be replicated in areas with the same characteristics.

Organtech as such is born as a collaborative proposal that aims to become a solution of problems clearly detected, but always thinking about who will use this tool and above all contemplating that not only remains as a study more than a community.

Due to the characteristics offered by the communities with which we were working, we were able to have a clearer perspective on the interest in a paradigm shift, such as the shift to the model of organic agriculture, in which farmers are interested from the outset; in the same way incorporating new tools and technologies was attractive to them; so, developing our tool was simple. At the time of incorporating our tool there were complications such as the use of technology as such, because they have it, but not used its entirety, which makes continuous use difficult, another factor is the age of the farmers, who are people ranging from 35 to 65 years of age, where there is a technological illiteracy which had to be remedied with a sensitization of the same, this generated an extra activity

in our research, with the aim of maximizing The use of our tool; These conditions had to be developed in the part of the communication strategy.

Future work

Within the investigation it was possible to observe what is the condition of these peri-urban communities that are preserved with their customs and try to conserve activities that make them subsist, we consider that future work could identify tools that can support these communities in their day to day, allowing them to maintain it, but in turn they can take advantage of the benefits of being close to the cities.

Our project raises the possibility of creating a marketing process that can give a way of subsistence in a systematized way that could be considered in future works.

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RETHINKING RURAL DEVELOPMENT: A UNIQUE EXPERIMENT IN KARNTAKA, INDIA*

Author

Prof. Dr. Suresh V. Nadagoudar

M.A., LL.M., Ph. D

- Professor of Law & Registrar, Rural Development and Panchayat Raj University Gadag, Karnataka, India.
- Former Registrar & Registrar (Evaluation), Karnataka State Law University, Huballi.
- Former Registrar(Evaluation), Bangalore University, Bangalore & former Principal, Chairman & Dean Faculty of Law, P. G. Department of Studies and Research in Law & University Law College, Bangalore University, Jnanabharati, Bengaluru-560056

Abstract

Mahatma Gandhiji emphasized time and again “The true India is to be found not in its few cities, but in its seven hundred thousand villages. If the villages perish, India will perish too."

His idea of Gram Swaraj is that it is a complete republic, independent of its neighbours for its own vital wants, and yet interdependent for many others in which dependence is a necessity. Self-sufficiency does not mean narrowness. To be self-sufficient is not to be altogether self-contained. Thus, Gandhiji believed that interdependence of villages should not develop into over dependence.

It is a matter of great satisfaction and pride for Government of Karnataka for having pioneered a Karnataka Grama Swaraj and Panchat Raj (Amendment) Act 2015which amends the Karnataka Panchyatiraj Act to translate the dream of the father of the Nation Shri. Mahatma Gandhi that the rural governance should be coupled with Legislative, Executive and Judicial powers flown at the grassroots level.

In Karnataka, the Department of Rural Development and Panchayat Raj is working with focused attention towards providing of basic real necessities such as Pure Drinking Water, Toilets to every home and livelihood for everyone. In other words, the concept of rural development has been redefined, deviating from traditional money spinning contractor oriented road and mud works towards catering the basic real needs of rural populace. The present proactive Minister for Rural Development & Panchayat Raj Mr. H.K.Patil have formulated 15 points programs to achieve the vision of redefining the concept of rural development which would take care of rural Karnataka's needs from the *womb to tomb of an individual*. It has been long since the rural development issues in Karnataka have been addressed in right perspective. The department of rural development & panchayat raj was being used as a tool in the hands of political activists only to further their vested interests. In this background the paper intends to highlight various efforts and measures initiated in Karnataka, India to realize the dream of Mahatma Gandhi of establishing a welfare state with Gramswaraj.

I. NEW INITIATIVES FOR RURAL DEVELOPMENT IN KARNATAKA:

The 21point programme, which has been designed and implemented with real focus on the rural life and basic necessities of the rural people are, namely Pure Drinking Water, Our Village Tank Water, Toilets to Every Home, Bharat Nirman Rajiv Gandhi Seva, Play Grounds in rural areas, Developing entombment Grounds, Sheep / Cattle Shed, Farmer's Threshing Yard, Our Land Our Way ('Namma Hola-Namma Daari') , Strengthening Women in Agriculture Sector, Farmer's Land Development. The families belonging Schedule Casts and Schedule Tribes., small and marginal formers, Our Village – Our Water, Skill Development, Sanjeevini Livelihood Mission, Rajiv Gandhi Yuva Chaitanya, tippe Samskarane, Grameena godowns etc. these schemes are real needs of rural people and have direct impact on their life and livelihood[i].

II. THE CONCEPT OF SHUDDHANEERU (PURE DRINKING WATER):

The Karnataka State has around 59753 human habitations. In most of the human habitations, the drinking water sources are affected by chemical and biological contamination. Chemical contamination relates to excess of fluoride, iron, Nitrate, Arsenic and total dissolved salts and biological contamination. And socially, knowing or unknowingly two classes had emerged based on *access to pure drinking water,* one class having access to pure /bottled/processed water and the other class having access to raw or contaminated water. The government is committed to provide access to **Pure Drinking Water** for all and is determined to this noble cause.

Now around 10,000 villages are provided with Pure Drinking Water by installing water purification units. The quality of water meets international standards. Already 10000 such units are funtionong and another 2500 units will be taken up during the financial year 2017-18. As on today around 1.6 Crore rural population has been provided with access to pure drinking water. The LPCD (Litres Per Capita Daily) norms between rural and urban need to be rationalized. It is very much necessary to have policy changes in National Water Policy and Drinking Water Policy and the same is being advocated.

III. SHOUCHALAYAKKAGI SAMARA (CRUSADE FOR TOILET):

Sanitation is a high priority for the Government. The programme Shouchalayakkagi Samara (Crusade for Toilet) was launched by Government in the year 2013-14. It is an endeavour to make Karnataka an open defecation-free State by 2nd October 2018, a year ahead of Government of India's deadline of 2nd October 2019. The Government's focus on improving sanitation has resulted in construction of a total of 28 lakhs toilets in the past four years.

In addition to public toilets, the Government has also given attention to provide individual house hold toilets with bathrooms under the scheme Grameena Gowrava Yojana (Rural Honour Scheme) and propose to construct three lakh bathroom-cum-toilets from the funds out of Swachh Bharat Mission (Clean India Mission) and State Government.

In rural areas, the community sanitary complexes and integrated complexes are being constructed. The integrated sanitary complexes, apart from toilets, would also have bathrooms, dressing room, hair dryer and washing platforms etc,. Very significantly, in order to provide statutory backing, the Government is planning to introduce the Karnataka Rural Sanitation Facility Guarantee Bill.

The Government is also giving attention to the treatment and disposal of solid and liquid wastes. In villages, a project called "Tippi Samskarane" would be taken up for the treatment and decomposition of cow dung and other livestock material, by treating with

bacterial culture. So that, it is converted into value added manure which can be used for agriculture.

IV. BAPUJI SEVA KENDRAS

An innovative and people friendly administrative measure has been initiated by RDPR department from July 1, 2016 to provide 100 citizen centric services at gram panchayats. It has been welcomed by rural people with their overwhelming response and till date about more than 35 lakhs various certificates have been issued by panchayats from the date of its inception.

V. PLANNING THROUGH "BOTTOM TO TOP APPROACH"

There has been a paradigm shift in the planning, execution and evaluation of policy and programs through "**Bottom to top approach**". The main focus of planning is on the upgradation of living standards of rural people through providing real needs of villagers by way of decentralized planning system. The Panchayats are given rule making power by which panchayats can bring in governance related rules in their area, the executive of the Panchyats is given more teeth by introducing Karnataka Panchyati raj service, 20% grants out of the grants recommended by the state finance commission are provided as *un-tied grants* to panchyats and bottom to top approach for planning is made possible.

VI. GRAM PANCHAYAT DEVELOPMENT PLAN (GPDP)

So for as GPDP (Gram Panchayat Development Plan) is concerned, the Karnataka is on the threshold of achieving a new height. Karnataka was one of the earliest states to prepare a comprehensive toolkit for the preparation of Gram Panchayat Development Plan (GPDP) named as "Namma Grama Namma Yojane". The toolkit envisages converging various schemes horizontally at Gram Panchayat level and vertical integration with the intermediate and district plans. At Gram Panchayat level convergence is across own source of revenue, labour budget of MGNREGS, Swatch Bharat Mission, statutory grants provided to the panchayats, 14th Finance Commission Funds and grants for maintenance of drinking water schemes in rural areas.

The preparation of the plans are aimed at improving the overall human development parameters wherein the state has taken a major step in bringing out the Gram Panchayat and Village Human Development Index, which is first of its kind at the national level.

The preparation GPDP process has already completed about 5500 panchayats. We have identified 31 different activities for preparation plan. Despite state reeling under severe drought conditions and also elections to the local bodies, Taluk Panchayat and Zilla Panchayat, nearly 75 per cent of the proposed activities have been completed. These include capacity building programme for elected representatives and functionaries involved at all the levels.

Convergence of MGNREGS, NRLM with GPDP activities has been taken up in 69 IPPE blocks. The same process is being followed in 6023 Gram Panchayats in the state. Karnataka was pioneer in identification of less cost or costless development activities and a detailed list of such activities is part of the toolkit which has been circulated throughout the state.

VII. E-GOVERNANCE AND TRANSPARENCY INITIATIVES:

It is proud that Karnataka rural development department has been awarded first prize for e-governance initiatives. Mapping of assets using mobile application will be taken up in the state using application developed by Karnataka State Remote Sensing Application Centre. All the PDOs have been trained for using the application. RDPR, GOK have

separate web portal for all 6023 Gram Panchayats through Panchamitra apart from 176 Taluk Panchayat and 30 Zilla Panchayat portals.

Software captures the demands right from habitation meetings up to preparation of GPDP and also linked to the Gandhi Sakshi Kayaka which monitors implementation process. The software captures GPS based photo auditing and all other implementation details. Even Government is ready to allow pushing the required data to Government of India web.

Gandhi Sakshi Kayaka Tantransha is revolutionary *worksoft* solution that records all stages of works in online web-based geo-mapping enabled application. That curbs frauds, corruption, abuse of power, misrepresentation of works and actual progress based payment management system.

A note worthy measure of the present RDPR minister is that the tntire file note sheet of Rural Development and Panchayat Raj Minister's decisions including supporting officers recommendations is being displayed in the website www.rdpr.kar.nic.in as a measure of transparency in governance since 2016.

e-fms (Electronic fund management system)

Karnataka is on the pioneering state in implementation of efms in NREGS both; wage and material component is being disbursed through efms since 2013-14.

VIII. REFORMS IN PANCHAYAT RAJ SYSTEM:

The Panchayat raj System in India is having three tier systems (Article 243C, Constitution of India), designed to decentralize power enveloping the Indian rural base, while providing them a level playing field, making every citizen to participate in it. The object is to groom leadership at the grassroots level paving way for the realization of 'Gram Swaraj'. The Karnataka Panchayath Raj Act, 1993, was introduced to implement the objectives of the Constitution of India (73rd Amendment) Act, 1992, The Karnataka Panchayath Raj Act, 1993 while serving the political aspirations and needs of the rural mass for the past two decades served the state well. The present State Government have revamped the functioning of Panchayat Raj System in Karnataka to address newer challenges and opportunities.

- **Democratic Decentralisation–Karnataka Gram Swaraj and Panchayat Raj (Amendment) Act-2015**

To address the issues of rural governance in their right perspective, a policy is unveiled through this amendment to codify the powers, responsibilities and duties of the representatives of the institutions of the local self governance at the rural level. The Panchyatraj institutions are given more autonomy to translate the philosophy of Gram Swaraj in its entirety.

It is imperative to mention here Shri Rajiv Gandhi, while introducing the historic constitutional amendment (64th) bill in the Parliament had said.

> "We are on the threshold of a mighty revolution... It is a revolution that will bring democracy to the doorsteps of crores of Indians"

In this right earnest Karnataka has now stood on a threshold of a revolutionary effort with real translation of vision. It has been long since the concept of Rural Development have seen qualitative change but now with these amendments Rural governance gets importance on par with the governance at the state level.

The Karanataka Act now in its amended form renamed as Karnataka Gram Swaraj and Panchayath Raj Act has incorporated Preamble, Directive Principles, Duties &

Responsibilities of member to make them responsive and responsible. Rule making power, widening the revenue generation base, power to raise advance is given to Panchayats.

The Grievance Redressal Authority is created to bring transparency and redress the grievances. The introduction of transparency at all levels by a mechanism of grievances redressal cell which makes it compulsory to publicize the grievances received along with action taken report will make rural governance more responsive.

The Panchyati raj institutions are made responsible for socio-economic happenings of the village and the legislation strives for creation of an egalitarian society at the grass roots level. The directive principles of the panchyat policy are introduced, the preamble now brought in promises to usher in the qualitative change in the rural lifestyle. The Panchyat policy allows defining of the rural needs by villagers themselves and their by redefining the concept of rural development. Creation of rural infrastructure is given its required attention and the paramountcy of the will of the people is given its due regard with introduction of new concept of habitation Sabhas to adopt policy and programmes at the village level to help socially and economically weaker rural populace to participate in the process of policy making.

The participatory form of planning and implementation is considered as essence of the time. Community Contracting is introduced where in the beneficiary of the scheme is allowed to take up the work with marginal contribution.

The Panchayats are empowered to make villages free from fear, exploitation, and litigation. The honour, self respect and dignity of women folk are protected and gender equality is brought in. The evil practices such as un-touchability, the social practices derogatory to modesty of the women and open defecation are being done away with. An atmosphere of cordiality and mutual respect is ensured among village community.

It has been the endeavour of the Government to strengthen panchayats and give power to the voiceless and marginalised sections of society. The Concept of Habitation and Habitation Sabha has been introduced to bring small and marginalized habitations/villages to the mainstream. The Gram Sabha has powers to prepare action plan for the development pertaining to the wards concerned. Further the decision taken in the Gram Sabha is binding on Gram Panchayat, Taluk Panchayat, Zilla Panchayat and Government.

An honest effort has been made for devolution of 3 Fs (Funds, Functions and Functionaries). It shall be mandatory on the part of government to provide functionaries and funds for every function delegated to panchayats. It also provides for devolution of funds based on the recommendations of State Finance Commission and not less than 20 percent of such funds shall be un-tied grants.

In recent study conducted by Tata Institute of Social Sciences and accepted by Government of India, it is stated that Karnataka has been awarded first rank in devolution in matter of devolution of finances (Policy). In index of devolution in practice, Karnataka ranked third and is second in matter of devolution of functionaries in practice. Karnataka ranked second in aggregate index of devolution of policy".

IX. SOCIAL JUSTICE WITH STATUTORY SANCTION

The Karnataka Gram Swaraj and Panchayat Raj Act, 1993, has succeeded in achieving the desired social change. The 73rd Amendment has mitigated the menace of illiteracy, untouchability and inferiority and despotism, by ironing out conflicting tendency amongst the caste-class-creed-religion and has led the society towards egalitarianism. Further, it has driven the people of scheduled caste, scheduled tribes, backward classes and the women folk, who were hitherto never given a chance, these acts provided them an opportunity of self empowerment through democratic means., This has been the most significant

achievement of this movement by positioning them in the seat of power and made them to participate in the decision making process and activities. Thus, the 73rd amendment has thrived in wiping out the tears of the illiterates, gullible, oppressed and infused a social responsiveness and accommodative/assimilating social and political system.

Compulsory voting and NOTA

Karnataka has brought revolutionary amendment to the KPR Act 1993, which mandates every member of the Electoral College to cast his/her vote reflecting their choice in the election to the Panchayat Raj Institutions. The moment the candidate comes to know that each and every member of the electoral college is going to cast his/her vote in the election he/she will get invigorated to live up to their expectations. However, no penalty has been levied on the defaulter as of now. A provision has been made to implement **NOTA (None of The Above)** candidate to enlarge the freedom of expression by keeping the voting process secret.

Participatory Decisions of the Grama Panchayat

It becomes imminent to the legislations and panchayat which takes the villagers to its heart by keeping a close track with birth, life, interactions and death. Now a dire need has been sprouted to redefine social, economic and political conditions of the ruralites, considering their do's and don'ts, in order to fairly distribute locally available resources equitably just translate the principle "equal share and equivalent life". Any attempt to detract the humane relationship shall be shunned to better the life of the village people. With a view to regain the glory, by instilling the confidence of the people, in the village administration we need to sketch people friendly plan and policies. Thus, it is a high time to delineate the instrumentalities of the village administration into six types instead of continuing with the present two instrumentalities, they may be enlisted thus –

Children sabha, Women sabha, Schedule Castes and Schedule Tribes sabha, Village sabha, Grama Sabha and Wardsabha, as the case may be, shall deliberate on their dos and don'ts subject to activity mapping annexed to the Karnataka Gram Swaraj and Panchayat Raj Act, 1993. The panchayath administration shall see that the resolution is adopted unanimously. The official concerned shall put effort to educate the schemes/programs and true framework of government to make them to have common understanding for the cause of the village. A resolution will be drawn by the sabha as per the decisions and recommend it to gram panchayat for implementation.

X. CAPACITY BUILDING OF ELECTED REPRESENTATIVES AND PANCHAYAT FUNCTIONARIES

Abdul Nazir Sab State Institute of Rural Development and Panchayat Raj is the nodal agency for conducting the capacity building activities in the state. The Institute has been imparting training to nearly 1 lakh elected representatives and 50000 functionaries of PRIs. The training programmes to the elected representatives and functionaries are based on the Training Need Analysis that captures the needs of stakeholders in discharging their duties. The training is provided in face to face as also distance mode using SATCOM facilities that have been made available with support from Indian Space Research Organisation (ISRO).

The effectiveness of training programs in the state is undertaken with regular feedback collected from all the participants. Apart from the in-house feedback the evaluation studies are also commissioned involving reputed institutions. In recent times such studies have been conducted by Madras Institute of Development Studies, Chennai, Centre for Budget and Policy Studies, Bengaluru and TERI, Bengaluru. Recently the newly elected Gram Panchayat representatives were trained within first 6 months of the elections. Similarly it is proposed to complete the training of newly elected representatives of Zilla and Taluk Panchayats also.

ANSSIRD&PR is conducting training programs in 176 Taluk Samarthya Soudhas, 2 Regional Centres located at Dharwad and Kalaburagi and one State Panchayat Resource Centre at Bengaluru. The training programs are also conducted using SATCOM facility. These training programs are conducted using nearly 300 Decentralised Training Coordinators who are located at Taluks across the state and the services of expert resource persons are availed as and when need arises.

XI. ESTABLISHMENT OF KARNATAKA STATE RURAL DEVELOPMENT AND PANCHAYAT RAJ UNIVERSITY

The gap between the Research and technology adoption/policy formulation is increasing day by day, to bridge the gap between LAB and LAND a unitary Rural Development and Panchayat Raj University has been established at Gadag. This will be centre of excellence for conducting Study and Research in the Rural Development and Panchayat Raj, and assist governemnt in policy formulation, adoption and evaluation.

This University consists of following **two Centres** and **five schools**.

- **Two Centre's of the University are:**
  - Centre's of Research, Innovation and Evaluation
  - Centre for the Training, Publications & Supervision

- **Five schools of the University are:**
  - School of Agri-business Management and Management of Rural Development.
  - School of Rural Development and Panchayat Raj.
  - School of Environmental Science, Public Health and Sanitation Management.
  - School of Social Science and Rural Reconstruction.
  - School of Skill and Entrepreneurship Development.

  Already the university has started its activities at its head office Gadag and regional office at Bangalore and proposed to offer following various courses.

- **Post Graduate Courses proposed from the Academic Year 2017-18**
  - MBA in Rural Management with Specialization in Agri business Management and Rural Development Management
  - M A in Rural Development and Governance /Rural Development and Panchayat Raj
  - M.Sc in Geoinformaties with Specialization in GIS and Remote Sensing
  - M.Sc/M.Tech in Rural Technology or
  - M.Sc in Social Science and Rural Reconstructions
  - M.Sc in Skill and Entrepreneurship Development

- **Proposed P.G Diploma Courses**
  - PG Diploma in CSR Management
  - PG Diploma in Governance of Panchyath Raj Institutions
  - PG Diploma in Innovative Farm Techniques
  - PG Diploma in Renewable Energy
  - PG Diploma in Microfinance
  - Diploma in Food Preservation Techniques
  - Diploma in Water Harvesting, Conservation and Purification Techniques

XII. CONCLUSION:

The Rural local self governance institutions are the pillars of the polity and need to be strengthened. Real needs of the people to be addressed in its right perspective; responsive and responsible governance for effective implementation of Rural Development plans have to be ensured. Measures to ensure more powers and funds paving way to rural reconstruction and reverse migration have to be strengthened.

That these measures initiated in the state of Karnataka in India are noteworthy and worth emulating by other states in India and even in many developing nations of the globe.

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[i] *Inaugural speech of Sri H. K. Patil, Minister For Rural Devlopment And Panchayat Raj, Government of Karnataka in a seminar on Rural Development at Tumkur University, on 3 April,2017, Karnataka.*

STOBOSA Hillside Art: Transitioning from beautification to community economic development

Guinaran, Ryan C., Gatayen, Sandra B., Laron-Camacho, Annabelle B., Quileza, Rhea A., and Lami-ing, Marcial L.
PhD (Rural Development) Students
Benguet State University, Philippines

Abstract

Tourism is contributory to development in rural areas through agro-, eco-, cultural, and adventure tourism. Another innovation in tourist attractions is the STOBOSA Hillside Art mural which is the first of its kind in the Philippines. The aim of the study is to describe the development of the STOBOSA and the emerging effects on the host community after a year in terms of economic, sociocultural and environmental aspects. This case study collected data through numerous techniques including key informant interviews, document analysis, field observation, and survey. The perceptions of stakeholders on the impact of the tourism project to the community are mostly positive and optimistic. To optimize the potential of the STOBOSA project, the stakeholders may transition strategies from murals as community beautification to more institutionalized and structured community economic development programs.

Keywords: rural tourism, mural-based tourism, tourism impact, Philippines

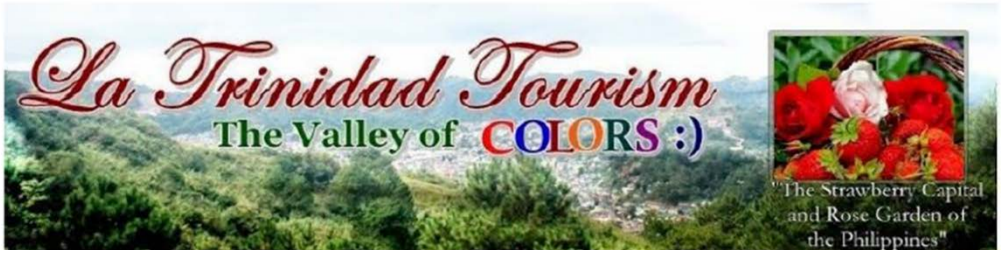

Photo courtesy of the La Trinidad Municipal Tourism Office

I. Introduction

The United Nations World Tourism Organization regards tourism as a key to development, prosperity, and well-being. As an economic and social phenomenon, it is a strong, resilient and diversifying industry. The noteworthy global spread of tourism today makes it a major driver for socio-economic progress.

As one of leading tourist destination in Southeast Asia, the Philippines recorded a double digit growth in tourism (+11%) in 2015 (UNWTO, 2016). Tourism contributes to Philippine economy, social development, and environmental protection. It also stimulates peripheral benefits to other sectors through tourism infrastructure investments, livelihood and entrepreneurship opportunities, and improving the image of the country and its promotion. In the 21st century, Philippine tourism is regarded as a significant sector to attaining inclusive socio-economic development, poverty reduction, private sector participation, and natural and cultural heritage. The goal is to establish the country as among the tourism and vacation hotspots in the world as initiatives have resulted in substantial surges in tourist arrivals and local tourist activities (Pilapil-Anasco and Lizada, 2014).

The Philippines boasts of several tourist attractions. Baguio City and Benguet are prime destinations north of Manila. Benguet comprises of thirteen rural towns which are the major sources of highland vegetables, fruits and flowers. Baguio City, also dubbed as the City of Pines, is the summer capital of the country. Both areas have the cold climate as primary attraction. Benguet as a tourist area offers agro-tourism, ecotourism and adventure tourism with its mountain peaks, and cultural tourism as home to indigenous peoples. Its capital is the municipality of La Trinidad.

The newest addition to Baguio-Benguet destinations is a first in the country, the STOBOSA giant community artwork which was unveiled in June 2016. “STOBOSA” stands for Stone Hill,

Botiwtiw, and Sadjap- three sitios (villages) in Balili, La Trinidad, Benguet at its border with Baguio City. Likened to the iridescent favelas of Brazil, STOBOSA displays around 200 of its hillside houses painted on as a single mural. One year after the unveiling, it is worthwhile to look into the community development activities and effects.

The objective of this paper is to describe the development of the STOBOSA and the emerging effects on the community. Specifically, this will describe the STOBOSA community and discuss the historical milestones of the STOBOSA Hillside Homes Artwork project, determine the perceptions of stakeholders on the effects of the tourism project to the community after a year in terms of economic, sociocultural and environmental considerations, and derive recommendations for enhancement of the project.

II. Methodology

This case study collected data through numerous techniques. Key informant interviews were conducted with the STOBOSA community coordinator, the barangay captain of Balili, La Trinidad, the La Trinidad Municipal Tourism Officer and the Department of Tourism- Cordillera Administrative Region (DOT-CAR) project coordinator. Document analysis was done looking into the community coordinator records, the barangay profile and Community-based Management System (CBMS), municipal policies and records, and DOT-CAR conceptual plans and memorandum. Observation was possible through an actual site visit on May 7, 2017 and 15 tourists (12 Filipinos and 3 foreigners) during the field visit were interviewed. Relevant news articles, and comments from blogs and web site (Trip Advisor) were gathered online. Forty residents also accomplished a survey form containing statements on perceptions on effects answerable using a Likert scale. Statements were answered on a 5-point scale, 1 indicating “strongly disagree” and 5 indicating “strongly agree”. The perception survey statements were adapted from van Breugel’s (2013) master thesis “Community-based tourism: Local participation and perceived impacts”. The statements were re-clustered in this study. The 40 survey respondents (21 male, 19 female; mean age: 41.6 years; average years as resident in the area: 22.51) were purposively selected based on proximity to where the tourists congregate.

Content analysis was employed for the qualitative data and descriptive statistics was generated from the quantitative data gathered. Triangulation was done to cross-check data and data collection methods. The use of triangulation method in impact analysis (including qualitative technique) is suggested to validate data sieved from quantitative technique, so that a researcher can hope to overcome the weakness or intrinsic biases and problems that can arise from a single-method or single-observer or single-theory study. Triangulation provides more and better evidence so that a researcher can construct meaningful explanation about the social world (Yee-Lee, Eng-Heng, Ramachandran, Yacob and Othman, 2011).

III. Results and discussion

The STOBOSA community

La Trinidad is the gateway to the whole Benguet province. In particular, the Stonehill, Botiwtiw, and Sadjap (STOBOSA) sitios of barangay Balili welcome visitors not only to La Trinidad, but to the province of Benguet. STOBOSA is in the southwestern part of La Trinidad and is located three kilometers north of Baguio City.

It has been sparsely populated since the 1950s but there was a sudden increase in population in the 1990s. Migrants, mostly Kankana-ey indigenous peoples from the adjoining province of Mountain Province, set up residential houses along the steep slopes of the area. It was noted that the population growth rate of Barangay Balili spiked between 1990 and 1995 at 8.6% (MPDO, 2014). Unabated rural migration to Baguio City and La Trinidad has been going on since the 1950s. This is because of education and work opportunities (Palangchao, 2014).

At present, there are no elected barangay leaders who are from STOBOSA although there were three candidates who ran for barangay councilor in the 2013 barangay elections. The only organized group in the area is the Botiwtiw Women's Organization.

Stonehill, Botiwtiw, and Sadjap are just three of the 11 sitios of Barangay Balili. Botiwtiw has the biggest population and number of households among the three sitios. The total number of residents in the area is 2,101 or 13.69% of the whole Balili population.

Table 1. Population and number of Households in STOBOSA

Area	Population	Number of Households
Stonehill	359	126
Botiwtiw	1385	357
Sadjap	744	214
Total for STOBOSA	2101	744
Barangay Balilli	15348	4791

**2014 Barangay Balili Physical and Socio-economic Profile*

STOBOSA statistics contributes greatly to Balili poverty indicators in terms of households with no sanitary toilet, households without access to safe water, and children not attending elementary and high school (Table 2). Being at the boundary of La Trinidad and Baguio City, STOBOSA residents are two kilometers away from the barangay hall and health center. Only a daycare center is found in sitio Botiwtiw.

Aside from students, residents of the area are people who are into trade, entrepreneurship, farming, or are employed in government and private offices. Only 90 households or 1.89% of households in Barangay Balili have income less than the poverty threshold but 21 (23%) of the 90 households are from STOBOSA.

Table 2. Selected poverty indicators in STOBOSA and in Balili

Poverty indicators	Balili	STOBOSA

	Barangay total	sitios
Education: Children not attending elementary school	32	14 (44%)
Education: Children not attending high school	52	18 (35%)
Health: Malnourished children	4	1 (25%)
Income and Livelihood: Households (HH) below poverty threshold	90	21 (23%)
Unemployed	208	18 (9%)
Water and Sanitation: HH without access to safe water	105	101 (96%)
Water and Sanitation: HH with no sanitary toilet	3	3 (100%)

*Municipal Planning and Development Office- CBMS 2010

STOBOSA can be accessed from the main highway through three bridges, two are concrete and one is a suspension bridge, traversing the Balili River. Tagged as "biologically dead", the Balili River carries pollutants and garbage from households and business establishments from Baguio City as it passes by STOBOSA. Foul odor emanate from murky waters especially after a rain-pour (Aro, 2016). Covering the hillsides of STOBOSA are limestone rock formations. On these limestone rocks founding the hillsides, residential houses were built. Then, the close-knit houses made of concrete and GI sheets were mostly unpainted.

STOBOSA Hillside Artwork

The DOT-CAR and the local government of La Trinidad wanted to improve the aesthetics of the STOBOSA area considered as a "show window" and the first sitios greeting visitors to La Trinidad. Learning from the model of tourist favelas in Brazil, the DOT-CAR Regional Director broached the idea of a painting project dubbed as "Project Bloom" as part of the Rev-Bloom (Rev up, Revive, Revisit, Revitalize) Redevelopment Tourism Campaign for Baguio City and the adjoining municipalities. The idea supported La Trinidad's identity as a "Valley of Colors" as written in the La Trinidad Tourism Development Plan.

The DOT tapped the Tam-awan Village artists to conceptualize the design for the proposed project. The initial mural design was a 'sunflower-filled garden with heavy patches of greens'. Volunteers were invited to paint after the consultations with the homeowners who gave their approval. Davies Paints provided 2,800 gallons of paint for free.

Public consultations with the house owners were conducted between November and December 2015. With the support of the community, a Memorandum of Agreement was signed by the Municipal Local Government Unit (LGU), the DOT and Davies Paints on January 3, 2016. On January 13, 2016, a basic painting training was conducted at the municipal grounds for STOBOSA residents, municipal LGU staff and volunteers. Davies Paints provided the resource speaker. On February 1, 2016, a symbolic launch of the painting activities was held at Botiwtiw. From February to March 2016, painting of primer paints was concluded. In the next two months, the application of colored paints was near completion. Before the turnover of political leadership to the new national and local administration, on June 23, 2016, the project was unveiled. At that time, 85% of the target mural was accomplished. No less than the Philippines' Secretary of Tourism graced the debut of the hillside mural, the first of its kind in the Philippines.

It took only 80 days, from the day of training on painting to the unveiling, to achieve 85% of the target. Not counting the residents who painted, there were 520 volunteers who assisted in painting

an area of 18,000 square meters representing 180 houses during that period. This included the youth sector: Boy Scouts of the Philippines - Benguet Chapter, the academe: Benguet State University and the King's College of the Philippines National Service Training Program students; and government and socio-civic groups: the Knights of Columbus volunteers, the Baguio-Benguet Photographers, Hikers and Artists Club, and the Philippine National Police trainees.

As to stakeholder participation, many groups collaborated to see the project into fruition (Table 3). The "bayanihan" spirit (Filipino value of community cooperation and unity) of the stakeholders was obvious. "Bayanihan" or "og-ogbo" in the Kankana-ey language is a traditional value of Filipinos. In the Cordillera villages, bayanihan is noted in the process of working, contributing or saving together like in building houses and agricultural work (ICBE-EU, 2013). The project revealed that the value is alive in the urbanized area.

Table 3. Stakeholder contributions and roles in project implementation

Stakeholder	Contribution/role
DOT – CAR	Lead coordinator (mobilizing social capital, also in charge of other supplies/materials for the project)
STOBOSA Community (led by Ms. Gloria Agasen)	Actual implementation of the painting project/ field coordination, in-charge of all materials and supplies
LGU La Trinidad	Coordination with LGUs, provided the scaffolding, brushes/rollers, paint thinners and other materials
Balili LGU	Endorsement of the project as a council
Davies Paints	Provided 2800 gallons of paint for free, as part of their Corporate Social Responsibility
Tam-awan Village Artists	Provided the design, assisted in the design implementation
National Institute of Information and Technology	Computerized mapping of design on community
Office of the Congressman of Benguet	Provided for the free meals (snacks and lunch) of all the volunteers/painters.
Volunteer groups	Assistance in painting

*Municipal Tourism Office project report, 2016

Stakeholders' perception on impact of the project

Influx of tourists to the area has been noted by informants. According to the community coordinator, around 500 tourists would stop by their area on weekdays and weekend visitors can reach 1,000. "During the recent Easter Sunday (Holy Week), I noted more than 50 cars that stopped by from 7:00 to 11:00 in the morning", she narrated.

Generally, there are three distinguishable forms of impact of a tourism development project: economic, socio-cultural, and environmental impact (Hall & Lew, 2009). One year after the

unveiling of the tourist attraction, the residents and stakeholders share some effects that they have noted.

The economic effects mentioned by informants are:

a. Rent and enterprises

- There was an increase in boarders and boarding houses in the area ("There was a boom", as the community coordinator noted). Since the demand increased, the home owners were able to increase monthly rent of a room by 10-15% or from P1,200 ($24) to P1,500 ($30).
- The number of *sari-sari* stores (neighborhood variety store) also increased in the area to cater to more residents and tourists. Since the project was started, the community coordinator noted 10 more sari-sari stores set up.
- Souvenir items being done by the Botiwtiw Women's Organization had a potential market in the area. More products are being made by the women.

b. Limited employment opportunity

- For specialized tasks, some painters were employed by the community but on a daily basis.

c. Donations

- The Office of the Congressman provided money (P120,000 or $2,400) to the community intended for the food of the painters and volunteers. The community captured the value of the money since food was purchased in stores in the area and food was prepared by the women's organization.
- Davies Paints donated 2,800 gallons (costing P2 million pesos or $40,000) to the residents, sparing the community of expenses to paint their houses.
- Donations from various groups which support the project were received. For example, the Philippine Veterans bank donated 1,000 coffee seedlings that will be planted in the area. Other economic benefits or donations have not been recorded due to lack of documentation.

Tourism is an economic sector known to significantly contribute to the economic growth of a host community or area, and generate occupation opportunities directly and indirectly through the supply of goods and the essential services for tourist activities (Zaei and Zaei, 2013). These opportunities may supplement traditional income sources especially for the households in the area which are below the poverty threshold.

Economic benefits may not be maximized though if the STOBOSA attraction remains as a scenic attraction or a leisure opportunity only. Benefits have narrowly disseminated as exemplified by the initial reactions of the residents. Roberts and Hall (2001) asserts that when the rural agro- or eco-tourism are understood as leisure opportunities rather than as part of diversification strategies for rural economy, limited benefits are derived. They suggest that in developing rural tourism, a holistic view is required to perceive the rural resource base as a multidimensional environment with a wide range of uses and values.

The belief that the project has not economically benefitted the community is reflected in residents' perceptions in which they disagreed or neither agreed nor disagreed with: tourism project giving rise to other forms of livelihood in the area, created new markets for products, and has brought major revenue to the community (Table 4). Aside from a beautification project that appears to tourists as a leisure opportunity, STOBOSA residents may capitalize on the potential for creating

employment and businesses with the inflow of visitors. It appears that in the first year of implementation, the community has yet to strategize to capitalize on the project.

They are more likely to agree that the tourism project has brought more advantages than disadvantages to them and that still the project would not make them dependent on people outside of their community. There is optimism that in due time they can maximize the tourism potential that has evolved.

Table 4. Perceptions of residents on economic effects of STOBOSA

	Statements	Mean	SD
1.	My quality of life has deteriorated because of tourism.	2.29	1.16
2.	Tourism brings in revenue to the community.	2.86	1.11
3.	Tourism benefited other industries and livelihood in my community.	2.97	1.22
4.	Tourism project gave rise to other forms of livelihood in the community.	2.89	1.16
5.	Tourism project created new markets for our local products.	2.95	0.98
6.	I believe that the tourism project development in my community has brought more advantages than disadvantages.	3.95	0.93
7.	I think that tourism project makes our community dependent on people outside of my community.	2.68	1.23

[1] *Statements were answered on a 5-point scale: 1 indicating strongly disagree, 5 indicating strongly agree*

As to sociocultural effects, the following were reported:

a. Pride and popularity

- Pride of Place effect: From a negative ("eyesore") description of the STOBOSA area, the area is now regarded positively and tourists who were interviewed described the place as "beautiful" and "amazing". One local tourist attested to the great improvement since he was a resident in STOBOSA a decade ago. As a gateway to Benguet, visitors are given the impression that La Trinidad destinations are beautiful. On the Trip Advisor site, 5 out of 6 people who left comments appreciated the project.
- The place is now well-known with local and international news coverage in print, radio, television, and social media. One resident said, "Now visitors know that strawberries are from La Trinidad and not from Baguio." A visit to STOBOSA will invite tourists to go to the La Trinidad destinations like the Strawberry Farm.
- The project serves as an inspiration that large mural projects are possible. DOT-CAR is looking at painting a larger area, the Quirino Hill in Baguio City.

b. Culture and history

- During the launching and unveiling, cultural presentations from the indigenous peoples' groups in the community and municipality were shown and appropriate rituals were done.
- The design of the mural (sunflowers and strawberries) reflect the main produce of the valley and the past of the STOBOSA area as it was bedecked with sunflowers *(Helianthus annuus)* when there were no houses there yet.
- The Bayanihan culture during the project implementation was manifested. The community residents claim that their community is more united now.

c. Social capital

- The social capital of the community multiplied. They now have local and international linkages and both government and civic support.
- Universities conduct research in the area and assist in improving the project.
- Other social impacts include support from stakeholders including the planned improvement of infrastructure to cater to tourists such as a view deck and wider parking space.

Social or cultural impacts are experienced in the encounter between the host communities and the visitors (van Bruegel, 2013). It is in this area that residents have felt a significant transformation based on the interviews and survey (Table 5). It has imparted a greater sense of pride, distinction, and community spirit. It is likely to make the residents promote further their place and culture, and strengthen linkages with new and established partners.

Table 5. Perception of residents on sociocultural effects of STOBOSA

	Statements	Mean	SD
1.	I think that the tourism project makes our community stronger.	3.60	1.10
2.	I think I could learn a lot from interaction with tourists.	3.20	1.04
3.	Tourism promotes pride of their way of life and cultures among community members.	3.18	1.01
4.	Tourism promotes cultural restoration and conservation.	3.28	0.93
5.	Tourism invites other organizations to assist the community.	3.63	0.77
6.	Tourism makes the community well known to outsiders.	3.98	0.73
7.	Tourism becomes a platform for skills training and learning new ideas for the community.	3.73	0.96
8.	Tourism unites various groups inside the community to work together.	3.50	1.11
9.	Most tourists are respectful to the community.	3.40	0.87
10.	Tourism is another form of education for tourists to understand and appreciate way of life of the host community.	3.85	0.95

Concerning environmental effects, the following were gathered:

a. Pollution

- Waste management issues include lack of trash bins in the waiting shed where most visitors would stay. Also, the community garbage bin is along the highway and this was moved farther away from the sight of visitors. However, some residents say since it's more distant from their residences, others would dispose their garbage in the river.
- With the limited space for parking, vehicles of tourists would cause traffic along the highway. Increased number of vehicles in the area would mean more air pollution.

b. Space as resource

- Visitors would take 'selfies' and group pictures on the suspension bridge where residents pass. The latter would have to wait for the visitors to take their pictures.

Residents have perceived limited negative environmental effects in the past year (Table 6). This is also so because of the nature of tourism activity (mostly viewing) in the area. There may be a need to socially prepare the residents in anticipation of more tourist arrivals and activities. Residents

have also expressed more consciousness in terms of environmental care and proper waste management due to more people coming in. Zaei and Zaei (2013) reported that tourism could positively contribute to the maintenance of the natural environment with the people consciously maintaining and protecting the area.

Table 6. Perception of residents on environmental effects of STOBOSA

Statements	Mean	SD
1. I often feel irritated because of the tourism project in my community.	2.28	1.05
2. My community is overcrowded because of the tourism project development.	2.21	0.92
3. Community resources (ex. The bridge, spaces) are overused by tourists.	2.50	1.04
4. The environment in my community has deteriorated because of tourism.	2.21	1.12
5. Tourism is growing too fast.	3.23	0.84
6. I believe that because of tourism the environment in my community is well preserved.	3.35	1.03
7. I believe that tourism in my community causes pollution.	2.18	0.93

Transitioning to Community Economic Development

From a beautification project, the residents and other stakeholders are poised to shift to community economic development through tourism. The DOT refers to it as phase II of the project. The community perceives it as a period to increase benefits from the tourism undertaking. The municipal LGU is geared to institutionalizing management and support to the STOBOSA project, and aligning its growth to the municipal-wide tourism development.

There can be plans to enhance the project to include promoting the story (the community spirit and lessons during the implementation) of the spot (mural) and diversifying the attractions there. The values and lessons from the project may appeal to the subjective meaning, including symbolic and emotional values that tourists ascribe to attractions (Vitterso, Vorkinn, Vistad and Vaagland, 2000). The DOT-CAR coordinator said there is a planned Everlasting (*Helichrysum bracteatum)* plantation at the top area of the STOBOSA where a view deck can also be constructed. This will be matched with basic tourism facilities along the highway- construction of a view deck, souvenir shop/reception area, comfort room, and parking area. The municipal LGU has allotted P1.6 million pesos ($32,000) for these facilities to be completed by early 2018, the projected time for 100% completion of painting of all the houses too. Aiming for sustainability, the municipal council is currently hearing the proposed ordinance on institutionalizing the STOBOSA Hillside Homes Artwork promotions and development programs, projects and activities. For paint needs after 3-5 years, Davies Paints has offered to sell coats at discounted price to sustain the mural.

The community has also thought of creating a cooperative that will manage community operations and entrepreneurship in the area. The municipal LGU has oriented prospective incorporators from STOBOSA on cooperative management.

There arises a need for the involvement and support of the barangay LGU which had limited participation in the project implementation.

As the way forward in the STOBOSA project is institutionalization at community and local government levels, it is important to underscore that community economic development through mural-based tourism involves self-help, local leadership and initiative, networking and local capacity building (Koster & Randall, 2005). Ross and McRobie (1989) have defined CED as 'a process by which communities can initiate and generate their own solutions to their common economic problems and thereby build long-term community capacity and foster the integration of economic, social and environmental objectives'. The CED is appropriate in supporting the United Nations Commission on Sustainable Development pronouncement that "Rural livelihoods are enhanced through effective participation of rural people and rural communities in the management of their own social, economic and environmental objectives by empowering people in rural areas, particularly women and youth, including through organizations such as local cooperatives and by applying the bottom-up approach." With CED, there is a greater opportunity to take advantage of the economic, social and environmental potential benefits of the STOBOSA as a tourist activity to develop the community and improve on its inequitable poverty indicators.

In communities that created murals-as-community-beautification, the process was less formalized and success was measured more qualitatively, for example in increased community pride and the development of social relationships. As STOBOSA managers shift from 'leisure to economic development', there is a need for strong institutionalization arising from within the community. For those communities where murals were developed as part of an explicit economic development strategy, the process was more formalized and the outcomes measured more quantitatively, including the numbers of visitors, employment and businesses created (Koster & Randall, 2005).

IV. Conclusions and Recommendation

The STOBOSA mural is the first of its kind in the Philippines. Unlike the favela experience which is a social engineering typology, the giant artwork concept emanated from the idea of beautifying the gateway to La Trinidad and Benguet, the STOBOSA hillside which was perceived as an eyesore due to close-knit unpainted residences. From November 2015 when public consultations were conducted until the unveiling of the project in June 2016, many stakeholders contributed to the successful implementation of the project. The stakeholders especially community residents exhibited unity and volunteerism.

The perceptions of stakeholders on the impact of the tourism project to the community after a year in terms of economic, sociocultural and environmental effects are mostly positive and optimistic. Stakeholders felt the social impact in terms of pride of place the most. They anticipate greater economic benefit to them in the coming years.

To optimize the potential of the STOBOSA project, the stakeholders may transition strategies from murals as community beautification to more institutionalized and structured community economic development programs.

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The Sustainability Notion of Green Infrastructure Planning in Rural South Africa

Elizelle Juaneé Cilliers & Zhan Goosen
North West University, Unit for Environmental Sciences and Management, Urban and Regional Planning, Potchestroom, 2531, South Africa.

The provision of green spaces through green infrastructure planning within urban environments have been affirmed to be non-negotiable within literature (Goosen, 2014:8; Palacky, 2015:1; Schmidt & Nemeth, 2010:454). This motion also applies to rural environments. Regrettably with the need of basic services coupled with the demand for extensive housing supply, green spaces within rural environments is often disregarded, recognised as a luxury rather than a necessity.

Green infrastructure introduced as an alternative planning approach within rural environments could aid in improving current realities and challenges, establishing a balance between human and nature. The environment and quality of life is thus the two pillars this study aims to improve. This paper provides an overview of what is regarded as green infrastructure planning with the intention of introducing this approach within rural environments of South Africa. The existing local realities and challenges restraining green infrastructure planning within rural South Africa are furthermore explored along with the benefits and contributions that green infrastructure planning could provide within rural environments of South Africa. Finally guidelines are proposed for the implementation of green infrastructure planning within rural environments of South Africa.

Keywords: Green Infrastructure, Rural Development, Sustainability

1. Introduction

As a result of increasing population growth, constant pressure is places on the economy and lower living standards are resulting into a reality. Planning for sustainable communities consisting of green infrastructure, urban or rural areas, should thus be the shifted aim, affecting the quality of living standards for residents as well as enhancing the sustainability notion of their direct environment. Regrettably the benefits and importance in terms of green spaces provided within rural areas are not continually recognised and the planning of these spaces are not regarded as a priority, but rather as a luxury (Goosen, 2015:40).

This paper does not report new research results but rather suggests a finer grain of the inclusion of green infrastructure planning within rural areas of South Africa. Along with the literature discussed in this paper, the aim is to improve and develop rural environments for the residents while simultaneously enhancing their quality of life. The study will therefore look successively at what is considered as green infrastructure planning, the benefits in terms of green infrastructure planning and the ideas as well as theories drawn on implementing this approach within rural South Africa. Finally the researcher will engage briefly on the three perspectives of sustainable development, with some in depth considerations of planning for green infrastructure to improve sustainable development.

2. Green infrastructure planning

2.1 Defining green spaces

An abundance of definitions in term of green spaces are provided within literature and are diversely understood. Green spaces can be defined and understood as areas having continuous vegetated localities that are proximate, public or private space, directly (active or passive recreation) or indirectly (positive influence on the urban environment) available for the use by residents (Al-Hagla, 2008:164; Atiqul & Shah, 2011:601; Barbosa *et al*., 2007:187-195; Cilliers & Cilliers, 2016:9; Levent *et al*., 2004:9; Mensah, 2014:1; Thai Utsa *et al*., 2008:221). It is therefore land in a natural (i.e. earth, water and living things) or undeveloped condition which is easily accessible to all users (Cilliers, 2015:1; De Jong, 2015:14).

Artificially created parks, botanical gardens, street trees that are isolated and even private gardens (Goosen, 2015:34; Levent *et al*., 2004:2; UrbSpace, 2010) are all categorised under green spaces, where McConnachie & Shackleton (2010:244-248) states that green spaces furthermore include school grounds and sport fields, which can then be ultimately divided into formal and informal green spaces, where Young (2010:313-321) defines green spaces as "…publicly managed natural resource assets…including street trees, parks, 'natural areas'…".

For the purpose of this study the term green space is applied and when developing green spaces it is referred to as green space infrastructure and will carry the following meaning, as derived from above: "*safe and maintained open land primarily remaining natural for use by the community, impacting on the quality of life of the residents and the sustainability notion within the direct environment*".

2.2 Defining green infrastructure (GI)

Referring to the entire green network, at all spatial scales, GI and the planning of GI is not an entirely new concept (Schilling, 2010:8). GI is introduced as a way of understanding nature, through contributing to sustainability, serving society and improving the quality of living standards for residents within a specific location.

Defined by the European Commission green infrastructure is referred to as "*the use of ecosystems, green spaces and water in strategic land use planning to deliver environmental and quality of life benefits. It includes parks, open spaces, playing fields, woodlands, wetlands, road verges, allotments and private gardens. Green infrastructure can contribute to climate change mitigation and adaptation, natural disaster risk mitigation, protection against flooding and erosion as well as biodiversity conservation*".

Green infrastructure (GI) planning can furthermore be understood as the interconnected set of natural and man-made ecological systems, a network of multi-functional green areas forming an infrastructure network (Town and Country Planning Association: The Wildlife Trust, 2012:3). For this reason GI planning should form an integrated part of spatial planning initiatives in order to contribute to infrastructure and green network (Cilliers & Cilliers, 2016:10) and simultaneously provide direct as well as indirect benefits to the public.

3. Existing rural associated realities, challenges and deficiencies: South African context

It seems to be an essential starting point to briefly touch on some of the existing rural realities and challenges faced within South Africa. An improved understanding will then be gained in order to comprehend the need of green infrastructure planning implementation within rural areas of South Africa.

South Africa as a developing country, faces numerous challenges at a continuously increasing rate. According to De Jong (2015:14-16) an estimation is made that half of South Africa's population resides in rural areas, posing great challenges for these areas. South African rural communities and the development thereof thus continue to remain a main priority within policies and frameworks guiding social as well as economic development (De Jong, 2013). The challenges faced within rural environments are primarily due to the apartheid and post-apartheid eras, contributing to urban and rural segregation. These challenges directly affect, among other, social, economic and environmental concerns as well as the quality of life of rural residents.

In order to establish the existing challenges faced within rural environments of South Africa, one should establish the term "rural" as the definition of rural consists of various understandings in terms of different localities worldwide. Rural, within South African context, as defined by the Rural Development Framework of South Africa that was originated in 1997, can be referred to as "*... the sparsely populated areas in which people farm or depend on natural resources, including villages and small towns that are dispersed through these areas*" (RDF, 1997), thus any place that is not urban (Weeks, 2010:34) focused on agricultural activities. Within South Africa rural areas are typically classified as the areas where the low income class resides and the main focus from a governmental point of view is the provision of housing, water and electricity, better known as basic services. This is when the key component of sustainable development and quality of life goes unrecognised.

Rural areas are in addition usually far out locations, where maintenance of the area, and more specifically green spaces, become problematic. Poverty, employment opportunities and poor delivery services are a threat due to urban migration and residents within these rural environments living below the MLL (minimum living level) (Layard *et al.*, 2001:235). A variety of challenges and realities experienced within rural areas of South Africa include, but are not limited to, the need for development, poverty, lack of community recreational areas, low quality of life, lack of skill development, lack of safety, high crime rates, lack of facilities and services, complete lack of public participation, lack of integrative policies and a need for opportunities. The lack of infrastructure is however the main reason for Africa's current rural development state coupled with inadequate participation from local residents resulting in development project tending to be unsuccessful (Fox & Van Rooyen, 2004:83). To further exacerbate the existing realities and challenges, policies regarding sustainable community development within rural environments are often vague, broad and complex.

The lack of community recreational areas through green infrastructure planning within rural South Africa is the main deficiency this study focuses on. Current planning approaches within rural environments are often project orientated, thus seldom supporting green growth and GI planning (Okeke, 2014). Providing GI is rather seen as a luxury within rural environments, where the financial aspects of developing and maintaining these spaces as such are usually not prioritized in budgets (Parker, 2014). This is more often than not by reason of the need for more current realities faced, such as housing to provide for a growing population. As a result financial limitations along with the various challenges prevent the development and maintenance of green infrastructure planning in rural environments, where a need exists (City of Tshwane, 2005:57). The major benefits that these green spaces could provide within rural environments, on more than one level, are as a result disregarded (Prange 2014).

4. Value of green space infrastructure: Direct and indirect benefits related to rural environments

Numerous benefits are provided in terms of human and nature through GI planning within rural environments. The value that green spaces add needs to be identified in order to emphasize the importance of planning for such spaces through GI planning.

The benefits in terms of GI planning can be divided into direct and indirect benefits, all relating to sustainable development within rural environments.

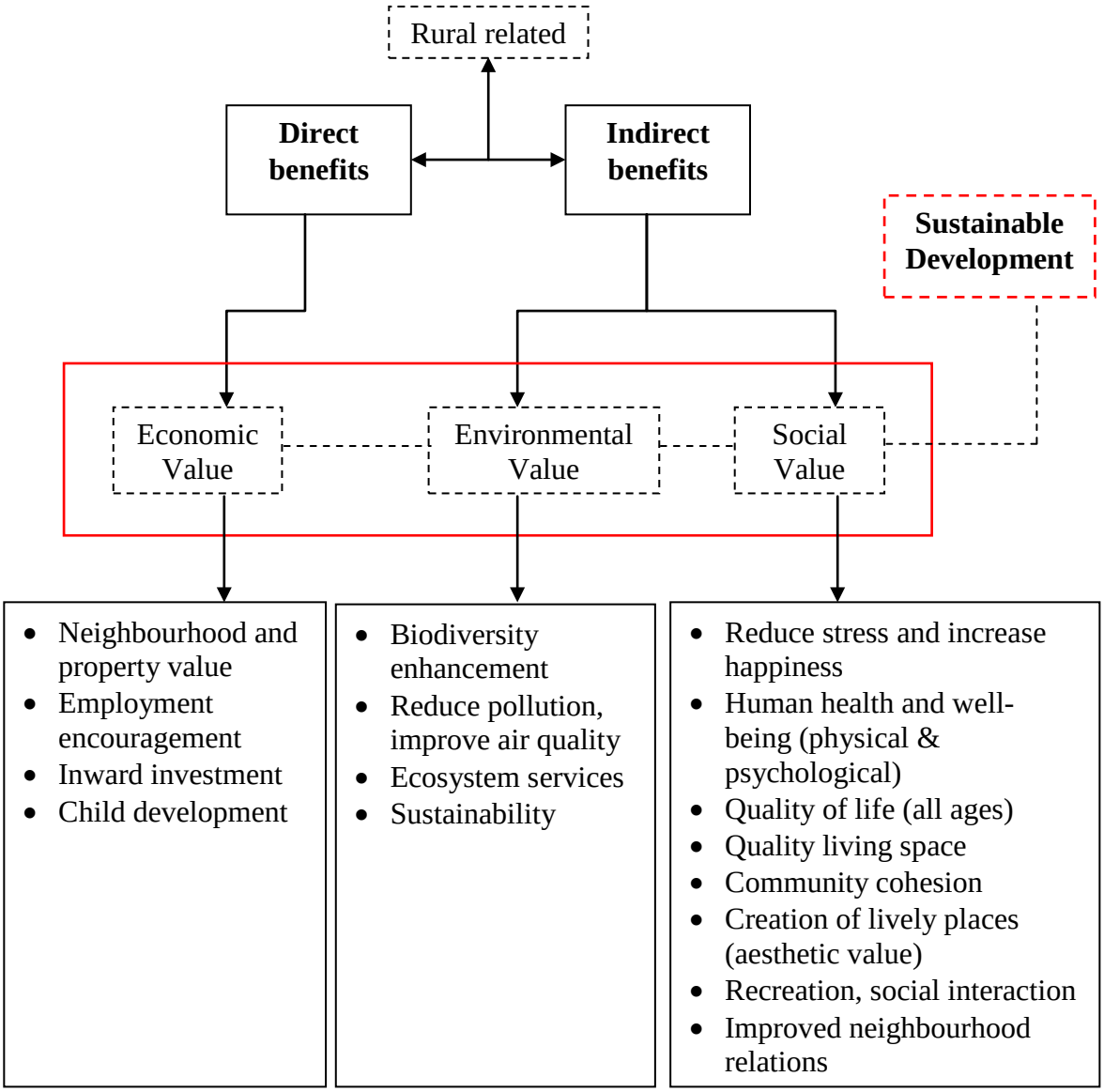

Figure 1: Direct and indirect benefits of GI planning
Source: *Own construction based on Akbari et al. (2001); Alexandri & Jones (2008); Anderson & West (2006); Atiqul & Shah (2011); Bolitzer & Netusil (2000); Bolund & Hunhammar (1999); Cabe Space (2005); Chiesura (2004); Cilliers et al. (2010); Cilliers et al. (2012); Cilliers et al. (2013); Cilliers & Timmermans (2014); Cohen et al. (2006); Greenspace Scotland (2008); Hansmann et al. (2007); Hodgkison & Hero (2007); Jim et al. (2006); Kazmierczak & James (2008); Kuo (2003); Luttik (2000); Lutzenhisher & Netusil (2001); McPherson et al. (2002); Owen et al. (2004); Roger (2003); Shultz & King (2001); Smith et al. (2002); Stiles (2006); Taylor et al. (2002); Thaiutsa et al. (2008); Van den Berg et al. (2007); Woolley et al. (2003)*

4.1 Addressing sustainable development in rural South Africa

At present GI planning is considered an important constituent of sustainable development while impacting on human well-being (Levent *et al.*, 2004:2; Prange, 2014; UrbSpace, 2010). The incorporation of GI planning within rural environments play an essential role in social, economic and environmental aspects of sustainable development (Al-Hagla, 2008:162-163; Cilliers, 2010:9; Harris, 2003:1; Palacky *et al.*, 2015:5; Power, 2004:4; Schilling, 2010;22; Town and Country Planning Association: The Wildlife Trust, 2012:2; 2014:234), ultimately leading to the creation of sustainable communities (Al-Hagla, 2008:162-163).

The characteristics of a sustainable community are typically aimed towards a healthier, safer, greener, economically independent community which is well managed and maintained (Schlebusch, 2015:59). With particular reference to the applicability of sustainable development within rural areas in terms of GI planning, sustainable communities are achieved (Palacky *et al.*, 2015:1).

Figure 2 below illustrates the three perspectives of sustainable development in terms of GI planning, directly related to the direct and indirect benefits, and are expanded on in Table 1 accordingly.

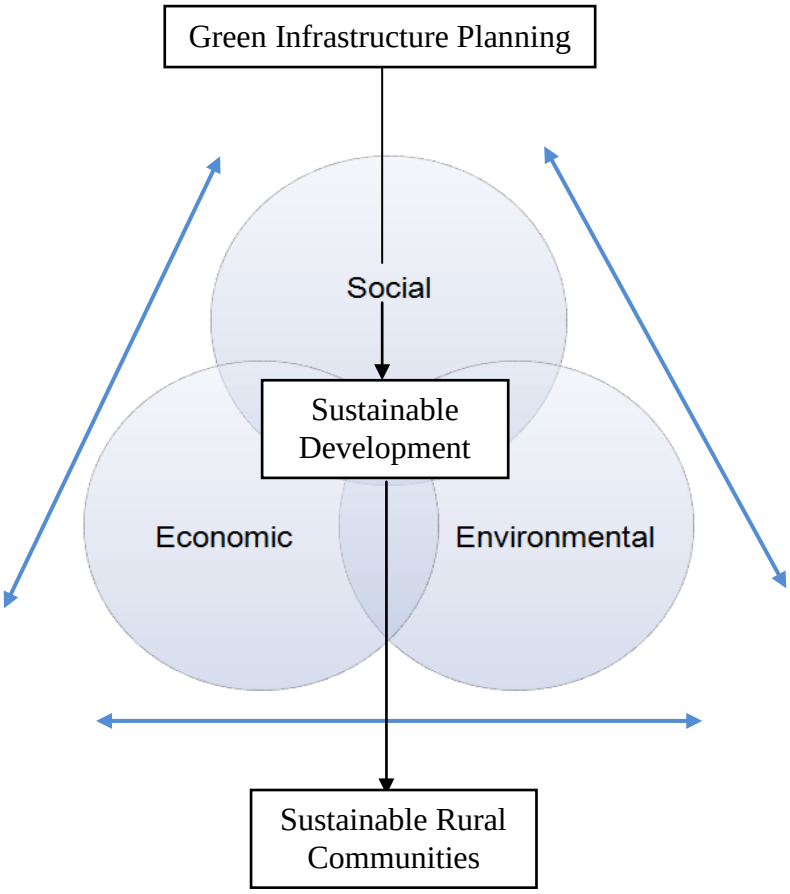

Figure 2: Perspectives of sustainability
Source: *Authors own construction (2016)*

Table 1: The three perspectives of sustainable development

Perspective	Description
Social	Directly related to the leisure and recreational aspect of the space itself. Social contact (communication), health and well-being of communities are directly influenced.
Economic	Directly related to the economic and financial gain, which is directly affected by green infrastructure planning within a specific area.
Environmental	Key role in enhancing biodiversity, but main benefit is however the vast impact on sustainability within the direct surrounding area as well as the broader area of the rural environment.

Source: *Authors own construction based on Harris (2003:1); Schilling (2010;22)*

5. Planning for green space infrastructure: Converting theory into practice

At present, green infrastructure (GI) is considered as an important constituent of sustainable development through planning for sustainable communities (Cilliers & Cilliers, 2016:6; Levent *et al.*, 2004:2; Prange, 2014; Town and Country Planning Association: The Wildlife Trust, 2012:2; UrbSpace, 2010). Through the GI planning approach emphases is laid on a balanced development creating a harmony between human and nature.

A collaborative multi-disciplinary approach, in partnership with innovative development is thus required for GI planning to maximise its function and ensure a balanced development. Although the characteristics of GI planning are multifunctional, it should be planned, implemented, enhanced, maintained and protected in order to achieve its maximum potential.

The aim is for strategic GI planning and approaches to become a reality. Figure 3 bellow illustrates 3 different phases along with 5 steps aiding in ensuring successful implementation of GI planning within rural environments.

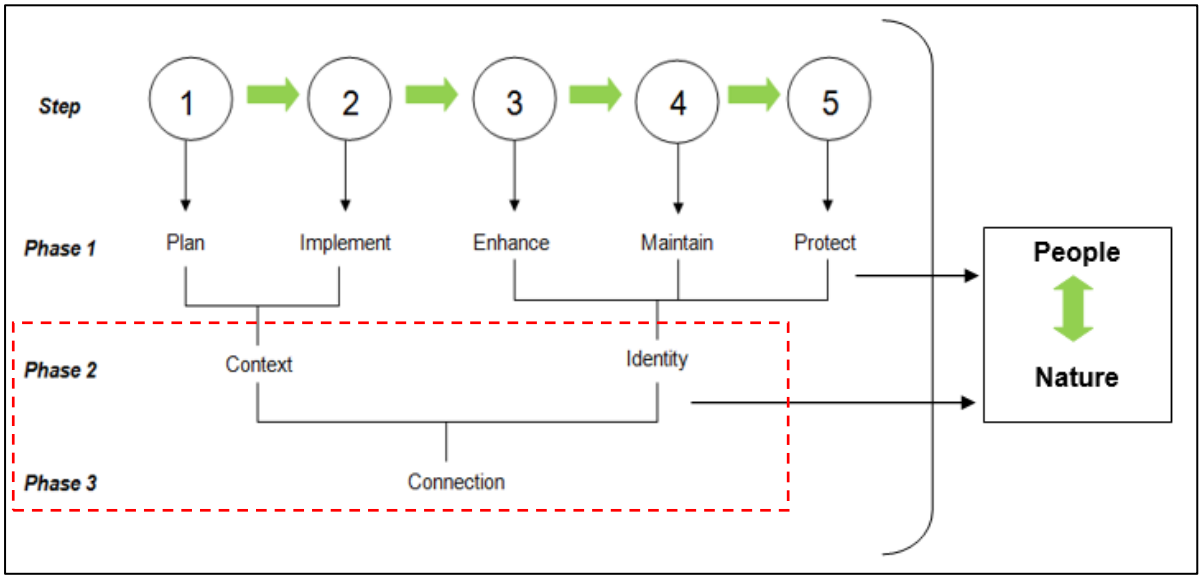

Figure 3: Strategy for GI implementation
Source: *Authors own construction based on Town and Country Planning Association: The Wildlife Trust (2012:2)*

Table 2: Phase description in terms of the five step strategy of green infrastructure planning

	Step	Phase	Description
Context	1 & 2	2	The capturing and examining of the location and surroundings is required to recognize the context within the existing wider green network. Natural features and topography in the broader context is included in order to plan and implement GI within a specific area.
Identity	3, 4 & 5	2	Character of the existing landscape along with existing unused green areas is analysed. Ecosystems within the specific locations are identified and needs within in terms of human and nature is established. Enhancement and transformation of the current location can then take place, with emphasis laid on the maintenance and protection to follow.
Connection	1 to 5	3	Connectivity of GI in terms of the urban environment is recognised to promote green corridors, enhancing movement and linkages for pedestrians. All 5 steps in terms of the 3 phases are here connected in order for GI to reach its maximum potential within the direct and broader rural area.

Source: *Authors own construction based on Town and Country Planning Association: The Wildlife Trust (2012:2)*

Contributing to the five steps and three phases of green infrastructure planning, different considerations guiding GI planning should be considered (Town and Country Planning Association: The Wildlife Trust, 2012:10-11) and is portrayed in Table 3 below.

Table 3: Considerations in planning for GI

Considerations	Description
Consideration 1	Connectivity is key and the context of the planning environment matters.
Consideration 2	The planning of green infrastructure should be grounded in land use planning theory and practice.
Consideration 3	Green infrastructure should function as a framework for conservation and the improvement of human and nature related benefits.
Consideration 4	Before development or transformation of green infrastructure takes place, the planning and protection thereof should be established.
Consideration 5	Green infrastructure planning is a public investment. Influenced by the public, led by the professionals.
Consideration 6	The needs of the public and the environment should be respected in the planning and implementation of green infrastructure.
Consideration 7	Green infrastructure planning is a long term ongoing commitment from all stakeholders.

Consideration 8	Green infrastructure planning should be distinctive and welcoming.
Consideration 9	Adaptable, safe and easy to move in is elements that need to be considered in terms of green infrastructure planning.
Consideration 10	Within green infrastructure planning approaches resource efficiency is required, where the sustainable use of materials is evident.

Source: *Authors own construction based on Town and Country Planning Association: The Wildlife Trust, 2012:10-11*

6. Conclusion

Urban and rural communities within South Africa differ in many aspects, where rural environments in South Africa face problems that are uniquely their own. However urban and rural areas within South Africa share common challenges in achieving sustainable communities through implementing sustainable development planning methods and approaches. This paper aimed at capturing the value of GI planning within rural environments of South Africa in order to provide basic implementation guidelines. Although the planning and implementation of green spaces, especially in a rural context, remains complex, the benefits in terms of GI planning within rural environments have been proven. It should be highlighted that this complexity is also due to the crucial role of local authorities in achieving sustainable rural communities through GI planning.

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Transforming Gender Relations through Gender Mainstreaming: A case study from the Philippines

Palaniappan, G[1], Nuñez, Lilian[2], Nicetic Oleg[3] and Abamo, Antonio[4]

Names of Authors:
Dr. Gomathy Palaniappan
Senior Research Fellow & Lecturer
School of Agriculture and Food Sciences
The University of Queensland

Dr. Lilian B. Nuñez
Associate Professor (Anthropology)
Institute for Strategic Research & Development Studies
Visayas State University
Visca, Baybay City, Leyte
Philippines

Dr. Oleg Nicetic
Research Fellow
School of Agriculture and Food Sciences
University of Queensland
St Lucia Qld 4072

Dr. Antonio P. Abamo
Professor (Agribusiness)
College of Management and Economics
Visayas State University
Visca, Baybay City, Leyte
Philippines

Abstract

Gender mainstreaming has gained considerable attention to achieve gender equity. It has been reported that gender mainstreaming will enable women and men to participate equally in all spheres of life for development. It was imperative to conduct gender mainstreaming in the Philippines to facilitate transformation of gender relations among smallholder farmers. This article focuses on addressing transformation of gender relationship among smallholder farmer participants from Eastern Visayas (Ormoc City, Leyte), Southern Mindanao (Davao City) and Northern Mindanao (Cagayan de Oro City), through Australian Centre for International Agriculture Research (ACIAR) funded Project titled "AGB/2012/109 Developing vegetable and fruit value chains and integrating them with community development in the Southern Philippines".

A dialogue based research method of group discussions were conducted through a trained facilitator, engaging participants in listening, speaking and active thinking through a series of topics during the gender and awareness development training. A total of 35 participants were purposely selected from farmer associations, amongst them were 23 female participants and 12 male participants. The female participants were further allocated in small groups of 4 (5participants in 1 group and 6 participants in 3 groups) and male participants were allocated in small groups of 3 (4 participants per group) with a trained facilitator in each group. The discussions were recorded in field notes by an observer. The Development indicators were identified through small group discussion at the individual, family, association and community level. The gender issues that are barriers to development were also identified through small group discussions. It was agreed by the participants that the roles of men and women in the society was stereotyped by institutions such as religion and media. Participants suggested that the farmer associations should play a vital role in transforming gender relations to achieve fair division of labour which will be agreeable to both gender.

Introduction

The Philippines is a predominantly rural society with more than 80 percent of the population relying on agriculture for their livelihood. Agriculture is the primary source of income for poor rural people, most of whom depend on subsistence farming and fishing for their livelihood. Overall, more than a third of the people in the Philippines live in poverty. The Multiple Poverty Index (MPI) for 2013, which identifies multiple deprivations in the same households in education, health and living standards is reported to be high in the Philippines (UNDP, 2015). About 6.3 percent of the population (6,221thousand people) are multi-dimensionally poor, while an additional 8.4 percent live near multidimensional poverty (8,282thousand people). The Philippines Human Development Index (HDI), which measures three basic dimensions of human development such as long and healthy life, access to knowledge and a decent standard of living for 2014 is 0.668. As a result, Philippines is categorised as medium human development, positioning at 115 out of 188 countries and territories (UNDP, 2015). Undernourishment associated with poverty was reported in the Philippines and various agriculture and aquaculture programmes were implemented in 2015 to address undernourishment (FAO, 2016).

The Gender Inequality Index (GII) in the Philippines reflects gender-based inequalities in three dimensions –reproductive health, empowerment, and economic activity (UNDP, 2015). Gender Inequality Index (GII) in the Philippines is 0.420, ranking it 89 out of 155 countries in the 2014 index. In the Philippines, 27.1percent of parliamentary seats are held by women, and 65.9percent of adult women have reached at least a secondary level of education compared to 63.7percent of their male counterparts. However, the death of women during pregnancy related reasons are high, for every 100,000 live births, 120 women die from pregnancy related causes; and the adolescent birth rate is 46.8 births per 1,000 women of ages 15 -19. Female participation in the labour market is 51.1percent compared to 79.7 for men (UNDP, 2015). This article focuses on addressing gender transformation of farmer participants from Eastern Visayas (Ormoc City, Leyte), Southern Mindanao (Davao City) and Northern Mindanao (Cagayan de Oro City) in Australian Centre for International Agriculture Research (ACIAR) funded Project titled “AGB/2012/109 Developing vegetable and fruit value chains and integrating them with community development in the Southern Philippines”.

Study Location

The project sites include four barangays, two in each region namely Eastern Visayas (Ormoc City, Leyte), and Northern Mindanao (Cagayan de Oro City) and two sitios in Southern Mindanao (Davao City) (See figure 1). The two barangays in Ormoc city, are Cabintan, located at a higher altitude and Lao, a low land. The Cagayan de Oro sites covered two peri-urban barangays namely Pagatpat and Canitoan. The two sitios in Davao city are Pamuhatan and Upper New Sabang. The participants were selected from all project sites for gender and development mainstreaming except Lao. The reason for excluding barangay Lao is because the community characteristics being unique with fisher folks along with vegetable growers whereas the other sites showed community characteristics of vegetable growing.

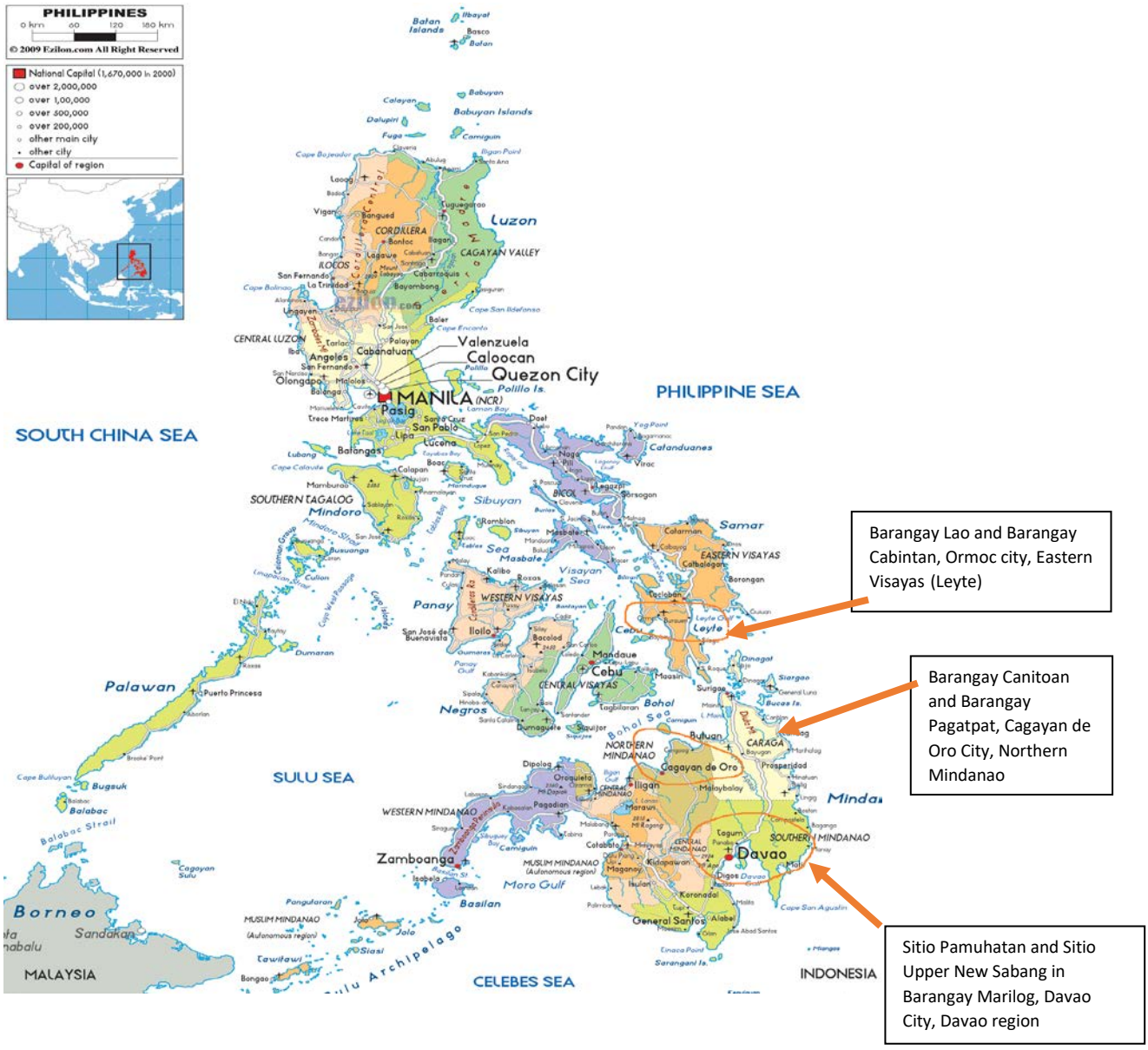

Figure 1. Map of Philippines showing project activity sites

Method

Using a group discussion method, collective phenomena (Fiedler, 2002) with respect to gender issues at a training setting was documented in April 2017 at Ormoc City, Leyte. The group discussion method was chosen to allow participants to be dynamic and reveal shared meanings, underlying structures, and implicit norms in relation to gender issues shaped by institutions such as family, association and community. Four group discussions were conducted during the training on Gender and Development Mainstreaming to answer a series of questions. The questions included, 1. What are the development indicators at the individual, family, association, and community level; 2. What are the traits and activities associated with men and women; 3.What are the traits and activities common to both men and women; and 4. What are the gender issues experienced in the family, community and association and how can they be addressed? The four group discussions were conducted with 35 participants, 23 female participants and 12 male participants, purposely selected by project

field staffs by employing a set of criteria. The criteria employed for selection of participants in the villages (barangay) included, willingness to participate in training; office bearers of farmer associations; office bearers of women associations; key leaders in formal or informal organizations and willingness to take actions to address gender issues. The participants were selected from Cabintan in Eastern Visayas (Ormoc City, Leyte), Pamuhatan and Upper new sabang in Southern Mindanao (Davao City) and Canitoan and Pagatpat in Northern Mindanao (Cagayan de Oro City). All participants travelled from their barangay to Ormoc City, Leyte to attend the training and participate in group discussions.

To conduct group discussions the participants were seated in groups during the training. The female participants were seated in small groups of four (five participants in one group and six participants in three groups) and male participants were seated in small groups of three (four participants per group). Groups one to four were female groups and five to seven were male groups. The female and male participants were in separate groups to allow participants to discuss gender issues without restrictions. Trained facilitators were assigned to each group to facilitate discussion among participants. To enable participants to discuss without restrictions, female facilitators were assigned for female groups and male facilitators for male groups. Thus the participants were representatives of the communities with the age ranging from 22 to 66 years. All participants grow vegetables such as tomato, bitter gourd, eggplant, capsicum, pechay, and cabbage. The most common non-farm occupations in majority of the sites are habal habal driving, carpentry, broom making etc. The information from the discussion was organized by themes and translated into tables to summarize results.

Results and Discussion

Participants' shared meaning for development

Participants were asked to answer the question "What are the development indicators at the individual, family, association, and community level?" as a group. Each institution namely family, association, and community was assigned to a female and male group. The first group (female) was identified development indicators at the individual level; second (female) and seventh (male) group identified development indicators at the family level; third (female) and sixth (male) group identified development indicators at the association level and; fourth (female) and fifth (male) group identified development indicators at the community level.

The responses of the participants were written on metacards by facilitators or participants and presented during the plenary discussion. Responses that have similar theme were grouped together and were summarized in the table below (see Table 1).

Table 1 Development indicators identified by the participants at the individual, family, association, and community level.

Levels	Development Indicators
Individual	There is commitment Open minded and listen to the advice of others Sharing knowledge to others Buying only what is needed Empower others Industrious Active participation on seminars and trainings which help develop

	self-confidence and self- esteem Have patience Responsible
Family	The husband and wife make good decisions Understanding between wife and husband Working together in doing household chores Self-discipline Respect among the members of the family Refrain from committing vices Able to send children to school God fearing Able to provide nutritious food to children Good communication Spending quality time with family members Both parents lead the family and take good care of the children Able to budget expenses Happy family
Association	The association has bank savings. The association sells vegetables to a supermarket. The association has high number of membership The association acquired assistance from UP Mindanao, Local Government Unit and Department of Agriculture The association has a decent multipurpose hall The members of the association has expanded the land utilized for vegetable production There is unity among members of the association. The members participate in the activities The association regularly holds Christmas party The members of the association receive patronage refund and dividend The association purchased land and farm equipment The number of animals reared by the members increased The policies are strictly implemented
Community	Good housing structures Households have appliances High employment rate Less number of malnourished children Less incidents of robbery People have good hygiene Good farm to market road There is a group of people who unites to develop the community and the livelihood of the people The citizens are handsome and beautiful because they can afford to buy beauty products. Presence of investors Peace and order Community members have access to technology (i.e. cellular phones, internet, farm machineries)

	Less number of out of school youth Community members are professionals and skilful There is abundance of food Unpolluted environment Presence of public toilet facilities

At the individual level, there were no responses or attributes of development specific to males and females (see Table 1). This is in accordance with Caglar (2013) who stated that development can be achieved when both genders work together. The group envisioned a developed individual without regard to his/her sex; each individual is free to develop himself/herself. At the family level, development was described as a joint effort of the husband and wife as well as the other members of the family. There were several responses showing that family members played a role in building a happy family without particular assignment of roles to males and females. For instance, husbands or wives were not assigned as being responsible for sending children to school and providing them with nutritious food. Decision making which used to be a traditional gender role of the husband in many countries including the Philippines, was seen as a joint undertaking of both husband and wife. Likewise, performance of household chores which is traditionally a woman's role, was considered a shared task among family members. At the association and community levels, there were also no particular roles assigned to men and women in the development of the association and community. The assigned groups regarded development of the association and community as everyone's goal to achieve. Overall, the participants' vision of development seemed free from gender bias as they did not specify differences between men and women. Their responses implied that any individual, family, association, or community can develop irrespective of the biological and gender differences between males and females, and that any individual, regardless of sex, can contribute to development of himself/herself, the family, association, and community.

Participants' observations on implicit norms

Participants enumerated the traits, activities, and objects associated with men and women to answer the question, "What are the traits and activities associated with men and women"? The facilitator in each group recorded the response on a meta-card and pasted it on a manila paper. The groups were given 15 minutes to finish the activity. The table below presents the responses from each group.

Table 2 Traits, objects, and activities associated with men and women

	Traits	Objects	Activities
Group 1 (female)	**Men:** hot-tempered, make firm decision, alcoholic **Women:** talkative, strict	**Men:** pants, mustache, short hair **Women:** earrings, long dress, high heels, sandals	**Men:** chop firewood, plowing, carpenter, spraying pesticide **Women:** put make-up, breastfeed, give birth, menstruation
Group 2 (female)	**Men:** jealous, not emotional, alcoholic, brave, strong **Women:** talkative, strict	**Men:** ball, shoes, backpack **Women:** jewelleries, pants, lipstick,	**Men:** gambling, plowing, gym, driver **Women:** take care of children, perform

		shoulder bag	household chores, cook food
Group 3 (female)	**Men:** impatient, alcoholic, strong, gambler **Women:** caring, brat, graceful, moody	**Men:** sprayer, knife, machete, plow, **Women:** sandals, make-up, lipstick, dress	**Men:** chop firewood, gambling, farming, carpenter **Women:** take care of children, give birth, clean the house, buy groceries
Group 4 (female)	**Men:** jealous, creative, protective, active, strong **Women:** martyr, moody, fashion, enthusiast, loving, brat, humble	**Men:** bike, shaver, cap, gun, **Women:** dress, make-up, accessories, shoulder bag	**Men:** electrician, driver, farmer, carpenter, fisherman **Women:** prepare budget, cook food, take care of children, wash clothes, give birth
Group 5 (male)	**Men:** strong, head of the family, joker, silent, gambler, jealous, alcoholic **Women:** caring, patient, graceful, talkative, loving, compassionate, gentle	**Men:** belt, machete, pants **Women:** headband, make-up,	**Men:** farming, chop firewood, driver, basketball, fetch water, protector in the family, gambling, boxing, carpenter, masonry **Women:** prepare meals, wash clothes, prepare budget, give birth, breastfeed
Group 6 (male)	**Men:** brave, jealous, strong, alcoholic, boaster **Women:** naughty, jealous, refined/ladylike, fastidious about looking good,	**Men:** belt **Women:** lipstick, sleeveless dress, skirt, high-heeled shoes, hairband, earrings	**Men:** work that requires physical strength, foundation of the family, basketball, boxing, coconut wine harvesting, mason, carpenter, fisherman **Women:** helps men do their work; light of the family; can be entrusted in all household works; cook food; wash clothes; take care of the children and the husband; give birth; join beauty pageant
Group 7 (male)	**Men:** argues strongly, jealous **Women:** blabber, backbiter, affectionate, ill-tempered, naughty	**Men:** bolo, axe, plow, *barong tagalog (embroidered formal shirt)* **Women:** make-up, stuff to relieve pain	**Men:** labourer, soldier, farmer, driver, construction worker **Women:** sales lady, cooking, cleaning, washing clothes, manicurist, sewer

Several groups among the males and females cited hot-tempered, strong, jealous, and alcoholic as men's traits. Women's common traits were talkative and loving. Additionally,

two of the three male groups cited negative traits for women such as naughty, blabber, and backbiter (see Table 2).

For objects associated with women, all of the groups mentioned those pertaining to physical objects worn by women such as dress, shoes, and lipstick, while for men, many objects pertained to their activities like sports and farming. Thus, objects like ball, ax, bolo, and plow were mentioned by several groups. Identifying women through objects pertaining to clothing supports the earlier observation that women are particular about their looks.

The activities cited for men and women were different as shown in Table 2. Men's activities were usually associated with skills such as farming, fishing, and carpentry, while women's activities were mostly related to domestic chores and reproductive roles like cooking, cleaning, breastfeeding, and childbearing. This is agreement with Sadath et al.'s (2017) report that women are explicitly tasked with the management of domestic chores which has been reflected by participants. Women groups associated themselves with domestic chores embracing the normative standards constructed by the society (Goldscheider et al., 2014). However, only one group cited women's occupations, such as sales lady, dress maker, and manicurist whereas majority of the groups described women's roles to be confined to domestic chores. Yeasmin et al. (2012) asserts that associating women with stereotype traditional roles reinforces oppressive and restrictive conceptualizations of gender and paints a limited picture of the skills, abilities and interests of women.

After the group discussion, the facilitator discussed the difference of gender and sex, the former being socially determined and a learned behaviour while the latter is biologically constructed. Whilst gender changes across time, places, and cultures, sex is constant across time and across different societies and cultures. The facilitator asked the participants to discuss within their respective groups the objects, traits and activities they had identified that belong to both men and women. The responses of the participants is presented in Table 3.

Table 3 Traits, Activities, and Objects common to both women and men

Group 1 (female)	**Traits:** alcoholic, hot-tempered, talkative, make firm decision **Activities:** spray pesticide, chop firewood, **Objects:** pants, sandals, short hair, earrings
Group 2 (female)	**Traits:** alcoholic, hot-tempered, talkative, strong personality, jealous, sensitive, brave **Activities:** take care of children, gambling, doing household chores **Objects:** shoes, jewelleries, pants
Group 3 (female)	**Traits:** impatient, caring, alcoholic, brat, strong, graceful, moody **Activities:** gambling, chop firewood, farming, take care of children **Objects:** knife, machete, sandals, sprayer
Group 4 (female)	**Traits:** active, strong, humble, brat, jealous, creative, protective, moody, **Activities:** electrician, prepare budget, cook food, wash clothes, take care of children, driver, farmer, carpenter, fashion enthusiast **Objects:** bike, gun, dress, cap, shaver

Group 5 (male)	**Traits:** strong, patient, silent, joker, talkative, loving, caring, **Activities:** wash clothes, head of the family, fetch water, driver, chop firewood, gambling, plays basketball, protector of the family, cook food **Objects:** belt, pants, machete,
Group 6 (male)	**Traits:** strong, brave, boaster, alcoholic, naughty, fastidious about looking good, ladylike/refined **Activities:** plays basketball, boxing, joins pageant, take care of the children **Objects:** earrings
Group 7 (male)	**Traits:** argues strongly, affectionate, ill-tempered **Activities:** labourer, soldier, farmer, driver, cooking, cleaning, washing clothes **Objects:** bolo and axe

After reclassifying the traits, objects, and activities, the participants realized that most of the traits, objects and activities were true to both men and women (see Table 3). The participants were in agreement on the biological traits assigned to men and women. Furthermore, participants agreed that the skills, abilities and interests of both men and women need to be acknowledged. The above discussion reinforces that gender mainstreaming activities diffuses egalitarian values that translate into structural changes in the relationship between men and women (Goldscheider et al., 2014).

Participants' views on gender issues

What are the gender issues experienced in the family, community and association and how can they be addressed? In an activity, the participants were asked to identify gender issues in the family, community, and association as well as actions to be taken to address the issues. The responses of participants were documented in the table below.

Table 4 Gender issues identified in the family, community and association and its corresponding solutions

	Gender Issues	**Actions**
Family	• The husband does not trust wife in doing farm works. The wife does not trust husband in doing household chores. • The woman does almost all of household chores. • The work faced by men requires physical strength than the work performed by women.	• The participants argued that biologically, women are weak while men are strong. • Farm mechanization helps minimize gender gap. It enables women to perform farm works which were previously carried out by manual labor. It also increases workers' productivity. (One participant shared that 70% of the lawn mower operators in a certain village in Ormoc City

		are female.) • Helping one another is important. • Appreciating the works of the opposite sex must be encouraged. • Giving trust to the opposite sex will help him/her do the job.
	• Male is dominant. The man makes decisions for the family. Only the father's voice is heard in the family.	• Participatory decision-making • The husband and wife should consult one another. They may also consult their children if necessary.
	• The woman budgets the money for the family. • In a big family, the male children's education is a priority than the female children's. • Disciplining the male child is done by the father.	• Husband and wife must have shared responsibility including in the discipline of children. • Some participants said that prioritizing male children's education is no longer true in the present generation.
	• The woman cannot go out at night.	• Discussion among family members
	• If the husband beats his wife, he can be put in jail. However, there is no punishment if the wife beats her husband. • Husband having many spouses	• The female participants argued that normally the wife does not beat her husband. • One male participant said that men are embarrassed to report violence because it will lower their morale. • Cultural practice of Muslim men to have several spouses
Community	• Men are more active in politics. • Most of the Barangay Health Workers are female. • Many degree courses are suited for male. • Most of the gossipers are female. • Males are preferred to serve as *Barangay Tanod* (community police). • Only men chop firewood. • Haggling of price is done mostly by females.	• A leader must be chosen based on his/her capacity and willingness to serve and not based on sex. • Women must be empowered to accept leadership positions. • Most of the welders in a geothermal power plant in Leyte are women because of their meticulous trait.
	• It is the women who attend parents-	• Time management is

	teachers association (PTA) meetings, graduation and other school activities, and barangay assemblies. Most churchgoers are female.	important in order to address busy schedule and allow men and women to attend various activities in the school and church.
Association	• Women are given light work. • Management does not accept female driver applicants.	• Consider willingness and capability of the applicants.
	• Meetings are usually attended by women. • The treasurer and secretary positions are always given to women. • Most of the members prefer a male leader. • Female members are more active than male members.	• Some associations allow wife/husband or any member of the family as proxy during meetings when the member is not available. • The members must have commitment and proper time management in order to participate in every activity conducted by the association • Leaders must be chosen based on their capability and willingness to serve. • Empower women to take leadership positions. • Reduce the workload of women at home in order for them to perform leadership duties and responsibilities in the association.

Most of the gender issues in the family fall under unequal participation of men and women in the family's livelihood and household activities and differential treatment of men and women (see Table 4). There is gender division of labour where men engage in farming while women perform household chores. This is in agreement with Sadath et al.'s (2017) report that women are explicitly tasked with the management of domestic chores which has been reflected by participants. It is interesting to note a division of labour where men consider farming their field of expertise and do not welcome women's contribution. Likewise, the women consider home to be their field of expertise and do not appreciate men's involvement. This is in agreement with the assigned gender roles defined through normative standards constructed by the society (Goldscheider et al., 2014).

Participants reported that men are the decision makers while women are the financial managers. In addition to this, participants reported that male children were given priority in education because they would fulfil the needs of their family. However, equal opportunity is being provided to both boys and girls with respect to education as both sexes can fulfil family needs. Participants were in agreement of the structural changes in the relationship between men and women with respect to fulfilling family needs (Goldscheider et al., 2014).

Gender issues in the community and association revolved around gender division of labour (see Table 4). Participants reported that men's tasks were associated with protecting and providing such as *barangay tanod* (community police), leaders of the association, and political leaders. This is in agreement with the notion that men are seen as protectors and providers rather than care givers (O'Brien, Brandth, & Kvande, 2007). Furthermore, participants reported that women's tasks were associated with care giving and reporting such as Barangay Health Workers and attending meetings for men. Participants are in agreement that this notion has been in acceptance without any challenge. To challenge the notion structural changes in the relationship between men and women need to be established with egalitarian values (Goldscheider et al., 2014).

Conclusion

Gender mainstreaming was conducted in the Philippines to facilitate transformation of gender relations among smallholder farmer participants from Eastern Visayas, Southern Mindanao, and Northern Mindanao. In subsequent discussions, stereotype traditional roles were recorded for men and women, with protecting and providing roles for men and caring and reporting roles for women. It was also observed that women's skills, abilities, and interests were oppressed. Women participants also reported their skills in domestic chores ignoring their capabilities in farming and embracing the normative standards constructed by the society. As a consequence, unequal participation of men and women in the family's livelihood and household activities were reported to be the foremost gender issue in families. The gender issues in the community and association were reported to be the gender division of labour reflecting stereotype traditional roles. Participants are in agreement that this notion needs to be challenged to establish structural changes in the relationship between men and women with egalitarian values.

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Volunteer Tourism Teaching Program to the Development of Local Community

By:

Imam Al Rezki

Abstract

The research attempts to assess local community opinion on whether volunteer tourism English teaching program for children in Bongkasa village, Bali is effective or not. The research using qualitative method focuses on using community development keys by The Institute for Volunteering Research. One of the keys is to build cooperative relationship and building connections between the village as the object and NGO as the program provider. Based on interview with the initiator of the program, the relationship between two parties is still satisfying. Moreover, no memorandum of understanding is signed that might endangered the cooperation between two parties in the future. The initiator himself takes no action for this issue. The right flows of communication between the village and the organization must be reassessed to prevent possible conflicts from happening.

Keywords: volunteer tourism, local community development, Bongkasa Village

Introduction

The term ‘tourism’ has become increasingly omnipresent in the global vernacular, it has brought with it economic, social, cultural and environmental changes, emphasizing the requirement for a deeper understanding of this phenomenon of contemporary society. The increase in the rate of participation in tourism since the 1950s has been dramatic. In 1950s there were approximately 25 million international arrivals recorded in the world compared to over 700 million in 2003, and by 2020 it is forecast by United Nation World Tourism Organization in 2003 that this number will have risen to over 1.600 million. However, tourism is not just about the movement of people between countries, but also inside country referred as ‘domestic tourism’. Although a global estimate of the amount of domestic tourism is difficult to attain, its volume is likely to greatly exceed that of international tourism (Holden, 2005:8). These situations of tourism have been one of the concerns in Indonesia as well since 1986.

The price of natural oil and gas decreased drastically in the world market and the devaluation of Indonesian rupiah on September 12, 1986 drives tourist industry enhanced to solve our financial problems. It was for these reasons that President Soeharto emphasized the enhancement of tourism in his official speech when he opened a national meeting of the ministry of Tourism, Post and Telecommunication of the Republic of Indonesia on September 26, 1986. Mr. Joop Ave, General Director of Tourism, also reminded participants of the meeting that foreign tourists were just like gold mine, which should be dug up. In that year there were only 825,035 foreign tourists visiting Indonesia, and by 1987 the number increased considerably to become 1,060,000 (Soedarsono, 2004:54). Meanwhile the development of tourism industry in Bali as the main gate of Indonesian tourism has undergone even before the enhancement of tourism in 1986.

During the 1950s, after the traumas of war, Bali was discovered anew, but this time not just by Europeans. When Pandit Nehru, first prime minister of India and hero of the newly emerging non-aligned nations, called Bali “the morning of the world” he coined the most memorable of all the praises heaped on the island. Bali’s image was not simply the province of Europeans and Americans who belonged to the world powers, it was international property. Indonesians endorsed this fascination with Bali’s image. President Soekarno, the charismatic demagogue who united the thousands of islands and hundreds of

cultures of the Indies into Indonesia, had a Balinese mother. It was natural for him then, to focus attention on Balinese culture. In Soekarno's Indonesia the image of Bali from the 1920s and 1930s was given a new life, as the President established a palace there and held court regularly, entertained by Balinese dancers, his walls hung with Balinese paintings. Although, foreign tourists were not particularly welcome, Bali in the 1950s became a tourist destination for Indonesians emulating flamboyant President (Vickers, 2012:19).

The fascinating of Bali that attracts many people from many nations to come, create the development of tourism industry. As one of marketing strategy to make tourists keep coming to Bali apart from its beauty of nature and culture, new innovations of tourism packages started to grow significantly.

As the development of tourism getting increasingly concerned in the late 20th century, tourists in the other hand, in search of new experiences seem to look for a wide range of diverse activities that motivate them to visit certain destinations. Sailing, sightseeing, hunting, fishing, attending sport events, participating in nature conservation and in adventure recreation are only some examples. 'Activity-based tourism' may be defined as a form of tourism, which involves consumers whose holiday choice is inspired by the desire to pursue an activity (Novelli, 2005:143). Volunteer used to have purpose to create better change in society. Meanwhile volunteer tourism as a part of activity-based tourism which attracts people to participate as one of the tourism packages is always been an interesting set of issues that often being ignored to discuss. While volunteer nowadays recognized more into volunteer-tourism, this research is trying to prove whether the original purposes of volunteer itself remain the same or not.

Some researchers have claimed that many volunteer tourism activities organized by western nations have a negative impact on tourism development in host communities. For instance, volunteer tourism expeditions can lead host communities to become dependent upon volunteer tourism sending organizations, undermining the dignity of local residents, exceeding the carrying capacity of the community if not properly managed, and impending the need of host communities regarding tourism development. This discrepancy between host communities and sending organization can result in fiction between host communities and volunteer tourists. Some argue that the very foundation of volunteer tourism exists in a commodified environment and serves as a stronghold for the privileged (Raymond & Hall, 2008).

The Association for Tourism and Leisure Education in 2008 stated that the volunteer tourism market has grown rapidly, with a current yearly total of 1.6 million volunteer tourists contributing a value between USD 1.7-2.6 billion. The significant growth and the uniqueness of the style have attracted many researchers and practitioners. Based on the database in Go Abroad.com, this study accessed 17,711 verified numbers of programs across 156 countries representing 289 different organizations as a volunteer program provider. Indonesia listed as one of the 'Top Ten' volunteer tourism destination based on the article written by Michelle Callahan and Sarah Thomas in 2005. In Indonesia itself, there are 63 volunteer programs and 27 of them located specifically in Bali. The number of projects that can be accessed is constantly changing as the database is frequently updated day by day. It must also be noted that there are other organizations provide volunteer projects that not being accessed by Go Abroad.com.

One of the volunteer programs held in Bongkasa Village, Badung, Bali managed and organized by the foreign organization called The Green Lion Bali. The Green Lion is an organization founded in 1998 in Thailand under the name Greenway. The Green Lion organization is believed to become trendsetters in developing exciting and meaningful travel programs and offer something in return through community engagement.

In 2005 the organization legitimized their name into The Green Lion to keep up with their expansion. The Green Lion grow from small organization into offering programs in over 20 countries spread throughout Asia, Africa, South America, Central America and Oceania. Even the programs are running on multiple continents, The Green Lion organization is a family-run with dedication and passion. There are various number of programs The Green Lion Organization offer including education, adventure and leisure travel, wildlife and environmental conservation.

The Green Lion Ubud Bali found in 2011 along with The Green Lion Nusa Penida and The Green Lion Lovina. The Green Lion Ubud and Lovina are concerning on education program trough language, environment and medical teaching to kindergarten and elementary school student. The Green Lion Nusa Penida is concerning in turtle conservation program.

Trough these phenomenon of volunteer projects as the alternative tourism experiences, tourists who tend to gain meaningful holiday which aim to give positive impacts and change the situation of certain community to be better, the author oftentimes questioning 'Is volunteer program really effective and give beneficial to host community?'

throughout this case, host community as the object of the program is taking a huge part into the industry. Their responses meanwhile needs to be heard whether the existence of volunteer teaching program in their village has successfully achieved their expectations and what kind of social impact that revealed to them with the existence of volunteer tourism program.

The Institute for Volunteering Research (2010) also stated that there are four key aims which community development workers will seek to build:

1. Social Capital – building cooperative relationship, building connections:
2. Human Capital – building knowledge, skills and confidence;
3. Physical Capital – delivering good and services;
4. Cultural Capital – having a sense of ones own identity and understanding of others, sense of belonging to a group.

In this research, the author use the four key aims of community development as a basis for evaluating development revealed towards the existing of Maha Daksa Club volunteer teaching program in Bongkasa Village. This criteria has been chosen because arguably some of the most significant and valuable impacts that come from volunteering are in relation to building skills, relationships, bonds and having positive outcomes.

Maha Daksa Club in Bongkasa Village

Bongkasa Village is located in Abiansemal Sub-district, Badung, and Bali Province. Bongkasa Village is one of 18 villages in Abiansemal Sub-district with boundaries as follows:

a. North: Bongkasa Pertiwi Village
b. East: Ayung River, Kedawatan Ubud Village, Gianyar
c. South: Mambal Village
d. West: Punggul Village

Bongkasa Village is an undulating plateau with 480 meters height above sea level with lowland topography. The surface area of the village is 4.560 km^2 with 3.494,180 hectares of fields, 109,915 hectares of dry land, 24,34 hectares of housing and 0,16 hectares of traditional market. The average temperature of the village is 26 degrees Celsius with average rainfall 3,500mm every wet season (Data Monografi Desa Bongkasa, 2015:1).

10 Banjars in this village consist of Kedewatan, Tanggayuda, Sayan Agung, Sayan Tua, Pengembungan Sari, Teguan, Pengembungan, Kambang, and Karangdalem I. The population of Bongkasa Village is 6,089 inhabitants including 3.027 men and 3.062 women living in 1,578 households with 390 underprivileged households (Data Monografi Desa Bongkasa, 2015: 3). There are 1.889 people aged 18-40 in this village meanwhile there are 2.453 people who work. Most of the population in the village used to work as a farmer until tourism begin to contribute on economic development in Bali and impacted the livelihood of the people to work in tourism as it gives bigger salary. To financially fulfill their needs, most of the farmers and breeders living in this village take more than one job as handyman[1]. The biggest number of livelihood in this village is as private employee with 726 people and all of them are related in tourism industry and commute outside the village to work. Entrepreneurs in the village work in 20 home industries, 130 small shops and 6 street shops. The classification of population based on livelihood in Bongkasa Village is shown in table below.

Table 2.1

The Classification of Livelihood in Desa Bongkasa

Livelihood	**Number of People**
Civil Servant	78
Soldier	9
Private Employees	726
Entrepreneurs	250
Farmers	563
Handyman	698
Farmer labor	128
Scavenger	1
Total	**2.453**

Source: Data Monografi Desa Bongkasa Tahun 2015

By the end of 2015, there is 8 tons of rice produced in Bongkasa Village as the biggest agricultural product. There also 6 tons of fruits and 6,45 tons of other farm products produced. Since farmer terms of trade in agricultural product are decreased by 0,29% in Bali

[1] Interview with Mr. Nyoman one of the farmer on April 27th 2017

(BPS Provinsi Bali, 2016: 1), interest of people in Bongkasa Village in continuing their livelihood as farmer has been decreased. Meanwhile, local community of Bongkasa prepare their children to have proper job in tourism industry, one of the ways is by sending them to Maha Daksa Club volunteer English teaching program held by Green Lion Bali[2]. The detailed data of agricultural products is shown below.

Table 2.3

Agricultural products in Bongkasa Village

Products	**Number of Tons Produced**
Rice	8,00
Banana	2,00
Papaya	0,50
Mango	0,50
Durian	1,50
Cashew	0,50
Rambutan	0,50
Star fruit	0,50
Coconut	2,00
Coffee	0,45
Cocoa	0,50
Areca Nut	2,00
Vanilla	0,50
Total	**19.45**

Source: Data Monografi Desa Bongkasa Tahun 2015

Even though there are 2.453 people in the village who have a job, there are still 390 households categorized as underprivileged. Moreover, the awareness of having proper and higher education in Bongkasa Village is really low. This is proven by the data stated that primary school graduate is taking most numbers with 1.305 people in the village. There only 4 elementary schools and 1 junior high school as the education facilities provided in Bongkasa Village (Data Monografi Desa Bongkasa, 2015: 9). To pursue a high school or even university degree, people of the village must go out the village and study there. Since the income from being farmers and breeders is low, some of the people in the village sell their farmland to the investors to build hotels and they end up

[2] Interview with Ni Luh Sri Handayani as one of the student's parent on November 25th 2016

being handyman or sellers[3]. The classification of population based on educational level is shown in the table below.

Table 2.2

Education Level of Community in Bongkasa Village

Education	**Number of People**
Undergraduate	148
Academy	150
High School	1.040
Middle School	1.139
Primary	1.305
Preschool	126
Total	**3.908**

Source: Data Monografi Desa Bongkasa Tahun 2015

The approach to religion is strong in the village as the only religion people in Bongkasa Village follow and believe is Hinduism. There is nothing else but Hindu temple as a religious facility in Bongkasa. 42 Hindu temples are located in almost every corner of the village. There are also 8 Hinduism young groups with 950 members (Monografi Desa Bongkasa, 2015: 17). Moreover, Mr. I Gede Sugata as Vice Secretary of POKDARWIS[4] also claimed Bongkasa Village as a spiritual village that creates many *pemangku*[5] until today. They are also more likely to share the values of Hinduism to International Tourists.

As the number of *pemangku* created through the training grows, the village built a Hinduism pastor chaplain in master degree level with classic Javanese dialect, classic Balinese dialect, Mandarin, Sanskrit, and English as the subjects of the school. The reason why English is included as the subject is because they hope that after they have graduated and become pastors, they can spread the values of the beliefs internationally and for the well renowned of the village as a spiritual attraction in Bali for international tourists visiting Bali.

I Putu Sudiartana as member of local government parliamentary who is also part of Bongkasa Village showed his interests in the welfare of *pemangku*, not only in Bongkasa

[3] Interview with Mr. Yadnya Manuaba as Vice President of Widya Daksa Dharma Foundation on November 26th 2016

[4] Tourism Awareness Group

[5] The one who lead the pray in the temple

but also Abiansemal sub-district. He is currently striving to make sure 80 *pemangku* receive a proper health insurance and help them to pay the premise[6].

Parents also expect their children to adjust with the modern world but still understand Balinese values as a part of their culture with religious approach to fulfill demand of society. Being farmers and breeders that rooted from a long time ago have changed to the second job of most people in the village. Moreover, people in the village tend to pursue a job in tourism industry, as the salary offered is higher than the other opportunities available for them. To be able to get the job in tourism, many people are willing to move to Kuta or Seminyak[7]. Even worse, the people sell their land that used to be a farm and stock for foreign investors to build hotels and resorts. Recently, one of the citizens just sold 30 hectares of their pigs' farm to a foreign investor, as it seems being a pig breeder is no longer a promising occupation for them.

Apart from that, the village has a strong purpose of building tourism development in their village as one of spiritual attractions in Bali to spread Hinduism values to the world. One of their biggest achievements is producing 30 Hinduism *pemangku* coming from Japan. In the future, they are planning to invite more people from more countries to be *pemangku* and while they are back to their country, they can build Hinduism-based community.

Tourism in Bongkasa

There are 4 components to identify tourism attraction, which includes attractions, accessibilities, amenities, and ancillaries (Cooper, 1995:81).

a. Attractions

Attraction is defined as something that tourist can see, can do and can buy. By the result of observation, Bongkasa Village has one developed tourist's attraction that tourists can do such as Desa Rafting. Desa Rafting is a package of outdoor activity that includes rafting, rice fields trekking and cycling. Although it is located in Bongkasa Village, the owner is not originally from Bongkasa. Even though most of the tourists come for outdoor tourism activities are international tourists, most of them are coming from China and Japan. Desa Rafting is developed as it cooperated well with many Balinese travel agencies.

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6 *https://www.posbali.id/pemerintah-belum-maksimal-perhatikan-pemangku-adat-bali/* accessed on April 27th

7 Interview with Sukerni as store owner in Bongkasa on April 27th 2017

The other attraction in the village is a spiritual tourism activity. POKDARWIS[8] and Widya Daksa Dharma Foundation initiated the program to introduce Hinduism to International tourists who are interested to learn more about the religion. Until October 2016, there has been one group of tourists from Japan who participated in this program.

b. Accessibilities

Accessibility is defined as access available to reach the destination such as road, transportation, accommodation and water supply. As the result of observation, the road in the village is well conditioned. Buses fit to reach the village for Desa Rafting. There is no public transportation available to reach this village, but tourists who come usually provide their own transport such as bus or minivan. There used to be a hotel in the village, but after few years of operation, the hotel was financially unstable and bankrupted[9]. Until now, there is no longer any hotel available in the village, although the village is located 11km from Ubud where hotels and villas are available with variety of stars. For water supply in the village, there are 2 river dams, 500 meters irrigation pipe and 45 pieces of water tunnels (Data Monografi Desa Bongkasa, 2015: 12).

c. Amenities

Amenities define as the supporting facilities for tourists such as public toilets, signages and restaurants. Public toilets in the village are only available in a certain area like Desa Raftng that can only be used for tourists who booked the package or restaurants that are only available for visitors. Signage to reach the village both from Denpasar as the capital city of Bali and Ubud as the nearest tourist's area is available clearly in almost every corner of the road, and there are 3 restaurants available in the village (Data Monografi Desa Bongkasa, 2015: 12).

2.2.4 Ancillaries

Ancillaries define as stakeholders that support the development of tourism in a destination consists of tourist information, travel agent and organization. There is no tourist information desk available, but information could be found through travel website or interactive online travel forum like TripAdvisor. There is also no travel agent available, although Desa Rafting has cooperated with many travel agents to bring tourists.

[8] Tourism Awareness Group

[9] Interview with Sulendra as Village Secretary on April 26th 2016 10:00AM GMT+8

There is one organization in the village called Kelompok Sadar Wisata (Tourism Awareness Community) Bongkasa or people known as POKDARWIS. The organization responsible for making a strategic planning to the development of tourism in Bongkasa. Kelompok Sadar Wisata Bongkasa thinks that one of the problems to the development of tourism in Bongkasa is the ability of the people to communicate in English. They also think that English teaching program in school seems not to work efficiently. While demand of people in Bongkasa Village to work in tourism industry is getting higher due to the salary they will get and number of farmer terms of trade in agricultural product in Bali is decreasing, a foundation concerning in community development of Bongkasa Village initiated a program called Maha Daksa Club volunteer teaching program collaborated with Green Lion Bali. Kelompok Sadar Wisata Bongkasa has been legalized by the Government of Badung Regency in August 30th 2016 through *Surat Perbekel Bongkasa nomor 37 tahun 2016 tentang Pembentukan Kelompok Sadar Wisata Bongkasa Periode 2016-2020.*

Maha Daksa Club Volunteer Teaching Program

Mr. I Gede Made Swardana who was participant to become a *pemangku* in Ubud first initiated Maha Daksa Club volunteer teaching program. He heard news in Ubud that there is an organization that can help a community to learn English trough volunteer tourism teaching program. As he is also part of a Foundation named Widya Daksa Dharma, he later on announced to other member in a foundation and asked for collaboration with the organization. After two agreements both from Widya Daksa Dharma foundation and Green Lion Bali Organization, the program was held as a part of community development for children in the village[10]. Widya Daksa Dharma itself is a part of local government initiation of the village that aims to be the central of socio-cultural training with Hinduism values[11]. The activities of the foundation include the training for *pemangku* and English language for children.

The foundation subsidized all the facilities such as hall, chairs, tables and whiteboard to support the English learning program for children in the village. One of the reasons why the foundation considered to support and initiated the program is because POKDARWIS stated that this program could help tourism development in the village. The foundation also

[10] Interview with Mr. I Gede Sugata as the Vice President of Widya Daksa Dharma foundation on November 26th 2016

[11] Interview with Sulendra as Village Secretary on April 26th 2016

expects the children by having enough ability to communicate in English, so they can introduce Balinese culture to the world and what they believe in[12].

The reason why Widya Daksa Dharma decided to collaborate with Green Lion Bali is because The Green Lion Bali has developed an ever-expanding choice of programs in the fields of volunteer projects, culture and education for tourists to not only experience but also immerse themselves into local culture. Green Lion Bali also believe that these programs have enabled the company to continue to offer reliable, affordable and also increasing attractive activities to maintain its leading position in Asia. One of the programs is Bali Teaching Program that located in various places of Bali. Based on the topics that the volunteers teach through this program, there are 3 categories: English, Environment and Healthcare. Based on the places, the programs are divided into 2 categories: institutionalized and study clubs. Institutionalized includes primary schools and kindergarten while study clubs consists of students from more than one particular school. There are 7 Kindergartens and 6 Primary Schools The Green Lion Bali cooperated with.

Table 2.4

List of Schools cooperate with The Green Lion Ubud Bali

No	Name	Location	Type of School
1	Kemala Asri	Kelurahan Pejeng	Kindergarten
2	Sentana	Kuta Utara	Kindergarten
3	Catur Paramita	Gianyar	Kindergarten
4	Kedewatan	Ubud	Kindergarten
5	Ratna Kumara	Denpasar	Kindergarten
6	Belusung	Belusung	Kindergarten
7	Penestanan	Sayan	Kindergarten
8	SDN 1 Kelusa Payangan	Desa Payangan	Primary
9	SDN 2 Pejeng Kaja	Desa Tampaksiring	Primary
10	SDN 6 Blahbatuh	Gianyar	Primary
11	SDN 2 Buahan	Pajangan	Primary
12	SDN 2 Selat	Bangli	Primary

[12] Interview with Mr. Yadnya as Vice President of Widya Daksa Dharma Foundation on November 26th 2016

13	SDN 2 Pengiangan	Bangli	Primary

Source: The Green Lion Bali Management Office

The different between institutionalized and study clubs is mostly the initiation of the program. While the institutionalized initiated directly by The Green Lion Bali to come to schools and ask for cooperation, study clubs initiated directly from the local community. Local community contacting The Green Lion Bali to help by supplying the tutors and usually students participated in the program come from variety of schools. There are 2 study clubs Green Lion Bali has helped with.

Table 2.4

List of Study Club Cooperated with The Green Lion Bali

No	Name	Location
1	The Sunshine Club	Banjar Bayad, Tampaksiring Village
2	Maha Daksa Club	Banjar Pengembungan, Bongkasa Village

Source: The Green Lion Bali Management Office

Maha Daksa Club volunteer teaching program itself involved 40 students and divided into 2 different classes such as the senior class, which consists of 5th and 6th grades, and junior class, which consists of 2nd, 3rd and 4th grade. The students coming from 3 different schools consists of SDN 1 Bongkasa, SDN 2 Bongkasa and SDN Penarungan[13]. One of the problems throughout this program is the engagement with the children to keep attending to the class. Some of the students remain absent after second and third meeting of class.

Until recently, the program has happened four times. Most of the programs duration was at least two weeks, but in this period of time, Green Lion Bali only needs one-week program as the availability of the volunteers. Usually, the program is held during school's holiday. But on November 2016, they offered to do the program during the school's mid-exam. The English teaching program in Bongkasa Village happen during the weekdays from Monday to Friday started from 2 P.M to 5 P.M in the afternoon with 30 minutes break. In some cases where there is a traditional ceremony, the class is dismissed for one or couple of days.

[13] Volunteers' note

The number of volunteers is various. Minimum number of volunteer is two people and maximum of four people. There are four volunteers and one guide from Green Lion Bali who is involved in the program by the time the research was conducted. All of them are women coming from United States, Canada and Jordan. The volunteers need to be ready at least 1.30 P.M after lunch and a driver from Green Lion Bali will take them to the location from Ubud. The Green Lion Bali provides them buffet lunch in a canteen at 12 P.M. In the morning, the volunteers prepare materials and logistics needed for the program.

Impact

a. Social

Social is defined as relationship built between the organization and local community. Based on interview with one of member in Widya Daksa Dharma foundation, there is no memorandum of understanding sign between two parties. There is no clear statement in structural position where the foundation should be put in the program. Although Maha Daksa Club was initiated by the local community, but Widya Daksa Dharma still think memorandum of understanding is important to prevent any endangered impact between two parties.

b. Human

Human is defined as knowledge, skill or confident that built trough the program. Based on interview with the students' parents, their children received enough confident to talk to foreign tourists than they were before participating the program. Moreover, this program has built a good cross-cultural understanding for their children to see the world outside Bali without going abroad. These knowledge are believed to be part of their future plan in having proper job in tourism industry.

c. Physical

Physical impact is defined as goods and services deliver by the volunteers to the local community there. Based on interview with students' parents and volunteers, this program transferring knowledge that volunteers have to the children in the village. They themselves feel satisfied as the learning process is more enjoyable and fun rather than learning process the children get from school.

d. Culture

Culture is defined as sense of belonging that built between local community and volunteers. Based on observation, a strong sense of belonging is built trough this program between the children and volunteers. Moreover, some of children were crying due to the program has ended and the volunteers need to go back to their home country. Although, one interesting thing the author found while having the interview with the volunteers are the reason why the program was built in the first place. There is clear flow of communication about culture and situation of the community.

Conclusion

Maha Daksa volunteer tourism teaching program is a good activity to deliver knowledge as this program was built based on what the local community needs. Although the effectiveness of the program need to be reassessed. The volunteers stated that their way of teaching is a repetitive as it is hard for the children to understand and memorize the material taught each day. Other than that, a clear flow of communication between the Green Lion Bali as the volunteer provider, volunteers and local community is importantly needed to prevent future situation that might endangered the relationship and reputation of the organization.

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Women's Role in Rural Development

Ms. Archana Sharma
Director, BINDU

The Author, Ms. Archana Sharma, is serving in the capacity of Director at BINDU, a national NGO in India, and has been instrumental in building the capacity of many vulnerable women and grass-roots level CSOs in the span of past two decades of her professional life in South Asia.

Abstract

Women play crucial role in the local, national & global context and therefore women empowerment is vital not only for the advancement of agriculture and rural life; it is essential for the construction of a new social order. The paper is primarily based on real life field experiences, project based studies and some secondary sources. A careful situational analysis reveals that women, despite being marginalized by present-day socio-economic and development frameworks; represent the greatest source of untapped potential in the rural and global effort to eradicate poverty and advance collective prosperity in true sense.

Women's Role in Rural Development

"The soul of India lives in its villages"- M. K. Gandhi

Rural development is a continuous process of qualitative & quantitative changes and needs to be an integrated program where all aspects of rural life should be taken into account and the threads be woven together in the country's fabric to reflect its utmost significance in the growth of Indian economy. Rural development aims at improving people's livelihoods in an equitable and sustainable manner, both socially and environmentally, through better access to resources (natural, physical, human, technological and social capital), and services, and control over productive capital (in its financial or economic and political forms).

India, since independence in 1947, has witnessed many socio-demographical-political upheavals and internal problems. In 1947, 47% of India's population was below poverty line. Though, it has come a long way, 21.9% of India's population still lives below the national poverty line.[i] What seems to be even worse is the fact that a third of the global poor reside in India.[ii]

The critical role of women in advancing agricultural and rural development, and in ensuring food security, has been acknowledged universally. Though, in principle, by recognizing women's significant role in the rural and agricultural development and GDP growth; most countries have committed to providing women with equal access to productive resources and to markets— in practice, women keep on battling with low levels of income, sparse access to education and health services, limited job security as well as limited land and inheritance rights; particularly in rural areas. Often, women's contributions are relegated to the margins of policy development and budgetary considerations. In addition to the entrenched patterns of discrimination, unsustainable development practices, climate change, and violence against women intensify the burden placed on them and their families.

The Indian Scenario

In Indian context, the basic objectives of Rural Development Programmes developed by the government to alleviate poverty and unemployment are three pronged- i) creation of basic social and economic infrastructure, ii) provision of training to rural unemployed youth and iii) provision of employment opportunities to marginal farmers/labourers & unemployed youth to discourage seasonal and permanent migration to urban areas.

The Ministry of Rural Development[iii] in India is the apex body for formulating policies, regulations and acts pertaining to the development of the rural sector. Agriculture, handicrafts, fisheries, poultry, and diary are the primary contributors to the rural business and economy. The introduction of "Bharat Nirman", a project by the Government of India in collaboration with the State Governments , the "Panchayati Raj Institutions" (local units of self-governance) and The National Rural Employment Guarantee Act 2005 are major steps towards improving the living conditions in rural areas. The Ministry encourages voluntary action in the implementation of its projects for the enhancement of rural prosperity with a focus on injecting new technological inputs, acts as the national nodal point for co-ordination of all efforts at generation and dissemination of technologies relevant to rural development in its wide sense and promotes programmes aimed at conservation of the environment and natural resources.

However, the government fails to bridge the huge income disparity between the rich and the poor in rural India which continues to widen by the day. It is evident by the statistical analysis that vividly explains how and why the half of all rural households do not have any land holdings, 37% are marginal farmers, 7% are small farmers, 3% have small-to-medium sized farms, 2% have medium-sized farm holdings and only 0.1% have large cultivable land holdings.[iv]

The assumption that rural households are largely dependent on farm income doesn't hold true anymore. A little over a quarter of all the households in rural India depend on incomes from cultivation of land. An overwhelming majority of 43% earn their livelihood from non-farm activities. The remaining are dependent on a combination of farm and non-farm incomes. This indicates that agriculture-dependence has gone down drastically.

The fact remains that most central and state government subsidies are being directed towards large agricultural landowners that constitute a tiny percentage of the rural population and the food production has declined due to flawed agriculture policies. Subsidies, irrigation and investments have been directed at cash crops, leading to a decline in food production across states. As a result, small and marginal farmers, particularly women have had to rely on agricultural labour opportunities or have bailed out completely from the farm sector.

Some Areas of Concerns

Rural development is a process to increase the level of per capita income and enhance living standard of the rural population by taking into account factors like food security, nutrition level, health, education, housing, recreation and safety. The rural development is also seen in terms of the condition and percentage of the labor force in the agricultural sector. It is often argued that a program of rural development should go beyond agriculture to include the country's total economic development in rural areas as about 60-70 % of Indian population (directly or indirectly) depends upon Agriculture sector and currently it contributes to only 16–17% of the GDP. The low productivity in Indian agricultural sector and significant decline in the contribution of agriculture in total GDP over the years (50 % in 1951 to 16% of GDP today) are areas of concerns that need immediate attention.

A new United Nations Global Assessment Report on Disaster Risk, released in May 2017, says India's average annual economic loss due to disasters is estimated to be $9.8 billion. This includes more than $7 billion loss on account of floods. The global assessment report (GAR) 2015, produced by the UN Office for Disaster Risk Reduction (UNISDR), has urged countries, particularly in Asia, to treat this as a wake-up call and make adequate investment in disaster risk reduction (DRR) or it will hinder their development. In this context, recent floods in India and Sri Lanka in May 2017 can't be ignored as seasonal occurrences.

The rural areas in most parts of India exhibit wide spread poverty, malnutrition & poor health condition and ignorance as a result of varying degree of geographical, social and political isolation. This has led to the relegation of the rural areas to the background in the spatial economy of the country resulting in a huge rural-urban migration of able work force. This problem has been compounded by lack of vision & multi-pronged strategical interventions by the government and limited unattractive income generation opportunities available to youths in the Indian rural belt.

Globally, women's influence and contribution in the developmental process has become very significant; however while Indian women contribute significantly to the educational, social, political and fiscal spheres in the rural India; they still have to struggle to get a foothold in the mainstream development process and need validation. In over all farm production, women's average contribution is estimated at 55% to 66% of the total labour with percentages, much higher in certain regions. In the Indian Himalayas a pair of bullocks works 1064 hours, a man 1212 hours and a woman 3485 hours in a year on a one hectare farm, a figure that illustrates women's significant contribution to agricultural production. (Shiva FAO, 1991). Therefore, BINDU has stategically planned and adopted a few villages to promote women empowerment viz -a viz rural development and has integrated multiple dimensions of women in the rural development process; and plans to emphasize their significant role in the rural development at international forums and in a fully fledged research study and advocacy plan.

Recommendations

Indian agriculture largely depends on traditional farming leading to low per capita productivity, therefore, farmer's income needs to be boosted by immediate technological upgradation .

The percentage of Indian women dependent on agriculture for their livelihood is as high as 84%. These women have no land rights and are engaged in less skilled jobs, such as sowing, transplanting, weeding and harvesting and therefore skilling these women may help in increasing their productivity .

India has one of the world's highest food spoilage rates because it badly lacks cold storage facility, food packaging mechanisms ,efficient rural transport system and almost nonexistent effective retail channel structure at Rural level. The food travels to the Indian consumer through a slow and inefficient chain of traders and therefore infrastructural investments are highly recommended. In this context railroading and farming enjoyed by US companies—well before globalization; is yet another phenomenon required to radically change the Indian transportation, agricultural and rural landscape.

Inadequate irrigation systems, regional floods/draughts, poor seed quality and inefficient farming practices lead to frequent crop failures and need policy interventions and immediate attention from the government.

Unlike the farmers in developed economies who receive 65% to 85% of the price paid by the consumers; the Indian farmers receive just 10% to 20% and the difference goes to losses, inefficiencies and the middlemen and require direct intervention from the government.

The average size of land holdings is very small (less than 2 hectares) and it is often over-manned, resulting in disguised unemployment and low productivity of labour and therefore land pooling , land development and land reforms are recommended. In this direction current AAP Government in Delhi engaged in land pooling covering 89 villages for proposed DDA group housing plans in Delhi/NCR is ironically an example of land pooling for non-agricultural purpose.

Rural women are key agents for achieving the transformational economic, environmental and social changes required for sustainable development. But limited access to credit, health care and education are among the many challenges they face, which are further aggravated by the

global food and economic crises and climate change. Empowering them is key not only to the well-being of individuals, families and rural communities, but also to overall economic productivity, given women's large presence in the agricultural workforce worldwide.[v]

Though, the current Modi Government has initiated a few praiseworthy programs for the rural population like, "Jan- Dhan-Yojana" (banking for all) , have covered lakhs of farmers under " Pradhan Mantri Fasal Beema Yojana" (Crop Insurance scheme), Soil Health Card Scheme, National Food Security Mission (NFSM) and the likes; much is yet to be achieved alongwith sound government policies and strong will for the rural women to play the role of key agents for achieving the transformational economic, environmental and social changes required as part of the UN new sustainable development agenda to end poverty**,** protect the planet**,** and ensure prosperity for all over the next 15 years.

Government of India and state governments financial outlays, reforms, financial projections and operations indicate lack of coordination and lack of common vision and will that have little use on the ground levels. The arbitrary rules framed by different arms and departments of government, in fact, prevent any real women empowerment and rural development to take place. women empowerment is an all encompassing expression and the only answer to comprehend rural development completely .

A preliminary estimate by the Central Statistical Organization (CSO) of registered Non Profit Institutions (NPIs) put the number of such players at around 4 million in India. It is proposed to Government of India to give NGOs its due recognition as a separate sector and lower the financial threshold while inviting tenders & awarding contracts to facilitate implementation of women empowerment programs and pro -poor policies of government and international development agencies at grassroots levels. For instance ; National Skill Development Council (NSDC)[vi] that claims to transform the skilling landscape of India seems to be leaning towards for profit making corporate; as in its current avatar even the well established NGOs are unable to match the positive net-worth and the financial viability standards set up for them to implement the project aimed at Skill Development. NGOs play pivotal role in empowering women and significantly contribute towards the rural development and should be further strengthened as instruments of delivery mechanisms to reach out the unreached rural population; the real targeted beneficiaries through rural development initiatives in Indian context.

The most comprehensive perception of development is one that conceives a multi-dimensional process involving changes in structures, altitudes and institutions, as well as the acceleration of economic growth, the reduction of gender inequality and eradication of absolute poverty. The policy makers must strengthen NGOs that implement the policies at the grass-roots level, foster development, and induce desirable revolution in the economic structure well tuned to the diversity of socio-cultural settings and basic needs and collective aspirations of women and rural population within the system of the nation.

There is a need of planned interventions at the grass- roots levels aimed at improving socio-economic condition of women. The credit based income generation program is one such leading mechanism of planned intervention for poverty alleviation. Bangladesh is an example where NGOs are increasingly adopting the practice of microcredit to poor women to improve their livelihood and socio-economic conditions and the practice may be replicated in most of the developing nations.

Women are the backbone of the development of rural and national economies. They comprise 43% of the world's agricultural labor force, which rises to 70% in some countries. In Africa, 80% of the agricultural production comes from small farmers, who are mostly rural women. Women comprise the largest percentage of the workforce in the agricultural sector, but do not have access and control over all land and productive resources.[vii] Often working longer hours than men, rural women are also the caregivers who look after children, the elderly, and the sick. In addition, many rural women are small business entrepreneurs and investors who dedicate most of their earnings to the well-being of their families and societies. in this regard UN Women's Fund for Gender Equality's "Dalit Women's Livelihoods Accountability Initiative" need to be appreciated that has helped marginalized Indian women engage in the Government of India initiative "Mahatma Gandhi National Rural Employment Guarantee Scheme". The participation of these marginalized women by Indian cast system grew from 2,800 to more than 14,000 between 2009 - 2011in eight districts. Now, many Dalit women have bank accounts in their names and are unionized to defend their rights.[viii]

It is important to Skill Women Workers under Skill India Initiative and solicit their proactive participation in rural development to make the plans participatory. The way forward for state and central governments is to focus on issues pertaining to small and marginal farmers, women workforce and create a healthy rural economy that offers opportunities in agriculture and non-agriculture sectors while enhancing skill-sets of people employed in both.

The major concerns- low productivity of agriculture in ratio to its population and the improper utilization of human resource can be efficiently addressed by encouraging more skilled women's participation in rural economy as one of the foremost pre-requisites of development process both from procedural and philosophical perspectives.

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