



International Journal of Social Sciences and Management

A Rapid Publishing Journal

ISSN 2091-2986



Available online at:

<http://www.ijssm.org>

&

<http://www.nepjol.info/index.php/IJSSM/index>

Vol-1(4) October, 2014



SEM-Biotech
Publishing

Impact factor*: 3.389

*Impact factor is issued by SJIF INNO SPACE. Kindly note that this is not the IF of Journal Citation Report (JCR).

Published by: SEM-Biotech Publishing



Research Article

IMPACT OF SUSTAINABLE SOIL MANAGEMENT PRACTICES ON HOUSEHOLD FOOD SECURITY IN RAMECHHAP DISTRICT, NEPAL

Bikal Koirala¹, Jay Prakash Dutta², Shiva Chandra Dhakal³ and Krishna Kumar Pant⁴

Institute of Agriculture and Animal Sciences, Rampur, Chitwan, Nepal

Corresponding author email: bikal.koirala@gmail.com

Abstract

This research was conducted in the month of June (2012) at Chisapani, Nagdaha and Kathjor VDCs of Ramechhap district of Nepal to analyze the impact of sustainable soil management practices on household food security. Pre-tested semi structured interview schedule were used to collect the primary data from 120 farmers, 40 farmers from each VDC by applying simple random sampling technique. It was found that before adopting sustainable soil management practices the food sufficiency from own production was 3.98 months and after the adoption the food sufficiency months was 7.67 and farmers perceived that there is increased access to food. Similarly, the income and expenditure on food consumption before the adoption of practices were Rs. 25758.33 and Rs. 12133.33 respectively and after the adoption of practices were Rs. 51675 and Rs. 7175 respectively. Farmers expressed that increase in production and productivity was major reason in adopting sustainable soil management practices. The increase in the production and productivity was the main reason for contributing towards household food security. Lack of irrigation facilities was major problem in adopting the sustainable soil management practices. The study revealed that sustainable soil management practices had significant impact on food sufficiency, income and production of different crops which ultimately results to improvement in food security in the study area than before. Finally, this study concludes that the sustainable soil management practices had high contribution to household food security.

Key words: Sustainable soil management; food security; income; adoption; food sufficiency

Introduction

Nepal is a small landlocked and developing country with total area of 1,47,181 sq km. Out of total area the total cultivated land is 30,91,000 ha and uncultivated cultivable land is 10,30,000 ha (CBS, 2007). Nepal ranks 79th position out of 105 countries scoring 35.2, in the global food security index in 2012 and the lowest rank in the South Asian region (The Himalayan Times, 2012). Majority of people are engaged in agriculture and are poor having income less than one dollar per day. They have food insufficiency from own production and are vulnerable to food insecurity condition. In fact about 61 percent of the farmers are not able to meet their own food needs (CBS, 2011). Food security is assured physical and economic access to at least a minimum package of food for all, existing & to be borne, a state of health which ensures efficient physical utilization of consumed food for productive life (Joshi, 2008). About 25 percent people in about 38 districts of Nepal suffer from hunger (WFP, 2009). Many organizations either governmental or non-governmental are not focusing to solve the problem of continuous food insufficiency condition in many parts of the country especially the hilly

and himalayan regions of country. The supply of chemical fertilizer from Agricultural Input Company Limited rises to 10328.83 Metric ton in year 2009/10 as compared to 7133 metric ton in year 2008/09 and 142 metric ton of chemical pesticide in year 2011/12. The quantity was increase very highly in year 2010/11 which reached to 110013 metric ton (MoAD, 2012). This reflects the excessive use of fertilizer and its bad impact on soil health. There is poor management (fertilizer, pesticides, irrigation etc) of soil as per its requirements which seriously have shown the problem of sustainability and food security. The haphazard use of chemical fertilizer and pesticide had resulted in unsustainability of soil and had toxic effect to human beings and animals. Nevertheless large amount of money is being spent on purchasing chemical fertilizers and pesticides from other countries. In this condition there is need of ecologically, socially and economically compatible and sustainable technologies at the hands of rural people for dealing with problem of food security. The different technologies of sustainable soil management practices includes are improved farm yard manure, use of cattle urine,

inclusion of leguminous crops and vegetables in cropping system and use of bio pesticide.

Materials and Methods

Study area and sample size

Three VDCs of Ramechhap district namely Chisapani, Nagdaha and Kathjor were purposively selected to study the impact of SSM practices. Altogether 120 farmers adopting sustainable soil management practices were taken, 40 from each VDC using simple random sampling technique. The field survey was conducted in June, 2012. A co-ordination schema was developed and semi-structured interview schedule was prepared containing both closed and open-ended questions. Observations in the farmer's field were done, focus group discussion was conducted and key informant survey was carried out. The final analysis was done by using computer software Statistical Package for Social Sciences (SPSS), Microsoft Excel and STATA.

Socio demographic and Economic Variable

These variables include (family, occupation, education level, size of holdings, food sufficiency period etc), we analyzed by using descriptive statistical tools such as frequencies, percentage, mean, mode and standard deviations as per the need.

Methodological approach of impact evaluation

Before after approach was used for the impact study of the SSM practice. For the impact assessment pair t test was used to test the impact of SSM practices on food sufficiency from own farm production, income and food expenditure.

Indexing:

Indexing method is used to calculate food sufficiency index, index for coping strategies method, problems and reasons associated on using sustainable soil management practices. For food sufficiency the household under study were categorized into four categories. Similarly, coping strategies method for future food security, reason for and problems associated in adopting SSM practices were judged by using five point scale.

$$I = \sum (S_i f_i / N)$$

where, I = Index value for food sufficiency, coping strategies method, reasons for and problems associated on using sustainable soil management practices

\sum = Summation

S_i = Scale value

f_i = Frequency given by the respondents

N = Total numbers of respondents

Results and Discussion

Impact of sustainable soil management practices on food sufficiency

Before the adoption, the mean food sufficient months from own production was 3.97 and after the adoption food

sufficient months had increased and it was 7.66 which were statistically significant at 1% level of significance as shown in Table 1. Food sufficiency level increased due to increase in production and area of different crops.

Rana *et al.* (1999) reported that numerous exercises on the field relating to the wealth ranking in different communities of Nepal that is in terai, hilly and mountainous regions of Nepal have indicated that food sufficiency months based on production from own land was the true reflection of wellbeing in marginal and agrarian society (which ultimately reflects to food security).

Table 1: Impact of sustainable soil management practices on food sufficiency from own production in the study area (2012)

				t value
Food sufficient practices(months)	before	SSM	3.98	24.75***
Food sufficient practices(months)	after	SSM	7.667	
Mean differences			3.69	
Significance of mean difference			0.000	
				df=119

t-value obtained from paired t-test are significant different at 1% level of significance (***)

Implications on food security dimensions

It was found that adoption of sustainable soil management practices had affected different dimensions of food security. Respondents were asked about important dimensions of food security affected by adopting sustainable soil management practices. Majority of respondents perceived food availability, food accessibility, food stability and food use were important dimensions affected by sustainable soil management system. There was high availability, accessibility, and increase in food use and stability system in the study area. The implication in food security dimensions was shown in Table 2.

Technique adopted by farmers

For the purpose of determining the techniques adopted by farmers focus group discussion was done. Mainly, five types of techniques were found that were used by farmers. They were improved farm yard manure, improved cattle urine, inclusion of vegetable in cropping system, inclusion of legume in cropping system use of bio pesticide. During primary data collection it was found that one farmer had adopted one or more practices. Improved farm yard manure and improved cattle urine technique has resulted the less nitrogen loss. Similarly, inclusion of legume had helped in the reduced dose of nitrogen fertilizer to the soil due to the storage of nitrogen in the soil by the nitrogen fixing bacteria. Use of the bio pesticide had used in order to make the food organic. It was shown in Fig. 1.

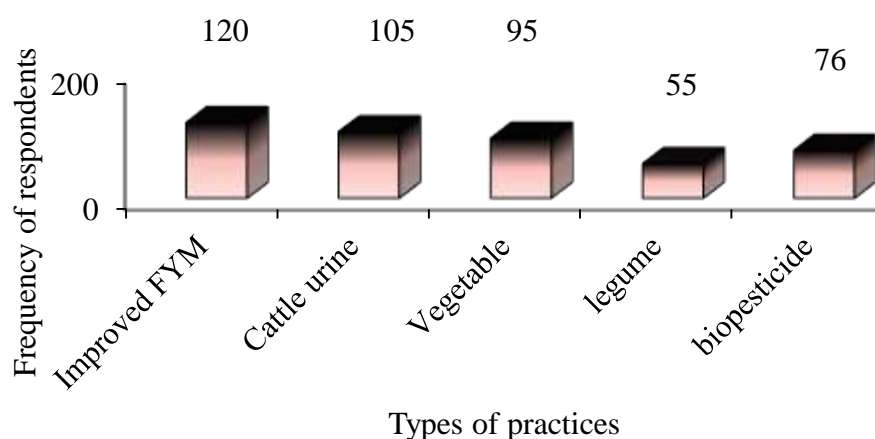


Fig. 1: Frequency of different SSM techniques of used by farmers in study area (2012).

Table 2: Perception of farmers on food security dimensions in the study area (2012)

Food security dimensions	Respondents %		
	Increased	No change	Decreased
Food availability	75(62.5)	36(30.00)	9(7.5)
Food use	80(66.67)	36(30.00)	4(3.33)
Food stability	69(57.50)	40(33.33)	11(9.17)
Food accessibility	65(54.17)	52(43.33)	3(2.5)

Figures in the parentheses indicates percentage

Impact of Sustainable soil management practices on income and expenditure on food consumption

The Table 3 shows that before the adoption of practices the mean income and expenditure was Rs. 25758.33 and Rs 12133.33 respectively. However after the adoption of practices the mean income and expenditure was Rs. 51675 and Rs. 7175 respectively which were significant at 1% level. It was shown in Table 3. Bhusal (2012) also reported that use of the improved cattle urine use technology (one of the sustainable soil management practices) income increased by 169.08% after the adoption of practices as compared to before the adoption of practices.

Table 3: Impact of Sustainable soil management practices on income and expenditure on food consumption in the study area (2012)

	Before	After	Difference	t-value	Sig.
Income (Rs)	25758.33	51675	25917	18.9857***	0.000
Expenditure (Rs)	12133.33	7175	-4958.33	-24.71***	0.000

t-value obtained from paired t-test are significant different at 1% level of significance (***)

Perception of respondents to sustainable soil management practices

The Fig. 2 illustrates that the perception of respondents to the sustainable soil management practices. It shows that 67 respondents (55.83%) are very satisfied with the practice. Similarly, 44 respondents (36.67%), 6 respondents (5%) and 3 respondents (2.5%) are dissatisfied with sustainable soil management practices respectively. The reason for high level of satisfaction is due to increase in income and increase in food sufficiency months from own production.

Problems in adopting sustainable soil management practices

Farmers were asked about the problems in using SSM practices. The detail of problems with their index value is given in following Table 4. Lack of irrigation was the major most important constraint. Provision of well irrigation might have increased their production than present. Lack of training facilities was the second important problems followed by problem of marketing to fetch higher prices, inadequate knowledge to farmers and lack of infrastructure facilities were third, fourth and fifth important problems respectively.

Table 4: Problems in adopting sustainable soil management practices in study area (2012)

Problems	Index value	Rank
Lack of irrigation	0.87	I
Lack of training facilities	0.79	II
Problem in marketing to fetch higher prices	0.62	III
Inadequate knowledge to farmers (difficult to practice)	0.42	IV
Lack of infrastructure facilities	0.3	V

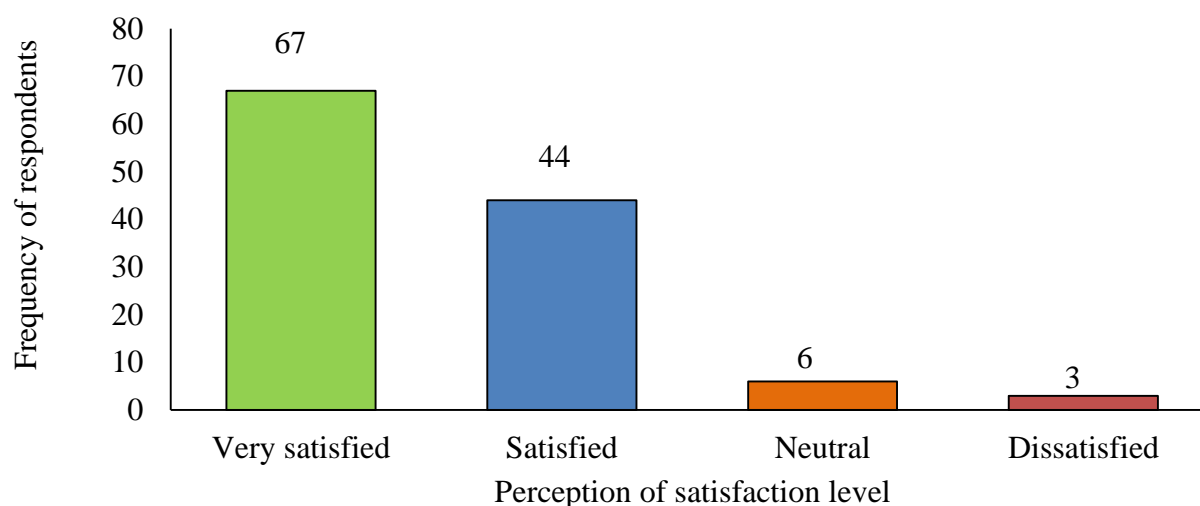


Fig. 2: Perception of respondents to sustainable soil management practices

Reasons for adopting sustainable soil management practices

Farmers were also asked about the reasons for using SSM practices. The detail of reasons with their index values were given in the Table 5. They rank increase in productivity as the foremost reason for using it. Due to increase in productivity and production, the food sufficiency months from was increased. Decrease in production cost, improvement in soil fertility, awareness from SSMP and low incidence of insect pest and diseases were the second, third, fourth and fifth important reasons in adopting sustainable soil management practices.

Table 5: Reasons in adopting sustainable soil management practices in study area (2012)

Perceptions	Index value	Rank
Increase in productivity and production	0.86	I
Decrease in production cost	0.74	II
Improvement in soil fertility	0.58	III
Awareness from SSMP	0.46	IV
Low incidence of insect pest and disease	0.36	V

Conclusion

Agriculture is the major occupation in Ramechhap district composed mainly of rainfed farming. Agriculture in this district is characterized by subsistence farming where maize, wheat, rice, finger millet and vegetables are grown. Farm households conditions were worst in food security condition from own production before the initiation of sustainable soil management practices but after the condition the condition is improving. Majority of the farmers expressed that there is significant impact on food sufficiency from own production, expenditure on food consumption, income and production of different crops. Before the adoption of practices the use of fertilizers and pesticides had adverse affect on soil resulting on different

soil health problems. But now different sustainable soil management practices initiated by Sustainable Soil Management Program are adopted by farmers and have reduce the amount of fertilizer and pesticides that they use before and this had resulted in improvement of soil health conditions. These practices are easily available in local conditions, cost effective and maintain soil health and fertility and can play as substituent for fertilizer and pesticides. Realizing the potential and significance of the sustainable soil management practices and its contribution to household food security, it is necessary to promote these practices in different parts of the country.

Acknowledgements

I am thankful to Dean, IAAS; Academic Dean, IAAS; Advisory committee, Department of Agricultural Economics, SSMP, Colleagues, seniors, juniors, respondents of Ramechhap for valuable and genuine information and my family.

References

- Bhusal DR (2012) Impact of cattle urine use technology on farm income of the vegetable growers of Dhading district, Nepal. Thesis submitted to Tribhuvan University, Nepal. 37p.
- CBS (2007) Statistical pocket of Nepal. Central Bureau of Statistics, National Planning Commission Secretariat. Thapathali, Kathmandu, Nepal.
- CBS (2011) Population census. Central Bureau of Statistics. Kathmandu, Nepal.
- Joshi GR (2008) Status of food security rights and food security in Nepal. Agriculture development journal 5: 123-127.
- MoAD (2012) Statistical information on Nepalese Agriculture. Ministry of Agriculture Development, Singh Durbar, Kathmandu, Nepal.
- Rana RB, Chaudhari P, Gauchan D, Khatiwada SP, Sthapit BR, Subedi A, Upadhaya MP and Jarvis DI (1999) In Situ Crop

Conservation: Findings of agro-ecological crop diversity and socio-economic baseline survey of Kacharwa eco-site, Bara, Nepal. In: NP working

The Himalayan Times (2012) Food security rank of Nepal. Available on www.thehimalayantimes.com. Retrieved on 18th December, 2012.

WFP (2009) The cost of coping: A collision of crises and the impact of sustained food security deterioration in Nepal. United Nations World Food Programme, Nepal Food Security Monitoring System. Kathmandu, Nepal