



## Organic Farming: Opportunities and Challenges in Sundarbazar, Lamjung, Nepal

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### Abstract

Organic farming is growing concern to Nepalese societies, however there were limited studies regarding this in Nepal. Thus, this research was objectively conducted to assess organic farming practice and employment opportunities, compare the income generated from organic and inorganic products and identify problems faced by farmers. Sundarbazar of Lamjung district Nepal was selected as study site. Total 50 farmers were selected for questionnaire survey, 30 key informants interview were conducted and market survey and observation were employed in April and May, 2019 and collected data were analyzed. Results showed that, total 137 and 99 employments were created through organic farming and inorganic farming respectively. Statistically t-test and Levene's test did not show significance difference in employment generation by organic and inorganic farmers at 95% confidence level. However, one-way ANOVA and Tukey's b tests showed that there was significance difference in employment generation from organic farming among rich, medium and poor farmers. Farmers were used extracts of *Allium sativum* (Garlic) and *Azadirachtaindica* (Neem) and ash to control pests in organic farming. The highest difference was US \$ 0.18 recorded price of cucumber produced by organic and inorganic farmers. Interestingly, it was quite higher earnings of farmers applying organic farming than inorganic farming. Specifically, rich farmers applying organic and inorganic farming were earning annually US\$ 8677.54 and 2603.26 respectively. Principle component analysis showed that low production in initial year was the highest challenging issues for farmer to continue the practice of organic farming but low irrigation facility was of inorganic farming.

### Keywords:

Organic Farming, Inorganic, Chemicals, Compost

### 1. Introduction

The soil, water and air are the main component to live on the earth. Healthy soil, fresh water and clean water assure to live long and organic farming is associated with to keep the balance in environment (Olajire, 2020, Commoner, 2020). Organic agriculture works in harmony with nature and environment rather than against it (Ramesh et al., 2010). Agriculture has been practiced in the world for more than 10,000 years (Bellwood, 2005) and it was complete natural and organic. This principle is again gaining the opportunity in the globe to keep healthy environment for healthy lives (Ghimire, 2002; Sanders, 2006; Willer&Lernoud, 2018). Moreover, it helps to preserve the seed and other material and maintain the

environment balanced for the next generation (Barrett et al., 2002; Shukla et al., 2013; Bahrami Nokandeh and Mahmoodi Karamjavan, 2018; Rasouliazar et al, 2015; Noorivandi, 2012). On the other hand, synthetic fertilizer, chemical pesticides and insecticides became popular because it helps to increase high yield to fulfill the demand of increasing population. German scientist Fritz Haber coined the synthetic fertilizer in 1909 as new revolution in agriculture make the life easy yield more. The fertilizer factories have been extended all over the world without caring its long-term and continuous severe effect on life and ecosystem (Hsieh, 2005). Excessive use of chemical fertilizers, chemical pesticides and insecticides has hazardous effects on soil, health of living beings and environment as well.

In addition, it has severe effect on natural cycles and ecosystems (Sanders, 2006, Shukla et al, 2013). However, the inorganic farming has huge market and organic farming is peaking speed to replace.

In 2016, the American studies had reported existence of 14,000 certified organic farmers with their cumulative income reaching approximately to US\$ 7.6 billion. Moreover, the farmers in Denmark have also been expanding organic farming with the annual turnover of nearly 40 billion Euros. Around 4.9 million ha of agricultural land is organic in Asia and China is the leading country with 2.3 million ha (Willer & Lernoud, 2018). Indian farmers are found to be meeting about 30% the global demand of the organic farm products and are now spread over roughly 1.5 million ha (Pandey & Singh, 2012).

It is satisfactory start of organic farming practice in Nepal too it is expanded (Ghimire, 2002) in over 33 districts including Lamjung district. More, specific the products like yellow and red rice from Humla, Black lentil from Rasuwa, Jumli Marcy rice from Jumla are some of the popular organic products which have found markets in countries like Britain, Qatar etc. (Shrestha, 2013; Shrestha, 2015; Bhatta et al., 2015). The markets for green organic vegetables are growing within Nepal as well (Bhatta & Doppler 2010). Sundarbazar of Lamjung district is also one of the prominent villages where farmers have been practicing organic farming. The farmers, here, are found to be earning happily and easily from the organic farming practice. However, the research related to organic farming is gap. Thus, this study was carried out to assess employment opportunities and income generated from the organic farming in Sundarbazar, and compares these with the inorganic farming practices.

## 2. Materials and methods

**2.1 Study area:** The study area is located in Lamjung district, a part of Gandaki Pradesh. Sundarbazar is a municipality in Lamjung District in the Gandaki state of northern-central Nepal. The location of Sundarbazar is 28.1448° N and 84.4120° E. As of 2011 Nepal census, it had 11,769 male population and 15,095 female population living in 7,199 households. The maximum temperatures is around 35.1 °C in June while it, at around. January has the lowest average temperature of the year, it is 14.5°C. The rainfall is approximately 900 mm and the most rainfall occurs in July.

**2.2 Primary data collection:** Primary data was collected applying stratified random sampling. The population was stratified according to their well-being ranking i.e. rich, medium and poor. Then the lists of farmers practicing organic farming and not practicing organic farming were prepared. Those

farmers practicing organic farming and not practicing organic farming were stratified into three main categories rich, medium and poor based on their socio-economic conditions. The stratification criteria were total land, job, annual income, educations, house, number of cattle etc. Total 50 farmers were selected to collect primary data whereas, each 25 were farmers practicing organic farming and 25 were farmers practicing inorganic farming.

**2.2.1 Questionnaire survey:** Total 50 semi structure questionnaire were prepared to ask among the local people. The lists of questions were prepared regarding the perception of both selected organic and inorganic farmers on their choice of farming. Questions related to the employment opportunities generated by organic and inorganic farming and the income given by selling both organic and inorganic products were also included in the questionnaire. The farmers were interviewed by visiting their home and farms.

**2.2.2 Direct observation:** The observation was done to assure of the information given by the respondents. It was done to see the condition of the farm and the crop and vegetables varieties farmers grow. Application of bio-fertilizers or any other types of pesticides were also observed. The observation was also done to collect the information about the market condition of both organic and inorganic products. The observation was done for 10 days and the check list was prepared before going to field.

**2.2.3 Key informant interview:** The key informants were the expert or leader or a progressive farmer of the village. Key informants were asked a series of questions about the current situation of organic farming through face to face interview and in a place where we could not meet the key informant were interviewed through phone or email. It was conducted to collect information about the quantity sale by farmers, income generated by the organic farming and the difficulties they face during organic farming. With motto to obtain more information, total 30 key informant were interviewed during data collection. Open-ended questions were asked to the farmers in formal way.

**2.2.4 Market survey:** Surveys of markets were also done for primary data collection where the shopkeepers and consumers were asked various questions regarding the price of both organic and inorganic vegetables. The shopkeepers of the market were also interviewed to know about the price of both organic and inorganic products. The buyers coming to the market were also interviewed about their perception on organic products and its price. The visit was done in April and May, 2019.

**2.3 Secondary data collection:** The data was collected from various sources such as reports,

articles, books, etc. Some unpublished literatures were also reviewed in order to add further more information. The documents or reports were also reviewed from different institutions.

**2.4 Data analysis:** The collected data were analyzed applying the descriptive analysis. The inferential statistics analysis such as t-test and Levene's test, One-way ANOVA and Tukey's b test were applied to compare the employment generation, principle component analysis was done to find the most influencing challenge.

### 3. Results and discussion

#### 3.1 Vegetable products by farmers practicing organic and inorganic farming

Farmers at Sundar Bazar area were growing mainly 12 types of vegetables. These are Cauliflower (*Brassica oleracea*L.var.botrytis L.), Tomato (*Lycopersianesculentum*), Cabbage (*Brassica oleracea*L.var.capitata L), Lady finger (*Abelmoschusesculentus*), Spinach (*Spinaciaoleracea*), Garlic (*Allium sativum*), Broccoli (*Brassica leraceavar.italica*), Cucumber (*Cucuminsativus*), Coriander (*Coriandrumsativum*), Radish (*Raphanussativus*), Chilly (*Capsicum annum*) and Beans (*Phaseolus vulgaris*) were the major vegetables (Figure 1).



Figure 1. Vegetable farming at farmers' field

#### 3.2 Employment opportunities generated by organic and inorganic farming system

The employment in organic and inorganic farming varied according to rich, medium and poor farmers. Total 137 employments were created by different categories of farming through organic farming. Out of this, the employment generation was 11 by the poor, 25 by the medium and 101 by the rich. While, through inorganic farming the total of 99 employments were created by different farming categories. Out of which, the employment generation was 9 by the poor, 24 by the medium and 66 by the rich. In both farming system, it was noted that the planting and harvesting process provided more employment than other processes i.e. 28 by organic farming and 18 by inorganic farming in planting and 32 by organic farming and 21 by inorganic farming in

harvesting. The less employment created was noted during the selling of products; 9 in organic farming and 8 in inorganic farming (Table 1).

The t-test and Levene's test were applied to examine whether, there was significance difference between employments generated through organic and inorganic farming practice. Both tests did not perform the significance difference at 95% confidence level since p values were greater than 0.05. However, one-way ANOVA showed that there was significance difference in employment generated through organic farming among rich, medium and poor farmers since p-value was less than 0.05 and Tukey's b test showed that, employment generated through rich farmers was significantly differed from medium and poor farmers. Similar result was shown in case of employment through inorganic farming practice.

#### 3.3 Manures/fertilizers and pest management

Most of the farmers were keeping their own livestock. They had own cows, goats or chicken so they prepared the compost from the dung and crop residues. These farmers were applying the compost in their field. On the other hand some farmers were using chemical fertilizers. In addition, farmers practicing the organic farming used the bio pesticides that were self-prepared to manage the pests and diseases, those were extracts from *Allium sativum* (Garlic) and *Azadirachta indica* (Neem). They also used ash for pest control measures. Hand picking measures were also used to remove harmful plants and weed (Table 2).

#### 3.4 Income generation from vegetable products

Generally, yields from organic farming practice are significantly lower than from inorganic farming practice. The harmful external inputs that the farmers use in inorganic farming system produced greater yields but resulting environmental and health impact. Since people are less aware about organic and inorganic products, the price difference is low. The highest price difference was noted for cucumber i.e. US \$ 0.18, while the price difference for organic cauliflower and tomato to inorganic products were same i.e. \$0.09 and organic and inorganic lady fingers difference was \$ 0.08 (Table 3).

There were differences in earning of farmers practicing organic and inorganic farming. It showed quite higher earnings from organic practice than the inorganic farming. Specifically, rich farmers practicing organic farming were earning US\$ 8677.54 in a year while rich farmers practicing inorganic farming were earning US\$ 2603.26. Similarly, medium farmers practicing organic

farming and inorganic farming were earning US\$ 3123.92 and US\$ 1561.96 respectively (Table 4).

### 3.5 Challenges faced by organic and inorganic farmers

Several challenges were noted of farmers practicing the organic as well as inorganic farming. Low quality seed (LOS), lack of organic fertilizer or fertilizer (LOF), low production in initial year (LPr), lack of government support (LGS), low irrigation

facility (LI), price difference (PD) and past effect of fertilizers and medicines (PEFM) were noted as the main challenges. The principle component analysis showed that low production in initial year was the notable highest challenges of farmer to continue the practice of organic farming. Similarly, low irrigation facility was the major problem of inorganic farming (Figure 2).

Table 1. Employment generated by both farming system

Activities	Organic farming			Inorganic farming		
	Poor	Medium	Rich	Poor	Medium	Rich
Ploughing	1	3	10	1	2	8
Farm preparation	1	4	15	1	4	10
Planting	2	6	20	2	4	12
Watering	2	2	10	1	3	8
Weeding	2	3	15	1	3	10
Harvesting	2	5	25	2	4	15
Selling	1	2	6	1	4	3

Table 2. Pest management done by both farms

Detail	Organic farm	Inorganic farm
Fertilizers	Cow, buffalo and goat manure & compost	Urea & Potash
Insecticide & pesticide	Cow urine, Neem, garlic extract, Ash, hand picking	Chemical pesticides

Table 3. Price of organic and inorganic products

Vegetables	Organic products (US \$)	Inorganic products (US \$)	Difference (US\$)	Difference (%)
Cauliflower	0.87	0.78	0.09	10.34
Tomato	0.78	0.69	0.09	10.34%
Cabbage	0.43	0.43	0	0%
Lady finger	0.69	0.61	0.08	11.59%
Spinach	0.09	0.09	0	0%
Garlic	1.30	1.30	0	0%
Broccoli	0.69	0.65	0.04	5.8%
Cucumber	0.87	0.69	0.18	20.69%
Coriander	0.09	0.09	0	0%
Radish	0.43	0.43	0	0%

Table 4. Income generated by organic and inorganic farmers in a year

Farmers	Organic farming US \$	Inorganic farming US \$
Poor	650.82	433.88
Medium	3123.92	1561.96
Rich	8677.54	2603.26

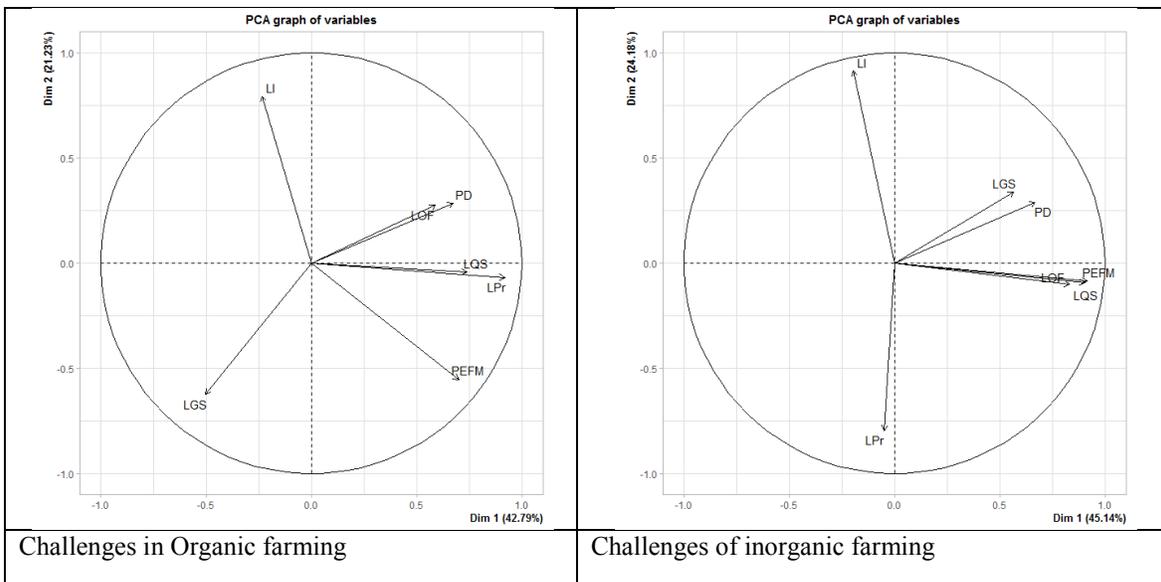


Figure 2. Challenging issue to farmers practicing organic and inorganic farming

Note: LQS: Low quality seed, LOF: Lack of organic fertilize or fertilizer, LPr: Low production in initial year, LGS: Lack of government support, LI: low irrigation facility, PD: price difference, PEFM: Past effect of fertilizers and medicines.

**4. Conclusion and Recommendations**

The vegetable farming has been being attractive for local people through creating employment opportunity to make money and busy themself. Altogether, 137 and 99 employments were created by vegetable farming through organic and inorganic farming respectively. This showed that, there was increasing number of organic farmers, the reason behind may be consumers in the market were health conscious. According to the case of Himachal, fruit and vegetable farming had helped to alleviate the poverty of many farmers. The quality of life had improved practicing the organic farming and using the products (Pratap, 2011). Organic farms hire more workers and employ greater proportion of full-time employees than inorganic farms (Finley et al., 2018).

Similarly, there was less price difference of the vegetable product of organic farming and inorganic farming. The highest price difference was recorded of cucumber with US \$ 0.18 per kg. , However, the earning of organic farmers was higher than this of inorganic farmers. Specifically, rich organic farmers were earning US\$ 8677.54 in a year while rich inorganic farmers were earning US\$ 2603.26. The reason behind this might be, the urban people have been showing the interest to buy the organic products. The income generated through organic farming system was higher than inorganic farming system (Lyons, 2009). As stated by Thakur & Sharma(2005), the vegetable yield, total production, income and profit have been increased

under organic farming system as compared to inorganic farming system over the years. A manager of organic farming Samir Nawar shared that he was able to earn around US\$15,000 in just four months (Aryal et al., 2015). The study of Adhikari ( 2009) also added that the organic carrot production is economically profitable in comparison to inorganic production system.

There were several challenging issues of farmers either they are practicing organic and inorganic farming. The common challenging issues were low quality seed, lack of organic fertilize or fertilizer, low production in initial year, lack of government support, low irrigation facility, price difference and past effect of fertilizers and medicines. The certification of organic products is a serious problems faced by the farmer in Nepal (Shrestha, 2015). In Himachal Pradesh of India the problems like lack of technology, pests and disease control, lack of knowledge and marketing problems was seen (Thakur & Sharma, 2005). Expensive certification cost an limited awareness of group certification among small and medium farmers have created challenge during organic certification system in Nepal (Bhat, 2015). Farmers practicing the organic farming showed higher satisfaction than that of inorganic farmers (Shrestha, 2015). In the case of Sundarbazar, Lamjung majority of people were willing to pay the higher price for the organic products. The majority of the consumers in Denmark would like to pay 10% extra for organic food stuff, in

France 30-35% and in Japan 10-20% (FAO, 2001). According to Misra et al., (1991) estimated that 40% of consumers would be willing to pay 10% more for a product free of pesticide residues, while Weaver et al., (1992) stated that around 50% people would pay at least 10% more for pesticide-free tomatoes. Organically produced food is generally healthier, safer, better tasting and more nutritious than inorganically produced food stuffs (Ming, 2006, Voon et al., 2011).

The number of organic farmers was increasing despite the inorganic farming was also substantial number. It can create employment opportunity and change the living standard of the farmers. There was little price difference between organic and inorganic farm products. The inorganic farmers use chemical fertilizers and pesticides while organic farmers use homemade compost and pesticides. However, the earning was more of organic farmers than the inorganic farmers. Organic farmers were having a problem of slower production in initial year but inorganic farmers were facing the problem of haphazard use of chemical fertilizers and pesticides. This study will be useful to develop the policy regarding organic farming and farmers. However further study is essential to assess the scope of organic farming in Nepal.

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