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## Article

# Attitudes of Fruit and Vegetable Farmers towards Organic Farming in Kathmandu Valley, Nepal

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**Abstract:** Organic farming is increasingly popular among the farmers of Kathmandu valley. However, the organic growers have been facing issues in production, organic certification, and product marketing. To date, little is known about the challenges faced by the organic growers in Kathmandu valley. This study aimed to explore the status of organic farming, attitudes of farmers towards organic farming, their suggestions for improvement, and strengthening the value chain of organic products. Face-to-face interviews were conducted at Agriculture Knowledge Centre, Lalitpur, Nepal during December 2019 with 37 organic growers directly or indirectly involved in organic farming. The results showed that organic growers face challenges in marketing and institutional recognition. Challenges in product certification and marketing were reported by 45.95% of the total interviewed organic growers while following organic practices (transitional organic). Our study suggested that reducing the cost of production through easy access to organic inputs like organic seeds, fertilizers, and biopesticides are highly desired by the growers. Participatory Guarantee System (PGS) or group certification along with collective marketing could be the policy implications to address the issues. Organic farming in Kathmandu valley is limited to a niche market; however, due to increasing consumer demand for safe, fresh, and local food, the popularity of organic products is extending to other regions within the country.

**Keywords:** farmer's attitude; marketing; organic certification; organic products



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## 1. Introduction

Organic farming has been proven as one of the noble practices in sustainable agriculture. It promotes and maintains soil and human health; manages and enhances biodiversity. Besides, it offers better nutrient cycling and mineralization with favorable microclimatic regimes and thereby less risk to farmers [1]. The health benefits and nutritive value of organic products are widely appreciated [2]. The increased popularity of organic farming among consumers, producers, and policymakers is markedly evidenced throughout the world in recent years. Growth of the organic sector in terms of area, the number of farmers engaged, and the market is continuing to rise rapidly in the last few decades. At present, the area, the number of producers, and market value of organic sectors are 71.5 million hectare, 2.5 million farmers, and market worth of 100 billion US\$, respectively [3].

In Nepal, farmers have been practicing farming using naturally available, local, and chemical-free inputs, which is considered organic farming [4]. It is one of the valuable

sustainable practices inherited from generations in rural communities. However; as the development and urbanization occurred, the modernization of agriculture was initiated and the country took a turn toward using agrochemicals with the main objective of increasing the agricultural productivity to feed the increasing population since the 1950s [5]. Increased production of food was materialized to some extent in the short run, however the high cost of increased dependence on imports, soil degradation, health hazards, and economic loss was recognized in the long run. Therefore, Non-Government Organizations (NGOs), government, and other stakeholders adopted the newer paradigms founded on science-based, plausible arts, and emulated local ecological processes and cycles through campaigns and organic movement.

Over the last two decades, Nepalese policymakers have increasingly recognized the need for sustainable agriculture, including an organic agriculture system, to preserve their natural resources and environment, and improve the livelihood of smallholder farmers [3]. Organic agriculture first appeared as one of the priority sectors in Nepalese agriculture since the 10th Five Years Plan (2002–2007) [6]. Recently, various institutions, individuals, and farmers are emerging and engaging in this area. In 2008, the National Coordination Committee for Organic Agriculture Production and Processing System (NCCOAPPS) was formulated and National Organic Standards were developed [7]. The National Adaptation Plan of Action to climate change (NAPA) has mentioned organic agriculture as an important agricultural strategy to adapt to the changing climate [8]. Nepal is in the process of drafting the regulations on organic agriculture. The total area of land under organic agriculture in Nepal has increased from 9361 ha in 2017 to 11,851 ha in 2020, representing a 26.6% increase per annum. Nepal contributes a 0.0004% share to the global organic market. The vegetable organic land covers 332 ha, and 398 ha under coffee, contributing to a 0.1 and 15.1% share in the global organic market, respectively. The recent statistics of the International Federation of Organic Agriculture Movements IFOAM international indicated that the stakeholders involved in the organic market in Nepal comprise 1622 producers, six processors, and one exporter. Nepal produces a total of 210 MT of organic produce annually, which is mostly exported to the European market. Of the total producers involved in organic farming in 2019, only 39 were certified producers, and the rest of them were PGS operational.

The initiation of the organic movement in Nepal can be traced the back to the early 1990s when two private permaculture organic farms were established in the Chitwan district. Teresa's Farm was established in Bhuwan Basti and another, Pereira's Farm, in Saradanagar. Both of these farms were landmarks and an open field for the learners of organic farming in Nepal. The farms were being used for demonstration of organic practices and training by many institutes for many consecutive years until they were abandoned, and now they are almost forgotten. Institute of Sustainable Agriculture Nepal (1986) was the first institute to start an officially organized organic movement through training built in its Permaculture Design Course (PDC), soon after its establishment; despite the long history of the movement, the speed of its overall growth is insignificant. Mostly NGOs, with a few cooperatives, entrepreneurs, hoteliers, and conscientious farmers are being instrumental in the development and promotion of organic farming in the country. The organic way of life is slowly becoming less of a passing trend and more of lifestyle for an increasing number of people, especially in urban areas and among educated and health-conscious people.

At present, in addition to other actors, the government has been prioritizing organic farming by formulating policies and procedures, with initiation through National Agriculture Policy 2004 to promote organic farming for the first time to modernize agriculture. Since 2019, the Government of Nepal has been emphasizing the promotion of organic farming extensively through higher investments, formulating policies and procedures, which include Organic Agriculture Promotion Working Procedure, Nepalese Organic Standard, Organic Fertilizer Subsidy Program Operating Procedure, Procedure on Internal Control System, and Implementation Guideline on Participatory Guarantee System (PGS).

However, the movement is still limited within the mission of NGOs and private sectors. The number of consumers preferring organic products is ever-increasing mostly in urban settlements. Kathmandu, Bhaktapur, and Lalitpur districts with a population size of around four million are increasingly favoring local and organically produced commodities [9]. The concepts of organic shops, mobile marketing of organically produced crops, and organic outlets have increasingly taking growth [10]. Despite the huge scope of organic farming, the benefit accrued to the farmers is not satisfactory and hindered by various obstacles. At the same time, there is a big gap in knowledge in viewing the quality of organic products, their value chain development, and handling of organic products in the market. The knowledge of organic production along with its promotion and marketing is limited even within government institutions.

The supporting conditions of the adoption of organic farming in the developing and developed world vary. Many factors are responsible for adoption of organic farming, which includes national policy settings (especially those concerning financial support for the adoption of organic farming), financial condition of farmers', access to markets, the presence of strong domestic demand for organic products, access to extension and consulting services, and appropriate training facilities [11,12]. To date, the research studies in the developing world focused on farmers and farm characteristics as determinants in the adoption of organic farming [13,14]. Also, other studies included a broad range of farmers' attitudes and motives for adopting organic farming [15]. We hypothesized that the farmers of the Kathmandu valley have favorable attitudes towards organic farming and would be willing to convert their farms to organic within the next five years. Further, we supposed that the farmers who are already using many organic practices and low chemical inputs would have the strong intention to convert to organic agriculture.

The present study aims to analyze the attitudes and perceptions of organic growers in the Kathmandu valley of Nepal. To fulfill this aim, the main objective of our study was to investigate whether organic vegetable growers of Kathmandu valley can imagine converting their farms to organic production and the underlying reasons why they can or cannot do so. For this purpose, attitude and perception of organic vegetable growers of Kathmandu valley towards the conversion of their farms to organic farming, production challenges, certification system, marketing, policy and possible interventions for establishing and strengthening organic agro-products supply chains were explored.

## 2. Materials and Methods

The study was conducted in Kathmandu valley (KV) capital, a major urban center located in the central part of Nepal. KV covers an area of 569.80 km<sup>2</sup> and includes three districts: Kathmandu, Bhaktapur, and Lalitpur [15]. Kalimati Fruits and Vegetables Market was the first organized wholesale market in Nepal; retailers, institutional consumers, and other bulk consumers procure their supplies at this market [6]. The KV has a population density of 2699 per square kilometer and climatic conditions vary, with altitudes that range between 1500 and 2200 m above sea level, a latitude of 27.63 and a longitude 85.36 [16]. The peri urban population livelihood is predominantly farmers, the majority of whose subsistence depends on vegetable farming [10,17]. KV has the highest vegetable productivity per unit area in Nepal [18]. A purposive sampling of farmers was carried out for the selection of 37 farm households who are particularly interested in organic farming. A two-day workshop was organized at the Agriculture Knowledge Center (AKC) in Lalitpur in December 2019, where a pre-discussion was held with government representatives and stakeholders before initiating the interviews for the study to cross-validate the pre-designed questionnaire. A survey adopting face-to-face interviews was conducted with the selected farmers of KV. The main respondent was the farmer himself who makes every decision required for his farm. The questions determined: the features of the interested farmers, their attitudes towards organic farming and marketing choices, and their perceptions regarding challenges in organic farming. The questionnaire was prepared in the English language translated into the native local language (Nepali) by authors to facilitate the

respondents. Descriptive analysis of data was done using percentage, frequencies and mean by Microsoft excel and the tables, graphs were generated. A total of 12 statements were used including both positive and negative to avoid the biases of the respondents. Each respondent was asked to indicate his extent of agreement or disagreement against each statement along a 5-point scale of strongly agree, agree, neutral, disagree, and strongly disagree. Percentage analyses were done to figure out the attitudes of the farmers against different notions.

### 3. Results

#### 3.1. Demographic Features

A total of 37 organic entrepreneurs were interviewed in this study. The majority of them were males (67.56%) and 32.43% were females (Table 1). The entrepreneurs were classified into three different age groups: 18–35 years, 36–50 years, and 51+ years each comprising 29.72%, 67.56%, and 2.70% respectively.

**Table 1.** Sociodemographic and farm characteristics of the respondents with gender, educational status, income, landholding and experience on organic farming.

Characteristics	Number of Responses	%
<b>Gender</b>		
Male	25	67.56
Female	12	32.43
<b>Age (years)</b>		
18–35	11	29.72
36–50	25	67.56
51+	1	2.70
<b>Education</b>		
High school graduate/GED	29	78.38
Associate or technical school degree	1	5.41
Undergraduate degree	4	2.70
Postgraduate degree	1	10.81
<b>Annual farm income from gross sales (US\$)</b>		
80–800	0	0
800–2000	7	18.81
2000–4000	19	51.35
4000–8000	4	10.81
>8000	7	18.91
<b>Size of farm/business (acres)</b>		
<1.0	18	48.65
1.0–2.0	6	16.22
2.0–3.0	7	18.9
3.0–4.0	6	16.22
<b>Land ownership</b>		
Own Land	21	56.76
Rented Land	12	32.43
Both Rented and Owned	4	10.81
<b>Farming experience</b>		
<5 years	4	10.81
5–10 years	12	32.43
10–20 years	16	43.24
20–30 years	5	13.51
<b>Farm type</b>		
Certified organic	4	10.81
Organic (transitional)	33	89.18

More than three-fourths of the organic growers in our study completed high school education and only 13% of the total had graduate and postgraduate degrees (Table 1). The

annual income of the respondent ranged from US \$800–8000 with more than half lying between the annual income of US \$2000–4000.

Similarly, farmers surveyed in this study were found to be holding less than five acres of land. Our study found that 16% of farmers hold more than three acres of land while not more than four acres and nearly 50% of them were confined to less than one acres of land. Our study also indicates that 56% of the farmers owned their land while nearly one-third (32.43%) had the land leased and established a farm. Also, we observed that 10.81% of farmers have both own and leased land for organic farming (Table 1).

Fruits and vegetables were the major commodities produced organically by the producers. We found that 67.56% of the farmers produced vegetables, 5.40% were fruits producers, and 27.04% were both vegetables and fruits producers. Respondents had 5 to 20 years of farming experience and 2 to 10 years was in organic farming (Table 1).

Our study identified three farmers who certified their organic produce by Organic Certification Nepal (OCN) and one farmer certified through a Participatory Guarantee System (PGS). The results indicate 89.18% of farmers still lack any form of certification. The existing certifiers are private certification organizations, namely Organic Certification of Nepal (OCN) and the Participatory Guarantee System (PGS).

### 3.2. The Market for the Organic Produce

Results suggest that organic growers had limited access to marketing facilities. The majority (35.14%) of the farmers sold their products to the wholesaler, 27.03% sold in the farmers market, and 10.80% to the retail market (Figure 1). Farmers also sold their products to wholesale, retail, or both wholesale and farmers' market.

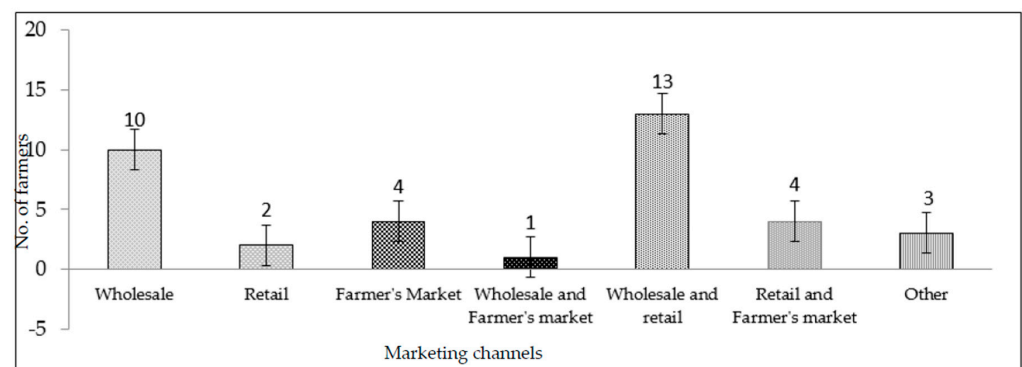


Figure 1. Market access for the organic growers of Kathmandu valley.

### 3.3. View of the Growers about Organic Farming

Table 2 present the distribution of responses for each Likert scale item for the whole sample. Data shows that all farmers agreed or strongly agreed with the notion “organic farming is better for the environment”. The majority of farmers (88%) stated that organic farming is getting popular at present while nearly the same numbers of respondents (86%) equally agreed or strongly agreed on the fact that weeds and pest control were the major challenges in their organic crop production. Nearly 95% of farmers agreed or strongly agreed that the profits are higher in organic farming. Over 97% agreed or strongly agreed with the statement that complex organic standards in farming pose a great challenge in adopting; only 10.81% of farmers disagree on the notion “Changing to organic farming is an exciting new challenge”. Almost all farmers perceived that organic farming allowed them to use various skills in their fields.



**Table 2.** Distribution of responses for Likert scales (1 = strongly disagree, to 5 = strongly agree); share of farmers (%).

Attitudinal Statements	Response (%)				
	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Organic farming is better for the environment	0.00	0.00	0.00	43.24	56.76
Organic farming can't control weeds, pests & diseases	0.00	13.51	0.00	54.05	32.43
More profitable than conventional farming	2.70	2.70	0.00	59.46	35.14
Profits on organic products are high	0.00	5.41	0.00	48.65	45.95
Organic farming is popular among local farmers	0.00	10.81	0.00	67.57	21.62
Organic standards are too restrictive to be practical	0.00	2.70	0.00	59.46	37.84
Changing to organic farming is an exciting new challenge	0.00	10.81	0.00	51.35	37.84
Organic farming gives a chance to make good use of skills	0.00	0.00	0.00	59.46	40.54
High cost of production	3.33	13.33	26.67	50.00	6.67
Labor intensive	3.33	50.00	0.00	40.00	6.67
Market competition is high	3.33	26.67	3.33	60.00	6.67
Lower yields	0.00	0.00	0.00	71.43	28.57

Organic growers of KV face many challenges. A reasonable percentage of farmers (nearly 60%) expressed that organic farming has higher production costs and more than two-thirds of them have agreed that market competition exists. A vast majority of farmers (93%) agreed or strongly agreed with the notion that the Certification process is difficult and time-consuming. Farmers agreed on the benefits of organic farming; however, the majority of them also accepted the difficulties in controlling insect pests and weeds. Organic standards posed a challenge in continuing organic farming practices. Nearly half of the respondents agreed that organic farming is labor-intensive work. Almost all agreed that organic farming yields are lower and produce have a shorter shelf life.

### 3.4. Attributes of Organic Products

Many of the previous studies have mentioned the change in the attributes of organic products, namely taste, nutrition, chemical residues, freshness, price, and consumer demand. Respondents in our study were asked their know-how in these attributes and their responses revealed that taste and chemical freeness are the prime attributes they perceive as non-organic products, which are then followed by taste, freshness, price, and nutrition (Table 3).



**Table 3.** Important attributes of organic products described by growers.

Attributes	Response		
	High	Medium	Low
Taste	34	1	2
Price	28	8	1
Nutrition	24	13	0
Chemical-free	37	0	0
Freshness	29	8	0
Consumer Demand	32	3	2

### 3.5. Inputs and Future of Organic Farming in Kathmandu Valley

Organic farming from a common person's perspective seems to be booming in the coming days. There is still a huge potential for organic farming and the market is expanding with the demand for safe and healthy food. Of those surveyed, 36 organic farmers responded that their business shall grow soon whereas one respondent of the survey was reluctant on organic entrepreneurship. Our study showed only five respondents use organic seeds for farming and the remaining used conventional seeds.

## 4. Discussion

The majority of the interviewed farmers in our study were both vegetable and fruit growers. Organic growers reported that vegetables are in higher demand and sold in the farmers' market. This may be due to a rise in demand for organically grown vegetables in urban areas, which could be attributed to several reasons, including increased buying power, knowledge and understanding about the health and safety of organic produce, and customers' desire to eat nutritious and chemical-pesticide free foods [19].

Most of the farmers in the present study had a lower education level. This finding is in line with the past studies conducted in Nepal [10,17]. Similar findings were documented in Vietnam, and in Syria [13], where researchers found that the education level of farmers is positively associated with the adoption of organic farming.

The data also indicate that middle-aged people are engaged more in organic farming. A similar finding was reported in studies conducted in Uttarakhand, India [15] where a similar age group was active in organic farming. By contrast, past studies like those in Vietnam [19] found that younger farmers were found to have a higher interest in organic farming. Low profits and higher risks in farming were the factors and cause lower engagement by educated youths in farming compared to other career jobs.

In the present study, the farming experience of the growers was ranged from 10 to 20 years, including 5 to 10 years in organic farming suggesting this area is in infancy. A farmer's experience in cultivation has a role in the decision to adopt organic farming; more experienced farmers can better cope with organic farming practices than younger farmers who usually have less farming experience [20]. A study on intentions and attitudes of Syrian farmers towards organic farming, however, stated that farmer's age, education level, and experience in cultivation have a small role in the decision to adopt organic farming [13].

Most of the respondents of the focused group discussion were limited to one to five acres of land, suggesting that organic farming has been limited to small land and is the choice for smallholders. This might be due to the limited availability of land, higher prices, and rent in the Kathmandu valley. The larger landholdings in Nepal are considered a sign of farmers' wealth as they can use the land as collateral to acquire cash or can lease out it. Interestingly, a study conducted in India [21] suggested that the larger landholdings have a positive correlation to converting their farm to organic. Most of the respondents reported that higher land rent had implications on higher production costs. Moreover, the small land size under organic farming of the growers limited them to supply enough products in the market. The land fragmentation of the country is the problem to switch on the growers on a larger scale [22–24]. Nevertheless, organic growers in Kathmandu valley

had generally positive attitudes towards organic vegetables and fruit production; however, their intentions to adopt organic farming were rather weak, suggesting that favorable attitudes alone are not sufficient to explain the behavioral intention. Policy reform on contract farming and land consolidation or subsidy on land rent is the recommendation to push smallholders into large-scale farming.

Many of the organic farmers expressed that insect pests, diseases, and weeds were among other constraints in organic farming. Most of them indicated that they used cultural practices to prevent risks from insect pests and weeds. Growers in focused group discussions indicated that they do not have access to effective organic pesticides and insecticides for pest control in organic farming; while few reported that they practiced crop diversification to withstand threats from pest problems. They grow crop variety mixtures from their acquired traditional skills. Increasing biodiversity due to alterations in agronomic practices helps in the management of insects and pests in organic farming [25,26]. Thus, research on combinations of crop mixtures that produce optimum yield and facilitate pest control is suggested.

The present research has shown that farmers of Kathmandu valley have favorable attitudes towards organic farming and were willing to convert their farms to organic. This offers a good pre-condition for further expansion of organic agriculture in the Kathmandu valley. Unfortunately, organic farmers in Nepal faced the challenges of a complex certification system and fair price in the market [27]. Respondents during group discussion stated that they lack incentives, namely production and marketing opportunities, due to expensive certification schemes. A few of the growers certified their organic produce through a private certification company: Organic Certification Nepal (OCN), whereas one grower practiced the Participatory Guarantee System (PGS) in the local market of Kathmandu valley. As of 2019, the total land under PGS certification is 66 ha in the country. The initiatives of government institutions, NGOs, and international development agencies in organic farming play an important role in the promotion and providing information on organic certification and standards for their produce. Such initiatives may provide information on the increasing organic market demand at regional and international markets, alongside farmers' perceptions and awareness of the economic, health, and environmental benefits of organic crop production. The certification system needs to be simplified for easy access to small organic producers.

Respondents in the current study indicated that organic product attributes such as taste, freshness, price, safe (chemical free) and nutrition are the main factors of consumers' attention. Similar findings were reported by various other studies in China [28], Spain [29], and India [29]. However, fair price to both consumers and growers is lacking in Kathmandu valley due to a sluggish supply chain and poor traceability. Consumers need information on the organic products (e.g., where they came from, certified organic, or transitional). The expansion of the organic market depends on government interventions in supply chain management. The short supply chain not only enhances the consumption of local produce but also provides a fair price to the growers. Unfortunately, the conventional, as well as the organic market, have no government influence and are controlled by middlemen. Thus, both government influence and investments in supply chain management are the utmost pre-requisites to come out from the niche-based organic market to be more even at the national and international levels.

Organic farming has always been an exciting business; however, constraints hinder farmers' interest in its adoption. Most of the farmers show constraints such as higher production cost, time and labor-consuming farming practices, the existence of market competition, and complex certification systems.

## 5. Conclusions

The present study found that farmers of Kathmandu valley showed positive attitudes towards organic vegetable production; however, their intentions to adopt organic farming were rather weak, suggesting that favorable attitudes alone are not sufficient to explain the

behavioral intention. Our study indicated that the market of the organic produce, certification system, knowledge of organic production, and government policy were the factors influencing the ability of farmers to convert their conventional farms to organic. Further, the farmers already adopting the organic production system in Kathmandu valley were facing higher production costs, market assurance, and complex and costly certification processes.

Our study showed that there was the emergence of retailers and wholesalers in the marketing of organic products, suggesting the limited contact of the organic farmers with the consumers. Organic farming is reliant on trust, and limited interaction of the growers with their consumers could have implications on the trustworthiness of the produce. Recently, the Government of Nepal has endorsed the policy of focusing on the development of the small and medium-sized market outlets throughout the organic growing regions. Also, in some regions, farmers organized themselves to establish farmers' markets. However, we argue that it is necessary to provide marketing information and promotion strategies of farmers' managed market from the government institutions. Our study indicated that certification of the organic products was a complex mechanism faced by the growers, as they must go through a lengthy and expensive process, which takes as long as 3 years, and producers do not get a premium price but have to pay the certification costs on their own.

We suggest identifying the objective of the country's organic production: for export promotion or domestic consumption. When the objective of the country to produce organic production is for domestic consumption, we suggest adopting the group certification process, namely PGS. The PGS is the best option for organic certification to support small farmers for coordinated production and marketing opportunities. Home and co-workers [30] stressed the importance of PGS certification after conducting interviews with 84 farmers from seven different countries. Hence, it needs to be simplified and subsidized during the certification process.

In our study, the respondents reported that organic farming needs more knowledge and skills compared to conventional farming, which is the limiting factor in the adoption of organic farming practices. Many studies reported that the attitudes and farmers' knowledge of organic production also contributed positively to some extent in influencing the development of organic farming. Thus, we recommend to government and non-government institutions to carry out an organized learning approach such as Farmers' Field Schools (FFS), a group approach, and establishing a demonstration organic farm in every organic region of the country. Further, there is a dire need amongst smallholders for organic inputs like seeds, organic fertilizers, and bio-pesticides. Increasing enforcement of labeling such as organic or "no-spray" to organic products, improving marketing channels, and campaigns for local foods might be the ways to address marketing challenges for smallholders.

Finally, we strongly recommend for future research two factors that play an important role in the conversion to organic farming. First, crop improvement (breeding program), which focuses on tackling the diseases and insects in organic farming. Second, the production and distribution of organic seed in the organic growing regions. However, such research must approach in line with national and (for export purposes) international regulations on organic agriculture, accepting the ethical and social standards of the organic farming.

## 6. Limitations of the Study

The study was limited to the organic entrepreneurs and stakeholders within Kathmandu valley. However, issues and concerns of stakeholders from other regions of Nepal such as hilly, mountainous, and Tarai be considered as per their needs due to geographical conditions. The conclusions were drawn from the sample size of 37 stakeholders only, which might show a significant relationship from the large sample. The conclusions drawn in the present study were purely based on the responses received from the organic stakeholders of Kathmandu valley, which might vary relative to other parts of the country.

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## References

- Dahal, K.R.; Sharma, K.P.; Bhandari, D.R.; Regmi, B.D.; Nandwani, D. Organic agriculture: A viable option for food security and livelihood sustainability in Nepal. In *Organic Farming for Sustainable Agriculture; Sustainable Development and Biodiversity*; Nandwani, D., Ed.; Springer: Cham, Switzerland, 2016; pp. 137–168. [CrossRef]
- Popa, M.E.; Mitelut, A.C.; Popa, E.E.; Stan, A.; Popa, V.I. Organic foods contribution to nutritional quality and value. *Trends Food Sci. Technol.* **2019**, *84*, 15–18. [CrossRef]
- Willer, E.H.; Lernoud, J. *The World of Organic Agriculture Statistics and Emerging Trends 2019*; Research Institute of Organic Agriculture (FiBL); IFOAM-Organic International: Bonn, Germany, 2019.
- Parajuli, S.; Shrestha, J.; Ghimire, S. Organic farming in Nepal: A viable option for food security and agricultural sustainability. *Arch. Agric. Environ. Sci.* **2020**, *5*, 223–230. [CrossRef]
- Sushma, D.; Dipesh, R.; Lekhendra, T.; Ram, S.S. A Review on Status of Pesticides Use in Nepal. *Res. J. Agric. For. Sci.* **2015**, *3*, 5.
- National Planning Commission. Tenth Plan (2002–2007). His Majesty's Government National Planning Commission. 2002. Available online: [https://www.npc.gov.np/images/category/10th\\_eng.pdf](https://www.npc.gov.np/images/category/10th_eng.pdf) (accessed on 11 March 2021).
- Atreya, K.; Johnsen, F.H.; Sitaula, B.K. Health and environmental costs of pesticide use in vegetable farming in Nepal. *Environ. Dev. Sustain.* **2012**, *14*, 477–493. [CrossRef]
- Ministry of Forests and Environment (MoFE) of the Government of Nepal, the NAP Global Network, Action on Climate Today (ACT), Practical Action Nepal. Nepal's National Adaptation Plan (NAP) Process: Reflecting on Lessons Learned and The Way Forward [Internet]. Government of Nepal. 2018. Available online: <https://napglobalnetwork.org/wp-content/uploads/2018/07/napgn-en-2018-nepal-nap-process.pdf> (accessed on 3 March 2021).
- Singh, M.; Maharjan, K.L. Prospect of farmers in generating additional income through organic vegetable farming: A case study in Kathmandu valley and Chitwan district of Nepal. *J. Int. Dev. Coop.* **2013**, *19*, 37–49.
- Bhatta, G.D.; Doppler, W. Smallholder Peri-Urban Organic Farming in Nepal: A Comparative Analysis of Farming Systems. *J. Agric. Food Syst. Community Dev.* **2011**, 163–180. [CrossRef]
- Schoonbeek, S.; Azadi, H.; Mahmoudi, H.; Derudder, B.; De Maeyer, P.; Witlox, F. Organic Agriculture and Undernourishment in Developing Countries: Main Potentials and Challenges. *Crit. Rev. Food Sci. Nutr.* **2013**, *53*, 917–928. [CrossRef] [PubMed]
- Thamaga-Chitja, J.; Hendriks, S.L. Emerging issues in smallholder organic production and marketing in South Africa. *Dev. S. Afr.* **2008**, *25*, 317–326. [CrossRef]
- Issa, I.; Hamm, U. Adoption of Organic Farming as an Opportunity for Syrian Farmers of Fresh Fruit and Vegetables: An Application of the Theory of Planned Behaviour and Structural Equation Modelling. *Sustainability* **2017**, *9*, 2024. [CrossRef]
- Jouzi, Z.; Azadi, H.; Taheri, F.; Zarafshani, K.; Gebrehiwot, K.; Van Passel, S.; Lebailly, P. Organic Farming and Small-Scale Farmers: Main Opportunities and Challenges. *Ecol. Econ.* **2017**, *132*, 144–154. [CrossRef]
- Singh, S.; George, R. Organic Farming: Awareness and Beliefs of Farmers in Uttarakhand, India. *J. Hum. Ecol.* **2012**, *37*, 139–149. [CrossRef]
- Central Bureau of Statistics. Environment Statistics of Nepal. 2019. Available online: [https://unstats.un.org/unsd/environment/Compendia/Nepal\\_Environment%20Statistics%20of%20Nepal\\_2019.pdf](https://unstats.un.org/unsd/environment/Compendia/Nepal_Environment%20Statistics%20of%20Nepal_2019.pdf) (accessed on 3 March 2021).
- Rai, M.K.; Paudel, B.; Zhang, Y.; Khanal, N.R.; Nepal, P.; Koirala, H.L. Vegetable Farming and Farmers' Livelihood: Insights from Kathmandu Valley, Nepal. *Sustainability* **2019**, *11*, 889. [CrossRef]
- MOALD. Krishi Diary-2076. 2019. Available online: <https://zonedhankuta.pmamp.gov.np/wp-content/uploads/2019/06/krishi-diary-2076.pdf> (accessed on 8 February 2021).
- Nguyen, V.H.; Nguyen, T.P.L. Intention to Accept Organic Agricultural Production of Vietnamese Farmers: An Investigation Using the Theory of Planned Behavior. *J. Asian Financ. Econ. Bus.* **2020**, *7*, 949–957. [CrossRef]
- Lamichhane, J.; Ghimire, Y.N.; Timsina, K.; Magar, D.T.; Sharma, T.; Timilsina, C.; Mishra, R.C.; Adhikari, S.P. Profitability assessment of tomato cultivation under plastic house in western hills of Nepal. In Proceedings of the 9th National Horticulture

- Workshop, Burlington, VE, USA, 8–9 September 2017; p. 8. Available online: <https://www.researchgate.net/publication/329023605> (accessed on 4 June 2020).
21. Ghosh, M.K.; Sohel, M.H.; Ara, N.; Zahara, F.T.; Bin Nur, S.; Hasan, M. Farmers Attitude towards Organic Farming: A Case Study in Chapainawabganj District. *Asian J. Adv. Agric. Res.* **2019**, *1*–7. [[CrossRef](#)]
  22. Dhakal, B.N.; Khanal, N.R. Causes and Consequences of Fragmentation of Agricultural Land: A Case of Nawalparasi District, Nepal. *Geogr. J. Nepal* **2018**, *11*, 95–112. [[CrossRef](#)]
  23. MOAD. Agriculture Development Strategy 2015-2035 [Internet]. 2015. Available online: [http://www.doanepal.gov.np/downloadfile/ADS\\_FINAL\\_1542883806.pdf](http://www.doanepal.gov.np/downloadfile/ADS_FINAL_1542883806.pdf) (accessed on 8 November 2020).
  24. Paudel, G.P.; Gartaula, H.; Rahut, D.B.; Craufurd, P. Gender differentiated small-scale farm mechanization in Nepal hills: An application of exogenous switching treatment regression. *Technol. Soc.* **2020**, *61*, 101250. [[CrossRef](#)] [[PubMed](#)]
  25. Haldhar, S.G.; Jat, C.; Deshwal, H.L.; Gora, J.S.; Singh, D. Insect pest and disease management in organic farming. In *Towards Organic Agriculture*; Gangwar, B., Jat, N.K., Eds.; Today & Tomorrow's Printers and Publishers: New Delhi, India, 2017; pp. 359–390.
  26. Singh, M.; Maharjan, K.L. Status and Scope of Organic Farming in Nepal. In *Sustainability of Organic Farming in Nepal*; Singh, M., Maharjan, K.L., Eds.; Springer: Berlin/Heidelberg, Germany, 2017; pp. 21–36. Available online: [https://doi.org/10.1007/978-981-10-5619-2\\_2](https://doi.org/10.1007/978-981-10-5619-2_2) (accessed on 28 February 2020).
  27. Singh, M.; Maharjan, K.L. Status of Local Organic Market in Nepal. In *Sustainability of Organic Farming in Nepal*; Singh, M., Maharjan, K.L., Eds.; Springer: Berlin/Heidelberg, Germany, 2017; pp. 151–166. Available online: [https://doi.org/10.1007/978-981-10-5619-2\\_10](https://doi.org/10.1007/978-981-10-5619-2_10) (accessed on 28 February 2020).
  28. Zhang, B.; Fu, Z.; Huang, J.; Wang, J.; Xu, S.; Zhang, L. Consumers' perceptions, purchase intention, and willingness to pay a premium price for safe vegetables: A case study of Beijing, China. *J. Clean. Prod.* **2018**, *197*, 1498–1507. [[CrossRef](#)]
  29. Rodríguez-Bermúdez, R.; Miranda, M.; Orjales, I.; Ginzo-Villamayor, M.J.; Al-Soufi, W.; López-Alonso, M. Consumers' perception of and attitudes towards organic food in Galicia (Northern Spain). *Int. J. Consum. Stud.* **2020**, *44*, 206–219. [[CrossRef](#)]
  30. Home, R.; Bouagnimbeck, H.; Ugas, R.; Arbenz, M.; Stolze, M. Participatory guarantee systems: Organic certification to empower farmers and strengthen communities. *Agroecol. Sustain. Food Syst.* **2017**, *41*, 526–545. [[CrossRef](#)]