Development of organic agriculture

To what extent is it beneficial to do eco-farming from the perspective of farmers?

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**Introduction**

According to Research Institute of Organic Agriculture (FiBL), only tiny 1.4% of agricultural land is used in a sustainable way today. However, detrimental effect of modern agricultural methods is well known. Here is a question: Why people refuse from turning to eco-farming?

In this research, pros and cons of eco-farming will be considered from the perspective of farmers, as very few relevant research has been conducted from this point. The project focuses mainly on growing fruits and vegetables to make investigation precise and narrow. As a result, illation about benefits and drawbacks of organic farming in terms of economic output, environmental effect and practicality will be made.

My motivation comes from the concern about current state of the environment, thus I would like to know is eco-farming a viable way to make one of the most important industries eco-friendly. Moreover, I am planning to connect my future profession with this sphere; therefore, I would like to expand my knowledge about it and find out if experts in sustainable agriculture are in demand.

The bias comes from the fact that consumers and officials urge farmers to turn to eco-agriculture but it seems that there are no conditions made to support them, which I believe to be unfair. Thus, the research may underestimate positive sides and concentrate on negative ones. To make the judgment impartial each research question and aspect will be considered from both sides.

The outcomes could be used by local officials to motivate farmers to turn to eco-agriculture or may be considered as an occasion to introduce governmental aid for eco-farmers and encourage public to support green farming.

**Context**

*Eco-farming* is a way to build a sustainable society, which provides a growing population of the planet with food and materials without harming the environment.

Major principles of eco-farming proposed by Greenpeace organization (n.d.):

* **Food sovereignty:**Producers and consumers, not corporations, should control the food chain and determine how food is produced.
* **Rewarding rural livelihoods:**Eco-agriculture is instrumental in rural development, food security and fighting poverty.
* **Smarter food production and yields:**Eco-agriculture can create higher yields to help feed the world.
* **Biodiversity:**Promoting diversity in crops, instead of monocultures like corn and soy, is essential to protecting nature.
* **Sustainable soil:**Soil fertility can improve using eco-farming methods and refraining from chemical fertilizers and inputs.
* **Ecological pest protection:**Farmers can control pest damage and weeds effectively through natural means instead of chemical pesticides.
* **Food Resilience:**Diverse and resilient agriculture, not monoculture crops, is the best way to protect communities from shocks from climate and food prices.

REQUIREMENTS

All eco-farms undergo official certification, allowing them to use organic labelling and sell products for higher prices. The requirements put by the Code of Federal Regulations, a document recognized worldwide:

* The agricultural land should be free from all prohibited substances for 3 years before using organic labelling
* All land must have distinct, defined boundaries and buffer zones to prevent unintended applications of prohibited substances (Scheme 1 – An example of a blueprint of an eco-farmland)
* Only eco-friendly methods of cultivation allowed

LENSES AND PERSPECTIVES

Economic is a major sphere to look at because lack of financial resources is one of the most serious obstacles eco-farmers face today. It is important to consider expenditures and potential profit to decide about financial viability of organic farming. Theoretically, the expenditures of eco-farmers are lower than of regular farmers, as they do not need to buy chemical fertilizers and pesticides, costly tools. The only significant money allocation is buffer zone mandatory to all eco-farms (Coleman, 2012). Furthermore, certified eco-products can be sold for higher price. However, “non-certified “biofarmers” are difficult to identify on the market due to common pseudo-marking” (Grigoruk & Klimov, 2016). Pseudo-labelling may cause consumers to distrust eco-food and reduce the price of organic products. Therefore, customers’ opinion on eco-farming should be explored in primary research. It is manageable to apply result only on national level due to limited sample size.

Globally, there are programs designed to support green farming. For instance, EU offers income support within “Young farmers” program to protect start-ups during the most difficult first 5 years. The financial aid offered on national level should be discussed during primary research, since information concerning it is unclear in the Internet.

Ecology is another major lens. As focus of eco-farming is protecting the environment, it is essential to ensure that the practice is safe for nature.

On a global scale, where eco-agriculture is developed, ecology improvement observed:

* Water and soil are not contaminated with chemicals
* Pesticides do not threaten insects
* Biodiversity is preserved
* Enhanced  soil fertility

This has been proved by numerous scientific research, for example: “When all the studies with qualitative data were included, the positive effect of organic farming on species richness was as strong as in the former case. Fifty‐three of the 63 studies (84%) showed higher species richness in organic agriculture systems” (Janne Bengtsson, Johan Ahnstrom & Ann-Christin Weibul, 2005).

Social lens also connects to the topic of eco-farming. Eco-farming seems to be poorly understood concept among producers around the world. Especially, ignorance in terms of ecological cultivation methods are widely spread among small- and medium-sized farmers: “Ecosystem services such as biological pest control … remain unknown to nearly 70% of farmers globally” (Wyckhuys, Heong, Sanchez-Bayo, 2019). This might be the reason, why eco-farming is unpopular today. Literacy of Kazakhstani producers should be considered during the primary research.

**Aims**

The hypothesis put in the beginning is that today not enough conditions created to develop eco-farming in Kazakhstan.

The aim of this project is to discuss advantages and disadvantages of eco-farming from the perspective of farmers and determine which of them outweigh, state the problems eco-farmers face today, suggesting possible ways to solve them to turn organic agriculture into thriving sphere.

Research questions:

* What is the consumers’ attitude toward organic products?
* What is the environmental impact of eco-farming?
* What are the difficulties of running an eco-farm?
* Is eco-farming profitable?

**Methods**

**Method & Motivation 1:** Survey

Research question: What is consumers’ attitude towards organic products?

The aim of the survey was to find out consumers’ opinion on organic products, and thus evaluate the potential demand for them and reveal associated problems to forecast the profitability of the business.

The target population of the survey was consumers of Kazakhstan, as the research focused mainly on national level. The sample included 100 people of different age to manage to generalize results to the whole target population.

Survey was an effective method to fulfill the aim as it covered big sample, therefore, the results could be reasonably generalized. Moreover, close-ended questions provided quantitative data, making it easy to calculate the average means and compare results. A cross tabulation method was used to reveal insight trends in preferences of consumers.

The research question was addressed based on combined information from the survey and interviews, making the conclusion valid and comprehensive.

**Method & Motivation 2.1:** Interview

Research question: What are the difficulties of running an eco-farm?

The aim of the interview was to discuss benefits and drawbacks of creating and running an eco-farm in Kazakhstan.

The interviewee was an experienced local eco-farmer, who had received relevant education. Therefore, his expertise and authority could not be undermined. To avoid personal bias of the interviewee, each question required profound explanation of the answer, which allowed evaluating the rate of impartiality.

**Methods & Motivation 2.2:** Interview

Research question: What is environmental impact of eco-farming? (Note: the remaining three research questions were partially answered via this interview as well)

The aim was to consider positive and negative environmental aspects of running an eco-farm and learn about governmental aid and supervision over eco-farmers. The value of the interview was that very few relevant and up-to-date information about legislation, governmental projects and work concerning eco-farming in Kazakhstan was present in the Internet.

The interviewee was an environmentalist, a worker of RSE «state expert examination», which made the answers reliable. In this case, personal bias of the person was overlooked, as the questions were mostly designed to ask for official information, scientific data.

**Methods & Motivation 2.3:** Interview

Research question: What are the difficulties of running an eco-farm?

The aim of the interview was to know the opinion of regular modern farmer on eco-farming and find out more information about the obstacles of turning to organic agriculture. This method was used only as an auxiliary tool to back up the results of other methods and look at the research questions from different perspective.

The interviewee was a regular medium-scale farmer. He was chosen as a typical representative of Kazakhstan farmers. To avoid personal bias of the interviewee, each question required profound explanation of the answer, which allowed evaluating the rate of impartiality. Although the attitude of a single person could not by applied for the majority, it is the only available way to know the opinion of modern farmers on eco-farming.

Interview was highly effective method in all three cases, as it allowed getting detailed information and know person’s opinion, as obtained data was qualitative. In addition, it was flexible so question could be added or changed if necessary. Research questions were addressed, taking into account opinions all three interviewees to obtain unbiased results.

**Results**

WHAT IS CONSUMERS’ ATTITUDE TOWARD ORGANIC PRODUCTS?

*Figure 2. Average frequency of buying fruits and vegetables*

The majority of asked people buy fruits and vegetables relatively frequently: 2-3 times a week or once a week, showing that this product category is in demand.

According to the environmentalist, public prefers naturally grown products. The results of the survey supported this claim: 88% of respondents suppose eco-products to be healthier than non-organic alternatives, the same percentage of people is also ready to overpay for organic fruits and vegetables. However, only 56% of respondents would buy eco-products if they were less attractive, tasteful. Thus, it is important to ensure good taste and appearance of eco-food. Furthermore, eco-farmer claimed that selling vermicompost is especially profitable, as it can be easily made from wastes and many people buy it for personal use.

However, some of the respondents biased against eco-food. Interestingly, the belief that eco-farming requirements are not always respected becomes popular with age of people: 57% at age under 25 and 75% at age over 50. The number of respondents, who do not know if eco-products available in neighborhood increases in the same manner (*Table 1. Cross table of survey responses according to the age of participants).*

|  |  |  |  |
| --- | --- | --- | --- |
| Question | Answer | Age groups | Total  |
| <25 | 26-35 | 36-50 | 50< |
| Do you believe that certified organic production meets all the requirements of eco-agriculture? | Yes | 34% | 10% | 9% | 0% | 17% |
| Not always  | 57% | 70% | 76% | 75% | 70% |
| No | 9% | 20% | 15% | 25% | 13% |
| Do you think that organic products are much healthier? | Yes | 80% | 90% | 94% | 83% | 88% |
| No | 20% | 10% | 6% | 17% | 12% |
| Are there any greengrocers, which offer organic fruits and vegetables in your region? | Yes | 80% | 65% | 61% | 58% | 68% |
| No | 3% | 10% | 12% | 8% | 8% |
| I don’t know | 17% | 25% | 27% | 34% | 24% |
| Would you buy organic fruits and vegetables if they were more expensive? | Yes, if the price is 5-10 % higher | 80% | 50% | 61% | 58% | 66% |
| Yes, even if the price is 30-50% higher | 11% | 30% | 30% | 25% | 22% |
| No | 9% | 20% | 9% | 17% | 12% |
| Would you buy organic fruits and vegetables if they have an inferior taste and appearance comparing to non-organic? | Yes  | 51% | 50% | 61% | 58% | 56% |
| No | 49% | 50% | 39% | 42% | 44% |

*Table 1. Cross table of survey responses according to the age of participants*

WHAT IS THE ENVIRONMENTAL IMPACT OF ECO-FARMING?

According to environmentalist, eco-farming improves local environment considerably: no contamination of air and water, soil fertility improvement, preservation of wild plants and insects. Eco-farmer’s personal experience confirmed this assumption, for example, reusing wastes to produce compost helped him to reduce water pollution and methane emission and replace chemical fertilizers with natural ones. The interview with environmentalist confirmed the positive effect of organic farming on human health as well, since GMO-, antibiotics- and pestisides-free technics are safe for people. However, this aspect requires additional research.

WHAT ARE THE DIFFICULTIES OF RUNNING AN ECO-FARM?

Both eco-farmer and regular farmer agreed that in farming markets and national online shops eco-seeds and fertilizers are almost unavailable, although they live in different regions: Almaty (one of the biggest and most developed cities of Kazakhstan) and Ust-Kamenogorsk, meaning that the situation could be generalized all over Kazakhstan. Therefore, eco-farmers have to buy materials from Russia and pay fee for delivery. Regular farmer thinks that it is difficult to educate farmers on eco-agriculture, as there are no educational centers. In contrast, eco-farmer stated that he holds seminars periodically and invites professionals to attend them. This inconsistency shows that modern farmers may be poorly educated about eco-farming and the offered opportunities to do it; therefore, a further research in this question should be done. All three interviewees agreed that government does not offer financial aid for eco-farmers. It is problematic, since during first 2-3 years eco-farmers have to stick to all rules without adding extra price. However, it is possible to apply for governmental agricultural programs. Eco-farmer highlighted that there is no standard certification; therefore, products cannot be sold abroad as organic. Absence of certificate may be the reason of consumers’ distrust discussed before.

|  |  |
| --- | --- |
| Positive sides | Negative sides |
| Environmentally safe | No specific financial aid |
| Has positive impact on human health | No official certification  |
| Variety of educational resources | Unavailability of eco-seeds and fertilizers |
| Cheap cultivating methods | Biasness among consumers |
| High demand among consumers | Labor-intensive methods and high risks |
| Free fertilizers (compost) |  |

*Table 2. Pros and cons of eco-farming*

**Conclusion**

The aim of the project (to discuss strengths and weaknesses of eco-farming and decide which of them outweigh and suggest solution) has been reached. Over the course of the research, the hypothesis that not enough conditions have been created to develop eco-farming in Kazakhstan was confirmed. The reason is that a certain bias among consumers (a result or the survey) and lack of governmental support (result of interviews) were expected.

Overall, the outcomes of the work are reliable and can be generalized for the population of Kazakhstan, since all the research question were addressed based on comprehensive study conducted during the secondary and primary research and combined results of all methods. However, several aspects should be investigated further to research the topic in more detail.

WHAT IS CONSUMERS’ ATTITUDE TOWARDS ORGANIC PRODUCTS?

Based on the survey results, consumers favor naturally grown food and are even willing to overpay for it, creating a potential demand. However, 70% of people have certain distrust of eco-farmers. The reason may be that food package labelling is misleading people: there are officially recognized eco-signs and those producers use for advertising purposes only. Inconsistency of the “eco”-signs and the actual composition of the product results in prejudice against “eco-food” (Grigoruk & Klimov, 2016) along with the absence of national organic certificate, which was revealed over the course of interviews.

WHAT IS THE ENVIRONMENTAL IMPACT OF ECO-FARMING?

Based on the Code of Federal Regulations and a research by Janne Bengtsson, Johan Ahnstrom, Ann-Christin Weibul and local environmentalist assumptions, eco-farming was concluded to be environmentally safe practice. Moreover, the interview with environmentalist indicated that organic product have positive effect on human health as well but more profound investigation should be conducted on this topic.

WHAT ARE THE DIFFICULTIES OF RUNNING AN ECO-FARM?

Having analyzed NOP organic land policy and experience of eco-farmer and regular farmer, it was concluded that eco-agriculture is associated with numerous problems:

1. Lack of qualified workers
2. It is prohibited to sell eco-products for higher price during first 2-3 years
3. Labor-intensive agricultural methods
4. Short shelf-life of products and vulnerability to illnesses
5. No governmental aid for eco-farmers (specific for Kazakhstan)
6. Highly inaccessible materials (specific for Kazakhstan)
7. No official certification (specific for Kazakhstan)

IS ECO-FARMING PROFITABLE?

Taking into account both opportunities and difficulties of organic farming, it is reasonable to claim that drawbacks are more serious and, therefore, outweigh benefits. However, there is a potential to turn eco-farming into a thriving sphere, and thus protect the environment and provide citizens with sustainable food. There are some of the main suggestions to improve the current situation:

* Ensure that required equipment and materials are easily accessible
* Introduce financial program that acknowledges specific needs of eco-farmers
* Design national certification that will be recognized abroad
* Offer educational opportunities for beginners
* Educate both consumers and farmers about the concept of green agriculture

**Evaluation**

Overall, the results of the survey are relevant and generalizable. The sample included 100 people of different age, which means that it reliably reflects attitude of the whole population (citizens of Kazakhstan) and could forecast change of people’s opinion in future (the majority of respondents are under 50 years old). Questions were designed to comprehensively study the attitude of respondents. The weakness is that SurveyMonkey platform does not allow inserting pictures to answer options (therefore, the survey does not manage to identify if respondents able to distinguish between eco-label and fake). Although the survey was intentionally distributed among respondents from five regions of Kazakhstan, a corresponding question was not included. Therefore, it is impossible to identify the difference in responses among regions. Therefore, it would be better to use another survey platform and add a question about location of respondents.

The environmentalist is a governmental representative, therefore, possesses certain authority, her answers were extended and with detailed examples and cites to official documents and programs, which proves the validity of obtained information and her expertise. The only drawback of the methods was that interviewee was unable to provide official statistics to make the results more precise.

The eco-farmer is well educated and experienced businessman, therefore, his responses are valid.

The interview with local farmer aimed to learn farmers’ opinion on eco-farming and their level of their awareness. Although the farmer provided extended answers and shared his attitude and fears, results may not be valid for the majority of Kazakhstani producers, as opinion of a single person cannot be generalized to the whole population. Therefore, it would be better to replace interview with survey among farmers.

Because of current unstable situation connected with COVID-19 outbreak, it has become challenging to carry out an experiment. The first obstacle is that farm shop around the country are closed, therefore seeds and fertilizers are unavailable. What is more, growing seeds at home not at a greenhouse may give false results, since the conditions are different: the amount of sunlight, humidity, temperature and space.

The conclusion based on combined results of primary and secondary research, which confirmed each other in many ways. To address each research question several methods used, therefore, each answer was considered from different perspectives to make it unbiased and reliable. Answers were precise and detailed, adequately generalized; all assumptions clearly explained. Overall, the problem has been studied profoundly; conclusion is well-balanced and insightful with suggestion for improvement of the stated problems.

**Further research**

 In the beginning, it was supposed that farmers were generally interested in eco-farming, while government and consumers were responsible for unpopularity of the practice. Over the course of the work, it was confirmed that officials do not support organic agriculture specifically, making it challenging to run an eco-farm. Surprisingly, it seems that farmers have low level of interest and literacy in this question and the majority of consumers are willing to buy organic products. Furthermore, while examining a variety of sources, eco-farming turned out to be associated with far more difficulties than was expected, as certified eco-farm has to follow strict official rules. Thus, the personal perspective that circumstances do not allow farmers to turn to organic agriculture was supplemented with the point that an another reason is farmers’ own lack of interest and knowledge.

Based on the results of accomplished work, further research should focus on three main aspects. First, a survey should be conducted to evaluate farmers’ awareness and interest in eco-farming to fully understand what prevents eco-agriculture from becoming thriving sector in Kazakhstan and make a suggestion how motivate farmers to start eco-friendly business. The sample should cover producers from different regions to identify specific obstacles they face. In addition, an examination of seed shops is needed to decide if all required equipment is accessible for regular eco-farmers.

Second, the interview with environmentalist has suggested a new aspect to consider – the impact of organic products on human health. Although it seems apparent that naturally grown food has wholesome effect on organism, the question has to be examined in detail. The obtained information could be used to urge healthcare officials, consumers as well as farmers to support eco-agriculture. The most appropriate method for that is data analysis or interview with a dietician, which would allow receiving detailed and reliable information. Third, it has been known that a part of consumers is biased about organic products, which decreases demand for eco-food. The secondary research and the interview suggested that it may be caused by people’s inability to discern certified labelling. In order to prove this surmise, it is necessary to test consumers using a survey with pictures of different labelling and add a question about the location of respondents to trace the trends and improve the confidence of generalization.

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**Appendices**



Scheme 1 – An example of a blueprint of an eco-farmland

Diagram 1 – Age of the survey respondents

Diagram 2 – Respondents’ attitude on environmental impact of eco-farming

Diagram 3 – Average frequency of purchasing fruits and vegetables among survey respondents

|  |  |  |  |
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