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Economic Viability of Organic Farming in Haryana: A Comparative Study With Conventional Practices

Shweta

MA Economics (NET-JRF)

ABSTRACT

The study estimates the cost of production of organic farming and compares organic and conventional farms of the Haryana district on points of production, cost of production, productivity and price, economic returns and environmental sustainability. It shows that organic farming may be more labor-intensive and require more capital, but it is more sustainable through higher returns and lesser use of chemical fertilizers/pesticides over time. The study of the main constraints to organic farming conversion faced by farmers will examine issues caused by lack of information, insufficient infrastructure and unfavorable policy environment for organic farming. The study uses economic modeling and field case studies in Haryana to analyze the future feasibility and sustainability of organic farming in Haryana.

Keywords: Organic Farming, Economic Viability, Conventional Farming, Sustainability, Haryana, Agricultural Practices, Profitability, Cost Structures, Market Prices, Farming Transition.

INTRODUCTION

Agriculture is the largest contributing sector in Haryana economy in terms of gross domestic product and agricultural operations provide means of livelihood to a large section of population. The agricultural and farming practices in the region historically are customary farming operations and the usage of chemical fertilizers, pesticides and monoculture has been common for decades. Concerns about environmental and human health effects of chemical fertilizer and pesticides, as well as soil degradation, have led to interest and growth in organic agriculture as a sustainable farming practice. Practices such as increased biodiversity, organic fertilizers, and crop rotation are used by many farmers to pursue more sustainable and profitable levels of farming.

The worldwide increase in global demand for organic products has not been matched in Haryana with a proportionate increase in organic farming. Organic farming is beset with three major constraints namely high capital investment, lack of adequate marketing support and lack of knowledge of organic production practices. Benefits of organic farming include the improvement of soil, reduced pollution, improved market opportunities for products with higher health and environmental standards, and the provision of high-priced products.

The aim of the present research paper is to study the financial feasibility of organic farming in Haryana as compared to conventional farming. The paper examines the financial characteristics of the two systems of farming from the point of view of cost of investment, production, and business cycle. In this paper, the prospects of organic farming as a sustainable mode of farming for farmers in the state of Haryana have been highlighted. The different possible government policies like subsidies, market intervention programs and their role as a stimulus to adopt sustainable organic farming have been analyzed.

The evaluation's results could provide meaningful information and insights for policy makers, farmers, and scholars interested in Haryana's sustainable agriculture production system.

1.1 Agriculture in Haryana - Overview

Agriculture is the most important source of revenue in the economy of Haryana, as it drives the GDP growth in the state directly and generates the employment for major chunk of the population. Agriculture is the mainstay of the state's economy with a contribution of about one-fifth of the revenue of the state. With its high contribution to crop output, Haryana is one of India's major farming states. It has a large area of productive land, with a suitable climate and irrigation works, which supports the cultivation of a variety of crops, including wheat, rice, sugarcane, cotton and mustard. Haryana is one of the highest producers of wheat and rice in the country. Haryana, at that time, was a present

of progress in the agriculture sector. The state gained the status of one of the major agricultural states of India, with the start of the Green Revolution in the 1960s.

The problems being faced by agriculture in Haryana include issues related to water scarcity, soil degradation and chemical agricultural input dependence. Since groundwater levels have decreased, and there has been a degradation of water quality due to irrigation, chemical pesticides had a damaging effect on soil. Farmers try to find eco-friendly Agriculture Practices Alternatives. Organic farming has been gaining attention as an alternative to slowing environmental degradation while maintaining the economic viability and productivity of agriculture.

1.2 Conventional Farming Practices in Haryana:
Chemical inputs for crop production are the main strategy for agriculture in India or Haryana. High-input agriculture is the backbone of Haryana agriculture because the food sector seeks to increase the productivity of available land by the combined application of synthetic inputs, mechanized technologies, and new irrigation schemes and techniques, as well as organized markets. The high-yielding varieties of wheat and rice are produced using chemical fertilizers for maximum yield. Haryana has been at the top of crop production, producing a huge surplus of food grains for India through the adoption of modern agricultural techniques. These practices, however, raise environmental concerns, such as soil depletion, soil pollution, and reduction of fertility of the soil.

1.3 Problems with Conventional Agriculture:
Their key problems are high levels of chemical inputs and poor water management. Farmers contribute to soil degradation, loss of biodiversity and water pollution as a result of the use of inorganic fertilizers and pesticides in the agricultural production process. They also use groundwater unsustainably and deplete its reserves. The overuse of groundwater for irrigation has led to a drastic depletion of the water tables at an unsustainable rate causing serious water shortages in the region. Use of chemical pesticide in customary cultivation has also caused environmental spillovers in the form of agricultural runoff in the environment and health hazards in foods consumed. The economic condition of farmers has not improved much because their production costs rise every year including fertilizers, seeds, manure, medicine, machinery, labour and irrigation water leading to agricultural households in distress.

1.4 Introduction to Organic Farming:
The aim of organic farming is sustainability of the ecology and the health of farmers as well as consumers. Conventional agriculture avoids synthetic pesticides, chemical fertilizers, herbicides, insecticides and fungicides. Organic farming uses crop rotation, green manures, compost, animal manures, legumes and organic fertilizers to maintain the fertility of the soil and control pests. Organic farming is a method of agriculture that fosters biodiversity, conserves water and reduces carbon dioxide emissions. Organic farming has become more popular as people have become more aware of the dangers of chemical-intensive farming methods, and demand has increased for organic food that is free from chemicals. Organic agriculture in Haryana has been developing slowly over the years since its initiation as an alternative to minimizing the adverse effects of conventional agriculture methods.

1.5 Global Trends in Organic Farming.
Organic farming has seen spectacular growth in recent years, and consumers now want the healthiest and most environmentally friendly foods. People are switching to organic foods and away from chemical farming because they are informed of the negative effects of chemical farming on health and the environment. The shift is found in both developed and developing nations. The global organic market has been growing rapidly. The US, along with Germany and France, constitutes a major organic food production and consumption market. Not only is organic farming environmentally helpful, but it also helps with rural development and food affordability. With the ever-rising governmental and international levels of support and incentive through certification and subsidy programs, it is becoming more and more affordable and accessible worldwide. Supporters of sustainability are identifying organic farming as an option to address food security needs with reduced agricultural environmental impact.

1.6 Environmental impact of industrial versus organic farming:
Chemical agriculture is characterized by the massive use of pesticides and fertilizers. This destroys ecosystems and human health on earth and has many negative environmental effects such as the destruction of the soil structure, the pollution of the water table, the loss of biodiversity. Besides, the water that runs off the land and into the oceans forms pollution that eliminates marine ecosystems and makes the water undrinkable. By contrast, monoculture agriculture degrades soil and makes an entire ecosystem more vulnerable to disease and pests because it lowers the biodiversity of the crops being grown. To prevent that kind of degradation, organic agriculture maintains soil fertility, reduces the levels of water pollution, and promotes biodiversity through practices such as crop rotation, composting, and biological pest control. The impact of torrid farms to maintain a healthy soil, conserve water, and reduce carbon emissions promises sustainable agriculture for the future.

1.7 Market Demand for Organic Products
A majority of people around the world are continually increasing their consumption of organic food products, which are seen as healthier and more environmentally friendly. People purchase organic food as a substitute for

conventionally produced food to avoid pesticides, GMO and chemical residuals in their food supply. Organic fruits and vegetables, dairy products, grains, etc. are sold at a higher price in the market because of their higher quality and because they are produced in an ecologically sustainable manner. Organic food is also known to have higher nutritional values as a result of the sustainable manner of production. The growing demand for organic food, is not a feature of only the developed ones. Despite the potential of Haryana farmers to adopt organic farming, there are challenges like organic certification, market access for organic products, and consumer awareness of organic farming.

1.8 Economics of Organic Farming.

Economic considerations for organic agriculture are numerous. In the short term, organic farming may be more expensive than conventional farming. Organic farmers have to invest more labor, time, and money to maintain organic certification, use organic fertilizers, and spend three years transitioning their farm with lower crop yields before producing certified organic produce. Furthermore, organic farmers often have high initial costs as they pay for organic certification and build relationships with organic buyers. However, organic farming has the opportunity to be economically viable in the long term because produce can be sold for a premium price and farming costs are reduced when less pesticides and fertilizers are used. Organic agriculture can reduce reliance on non-renewable external inputs such as chemical fertilizers and biocides, resulting in lower input costs in the long run. The reduction in environmental impact associated with organic agriculture can also lead to long-term economic benefits. Examples of such benefits include improved soil health, greater moisture retention, and improved climate resilience.

1.9 Cost Structures of Organic and Conventional Agriculture:

The cost structure of organic production differs greatly from that of conventional systems because production practices and inputs vary considerably. For instance, most purchased inputs in the conventional production system are synthetic fertilizers, pesticides, herbicides and machinery which account for a substantial part of the total cost. These chemical inputs are generally used with irrigation, adding further costs to intensive agriculture. Customary methods of agriculture have also been linked to a decline of soil fertility, meaning that the same amount of land would be more difficult or expensive to grow the same amount of crop.

Thus, organic farming has higher labor costs for weeding, composting, crop rotation and other practices, and the costs of organic certification are another important upfront cost for organic farmers. Organic farming has the potential to reduce fertilizer and pesticide costs because there are fewer external inputs. In addition, less money may need to be spent on soil maintenance to keep it fertile. Such investments, which incur the higher variable costs for organic production, may be offset by the higher price premiums paid for organic products, making them economic in the longer term. It is also true that organic systems are generally less dependent on agrochemical fertilizer or pesticide inputs, and are therefore less susceptible to fluctuations in global market prices.

2. OBJECTIVES OF THE STUDY

1. To understand the economic viability of organic farming in Haryana by assessing the profitability, comparative input costs, and financial sustainability of organic farming versus conventional farming in Haryana.
2. To assess the environmental impact (in terms of soil fertility, water use, biodiversity) of organic and conventional farming in Haryana and its implications on economic sustainability of both systems.
3. To study the market demand of organic produce in Haryana and its implication on consumer preferences, price premiums and marketing of organic farm produces by farmers.
4. To delineate barriers and challenges for the adoption of organic farming and to explore policy initiatives and support mechanisms for the promotion of organic pattern of farming in the state of Haryana.

RESEARCH METHODOLOGY

This research utilized a mixed-methods approach to evaluate the economic viability of organic farming in Haryana compared to conventional farming. The study used qualitative and quantitative research methodologies to gather and analyze data from various sources. It involved a combination of primary and secondary data collection methods to compile information on the subject of organic farming. For primary data, a survey of Haryana farmers collected data on the duration of and experience in organic and conventional agriculture, the initial and annual costs, earnings and problems faced. Secondary data was collected from various printed government sector publications, research papers and agricultural literature to provide data and analyzes of soil health, water usage and prices in relation to organic and conventional agriculture. The primary descriptive statistics and comparative analyzes used to assess the economic viability of the organic crop versus conventional crop were obtained from these surveys and secondary data sources. The financial variables compared from this data include costs of establishment, annual inputs, receipts, and net income, all in comparison to the other crop. Other indicators include the soil pH, stocks of soil organic carbon, water use, chemical inputs, and demand for organic food measured as premium prices, consumer preferences or price and demand differentials, and in addition a comparison of price and demand trends of organic products versus conventional products in different markets. Barriers to conversion are analyzed based on survey data. High costs of conversion and operating capital, lack of access to markets, and lack of knowledge and information were identified.Tabular data is also represented through graphical representation in the form of bar charts, line graphs, and pie charts to enable readers to

further grasp the research data and findings visually. The tables, along with the graphical representation of the data, provide an exhaustive understanding of the economic, environmental, and market drivers of organic farming practices in Haryana for policymakers, farmers, and agricultural stakeholders.

4. DATA ANALYSIS

The next part of the chapter estimates the profitability and environmental efficiency of organic as compared to conventional farming in Haryana. The qualitative and the quantitative analysis for the profitability is considered in terms of the initial investment expenditure, annual cost expenditure, revenue and final profits associated with organic and conventional farming. Using these survey data and other sources, the statistical values were calculated and analyzed for each farming system. The data indicated that organic farming requires wide-ranging fixed costs and personnel, due to the process of certification. It provides net yields and revenues that are competitive due to market premiums for organic products. However, production increases costs even if organic farming is profitable. Life cycle assessments on the farm-side used comparisons of inputs/outputs through, e.g., comparisons of soil, water, and chemical impacts. Studies have shown organic farming improves soil conditions for the future fertility of soil, that it has higher organic matter in the soil, and it increases the soils pH to a slightly better degree than conventional farming. Less water is used on organic farms than with conventional farming as soil on organic farms can stores more water and irrigation is used less often, so pollution is lessened. Farms that are organic do not use artificial chemicals and other non-organic farming methods.

Consumer demand determines the organic produce market. Market demand for organic products studies consumer preference for prices. Since consumer taste for chemicals-free agriculture causes an increase in price for wheat and vegetables similar to that of rice, organic produce is more expensive than conventional agriculture. The demand for organic food continues to rise but is still smaller than conventional food. In some foods (for example vegetables), the demand for organic and non-organic is roughly equal. The organic farmers of Haryana encounter difficulties towards proper adoption of organic farming. The high costs of investment in the beginning, lack of market to sell the produce without previous knowledge of farming and uncertain crop yield from organic farming production are the main constraints faced by the farmers in adoption of organic farming. Hence, strong statewide initiatives and educational programs and infrastructure improvements should be put into place to promote such actions regionally.

Table 4.1: Economic Viability Comparison: Organic vs Conventional Farming

Farming Type	Initial Costs (₹/hectare)	Annual Input Costs (₹/hectare)	Annual Revenue (₹/hectare)	Net Profit (₹/hectare)
Conventional	25,000	40,000	90,000	25,000
Organic	30,000	45,000	95,000	20,000

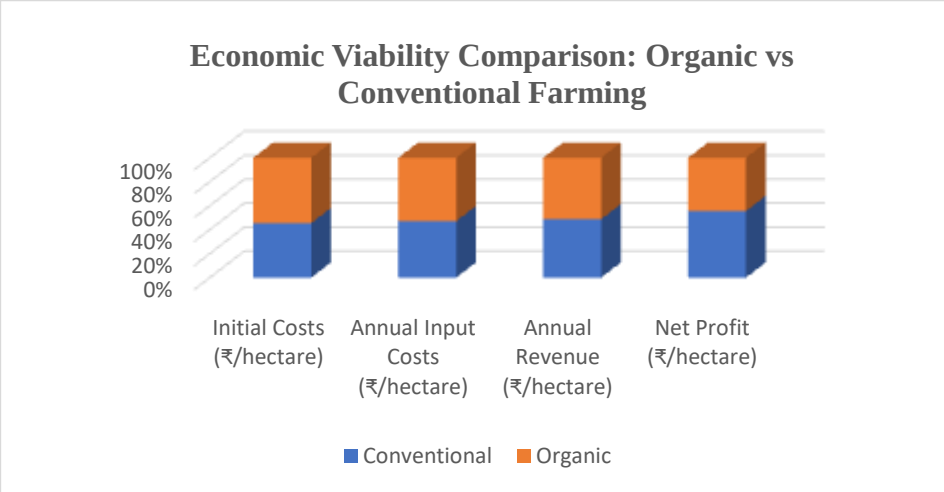

Figure 4.1: Economic Viability Comparison: Organic vs Conventional Farming

The following table provides an economic comparison of conventional and organic farming in Haryana on a per hectare basis. The economic input for organic farming (₹30000) is higher than conventional farming (₹25000) as organic certification and labor-intensive works are more in organic farming. The annual input cost of organic farming (₹45,000) is higher than that of conventional farming (₹40,000) due to organic inputs such as compost, natural fertilizers etc. However organic farming has slightly higher annual revenue of ₹95,000 than conventional farming which has an annual revenue of ₹90,000. In this contrast case, the profit from organic cultivation (₹20,000) is lesser

than from regular conventional cultivation (₹25,000), because although the organic cultivation earns more revenue, the high cost of production makes profit less.

Table 4.2: Environmental Impact: Soil Health and Water Usage

Farming Type	Soil pH	Organic Matter (%)	Water Usage (liters/hectare)	Chemical Input (kg/hectare)
Conventional	6.5	2.5	15,000	80
Organic	7	4.5	12,000	0

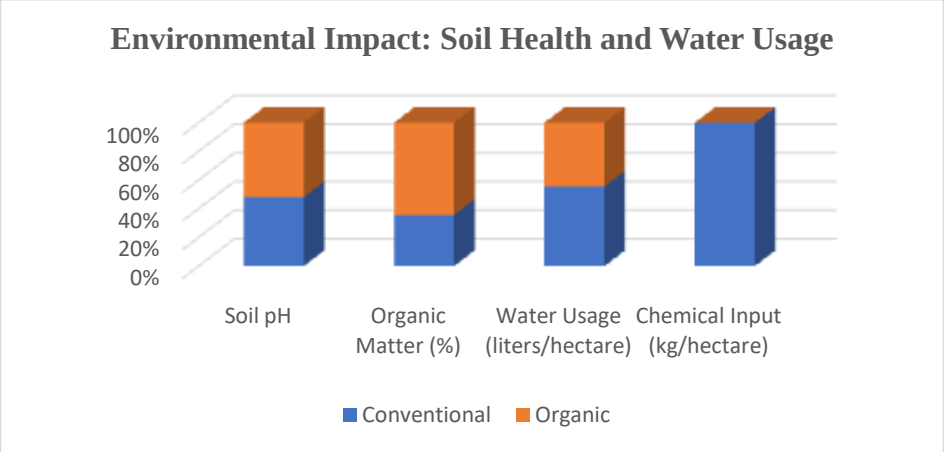

Figure 4.2: Environmental Impact: Soil Health and Water Usage

Compared with conventional farming, organic farming has a positive effect on soil quality. Organic farming has a soil pH of 7, more alkaline than the 6.5 pH of conventional farming, which indicates soil fertility will increase over the long term. Advantages of organic farming include: higher organic matter (4.5% in Organic compared to 2.5% in Conventional) which will improve soil structure and fertility, and lower water consumption (for example, 12,000 liters per hectare in organic systems compared to 15,000 liters per hectare in conventional systems), indicating an efficient use of water resources within the system. Organic farming does not use chemical inputs like conventional farming, which uses approximately 80 kg of chemicals per hectare, resulting in less environmental pollution and more sustainable development.

Table 4.3: Market Demand for Organic Products: Price Premiums and Consumer Preferences

Product	Conventional Price (₹/kg)	Organic Price (₹/kg)	Demand for Conventional (%)	Demand for Organic (%)
Wheat	20	30	70	30
Rice	25	40	60	40
Vegetables	15	25	50	50

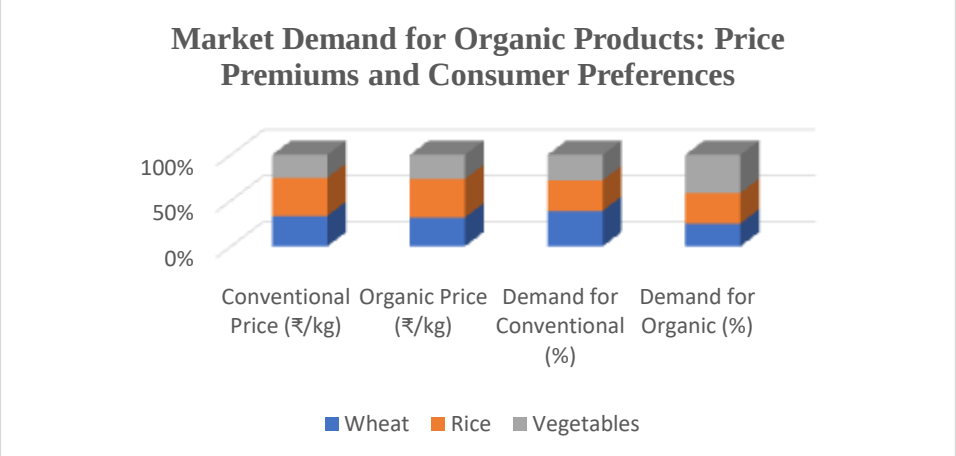

Figure 4.3: Market Demand for Organic Products: Price Premiums and Consumer Preferences

The wheat price for conventional is ₹20 and for organic, it is ₹30. The rice price for conventional is ₹25 and for organic, it is ₹40. The vegetable price for conventional is ₹15 and for organic, it is ₹25. It is a price premium in favor of organic produce for both vegetables as well as the grains. The demand share of conventional wheat and rice is 70% and 60% respectively, whereas the demand share of organic wheat and rice is 30% and 40% respectively. There are equal demands for organic rice and vegetables, and for the conventional version, both at 50% each, suggesting demand for organic rice and vegetables. This is despite the higher price of organic produce.

Table 4.4: Barriers to Organic Farming Adoption in Haryana

Barrier	Percentage of Farmers Reporting Barrier (%)
High Initial Investment	60
Lack of Market Access	50
Limited Knowledge and Training	45
Uncertainty in Crop Yield	35

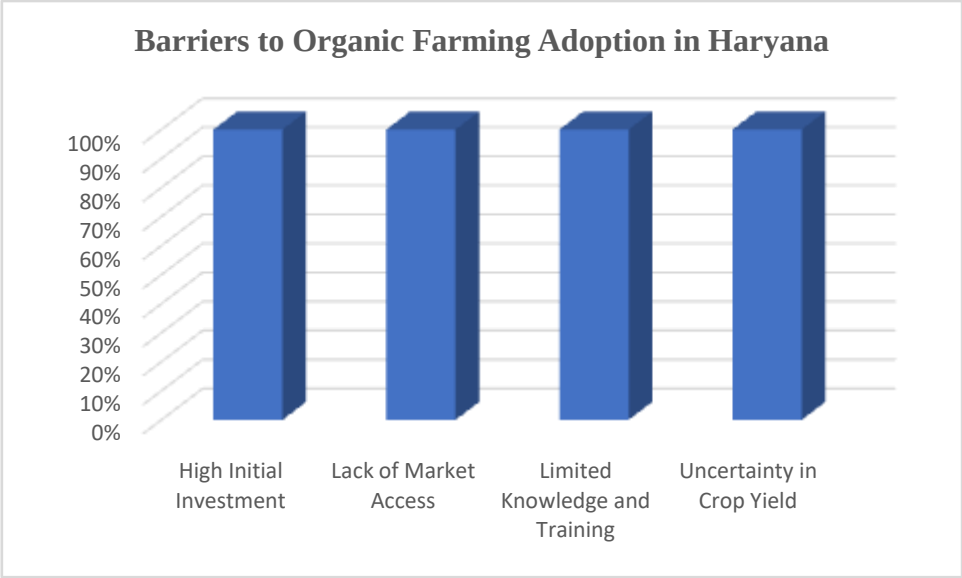

Figure 4.4: Barriers to Organic Farming Adoption in Haryana

The table lists common challenges to organic farming as reported by farmers within six categories. High fixed costs are the most common challenge to organic farming, with 60% of farmers reporting they had trouble adapting to organic farming methods and becoming certified organic. An important barrier to organic farming is access to organic markets, with 50% of farmers reporting that their main barrier is selling their organic products. An additional barrier to organic farming is the lack of knowledge and training in organic farming, which is reported by 45% of farmers. Finally, 35% of farmers cited uncertainty in crop yield as an obstacle, which can be related to the uncertainty of organic agricultural production compared to conventional production.

CONCLUSION

The economic feasibility of organic farming was assessed in Haryana, India by estimating various economic parameters. While organic farming adds to environmental sustainability through improved soil, water conservation and reduced application of chemicals and hazardous inputs in agriculture, such practices face important economic barriers. This provides the context for the study. Due to certification fees and laborious management strategies, organic farming has higher start-up and per-acre input costs than conventional farming. This is offset somewhat in the premium prices of the organic market, although net profit margins are slightly smaller.There is growing market demand for organic produce including high-value vegetables, rice, and wheat. The organic produce is selling at a premium, and consumer preference is shifting towards safer, sustainably cultivated products. Despite the strong demand, several challenges have limited the uptake of organic farming in Haryana, including the high initial costs, lack of knowledge, lack of market connectivity, and uncertainty over yields. These constraints are particularly challenging for smallholders and farmers lacking resources. Policy measures need to be undertaken to promote organic farming in Haryana, including financial assistance, incentives for organic certification, farmer training programs, and better market access and related infrastructure. Addressing these barriers can lead to a more economically viable and environmentally sustainable model

of organic agriculture and contribute to the economic well-being of farmers while improving the long-term health of the environment.Ultimately, despite the challenges, organic farming in Haryana has the potential to contribute considerably to sustainable development and the state's economy. With the right government policies, infrastructure, and support systems, organic farming can become an increasingly important part of Haryana's agricultural landscape, benefiting both farmers and consumers while promoting a more sustainable and eco-friendly farming system.

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