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SOCIECONOMIC TRENDS AND CONSTRAINTS IN ORGANIC FARMING IN THE SMALL HOLDER FARMING SECTOR OF ZIMBABWE

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Abstract

Organic farmers in Juru communal area were interviewed to establish socio-economic background, crops grown, problems encountered and the perceived advantages in organic farming. Farming was the main source of income to 86 % of the organic farmers. Only 57 % considered organic farming as a cheap strategy, while 50 % and 43 % respectively saw it as inconvenient and disease-free technique respectively. Problems highlighted included animal manure shortage, slow organic material decomposition and high labour requirements. Those implementing organic farming can use the results to formulate strategies that can improve on adoption of organic agriculture in the smallholder-farming sector. Any success in the implementation of organic farming in the smallholder sector would be a great step towards implementing sustainable agricultural production techniques in Zimbabwe.

Introduction

Organic farming is a form of agriculture which excludes the use of synthetic fertilizers, pesticides and plant growth regulators. The farming system is holistic in that it employs a number of strategies in maintaining as well as improving land productivity. Organic farmers rely on strategies like crop rotation, integrated pest management, crop residue, compost and mechanical cultivation to maintain soil productivity.

Crop rotation is the practice of growing a series of dissimilar types of crops in the same space in sequential seasons. Crop rotation avoids the build up of pathogens and pests that often occurs when one species is continuously cropped. The system also seeks to maintain the fertility demands of various crops to avoid excessive depletion of soil nutrients. The employment of strategies like crop residue incorporation and use of compost is designed to maintain or add the organic matter componet of the soil. In organic farming, Integrated Pest Management (IPM) is a pest control strategy that uses an array of complementary methods like natural predators and parasites, pest-resistant varieties, cultural practices, biological controls, various physical techniques, and even strategic use of pesticides . When carefully employed the approach can significantly reduce or eliminate the use of pesticides.

According to Kuepper (1998), the application of organic material in agriculture has contributed immensely to converting the poor fragile land of the world into stable productive zones. Many parts of Zimbabwe are arid and semi-arid and these experience recurrent droughts and crop failures. Almost 55% of Zimbabwe is semi-arid, with almost 63% of the rural population (Myer et al 2004). These areas are dry and farmers face food shortages in almost every season. The majority of the farmers have low incomes. Chemical fertilizers are expensive and manures are not readily available. Moreover, little is known about the correct use of these nutrient sources in dry climates.

Most farmers in the third world countries including Zimbabwe pursue farming strategies that require intensive use of expensive and sometimes unavailable inputs like inorganic fertilizers and herbicides. However, the majority of the farmers do not have the requisite capital to finance modern farming operations.

Use of chemical inorganic fertilizers can cause soil and water pollution in Zimbabwe. Serious consequences of water pollution have been reported in water bodies like Kariba, Chivero and Mutirikwi just to mention a few (Nyakanda, 1996). Although, nutrients such as phosphorus, nitrogen, and potassium in the form of fertilizers are applied to enhance production, when they are applied in excess of plant needs, they can wash into aquatic ecosystems where they can cause excessive plant growth, which reduces swimming and boating opportunities, creates a foul taste and odor in drinking water, and kills fish. In drinking water, high concentrations of nitrate can cause methemoglobinemia, a potentially fatal disease in infants also known as blue baby syndrome. Farmers can adopt organic farming system, which help maintain high yields and save money on the use of fertilizers while reducing pollution of water resources.

The term *organic farming* describes systems that work to mimic and optimize natural processes for the production of agricultural crops (Kuepper, 1998). Organic growers utilize a wide range of cultural practices and natural inputs to manage crops in a manner they consider safe for the environment and the consumer. Use of synthetic pesticides and standard commercial fertilizers is minimized or where necessary avoided. Organic farming encompasses adoption of some common practices and agronomic aspects like crop rotation, composting, use of livestock manure, cover crops, mulches and green manure.

Organic farming is compatible with rural communities and smallholder farmers who generally lack capital to buy synthetic pesticides and inorganic fertilizers. Farmers usually use livestock manure, cover crops and composts for small gardens and plots, which in most cases do not exceed three hectares. In much of Southern Africa, water is

scarce and contaminated when found. Marginal lands are typically short on soil tilth, vegetation, and rainfall.

A number of areas in Zimbabwe are experiencing recurrent droughts and crop failures. The majority of people in rural Southern Africa are conditioned to farming per Western standards of production, with off-farm inputs often imported at high costs, and water-intensive crop cultivars that are not adapted to the low-rainfall conditions or nutrition needs of local people. Furthermore, ranching with livestock and farming with chemicals have desertified, deforested, poisoned and stripped vegetation from the land. Ecologically, there are impacts of industrial-style farming on groundwater through pesticide and fertilizer runoff (The African Organic Farming Foundation 2004).

Chemical fertilisers are known to have damaging effects on the terrestrial and aquatic environments (Jiyane and Svotwa, 2006). Chemical fertilisers leach into underground water sources and surface water bodies (Palaniappan, 1995), bringing conditions like water hardiness and eutrophication. This endangers living organisms in the water. Of late, inorganic fertilisers have been in short supply in the country and, when the commodity becomes available on the market the prices are beyond the reach of small-scale farmers. The country is left with no option except to import chemical fertilisers in the background of perennial foreign currency shortages. It becomes imperative to shift our thrust to organic fertilisers that are affordable and renewable.

Organic fertilisers can improve the soil by lowering bulk density, and they can reduce soil erosion and improve soil fertility (Grant, 1981). Organic matter encourages formation of crumb soil structure thus improving soil drainage, infiltration and aeration. The dark colours that form with increasing organic matter content improve soil

temperature relations with an effect of boosting important microbial activities and root development (Kuepper, 2002). These fertilisers also take care for the 'living soil', which entails maintaining microbiological life in the soil in balance with the whole ecosystem without altering soil pH. Since organic fertilisers can be made on the farm, farmers can cut on the cost of crop production by adopting organic farming. Overall, the reduction in the use of inorganic fertilisers will reduce contamination of the soil and water environments.

The objective of the research was to establish the socio-economic background, crops grown, problems encountered and the perceived advantages in organic farming in Juru communal area in Mashonaland east province of Zimbabwe where a Non Governmental organisation was actively implementing the system. Juru communal area is in Goromonzi district in Mashonaland East province of Zimbabwe. Goromonzi is in Agro-ecological Region II of Zimbabwe. The zone is characterised by an annual rainfall of between 750-1000mm. The area has an altitude of at least 1000m above the sea level. Temperature ranges from 21-32^{0}C, with a mean of 25^{0}C. Frost occurs infrequently in low-lying areas in the months of July to August. Soil texture ranges from sand to sandy clay. The region is suitable for intensive cropping and livestock production.

A non-governmental organisation, Fambidzanai Permaculture Institute of Zimbabwe is encouraging farmers to practice organic agriculture and a total of 246 farmers had already adopted the technique.

Method

A structured survey questionnaire was used to collect data on households and farm details related to the research objectives. The research was conducted between 30

November 2005 and 31 January 2006. The sample frame consisted of 246 organic crop-growing farmers. A non governmental organisation that is supporting the use of organic farming techniques in the area assisted by providing a list of all the organic crop-growing farmers, which was used in this project to locate the farmers. Fifty farmers were selected to participate in the survey.

The first interviewee was selected from the list using random sampling. The next 48 respondents were chosen using a systematic sampling procedure where every tenth farmer after the first was interviewed.

Before data collection, a pilot survey to pre-test the questionnaire was conducted on two farmers who were not on the interview list.

Results and Discussion

Results

Table 1 gives summary information of the farmers in the study area. The majority (79 %) of the farmers were female and 57 % were over 51 years old, owning fields less than one hectare in size. To most farmers (86 %), farming was the main source of income whilst 14 % had other sources. The proportions of farmers who grew various crops for sale, subsistence and other uses are given in Table 2.

Seventy nine percent (79 %) grew maize and the remaining 21 % grew vegetables. Of the 21 % vegetable growers, 80 % grew tomatoes whilst 7 % grew fruit crops and round nuts.

Table 1. Status of organic farmers in Juru Communal area.

VARIABLE	***PERCENTAGE (%)***
More than 51 years old	57
Between 41 – 50 years old	7
Between 20 – 40 years	36

Field size less than 1 ha	57
Field size between 2 – 3 ha	43
Organic farming as main source of income	86
Other sources as main source income	14
Female farmers	79

Thirty six percent (36 %) of the farmers expressed the problems they faced in sourcing fertilizers in their decreasing magnitude as (1) short supply, (2) exorbitant prices (3) late delivery after the critical stages of crop growth. Equal proportions of 50 % of the farmers used kraal manure and, decaying and decayed leaf matter as fertilizers. Forty three percent (43 %) used compost and 64 % practiced crop rotation. Problems of high labor demands and inorganic fertilizer burns were equally mentioned by 7% of the farmers. Other problems encountered were those of livestock herd and slow compost decomposition (Table 3).

Table 2. Crops grown by farmers in the research area.

	Tm	Vg	Frt	Hb	Mz	G/nt	R/nt	CP	SP	SF
Sale	86	86	7	29	57	36	14	-	7	-
Subsistence	21	43	-	-	64	57	50	14	14	-
Stock-fed	-	-	-	-	-	-	-	-	-	7

KEY: Tm – tomato, Mz – maize, CP – cow peas, Vg – vegetables, G/nt – Groundnuts, SP – sweet potatoes, R/nt – round nuts, SF – sunflower

Organic techniques of controlling insects were also practiced in Juru. Thirty six percent (36 %) of the participants sprayed crop with solution of *lantana camara* and *comfrey leaves* (1:2 ratio) to control sap-sucking insects in vegetable gardens. Intercropped repellents included onion, pepper and the Mexican marigold (*Tagetes minuta*) weed was deliberately left in the field because of its repellent properties on insects like aphids, red spider mites and leaf eaters.

Table 3. Constraints encountered in organic farming

Problems encountered	Frequency (%)
High labor demands	7
Fertilizer burns	7
Slow compost decomposition	21
Transporting organic manures	14
Small herd of livestock	29

Forty four percent (44 %) of the interviewed farmers acknowledged improvement in all their operations due to the adoption of organic farming, with the remainder still in doubt of any success. Farmers commented that organic farming was a cheap and convenient method of farming, resulting in reduced crop diseases (Table 4). There were claims of organically produced tomatoes having a shorter shelf life and poorer outer skin texture, while leaf vegetables were said to have a better preference by buyers. Other opinions expressed by farmers on organic farming are recorded in Table 4.

Table 4. General comments on the success of organic farming.

COMMENTS	FREQUENCY %
Results in high quality crops	21
Increased yields	21
Herbs are healthy	7
Cheap means of crop production	57

Reduced disease incidence	43
No crop burns	14

A wide range of yield was realized by those who adopted organic farming. Farmers stated several problems associated with the adoption of organic farming as in Table 5.

Table 5. Problems of using organic fertilizers.

PROBLEM	FREQUENCY%
No market for herbs	14
Little technical back-up	14
High inputs quantities made	21
High labor requirement	14
Increased weed cover	21

Discussion

A high proportion of the organic farmers were elderly people and these were generally regarded as resource poor, and could not afford to use synthetic pesticides and inorganic fertilizers. Most farmers in the area earned their livelihood exclusively from farming. With only 1-3 ha of land per household, the overall farming system to be adopted had to be efficient to maximize crop output per hectare. Any increase in the rate of adoption of organic agriculture was a step forward in protecting the environment from degradation and contaminations by agrochemicals used in crop production practices.

A wide variety of crops that were grown in Juru were an indication of the suitability of the area to crop production. As an area in the Agroecological Region II of Zimbabwe, Juru was part of the prime crop production zone that had lost the status due to

general decline in crop output. An increase in the rate of adoption of organic farming would bring benefits such as improved retention and availability of soil nutrients, increase in the population of organisms in the soil, increase in water holding capacity, all of which reduce vulnerability of crops to dry spells. Such improvements can bring back the region to the breadbasket status that it has long since lost.

Late or lack of availability of inorganic fertilizers has been a problem for several years now. That has naturally resulted in the late distribution and deliveries of fertilizers to farmers to well after critical crop stages, thus resulting in low crop output. Cases of poor quality fertilizers of lower nutrient composition than what was actually on the label have been reported in Zimbabwe. Such factors should assist proponents of the organic farming technique to win many converts on their side to the benefit of crop production and environmental protection.

Although organic manure types such as kraal manure, compost and leaf litter could effectively substitute the inorganic fertilizers, they were seen to be bulky and hence difficult to transport, while their nutrient composition was not known. Manures are generally known to have a variable nutrient composition that depends on the class of animal and the weather conditions of the area in which it is stored. Grant (1981) noted the poor quality of kraal manure in most communal areas due to poor storage conditions, which expose them to rainfall and heavy leaching.

Communal farmers had small plots of about 1-3 ha and most of them could afford to grow crops like tomatoes, leaf vegetables and maize for sale. The greater part of their produce in maize, groundnuts and round nuts were retained for subsistence use. Crops like fruits and sweet potatoes are rarely sold, while cowpeas was not sold but grown for

home consumption. Some farmers grew herbs like lemon cream, comfrey and rosemary, and these have medicinal properties (Hudson, 1995). The success of organic farming had therefore the potential to create food self-sufficiency in Juru.

The problem of having a small flock of livestock could be a great set back to the success of organic farming, as cattle are mostly the major source of organic manures in the communal areas of Zimbabwe. The low livestock numbers could have been caused by the devastating 1991-92 drought that was estimated to have reduced the cattle herd in the whole of Zimbabwe by more than 50 percent (Ngara and Rukobo, 1992). The government of Zimbabwe and NGOs that were supporting rural development programs could aid the success of organic farming by introducing cattle restocking projects, as the South Eastern Dry Areas Project (SEDAP) once did in the Eastern and South Eastern Districts of the country (Svotwa, 2001). However, most governments of less developed countries are known to be hesitant in providing adequate support for biological control projects primarily due to myths that biological control is expensive, difficult to achieve, requires enormous investment and manpower while the chances of success are remote and highly unpredictable (Blade and Sweetmore, 1994).

The problem of slow decomposition of organic residue could be a result of the decline in the population of microorganisms in the area, due to land degradation. There are other techniques available to improve the soil. For example, organic management techniques like stubble mulch farming and residue incorporation in rows could be helpful in improving the physical, chemical and biological soil properties, leading to improvement in the rate of organic matter decomposition. An important factor in organic matter decay is the carbon: nitrogen ratio that is dependent on the age of the plant

material, the species and the part used (Hussein, 1999). Therefore farmers need technical and educational support to assist them in selecting material and techniques that quickly ensure the benefits of the strategy are realized. Currently the early adopters of organic farming were receiving technical assistance from Fambidzanai Permaculture Institute

Use of plant species with insecticidal and repellent properties could substantially reduce the amount of pesticides in the environment and subsequently retard land degradation. However, the volumes of such biological insecticides required could also be so big that demand for the insecticidal species could result in its overexploitation. Generally, the organic crop-growing farmers concurred that their success in organic farming was a result of the training they had received from Permaculture centre. However, a considerable number of farmers felt there was little progress in organic farming due to reduced visits from technical staff and the problem solving aspect which demotivates farmers reducing their participation in organic farming.

Conclusion

Female-headed families in the Juru communal area, the majority of who regard farming as the main source of income, dominated organic farming. The majority of these farmers were above fifty years of age. Most of the farmers possessed less than one hectare of land. Crops produced through organic farming in Juru communal lands included tomato, maize, cow peas, vegetables, groundnuts, sweet potatoes, round nuts and sunflower. Pest control strategies were varied ranging from intercropping with repellent crops to spraying plant juice extracted from repellent plants. Quite a number of problems were faced in trying to adopt organic farming. Among them was labor intensity, slow organic matter decomposition, bulky nature of organic manures, thus incurring high

costs of transportation and the general unavailability of organic fertilizer sources. Organic farmers in Juru communal area perceived quality improvement, yield increase, and reduced cost of production among others, as the main advantages of adopting organic farming.

Most farmers viewed organic farming as a cheap and convenient means of growing crops. The perceptions shared by farmers are that organic crops do not spread diseases. The benefits of organic farming were not well pronounced by farmers, who noted that some of them were not performing so well and that success or progress deteriorated as farm visits and problem-solving aspects had decreased.

Farmers were lamenting failure to secure markets for some of the crops like herbs which the population in the locality was not yet familiar with. As a relatively new agricultural strategy in the area, there is lack of technical backup and those sponsoring the program should look into the need for training of extension staff that work directly with the farmers. Another problem was the association between increase in weed population and the use of organic manures, a problem that could easily be solved by the adoption of integrated pest management techniques.

Recommendations

The few farmers in the area who have adopted organic farming techniques could be used to spread the perceived advantages of the farming practice. Since the practice is intensive it could be very useful in similar communal areas to Juru, where farmers have small land holdings.

Generally, organic farming could be successful through increased visits by technical persons, holding workshops or short courses for farmers and supplying farmers

with inputs like seed for organic agriculture. Farmers should get adequate training on preparation and post emergence application of organic fertiliser. Markets for organic crops should be opened to encourage farmers to appreciate the benefits of organic farming. The returns from organic farming should also be quantified for easy comparison with returns from conventional crops.

To counteract the problem of shortage of organic material, the application of organic fertilisers by foliar methods could reduce the quantities required per unit area, especially during the vegetative phase. More research is also required on the application rates and amounts to be soaked in water for foliar application. In addition, research is needed to compare efficiencies of organic fertilisers that are developed from different kinds of living organisms. Success in the implementation of organic farming techniques in the smallholder sector would be a great step towards making agricultural production sustainable.

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