ORGANIC FARMING IN THE SMALL HOLDER FARMING SECTOR OF ZIMBABWE

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Abstract
Some 20% (n = 246) organic farmers in Juru communal area were interviewed to establish their socioeconomic background, crops grown, problems encountered and the perceived advantages of organic farming. Farming was the main source of income to 86 % of the organic farmers. Only 57% considered organic farming as a less costly strategy; whereas 50% and 43% respectively regarded it as an inconvenient and disease-free technique respectively. Problems highlighted included animal manure shortage, slow organic matter decomposition and high labour requirements. Smallholder farmers considering organic farming may use these results to help them formulate effective implementation strategies.

Keywords: communal area, organic farming, organic manure, smallholder, farming sector

Introduction
The use of organic amendments in agriculture has contributed immensely to converting much of the poor fragile land of the world into stable productive zones. Many parts of Zimbabwe are arid and semiarid and these experience recurrent droughts and crop failures. Most farmers in the third world countries including Zimbabwe pursue farming strategies that require intensive use of expensive and sometimes unavailable inputs such as inorganic fertilisers and herbicides. Use of such chemicals cause soil and water pollution through eutrophication. In Zimbabwe, this has been reported in several water bodies, including Lakes Kariba, Chivero and Mutirikwi. There is therefore a need for Zimbabwe to prioritise adopting and improving organic agriculture, which has the potential to be safe, non-polluting, affordable and sustainable.

The term *organic farming* describes systems that work to mimic and optimise natural processes for the production of agricultural crops (Kuepper 1998). Organic growers use a wide range of cultural practices and natural inputs to manage crops in ways that are safe for both the environment and the consumer. Use of synthetic pesticides and standard commercial fertilisers is avoided or, where necessary, minimised. Organic farming encourages the adoption of practices such as crop rotation, composting, use of livestock manure, cover crops, mulches and green manures.

Organic farming is compatible with the capabilities of rural communities and smallholder farmers who generally lack capital to buy synthetic pesticides and inorganic fertilisers. Most small-scale farmers in Zimbabwe already use livestock manure, cover crops and composts in their small gardens and plots, most of which are less than three hectares. In much of southern Africa most fresh water is contaminated or unavailable. In a few years, almost all sub-Saharan countries will be below the level at which water supply is enough for all; and most will be in a state of water-stress or scarcity (UNEP 2008, Seckler *et al*.

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1998). Marginal lands typically lack soil tilth, vegetatative cover, and adequate rainfall (The African Organic Farming Foundation 2004).

Although the degradation of soils and vegetation as a result of human use and climatic events is common to all ecosystems, the drylands, which have low and variable rainfall, are especially fragile. Many areas the world over are now experiencing recurrent drought and crop failures (Seckler *et al*. 1998, Rijsberman 2006). Despite this, most people in rural southern Africa are conditioned to adopt Western methods of production, with their dependence on off-farm inputs often imported at high cost, water-dependent cultivars that are unsuited to low-rainfall climates, and that are unable to meet the nutritional needs of local people. Unsustainable ranching, and farming with chemicals, have desertified, deforested, poisoned and stripped vegetation from much of the land. The impacts of such industrial-style farming on groundwater, through pesticide and fertilizer runoff, have been extensive (The African Organic Farming Foundation 2004).

Synthetic soluble fertilisers have been shown to damage terrestrial and aquatic environments by leaching into underground water sources and surface water bodies (Palaniappan 1995), resulting in increased water hardiness and eutrophication. This endangers living organisms in the water. Of late inorganic fertilisers have been in short supply in Zimbabwe because of perennial foreign currency shortages; and when these fertilisers are available their cost is beyond the reach of most small-scale farmers. Consequently, it is imperative that ways are found for these farmers to have access to organic fertilisers that are affordable and renewable.

Organic fertilisers improve the soil by lowering bulk density, reducing soil erosion and improving soil fertility. Organic matter encourages the formation of stable soil crumb structure, thus improving soil internal drainage, infiltration and aeration. The dark colours that form with increasing organic matter content improve soil temperature relations, which improves essential microbial activity and root development. Organic fertilisers support a 'living soil', buffer the soil pH. Since organic fertilisers can be produced on-farm, farmers can cut their fertilisation costs; and contamination of soil and water environments with chemicals can be minimised.

The objective of our research was to collect data on the socio-economic background of the farmers, the crops grown, problems encountered and the perceived advantages of organic farming in Juru communal area in the Goromonzi district in the Mashonaland East Province of Zimbabwe. Goromonzi is in agro-ecological region II of Zimbabwe. This zone is characterised by an annual rainfall of 750 to 1000 mm. The area is at least 1000 m above sea level, with a temperature range of 21 – 32 ^{0}C (mean: 25 ^{0}C). Frost occurs infrequently in low-lying areas in July and August. Soil texture ranges from sand to sandy clay. The region is suitable for both 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 have already adopted the technique.

Method

A structured survey questionnaire was used to collect data on households and farm details related to our research objectives. The research was conducted between 30 November 2005 and 31 January 2006. The sample space consisted of 246 organic crop-growing farmers. A non-governmental organisation that is supporting use of organic farming techniques in the area assisted us by providing a list of all the organic crop-growing farmers. This list was used to select and locate the 50 farmers who participated in our survey. Before data collection, a pilot survey to pre-test the questionnaire was conducted on two farmers who were not on the final interview list.

Results

Basic data on the farmers and their farms in the Juru communal area are provided in Table 1. Most (79%) of the farmers were female, and 57% were over 51 years old owning fields of less than one hectare in size. For most of the farmers (86%), farming was the main source of income; with 14% relying on other

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sources. The proportions of farmers who grew various crops for sale, subsistence and other uses are given in Table 2.

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

PARAMETER	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

Most farmers (79%) grew maize; with the others (21%) growing vegetables (of these, 80% grew tomatoes and 7% grew fruit crops and round nuts).

A third (36%) of the farmers had problems obtaining organic fertilizers, associated with their (1) short supply, (2) exorbitant prices, and (3) late delivery (after the critical stages of crop growth). Half (50%) of the farmers used decayed kraal manure, and half used decayed leaf matter, as fertilisers. Less than half (43%) used compost and two thirds (64%) practiced crop rotation. High labour demands and inorganic fertiliser burns were each mentioned by a few (7%) of the farmers. Other problems are listed in 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, Vg – vegetables, Frt – Fruit, Hb - Herbs, Mz – maize, G/nt – Groundnuts, R/nt – round nuts, CP – cow peas, SP – sweet potatoes, SF – sunflower.

Organic techniques for controlling insects were practiced in Juru. A third (36%) of the farmers sprayed their vegetable crops with a solution of *Lantana camara* and *comfrey leaves* (1:2 ratio) to control sap-sucking insects. Onion was intercropped with pepper to repel pests; and the Mexican marigold (*Tagetes minuta*), although a weed, was left in the field to repel aphids, red spider mites and other leaf pests.

Les than half (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. The enthusiastic farmers commented that organic farming was a less costly and convenient method of farming; that resulted in reduced crop diseases (Table 4). Some claimed that organically produced tomatoes have a shorter shelf life and poorer outer skin texture, whereas leaf vegetables were preferred by the consumers. Some farmers (29%) highlighted the problem of the limited availability of manure due to the small size of their livestock herds (Table 3).

Table 3. Problems encountered by farmers in organic farming.

PROBLEMS ENCOUNTERED	FREQUENCY
High labour demands	7 %
Fertiliser burns	7 %
Slow compost decomposition	21 %
Transporting organic manures	14 %
Small herd of livestock	29 %

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 %
Less costly means	57 %
Convenient to use	50 %
No disease	43 %
No crop burns	14 %

A wide range of yield levels were recorded by the organic farmers. Field experiments are needed to confirm the farmers' claims of improved yields. The main problems associated with the adoption of organic farming mentioned by the farmers are listed 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 labour requirement	14%
Increased weed cover	21%

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Discussion

Most of the organic farmers were elderly people who were generally regarded as those who could not afford to use synthetic pesticides and inorganic fertilisers. 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 maximise crop output per hectare. Adoption of organic agriculture is a step towards protecting the environment from degradation and from contaminations by agrochemicals used in conventional 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 Natural region II of Zimbabwe, Juru is part of the prime crop production zone that had lost its 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.

Lack, or late availability, of inorganic fertilisers has been a problem for several years now, resulting in low crop output. Cases of poor quality fertilisers of lower nutrient composition than what was on the label have been widely reported in Zimbabwe. Such factors are likely to enable organic farming to win converts, and to improve environmental protection.

Although organic manures – such as kraal manure, compost and leaf litter – can effectively substitute for inorganic fertilisers, they were often regarded as problematic because of transportation difficulties; and because 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.

Most of the communal farmers grew some tomatoes, leaf vegetables and maize for sale on their small (1-3 ha) plots. However, most of their maize, groundnuts and round nuts were retained for subsistence use. Fruits and sweet potatoes were rarely sold; and all cowpeas were grown for home consumption. Some farmers grew medicinally important herbs, like lemon cream, comfrey and rosemary (Hudson 1995). Based on our observations, we consider that organic farming has the potential to create food self-sufficiency in Juru.

The small size of most livestock herds poses a challenge for organic farming, as cattle are the main source of organic manures in the communal areas of Zimbabwe. Low livestock numbers are probably the result of the devastating 1991-92 drought, which reduced the cattle herds in the whole of Zimbabwe by over fifty percent (Ngara & Rukobo 1992). The government of Zimbabwe and NGOs that are supporting rural development programmes could aid the success of organic farming by introducing cattle restocking projects. This was successfully done by the South Eastern Dry Areas Project (SEDAP) 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 organic and bio-ecological projects, primarily due to myths that these approaches are expensive, difficult to establish, require enormous investment and manpower, while the chances of success are remote and highly unpredictable (Black & Sweetmore 1994, Kiley-Worthington 1993).

The problem of slow decomposition of organic residue could be a result of the decline in the population of soil microorganisms in the area, due to land degradation. Organic management techniques, like stubble mulch farming and residue incorporation in rows, could be helpful in improving the physical, chemical and biological properties of the soil, 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 1989). Farmers need technical and educational support to assist them in selecting materials and techniques that ensure the benefits of the organic

methods are quickly realised. Currently the early adopters of organic farming are 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 reduce 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. The successful organic farmers noted that their success was the result of the training they had received from Permaculture centre. However, many farmers felt that their ability to participate and be successful in organic farming was limited because of the reduced visits from technical staff, and lack of help in solving problems.

Conclusions

Most farmers viewed organic farming as a less costly 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 understood by the farmers. Those who were not performing well noted that their success had deteriorated as farm visits and problem-solving support had decreased. However, the successful farmers found that organic farming had enabled them to achieve good crop quality, yields in leaf crops and improvements in their farming operations.

Farmers were constrained by having small livestock herds, with a limited supply of manure, although many still relied on animal manure. Decomposition of organic matter was often slow and was available too late. Common problems included inadequate inputs, high labour demand, little technical backup and no market for herbs.

Recommendations

Uptake of organic farming could be improved by increasing visits by technical persons, holding workshops or short courses for farmers, and supplying farmers with inputs like seed for organic agriculture. Farmers should receive better training in the preparation and application of organic fertilisers. Markets for organic crops should be opened to encourage farmers to appreciate the benefits of organic farming. The broad benefits of organic farming should be included in comparisons with conventional farming. 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 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 materials.

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