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ORGANIC AGRICULTURE AND FOOD SECURITY:

LESSONS FROM NEPAL

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Bachelor Thesis: UTKV03, 15 hp

Spring Term 2012

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Abstract

The aim of this study is to investigate the links between organic agriculture and food security. By examining organic NGO initiatives and organic farmers in Nepal, the paper seeks to better understand what impact organic agriculture might have on food security. The paper concludes that farmers can maintain and increase yields; access to their most important resources and new markets. Income generating activities are especially beneficial to women and children. Through organic management families increase the value on their land; stabilize their income; and get access to a diverse and nutritious diet. Knowledge helps farmers' to reduce their dependence on external inputs; and reduces exposure to toxic pesticides. Rising consumer awareness helps demand for organic products and farmers reaching a critical mass; and increases the overall health of people. Participatory activities build up social capital and strengthen the community; opens up for crucial opportunities for certification; and encourage empowerment of women. The examples show that organic agriculture contributes to local employment and can reverse migration. The two farms illustrate the importance of access to knowledge and markets. Farmers who are organic by default should have it relatively easy to transits to more intensive organic methods, as their practices are already fairly close. However, doing so is not easy without any help from the outside. As organic practices rely on more labor input than conventional agriculture this might lead to increased burdens on women and children. Moreover, being organic does not necessarily lead to higher-value chains, but requires facilitation from outside. Scaling up organic agriculture poses several challenges. Small subsistence farmers might have no problem sustaining their yields, but large farms using extensive methods might suffer lower yields – affecting regional and national food security. Moreover, poor consumers might not be able to face up to the higher prices if food at the markets becomes solely organic.

Keywords: Organic agriculture, food security, Nepal

Abbreviations and acronyms

FAO – Food and Agricultural Organization of the United Nations

GDP – Gross National Product

GMO – Genetically Modified Organism

HDI – Human Development Index

HYV – High Yielding Variety

IFOAM – International Federation of Organic Movements

ICIMOD – International Center for Integrated Mountain Development

NFC – National Food Corporation

NGO – Non Governmental Organization

SOIR-IM – Swedish Organization for Individual Relief

UNDP – United Nations Development Program

VDC – Village Development Committee

WFP – World Food Program

WFS – World Food Summit

WB – World Bank

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1. Introduction

“Fertiliser shortage looms ahead of paddy season” reads one of the headlines in the Kathmandu post on the 30th of April, 2012, referring to the lack of chemical fertilizers in stock at the state-owned Agriculture and Inputs Corporation. Many countries in Asia, including Nepal, face great challenges with producing enough food for the growing population. Although Asia has increased its food production with 30%, it still has the largest total amount of hungry people in the world, and many agree that food production has to increase from the existing land area (Pretty & Hine, 2000: 107). Since the 1960-70s Green revolution technology has led to astonishing achievements and dramatically increased food production, but has for some become a ‘Faustian bargain’ as adverse effects include soil erosion, water pollution, increased green-house gases, increased pest-resistance and loss of biodiversity (Badgely et al., 2006: 86). As concerns for the environment grew in the 1970s, new methods and resources were developed in the 1980s, and were implemented in the 1990s the issue of sustainable agriculture has been mainstreamed all over the world (Bhatta, 2011: 164).

1.1. Aim of the study and research questions

The aim of this study is to investigate the links between organic agriculture and food security. By examining organic NGO initiatives and organic farmers in Nepal, the paper seeks to better understand what impact organic agriculture might have on food security. The essay does so by trying to answer two research questions:

- How does NGOs and farmers work with organic agriculture; and
- How does this potentially affect food security?

It does so by: First, giving a background of the situation in Nepal in section 2, looking closer at some of the development indicators and the state of food security in the country. It then, in section 3, examines and clarifies ‘organic agriculture’ and ‘food security’ to get a better understanding of the concepts in the essay. In section 4 of the study, an explanation of the methodology is given; and in section 5 the theoretical framework on organic agriculture's impact on food security is accounted for. Then in section 6 a description of organic agricultural cases in Nepal is given; and in the following section (7) the lessons learnt from the study are specified. The paper is finished with a conclusion in section 8.

2. Background

Nepal is a landlocked country at the southern slopes of the Himalayas with about 26.4 million inhabitants. It is the poorest country in South-East Asia with a GDP/capita of US\$ 377. About one quarter of the population lives under the poverty line and about two thirds live on under 2\$ per day. The country is ranked 138 out of 169 countries in the world, with a HDI (Human development Index) of 0.428 according to the UNDP (2010: 1). Regional development in the country is uneven and especially the Western mountain- and hill- regions are lagging behind, much because of the inaccessibility due to geographical isolation, vulnerable roads and lack of bridges (UN: 2011: 2). Poverty in the mountain areas of Nepal is on average about 10% higher than the national average (source: ICIMOD). Around 80% of the population of Nepal resides in rural areas where the majority, (more than 90% of women compared to 75% of men), are involved in agriculture (FAO, 2004: 12).

Although such a majority of the population lives in rural areas, agriculture only contributes to about a third of the country's GDP, indicating to a low agricultural productivity. Under-five child mortality in the country is 48 out of every 1000 birth (<http://hdrstats.undp.org/en/countries/profiles/NPL.html>), almost half of the children in the country are chronically malnourished and an equal amount of children less than five years old are stunted in their growth (<http://www.who.int/gho/countries/npl.pdf>). Population pressure and the lack of employment in rural areas, has led to that about 75% of the households has at least one male member of the family who has migrated, either abroad (usually to India) or to one of the urban centers (often up to 11 months of the year). This leads to increased burden to women and children left behind, with less to eat – often having to resort to consuming seed stocks, selling assets, taking up wage labor or taking loans. In many cases the money remitted are not enough to cover the debts (Kilpatrick, 2011: 2-3).

Agro-chemicals in the shape of pesticides were introduced in Nepal already in the 1950s to control Malaria, however it was first in the 1980s that widespread use of inorganic fertilizers were introduced into agriculture. Between 2006 and 2007 the import of ingredients to make pesticides increased by 250% (Bhatta, 2010: 164-165). Nepalese agriculture is predominantly characterized by subsistence farming based on traditional knowledge and with a low productivity. Most farmers in the Hills and mountain regions never use any chemical fertilizers or pesticides (Pokhrel & Pant, 2009: 91).

Soil erosion, degradation and declining fertility are major problems facing sloping agricultural land in Nepal, as the status of the soil is essential for sustaining crop yields. Soil erosion reduces soil productivity and is mainly caused by poor tilling practices – leaving the soil exposed to wind and water. Declining soil fertility is mainly due to removal of crops without replacing the nutrients, loss through soil erosion and nutrient leaching. Water is essential for life, not only for drinking and sanitation, but also for growing crops. However, heavy or sustained rainfall can also lead to soil erosion, nutrient leaching and landslides. These are naturally occurring events, but in the mountain areas of the Himalayas they have increased drastically due to inappropriate land use and mismanagement (<http://books.icimod.org/uploads/tmp/icimod-godavari.pdf>).

2.1. Food security in Nepal

In total, WFP estimated that about 3.7 million people were food insecure in Nepal (in 2011) and the FAO (2004: 11) estimate that 38% of the total population is considered to be vulnerable when it comes to food security. Marginalized farmers, especially women and children, are considered some of the most vulnerable groups in the country (UNDP, 2010: 5). The slowness of the agricultural and economic growth in Nepal, together with large inequalities, has resulted in widespread malnutrition. In its annual report about Nepal from 2010, the UNDP asserts that environmental degradation, loss of biodiversity, climate change and natural disasters seriously threatens the livelihoods of Nepal's rural poor. The country is vulnerable to several types of natural disasters; the most serious being droughts, floods, landslides, hailstorms – that annually causes substantial material and human losses (Fang et al., 2007: 5).

Geographically the country is divided in three regions; mountain-, hill- and Terai- regions. The Terai has traditionally been Nepal's 'bread basket' feeding the nation. However since 2006, due to adverse climatic conditions, the cereal production in the Terai has been declining (Fang et al., 2007: 6). In 2007-2008 the Terai areas of central Nepal were hit by severe flooding, leaving farmers desolated, only to find that 2009 brought with it the worst drought ever recorded in the country – seriously affecting the country's food security. Since the 1990s Nepal has been relying on food imports, most notably from India, to feed its population. Agricultural development in the remote hill- and mountain- regions has been neglected by the government and food production has failed to meet the needs of the population in these areas. In 2007 India placed an export ban on food products – contributing to driving up food prices

by about 17% (between 2008 and 2009), forcing the WFP and the National Food Corporation (NFC) to intervene – distributing and subsidizing basal food products. This entails buying rice in the Terai districts (the low/flat- land of Nepal) and transporting it long distances through very tough terrain (sometimes by helicopters, tractors, mules and porters) making the situation increasingly expensive and unsustainable (Kilpatrick, 2011: 2-3).

3. Concepts

‘Organic agriculture’ and ‘food security’ are both complex concepts with several dimensions. To better understand how organic agriculture affects food security it first becomes important to portray and explain the concepts involved. First we will look into organic agriculture, and then the concept of food security will be investigated.

3.1. Organic agriculture

According to E. Karami & M. Keshavarz (2010: 21), there is a ‘narrow’ vision of agriculture limited to the cultivation of soil and production of crops. For others, agriculture is seen in a more ‘holistic’ way to include: financing, processing, marketing and distribution; supply and service industry; and related economic, social, political, environmental and cultural aspects of the agricultural system. Agriculture thus, include everything from the way that people manage and relate to the soils, water, plants and animals in order to produce, prepare and distribute food and other goods (http://www.ifoam.org/about_ifoam/principles/index.html). Agriculture in an even wider sense does more than just produces and distributes food; it also affects other aspects of local, national and global economies and ecosystems. A sustainable agricultural system tends to have positive effects on natural, social and human capital, whilst becoming depleted under an un-sustainable one (Pretty & Hine, 2000: 108).

Agriculture is therefore fundamentally multifunctional and delivers many non-food functions that cannot be produced by any other economic sectors (Pretty & Hine, 2000: 109). In their report “Organic agriculture and food security” the FAO defines “[o]rganic agriculture as a holistic production management system that avoids use of synthetic fertilizers, pesticides and genetically modified organisms, minimizes pollution of air, soil and water, and optimizes the health and productivity of interdependent communities of plants, animals and people” (Scialabba, FAO, 2007: 2). To the term ‘agriculture’ they include crop and livestock systems, aquaculture and foresting for non-timber products. With agricultural ‘products’ they include foods, fibers and medicinal and cosmetic materials. Moreover the report asserts that organic

agriculture is about more than production, it includes the entire handling in the supply chain from the farm to the market (Scialabba, 2007: 2).

In the context of a developing country, ‘organic agriculture’ often comes to mean: ‘farming without chemicals’, ‘traditional farming’ and ‘certified organic products for export’. The recent global food- and financial crisis has strengthened concerns about increasing food production to feed a growing population. In the mainstream discussion, chemical inputs and HYVs have been promoted as the solution; while organic systems has to a large extent been regarded as unproductive and as luxury goods for the elite (Vaarst, 2010: 38). According to Alroe et al. (2006: 78) organic agriculture is based on idea of ecological justice – in which environments are shared and should be regarded as commons. Agro-ecological organic systems build on local resources and the interaction with the nature. It is founded on the people involved and their knowledge about the system – enhancing independence and food sovereignty, increasing soil fertility and through its resilience to natural disasters and climate change (Vaarst, 2010: 39-40).

3.1.1. Principles of organic agriculture

The principles of organic agriculture, developed by IFOAM, are implemented to various extents and ways as legislation and guidelines in different countries (Vaarst, 2010: 38). These principals have been developed to translate into benchmark standards that will allow diverse paths to achieving organic agricultural goals. It becomes the goal of organic agriculture to use science to improve traditional practices anchored in multi-cropping, natural preservation and traditional risk aversion strategies (Scialabba, 2007: 3).

The IFOAM principles are: first, **health**: “Organic Agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one indivisible”. Second, **ecology**: “Organic Agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them”. Third, **fairness**: “Organic Agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities”. Fourth, **care**: “Organic Agriculture should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment” (http://ifoam.org/about_ifoam/principles/index.html).

3.1.2. Certified and un-certified systems

Organic agriculture is not a homogenous practice, but ranges subsistence farmers to entrepreneurs attracted by higher value chains (Scialabba, 2007: 10). In contrast to some alternatives to conventional agriculture, only organic agriculture has an established set of standards with little difference amongst different countries (Wu & Sardo, 2010: 43). The market place demands that organic products have certification obtained by a third party certification system with a valid proof of organic standards (Scialabba, 2007: 2-3). Certified organic farmers in developing countries are to a large extent conformed to Western standards and in return they get higher prices for their goods. However, this category is only the tip of the iceberg as most of the land under organic cultivation is un-certified and quite ill-defined (Parrott et al., 2006: 154-155).

Parrott et al. (2006:156-158) shows that, far from being uniform, certified organic farms vary in size and activities, and require different changes in practices before becoming organic. Some of the larger farmers are likely to be focused only on the market, while small scaled farmers may have more diverse goals and part of their farming will be for subsistence needs. The later of the two are likely to be the target of development programs seeking to improve livelihoods by involving them in fair trade, local value adding, higher value chains and agro-tourism. Although diverse, what brings all certified production together is that it is geared towards a growing global organic market, with much of the demand coming from the rich countries in the West. It is thus the market that socially constructs what is organic and not, guarantees consumers about production methods, provides producers with permits and inhibits free-riding.

Although not explicitly (certified) organic, there is an array of different kinds of farming that give claims to being similar to organic agriculture in methods and philosophy, and include agro-ecological approaches such as; biodynamic agriculture, permaculture, nature farming, bio-intensive, eco-agriculture, and Low External Input Sustainable Agriculture (Parrott et al., 2006: 160-161). All these approaches try to enhance soil fertility and productivity, while minimizing negative impact on the environment by using methods that include inter-cropping, mulching, use of compost, crop rotation and non-chemical pest and disease prevention (Vaarst 2010: 38).

However, probably the most common organic farmers are the resource poor farmers that are organic because of poverty and therefore cannot afford to use agro-chemicals. These farming practices are often characterized by low output and unsustainable practices, rather than by a choice in adopting organic practices and accepting low outputs. These farming systems are often synonymous with local and traditional practices, and vary in their ability to make use of the full range of techniques to maximize the advantage of local resources and knowledge (Parrott et al., 2006: 162-163).

3.2. Food security

The concept of food security has evolved since the mid 1970s as a process of international meetings and negotiations. These negotiations followed a time of concerns about availability and price stability of food stuff due to changes in the global food economy; reoccurring famines and hunger; and evidence that Green Revolution technology did not automatically and rapid reduce poverty and malnutrition. Thus, in 1974 the World Food Summit (WFS) defined food security as: “availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices” (FAO, 2003a: 26).

In 1983 the FAO expanded the definition to include: “ensuring that all people at all times have both physical and economic access to the basic food that they need” – stressing the importance of the access of vulnerable people in the food security equation. Furthermore, in 1986 the World Bank (WB) released a report (entitled “Poverty and Hunger”) that stressed the temporal dynamics of food security, distinguishing between ‘chronic’ and ‘transitory’ food insecurity – where chronic food insecurity is associated with continuing or structural poverty and hunger; and transitory food insecurity with times of pressure due to natural disasters, economic collapse or conflict (FAO, 2003a: 27).

By the mid 1990s the concept of food security, was spanning from the global to the individual level. It had become highly context specific and access to food included not only concern for caloric intake, but also nutritional balance – reflecting social and cultural food preferences. The 1994 Human Development Report from the UNDP closely related the concept of food security with that of the human rights and social security (FAO, 2003a: 27-28). In 1996 the WFS held in Rome, agreed on a definition of food security as: “when all people at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary

needs and food preferences for an active and healthy life” (WFS, 1996); and in 2001, much thanks to the works of Amartya Sen, FAO redefined the definition in *The State of Food Insecurity* so that it included entitlements of people (FAO, 2003a: 28).

Therefore, food security must be seen as a multifaceted concept with several interpretations and definitions. At one end of the scale is global and national availability and supply, and at the other end are the households and the nutritional wellbeing of individuals (FAO, 2003a: 3). Malnutrition due to food insecurity may be acute, chronic or hidden. Acute food insecurity is often associated with hunger and starvation during famines or disasters, but only accounts for about 10% of the global food insecurity. More common is chronic undernourishment due to reoccurring lack of availability or access to food of sufficient quality – resulting in underweight, stunted growth and poor overall health. Hidden hunger affects about two billion and is associated with deficiencies of micronutrients, such as vitamins and minerals (Roetter & Van Keulen, 2008: 28).

3.2.1. Dimensions of food security

Both household and national food security are complex, as they are influenced by many factors, such as technological and human capacities, policies, prices, trade and infrastructural contexts (Scialabba, 2007: 1). Food security is often divided into four dimensions; ‘availability’ of food, ‘access’ to food, ‘utilization’ of food and the ‘stability’ of these. These dimensions are all interlinked and affect each other (FAO, 2004: 1).

Availability of food is measured at the inter/national level as the total sum of domestic production and imports – including both commercial production and food aid (Gill et al., 2003: 6). It refers to having sufficient quantities of quality foods, in a world of increasing population growth and limited natural resources and services. Future availability to food is challenged by water and fossil-fuel scarcity; rural depopulation; and increasingly globalized food systems that erode local and traditional systems (Scialabba, 2007: 4). Recently concerns have been raised about competition from livestock, petrol prices and crops being used as bio-fuel, putting pressure on food supplies. Moreover, changing consumption patterns in the developed and developing world, where people change their diets in favor of a more meat, also puts pressure on the land and the availability of staple foods (Roetter & Van Keulen, 2008: 29-31).

Today it is well accepted that, globally, it is not a matter of a food shortage – but rather a matter of distribution (Roetter & Van Keulen, 2008: 29; Vaarst, 2010: 40). *Access to food* is peoples' entitlement to food; the amount they can produce, buy or obtain by social security means through either public distribution systems, community or family and friends (Gill et al., 2003: 6). Such entitlements are determined by the commodities an individual can get given the legal, political, economic and social arrangements of the society. Access to food is a continuing problem and is not guaranteed by national availability as distribution of food and production inputs are uneven, where poor and marginalized people are the worst affected (Scialabba, 2007: 6). The current problem for many people in the developing world is that they lack the economic and social means to acquire food. Due to urbanization and the erosion of traditional communities, many lack the social structures to fall back on, and governments of developing countries often lack the resources to reach those in need (Roetter & Van Keulen, 2008: 29).

Utilization of food refers to the biological ability of individuals to absorb and utilize the nutrients of the food consumed – and is determined by practices, beliefs, eating habits, hygiene, sanitation and health of a person (Gill et al., 2003: 6). This dimension highlights the impacts of non-food determinants and is challenged by such things as changing diets, consumption patterns and transboundary diseases due to globalization and rapid urbanization (Scialabba, 2007: 9). For food utilization, consumption patterns within households also matter, as intra-household food distribution can be uneven. Women and children are often victimized and fall short in terms of nutrition (FAO, 2003b: 5).

Moreover, households' vulnerability can be expressed as the likelihood of them falling below the three food security dimensions in the future. Thus, *food stability* is the ample availability, access and utilization at all times and not risking going hungry because of sudden economic and climatic shocks or cyclical events. Household resilience is determined by different levels of strategies to prevent, mitigate and coping with such risks and shocks (FAO, 2004: 2). The stability of the food supply is not only determined by the ecological carrying capacity as thought before. Instead, it is influenced by instable yields due to climate change and inter-annual variability; eroding resilience of local and global agro-ecosystems; and trade reforms that leads to changes in real prices for domestic farmers (Scialabba, 2007: 7).

4. Methodology

The method used for this thesis has followed in the lines of ‘grounded theory’, by using an inductive approach – refitting the research question to the collected and analyzed data (see Bryman, 2008: 541). This paper makes use of a number of sources collected in the field between the 2nd of February and the 2nd of May in 2012. The material collected (although not all have been used for this essay) contains interviews, field visits to organic farms and demonstration centers, participation in workshops, and written sources. To describe organic agriculture in Nepal the field work adopted an ethnographic approach (see e.g. Holliday, 2007: 16-17), extensively collecting material through thick descriptions of the whole experience (Holliday, 2007: 75), which has then been boiled down for analysis. The analysis consists of a descriptive part to illustrate organic agriculture in Nepal and one part synthesizing the lessons learned about organic agricultures impact on food security.

4.1. Sampling

For this study, two organic programs have been chosen to show how NGOs work with organic agriculture and contribute to enhancing peoples’ food security. The two initiatives encompass the most usual ways in which NGOs in the country engage with organic agriculture and involve: running, supporting and facilitating organic initiatives; promoting organic agriculture through education, research and demonstrating; and advocacy and policy pressure. Both cases are typical because they engage in more than one of these activities and by doing so they affect the issue of food security in a broad way and on different levels. Part of the data for this study derives from two field visits to farms in different parts of Nepal that are typical for organic farmers in the country. Both of them use organic practices, but they do so with different methods and intents, which makes them relate to food security in distinctly differently. The first farm is so called ‘organic by default’ and is run foremost in interest of subsistence, whilst the other one is organically certified and is run primarily with a commercial interest. Most farmers in the country can be related to these two cases of farmers.

4.2. Field visits and interviews

In the course of the data collection five field visits were made. Two of these field visits were in Pragatinagar in the district of Nawalprasi, where SOIR-IM (the Swedish Organization for Individual Relief – IM) operates a training and demonstration center, and supports another organic farming cooperative. One field visit was made to Subba Organic Farm, a commercial farm in the peri-urban area of Kathmandu; and one to a subsistence farm in Asrang: 4 in the

Gorkha district. Another field visit was made to ICIMODs (International Center for Integrated Mountain Development) demonstration site. At the field visits with the NGOs written material, in form of various publications, was collected. The interviews used in this final study were carried out with two organic farmers and two program directors of INGOs. The interviews were carried out in an unstructured and ‘reflexive’ way (Bryman, 2008: 437) with several follow up questions to adjust to the context.

5. Theoretical framework

As we have seen in the previous section of this paper, food security is a complex and multifaceted subject. To evaluate the impact of organic initiatives undertaken by NGOs and the effect that organic farmers have on food security, we will have to first understand how it relates to the four different dimensions; i.e. food availability, food access, food utilization and the stability thereof.

5.1. Organic agriculture and availability of food

The question of food availability is twofold. It both encompasses productivity of yields and the efficiency of the system in question (Zundel & Kilcher, 2007: 3). Pathways to higher yields with organic techniques includes: intensification of a single element (e.g. intensifying home garden with vegetables and trees); new productive parts (e.g. adding a fish pond); better use of natural resources (e.g. water harvesting or scheduled irrigation); and improving per-hectare yields of staple crops (e.g. by integrated pest management and/or local crop varieties and animal breeds) (Pretty, 2002: 142). Because natural and economic resources are both limited and scarce for poor farmers, efficiency is also important to consider when evaluating an agricultural system (Zundel & Kilcher, 2007: 7).

Yields

Converting from conventional agriculture to organic systems has in general been said to lead to initially lower yields (Zundel & Kilcher, 2007: 3). However, new evidence (Halberg et al., 2006) show that organic agriculture can grow enough food to supply the global need for food and even reduce the agricultural land needed (Badgley et al., 2007: 94). The yield outcomes are to a high degree management specific and vary between different temperate zones (Zundel & Kilcher, 2007: 4-7); it depends on intensity and level of external inputs (Scialabba, 2007: 5); market orientation and what organic techniques and strategies are engaged (Parrott et al., 2006: 165).

After the so called ‘organic transition effect’, where yields decline in high-yielding systems the first 1-4 years of adaptation, yields become stabilized as the soils have developed adequate biological activity (Lotter, 2003: 72) and pest-predator relationships establish a new balance (Parrott et al., 2006: 164). Most efficient is converting low-yielding and subsistence systems (Halberg et al., 2006), benefitting poor and small farmers the most (Parrott et al., 2006:165). M. Altieri’s (2002: 126) analysis of indigenous agro-ecological projects, show that these systems have proven to increase in productivity over the years. Moreover, increase in yields leads to a higher availability of a diverse diet on both the household and community level – in both rural and urban areas (Zundel & Kilcher, 2007: 13).

Efficiency

Closing the nutrient cycle is essential on organic farms (Scialabba, 2007: 5) and doing so helps small farmers faced with lack of capital and low product prices (Zundel & Kilcher, 2007: 10). Organic agriculture management replaces fossil fuel elements, such as fertilizers, pesticides and machines, with local natural resources and management skills (Scialabba, 2007: 5). Most low-input peasant systems are productive in terms of labor return per unit of input. When chemical inputs are introduced yields increase, but the efficiency return on the input drops (Altieri, 2002: 118). Numerous studies show that organic farming can be equally or more profitable than conventional farming (Lotter, 2003: 74). Economic returns to organic farming can be reached in several ways; through higher yields, fewer financial outlays, market access and premia, relative price stability (Parrott et al., 2006: 167), and creating new income-generating elements (Parrott et al., 2006: 173).

5.2. Organic agriculture and Access to food

On a household level, access to food means that there is adequate food regardless of gender, age or status. On regional and national levels it involves capacity building and empowerment of local communities (Sligh & Christman, 2007: 2). Systems that make use of locally available natural resources and farmers labor and knowledge, are likely to enhance the access to food for resource-poor farmers (Parrott et al., 2006: 167). Thus, organic agriculture contributes to peoples’ access to food by enhancing their self-sufficiency. It does so by giving people greater control over productive resources, use of diverse (traditional) knowledge, but also gives them access to new markets (Sligh & Christman, 2007).

Productive resources

Organic farmers rely on using manual labor and local resources including; land, water, biodiversity and environmental services. As organic practices increase returns, they can help ensuring land tenure for farmers over time (Sligh & Christman, 2007: 2-3). By mixing and rotating crops, farmers can rid themselves of their dependence on fossil fuel and chemical inputs by using their own labor and environmental services to intensify their production – helping to break dependence on credit and the vicious circles of indebtedness (Scialabba, 2007: 6). Organic practices make better use of rainwater and reduce the need for irrigation, at the same time as it reduces soil erosion (Niggli et al., 2009: 14-15). Farmers that have access to productive resources and use organic methods increase productivity; sustain resources over time; and increase need for labor – leading to greater household and community income (Sligh & Christman, 2007: 3). Thus when successful, organic farming may lead to substantial rural employment opportunities – benefiting landless people and can help reverse rural-urban migration (Parrott et al., 2006: 168; Scialabba, 2007: 12-13). On a regional and national level, organic agriculture lead to both greater wild and agricultural biodiversity, thus increasing access to environmental services – while at the same time diversifying diets (Sligh & Christman, 2007: 4).

Knowledge

Because organic agriculture is a knowledge-based practice that necessitates understanding of agro-ecological processes, access to this knowledge is a challenge when converting to organic management (Scialabba, 2007: 6). Traditional systems have always been based on practical farming skills, observations, experiences and intuition for breeding locally adapted seeds and livestock, and for producing on-farm fertilizers and natural pesticides (Niggli et al., 2009: 14). By making use of local resources, knowledge and labor – organic farming puts the initiative in the hands of the farmers (Parrott et al., 2006: 167), rather than outsourcing the knowledge to off-farm experts and products (Sligh & Christman, 2007: 5-6).

Networking with or through NGOs gives farmers a chance to cut costs on certification through e.g. ‘participatory certification’ (see e.g. Altieri, 2002: 130). The need to reduce costs for e.g. certification and planning farm rotation, has also lead to organic farmers to come together to share experiences, seeds and breeds and improve co-determination and collective ownership (Scialabba, 2007: 6-7). This leads to greater social capital within the community (Vaarst, 2010: 41) and strengthens the community to stand up for itself and take care of its

members (Scialabba, 2007: 15). On a household level training in organic practices is particularly useful to poor farmers, especially women who only have access to kitchen gardens (Sligh & Christman, 2007: 6-7). Farming based on cash crops and large scale monocultures, where inputs are mechanized and industrial are often controlled by men (Vaarst, 2010: 42). Organic agriculture, on the other hand, opens up for the empowerment of women as they gain greater control over the food production (Sligh & Christman, 2007: 7).

Access to markets

Essential for all farmers who want to sell their surplus crops are access to markets. These markets can be foreign, domestic, peri-urban and regional – although in most developing countries it is the foreign market in Europe and North-America that are most luring. Gaining access to these markets takes knowledge and experience about crop and product selection, certification and quality standards, marketing and trade regulations (Sligh & Christman, 2007: 8-9). When certified organic cash crops leads to improved incomes for poor people, at the same time as they also lead to higher self-reliance, reduces market dependence and import requirements (Scialabba, 2007: 5). Organic grower groups permits internal certification systems that cut certification costs and have proven especially efficient in partnership with NGOs – giving farmers greater leverage on the global market (Sligh & Christman, 2007: 11). Even though not certified, organic growers can obtain higher prices locally because of closeness (trust) and superior taste and quality (Parrott et al., 2006: 168). Thus, those who have most to gain from organic marketing are resource poor farmers, who rely upon indigenous knowledge and have little access to the conventional markets (Sligh & Christman, 2007: 12). However, higher price premiums can lead to that those consumers with low income cannot afford organic food (Zundel & Kilcher, 2007: 12).

5.3. Organic agriculture and utilization of food

Food utilization means reaching adequate diets, water, sanitation and health by minimizing the risks of getting food-borne diseases or harmful levels of toxins and protecting those who work in agriculture – at the same time as reaching food quality related to consumer choice such as animal welfare (Brandt, 2007: 3). The perception of consumers is the main driver of the organic market, as organic food due to its prohibition of chemical inputs and GMOs. Levels of pesticide residues and food additives are lower in organic food, but the enhanced taste due to longer maturation of organic food and particular taste in traditional varieties also makes up consumers choice (Scialabba, 2007: 9).

Improving health

Home gardens that produce organic food can significantly contribute to better nutritional status of especially children in rural and peri-urban areas (Scialabba, 2007: 11). Organic food contains more minerals, vitamins, high-quality proteins (Brandt, 2007: 11) and essential amino acids (Scialabba, 2007: 9). However, the real gains of organic agriculture can be found in the increased diversity of the diet, due to diversified crops and local varieties and breeds (Brandt, 2007: 13). Promoting such diversity has proven to be a simple and successive way to combat malnutrition and ‘hidden hunger’ (Scialabba, 2007: 12). Some studies suggest that organic food can have immunological properties and reduce, amongst other, risk for allergies (Brandt, 2007: 14).

In general organic food contains about four times less pesticides as conventional food (Scialabba, 2007: 9), but the scientific community agrees that substances found in conventional food poses no or only relatively small health risks (Brandt, 2007: 9-11). It is worth pointing out that the tolerated amounts of pesticide residues are not taking into the account of the so called ‘cocktail effect’ of different substances (Wu & Sardo, 2010: 66). Organic inputs reduce exposures to toxic pesticides and herbicides, something that mainly benefits smallholder farmers, agricultural workers, pregnant women and children working in the fields (Parrott et al., 2006: 169). Every year 20,000 deaths are reported due to exposure to pesticides, which also can lead to severe illnesses such as Parkinson’s disease (Scialabba, 2007: 9). Organic farmers have high incentives to collect and recycle animal and human waste as valuable fertilizers, which reduce the risk of pathogens and toxic algae in the water (Brandt, 2007: 17-18). Organic farming systems, thus, lead to higher availability of clean water, as both surface and ground water quality is improved and contains less phosphorous and nitrates than conventional farming (Scialabba, 2007: 10).

5.4. Organic agriculture and food stability

The stability of food is related to the sustainability of the environment and the resources where people produce their food (Niggli et al., 2007: 1). Agriculture in most parts of the world faces climate change and many systems are ill prepared for this (Niggli et al., 2009: 14). Rise in temperature and sea level, change in rainfall patterns and higher incidence of extreme weather such as droughts, storms and floods will have profound effects on global food supply (Niggli et al., 2007: 7). That makes favorable and stable environmental conditions

and farming systems resilience to climate change crucial for future food production (Niggli et al., 2007: 1). Organic agriculture contributes to the environment by avoiding use of polluting fertilizers and pesticides, hindering desertification, stopping biodiversity loss and mitigates climate change (Scialabba, 2007: 13).

Resilience, risk aversion and adaptation

Resilience means that vulnerability decreases by building up people's and the ecosystems adaptive capacity through soil and water management and by enhancing biodiversity (Vaarst, 2010: 40). Organic agriculture enhances the diversity of landscapes, fields, farming methods and biodiversity (Niggli et al., 2009: 15) and is an effective way of restoring environmental services; reduce risk of yield fluctuations from climatic and other uncontrolled events; and preventing imbalances due to new pest and disease outbreaks (Scialabba, 2007: 7). Organic farming practices conserve and improve the fertility of the soils and help to dampen or hinder the negative effects of erratic rains, droughts and floods (Niggli et al., 2009: 14) – at the same time as they improve soil fertility for future generations (Vaarst, 2010: 43).

Currently 70% of human water use goes to agriculture. As water is getting scarcer it is important to increase efficiency in rain-fed and irrigated agriculture. Organic agriculture use less water and use it more efficiently because of plant and soil management (Niggli et al., 2007: 4). Healthier and active soils lead to both better drainage and water holding capacity, which reduces runoff and recharges groundwater (Scialabba, 2007: 8). At micro-level agro-biodiversity helps to increase the fertility of soils and reduces risks of infestation and disease (Parrott et al., 2006: 169) and due to greater crop diversity, local seeds and breeds organic farming helps to stabilize the agro-ecosystem (Scialabba, 2007: 8). The impacts of climate change are very context specific, complex and unpredictable. This makes local and community knowledge important for adaptive strategies. As organic agriculture always has been driven by local and traditional knowledge, rather than relying on one-size-fits-all solutions, it is well positioned to maintain production faced with climate change (Niggli et al., 2007: 10).

6. Cases of organic agriculture in Nepal

In Nepal there are several NGOs and farmers that work with organic agricultural activities that affect food security in different ways. To describe the situation, this study describes the work of two international NGOs running organic programs; and two farmers that are typical

of organic farmers in Nepal. These actors take on organic agriculture in different fashions and have different goals, spanning from subsistence and commercial farming, research, teaching and demonstration, and policy objectives. Often more than one of these goals can be found within the same actor's agenda.

6.1. Godavari Demonstration and Training Center: ICIMOD

ICIMOD (International Center for Integrated Mountain Development) runs a 30 hectare demonstrations and training center in Godavari on the sloping hills of the Kathmandu valley. The center works by selecting, testing, demonstrating and training farmers in organic methods for sustainable development – to reduce poverty and conserve the natural resource base. The objectives are to come up with and show methods for sustainable land use; rehabilitation of degraded lands; income generating mountain niches (through e.g. beekeeping, animal husbandry, fishponds and horticulture); collecting seeds from multipurpose- and cash-plants; and to provide on- and off-site training and materials to farmers and development workers. Many of the activities at ICIMOD serve multiple functions and are interlinked with each other, taking on a holistic approach to agriculture. The methods that are developed and demonstrated do not use any commercial agricultural inputs and thus reflect results that could be obtained by resource-poor farmers.

Two of the main concerns of the demonstration center are soil and water management. At the demonstration center several methods for soil and water management are displayed. These include: conservation farming through covering the soil with green manure, mulch or vegetation; agro-forestry with nitrogen-fixing plants in rotation, hedgerows or trees in shelter belts (alongside the terraces); different kinds of composting; water harvesting (e.g. on rooftops); and irrigation (e.g. drip irrigation). Every year the demonstration center receives about 4000 visitors and the center has held about 135 training events both on and off the demonstration site – reaching more than 20,000 visitors and trainees. The community outreach program has provided farmers and others with 600,000 seedlings of nitrogen-fixing plants, over 11,000 fruit plants and 420 kg vegetable seeds (ICIMOD, Godavari folder). Furthermore, ICIMOD collaborate with NGOs to educate and help poor and marginalized women and children by teaching them activities, such as briquette making, kitchen gardening and planting fodder and fruit plants.

6.2. Integrated Development Program for Sustainable Agriculture through IPM and Organic Farming: SOIR-IM

SOIR-IM (the Swedish Organization for Individual Relief) supports and helps to organize two organic demonstration sites (combined about 1.3 hectare) in the Nawalparasi district in the low-lands of Nepal. The objectives are to promote and preserve the environment through a combination of modern and indigenous resources and knowledge. It does so in partnership with two partner organizations; JGIWCC (Jaluke Ghumaure Irrigation and Water Consumers Committee) and Ashara farmer's group and by involving the local district government and VDC (Village Development Committee). About 250 families are involved in growing organic seasonal and off-season crops, of which the majority of the families concerned are from so called 'backward ethnic groups'. Most of the farmers in the project are dependent on agriculture for their survival and used to use chemical fertilizer and pesticides in inappropriate ways, resulting in decreasing soil fertility, pest resistance and lower yields.

Both men and women participate in all activities, as part of the goal of the program is to empower women and strengthen gender equality. SOIR-IM provides seeds to the farmers and on the demonstration farms they produce saplings, manure and wormy-composts and botanical pesticides using locally available material. They also use different kinds of traps for controlling pest (IPM). Twice a month they organize training in organic methods and techniques, and now and then they organize workshops for both farmers and other visitors to advocate organic practices. About 95% of the families involved in the project have adopted organic farming and through proper knowledge, technologies and methods their production has been turned sustainable (SOIR-IM, Evaluation report, 2011). Furthermore, the projects engage people in planting trees and bushes for preserving water, renovating waterways for irrigation and constructing ponds for additional income from fish.

6.3. Organic by default

The first case comes from Thakur Bhattarai, a farmer with access to 15 ropani (20 ropani = hectare) on the terraces in the Gorkha district situated in the foot-hills of the Himalayas. The farm is about 1 hour by foot from the nearest road and everything coming in and out from the farm has to be carried in a basket on the back. At the time of the field visit he only farmed 1 ropani, growing vegetables and chilly in a small garden and a makeshift greenhouse. Normally he would also grow wheat and maize during the right season, and the fields were being prepared with dung from the farms animals.

Thakur is so called ‘organic by default’ as he is restricted from using chemical fertilizers because of lacking infrastructure and due to lack of credit, but he also recognizes that chemicals are bad for the health and that organic food is good for the body. He uses traditional methods of farming, meaning using animal dung for fertilizing, but he does not produce any of his own pesticides and sometimes have to spray with synthetics. This way of farming is very common in Nepal and does not make use of more advanced organic methods, such as mulching, hedgerows or cover crops etc. Two central problems for Thakur are lack of knowledge about organic techniques and lack of access to markets. There are no training- or demonstration centers where he lives and he cannot access the markets that demand organic products because he is not certified, geographical distance to urban centers and lacking infrastructure.

6.4. Subba Organic Farm

The second case comes from a field visit to Subba Organic Farm, run by Kul Bahadur Subba and his family (five members) who leases a 30 ropani farm (about 1.5 hectares) in the outskirts of Kathmandu. The farm grows a wide array of crops, including maize, mushrooms and vegetables and they keep cows, chickens, bees and fish. The cow dung and the chicken droppings are used for making compost, mixing it with vegetable matter. Because of the size of the farm and the amount of work required, Subba Organic Farm employs 15 people from outside the family, contributing to the local community. The farm is commercial in the sense that everything that the family does not consume themselves is sold on the local market or in the nearby Kathmandu. The farm has never used any chemical fertilizers or pesticides and is certified by Nepali standards, giving a better price on the local market, but the goods are not valid for export to foreign markets that requires third-party certification. Mr. Subba also has a small ‘farmers field school’ in a small hut on the farm that is free, spreading knowledge to farmers (large and small) who are interested in learning about organic farming techniques.

7. Analysis: Lessons from Nepal

By using the theoretical links between organic agriculture and food security and the data from the cases above, we can learn some lessons from the organic activities in Nepal.

7.1. Possibilities

The ICIMOD and SOIR-IM programs demonstrates and teaches methods for how farmers can protect, maintain and increase access to their most important productive resources (i.e. land,

soils, water and knowledge) and at the same time access new markets by using relatively simple techniques. Both initiatives show farmers how to replace chemical fertilizers and pesticides, thereby removing the need for expensive inputs and the need for credit loans that so often leads to indebtedness. By doing so, farmers become more productive, both in terms of crop yields and economic efficiency.

The methods and techniques, when learnt, hands over the initiative to the farmers themselves, thus increasing their self-reliance rather than being dependent on off-farm resources and knowledge. Moreover, soil and water management increases the value of the land, gives families a diverse and nutritious diet and steady income throughout the year as many of the nitrate- and water-fixing trees and plants are edible and/or medicinal. ICIMOD also demonstrates and teaches realistic opportunities for income generation for poor people in the mountains where agriculture in some areas are limited to only a few months a year (FAO, 2004: 9). Especially to women and children who are considered to be most vulnerable to food insecurity benefit from activities such as e.g. home gardens and fruit trees.

Spreading knowledge and productive materials contributes to several of the factors related to food security. If adopted by farmers, these methods could lead to greater self-reliance and thus reduce the dependence on both imports and exports and decrease vulnerability to price fluctuations on the market. Moreover, distributing locally adapted seeds and breeds increases biodiversity, as well as stabilizing the food supply. Educating the farmers about the risks of using chemical pesticides potentially increases their own health and the health of their families.

By rising consumer awareness about organic products and their benefits, increases the number of people consuming organic food and helps the overall health of the community. It also helps organic growers reach a critical mass, or as Mr. Sherpa Director at Godavari puts it; if more consumers become aware of the health aspects of organic food, demand will go up and if this demand is met with more production prices for organic products will go down. Facilitating networking and opening up for methods of e.g. 'participatory certification' is crucial for organic farmers to get access to markets and receiving a better price for their goods. When people participate in work, training and workshops – where they share problems, lessons and achievements – it builds social capital and networks between people and possibly enriches the community's social security.

By giving women the same chance to take part in the work and the meetings, as in the Pragatinagar program facilitated by SOIR-IM, it encourages gender equality. Empowering women by giving them more control over the household's productive resources and having them contribute more to the family's income. Mr. Bhattari, Country Director for SOIR-IM in Nepal, says that there are still a few farmers who are not convinced – but that it is a process that takes time. However, he points out that the project has helped many and gives an example of one of the men in Ashara farmers' group who used to work in one of the Gulf countries. Since starting with the project he has realized that he can make the same amount of money doing organic farming – showing the impact it can have on reversing adverse migration flows and contribute to rural development.

The case study of Subba Organic Farm shows how, when done right, organic agriculture does not only contribute to the household's economy – but to the income of the whole community. By employing 15 workers from outside of his family, the farm contributes to local employment and has the potential to impact negative migration patterns. Organic agriculture, being labor intensive, therefore offers a great potential for landless people to find a way to make a living. Many farmers in Nepal, like Thakur, are 'organic by default' and are not using any chemical inputs, but instead are relying on traditional methods of crop rotation and fertilizing. For those farmers, converting to more advanced organic farming it should be relatively easy to adopt organic methods without suffering any substantial financial losses.

7.2. Challenges

The two different cases of farms show how important access to knowledge and markets are for breaking the chains of subsistence farming and becoming food secure. But without any help it can be hard for small and isolated farmers to convert to organic practices. As organic methods rely on more manual labor input than conventional "pay and spray" methods, this poses a challenge for especially women and children who are already heavily burdened (if labor demand cannot be satisfied from outside the household).

Being 'organic' does not automatically open up for new markets. Even when certified there are no guaranteed access to markets and higher price. Getting both knowledge and access to markets are hard to achieve as a single farmer, but can be facilitated by the help from the outside – by for example a NGOs. As Mr. Sherpa from ICIMOD expressed it; Access to

markets is crucial! “I cannot see people living in the rural or remote areas going for organic vegetable farming, because they have no access – no roads for selling their products [...] But you can encourage them to go for organic for own consumption and environmental conservation”. Another way is for the government to take initiatives, but in many cases misguided policies and subsidies on chemical agro-inputs might hinder such interventions.

Working together with the government of Nawalparasi, SOIR-IM has advocated for the development of organic agriculture in the district. This has led to an initiative to make the district free from chemical pesticides. Although this would be good for peoples’ health in the region and the environment, such bans could have adverse effects on farmers who rely on chemical pesticides for their survival. Scaling up organic agriculture is a major challenge. Small farmers in low-input/output systems are those who benefit most, as their yields are likely to only improve. Mono-cropping farms that use extensive methods for growing e.g. staple grains might suffer negative yields during the so called ‘organic transition effect’ (of 1-4 years) and might worsen food security on a regional and national scale. Moreover, if farmers take out higher prices for their organic products, poor consumers might not be able to afford the new prices. Thus, if organic farming is going to be a thing of the future farmers, researchers and policy makers must work together to face up to these problems.

8. Conclusion

The aim of the study has been to show the linkages between organic agriculture and food security; and posed two research questions in the introduction. They were: How does NGOs and farmers work with organic agriculture; and how does this potentially affect food security? The essay has answered these questions by looking at four cases of organic agriculture in Nepal; two NGO facilitated organic initiatives and two typical but distinct organic farms.

Organic agriculture impacts the four dimensions of food security (i.e. availability, access, utilization and ‘stability’ of food) in different ways. The availability of food is determined both by the productivity of yields and the efficiency of the system. Converting to organic farming has in general been said to lead to lower yields, but new evidence suggest otherwise; and that farmers in low-yielding systems especially benefit from adopting organic methods by using their resources more efficient. Using organic practices rid farmers of expensive inputs and contributes to peoples’ access to food by enhancing their self-reliance by giving them greater control over their productive resources (labor, land, water, biodiversity and

environmental services), (traditional) knowledge and opens up for new markets. On a household level organic agriculture gives access to food despite gender, age or status; and on a regional and community level it contributes to capacity building and empowerment.

Organic food contains more minerals, vitamins, high-quality proteins and amino acids than conventionally grown food. However, the large gains with organic agriculture can be found in the diverse diets with farmers due to the diversification of crops; and promoting such diversity has proven a simple way to combat malnutrition. By using bio-pesticides rather than chemical, removes the risk of farmers and their families getting exposed to deadly toxins. Agriculture in most parts of the world faces climate change and most food systems are likely to be affected by erratic rains, floods and droughts in the future. Through sustainable use of resources and knowledge, farmers become more resilient, risk averse and adaptive to sudden climatic and economic shocks; and thereby more food stable.

ICIMOD and SOIR-IM both run demonstration and training centers for farmers and others that are interested in organic agriculture; and they offer materials in forms of seeds and saplings. By doing so they show farmers how to maintain and increase yields and access to their most important resources, i.e. land, soils, water and knowledge; and at the same time give them reasonably simple ways to access new markets in form of high value-chains that especially benefit women and children. Through soil and water management families increase the value on their land at the same time as they stabilize their income and get access to a diverse and nutritious diet. Knowledge spread to farmers' increase their self-reliance and reduces their dependence on external inputs; and reduces exposure to toxic pesticides. Moreover, by rising consumer awareness the NGOs help demand for organic products and farmers reaching a critical mass; at the same time as it increases the overall health of people.

Facilitating networks through participatory activities builds up social capital and strengthens the community. It also opens up for crucial opportunities for e.g. participatory certification, giving more farmers access to higher prices. By encouraging women to participate in the fields and at training empowers them and helps them to get control over productive resources, thus contributing more to the household economy.

Other than the two NGOs this study also shows how organic farmers in the country are different, by looking at two cases of organic farms. One of the farms is organic by default and

motivated by subsistence, whilst the other (Subba Organic Farm) is certified organic and sells its crops on the market. The example from Subba Organic Farm shows that, by being labor intensive, organic agriculture contributes to local employment and the economy of the community. Moreover, the two farms illustrate how important it is with access to knowledge and markets are for organic farmers to break free from poverty and fighting for subsistence. Farmers who are organic by default should have it relatively easy to transit to more intensive organic methods, as their practices are already fairly close. However, doing so is not easy without any help from the outside. Furthermore, as organic practices rely on more labor input than conventional agriculture this might lead to increased burdens on women and children. Moreover, being organic does not necessarily lead to higher-value chains, but requires facilitation from outside. Scaling up organic agriculture poses several challenges. Small subsistence farmers might have no problem sustaining their yields, but large farms using extensive methods might suffer lower yields – affecting regional and national food security. Moreover, poor consumers might not be able to face up to the higher prices if food at the markets becomes solely organic.

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