Ecological Economics 132 (2017) 144–154

Contents lists available at ScienceDirect

Ecological Economics

journal homepage: www.elsevier.com/locate/ecolecon

Organic Farming and Small-Scale Farmers: Main Opportunities and Challenges

Zeynab Jouzi [a], Hossein Azadi [b,c,d], Fatemeh Taheri [e], Kiumars Zarafshani [f,*], Kindeya Gebrehiwot [g], Steven Van Passel [b,h], Philippe Lebailly [c]

[a] Department of Environmental Management, Science and Research Branch, Azad University, Tehran, Iran
[b] Centre for Environmental Sciences, Hasselt University, Belgium
[c] Economics and Rural Development, University of Liège, Belgium
[d] Department of Geography, Ghent University, Belgium
[e] Department of Agricultural Extension and Education, Ramin Agricultural and Natural Resources University, Iran
[f] Department of Agricultural Extension and Education, Razi University, Iran
[g] Department of Land Resource Management and Environmental Protection, Mekelle University, Ethiopia
[h] Department of Engineering Management, University of Antwerp, Belgium

ARTICLE INFO

Article history:
Received 7 December 2015
Received in revised form 19 June 2016
Accepted 27 October 2016
Available online 5 November 2016

Keywords:
Sustainable agriculture
Organic farming
Food security
Food safety
Population growth
Sustainable livelihood

ABSTRACT

Producing enough food to meet the needs of a growing population has always been the greatest concern of food policy-makers around the world. Given the increasing attention to organic farming (OF), we conducted this study to investigate the main opportunities and challenges of the food production system of small-scale farmers in developing countries with an emphasis on their livelihoods. The study showed that the most significant advantages of OF are environmental protection and a higher resilience to environmental changes, increasing farmers' income and reducing external input cost, enhancing social capacity and increasing employment opportunities. A s well as enhancing food security primarily by increasing the food purchasing power of local people. However, the main challenges of this food production system include lower yields in comparison to conventional systems, difficulties with soil nutrient management, certification and market barriers, and the educational and research needs of small-holders. The paper concludes that even though OF might present some significant challenges to small-scale farmers, it could/should still be considered as a part of the solution and means of improving their livelihoods.

Contents

* Corresponding author.
E-mail address: zarafshani2000@yahoo.com (K. Zarafshani).

http://dx.doi.org/10.1016/j.ecolecon.2016.10.016
0921-8009/

1. Introduction

According to the latest data from the FAO (2014), it is estimated that about 805 million people, or one out of nine, around the world are unnourished. This statistic in sub-Saharan Africa is as high as one out of four. When speaking in general, 98% of those suffering from hunger live in developing countries, with the numbers reaching 526, 227 and 37 million of hungry people in Asia, Africa and Latin America, respectively. Although these numbers have shown a remarkable decline, specifically in Latin America as compared to the past, there is still a long way to go on the road of eradicating hunger. As the population and subsequent consumption around the world is growing, the demand for food, feed and fuel in the future will do the same. Moreover, in the developing world, diets are changing and people are putting extra pressure on natural resources as they consume more dairy products and meat (Godfray et al., 2010; Seufert et al., 2012). It is estimated that by 2050, the demand for agricultural products will grow by 1.1% annually as the world's population reaches around 9 billion (Alexandratos and Bruinsma, 2012).

From a historical point of view, the Green Revolution has truly increased agricultural production on a global level, but it has done so at the cost of the degradation of the environment and natural resources (Altieri, 2009; Rundgren and Parrott, 2006; Bazuin et al., 2011). Factors like lack of land, water and access to capital restricted food production in many regions (Rundgren and Parrott, 2006). Moreover, studies show that, generally, technology bypasses the poor who cannot benefit from agricultural technologies due to weak land governance, difficulty to obtain inputs and credits, barriers that restrict their access to the market and its opportunities as well as unfavorable policies like subsidies that discriminated against them (Pingali, 2012).

Numerous studies suggest that small-scale farmers in developing countries play a crucial role in food security (Altieri, 2009; Tscharntke et al., 2012; Azadi et al., 2015), even though they make up the majority of people in the world who experience food insecurity (HLPE, 2013; Mwaniki, 2006). It is estimated that around half of the hungry people on Earth live on small farms (IFPRI Research on MENA, 2015). In order to combat global food insecurity, we therefore ought to pay special attention to those small-holders in developing countries. Though, when we refer to "small-scale farmers" in developing countries, the term "small" can refer to different factors such as the amount of capital invested, the number of workers or the size of the land. Although land size is the most common factor, given different potential uses of lands around the world, there is no unique size for this definition. Nevertheless, the FAO, in a broad definition, considers lands around the world that are smaller than 2 (ha) as small-scale farms. In a more general definition, IFAD (2013; pp. 10) describes small-scale farmers as "marginalized people who have difficulties to access resources, capital, information and technology", which is the definition for small-scale farmers in developing countries we used in this paper.

According to the data published by the FAO, agriculture uses 11% of the world's land and 70% of its freshwater resources. The lands suitable for agriculture around the world is unequally distributed between high-income countries and low-income countries that have less than half of the cultivated land per person in comparison (FAO, 2011). In some regions of the world like Africa, the indigenous farming method is mainly based on the slash and burn method that include fallow period that lasts for a couple of years. Yet due to population growth, farmers allow their lands to fallow less and less with the majority of small-scale farmers planting annually to keep up with demands, leading to serious soil erosion and nutrient degradation. Consequently, these farmers must abandon their farms and move to new land to repeat the process (Lotter, 2015). According to the FAO, the total amount of arable land per person has decreased globally from 0.38 ha in 1970 to 0.2 ha in 2013 and it is predicted to decrease to about 0.15 ha by 2050. Different studies suggest that the arable land and water supplies in developing countries are significantly being reduced (UNEP, 2008; IFAD in the Near East and North Africa region, 2007; Food security in Asia and the Pacific, 2013). In the east and southeast of Asia, this figure is even less, at 0.10 ha by 2050 (Food Security in Asia and the Pacific, 2013).

Another important issue facing farmers in developing world is climate change, which can be detrimental to food production by small-scale farmers (Pingali, 2012), who are the most vulnerable group to climate volatility (IFPRI Research on MENA, 2015). Many studies suggest that Africa is among the most vulnerable regions in the world due to climate changes (de Sherbinin, 2014). It is also predicted that major crop yields across Africa will decrease in the future as a result of climate change (Wheeler and von Braun, 2013). Furthermore, apart from the agricultural aspects, African countries would also have to deal with the issue of "food access". The majority of studies on the relationship between climate change and social instability suggest that fluctuations in climate and social instabilities have a positive correlation (Hsiang and Burke, 2014). Although their review shows that the association between climatological changes and various conflict outcomes is casual, this hypothesis needs to be tested and justified in reality in order to realize whether and to what extent climate change could be a catalyst of social conflict. Maps provided by the global food policy report (IFPRI Research on MENA, 2015) illustrate that there is a remarkable overlap between regions suffering from civil conflicts and weather-related events. Which demonstrates that there is a correlation between fluctuations in climate and social instabilities. For example, a period of drought can lead to water shortage and scarcity of available resources which, in turn, sparks conflict in the society. Needless to say, food insecurity is prevalent in these regions.

Moreover, "water scarcity" in many food-insecure regions around the world continues to be an important issue because when natural like water are scarce, poor farmers are put under more pressure. For example, due to lack of access to appropriate water-storage systems, in many semi-arid regions in the world, during the dry months small-scale farmers cannot enter the market, a time that is the growing season for fruits and vegetables and the *prices* are at *their highest* levels (Namara et al., 2010). In most parts of the world, lack of water is a factor that crucially restricts agriculture, especially in the Middle and Near East, and North Africa; the latter being one of the driest regions on the earth. It is predicted that severe water shortage will be an issue for North Africa in the future that will cause direct and indirect negative effects on food security (FAO Fact Sheet, 2014; IFAD in the Near East and North Africa region, 2007; IFPRI Research on MENA, 2015). Moreover, studies show that hunger and famine are most prevalent in sub-Saharan Africa where drought is frequent. Although different factors contribute to food security, many studies suggest that reliable access to water supplies can improve the livelihoods of small-scale farmers and has the remarkable potential to decrease food insecurity in this region (Burney et al., 2013; Merante et al., 2015).

In order to address all these issues, many researchers have considered low-external input sustainable agriculture as a preferred development approach for the problem of food security (Setboonsarng, 2006). Integrated, agro-ecological, pest management, and particularly organic farming are the most important 'sustainable' agriculture systems introduced in recent years. Nevertheless, organic farming might be practiced differently in different regions (Genghini et al., 2006). In this regard, many researchers have proposed organic farming (OF) as an environmentally friendly agricultural production system (Badgley et al., 2007; Chappell and LaValle, 2011; Scialabba, 2000; Azadi et al., 2011; Schoonbeek et al., 2013; Seufert et al., 2012). OF is thus a holistic production system that considers long-term environmental sustainability and primarily aims to produce food in an environmentally friendly manner (Seufert et al., 2012). Environmental benefits of OF include biodiversity conservation, better quality of soil, reducing evaporati on and water harvesting, strengthening adaptation strategies and reducing greenhouse gas emissions as well as energy efficiency (Seufert et al., 2012; Reganold and Wachter, 2016). Organic livestock farming is in