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## STUDIES ON PROFITABILITY OF ORGANIC VEGETABLE FARMS

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*Abstract: The belief that organic food is healthier than the conventional ones continues to influence the market today. Surveys show that health is the main reason why consumers buy organic food (Carolyn Dimitri and Nessa J. R., 2000; Howie M., 2004; The Hartman Group, 2006). The pioneers of the environmental movement have issued a hypothesis that a healthy diet helps to increase the harmonious development of people and that is the basis of a healthy society. Since most food products come from the soil, they promote the natural cultivation method, which is consistent with the health of the soil.*

*Profitability helps measuring the ability of a farm to generate more revenue than expenses over time. Profitability ratios examine the relationship of net farm profit to the management skills and labor necessary for its proper function (Johnson D.M. and Lessley B.V., 1998). The Farm Financial Standards Council recommends five financial ratios for measuring profitability: net farm income, rate of return on equity; operating profit margin; earnings before interest, tax, depreciation and amortization and rate of return on investments.*

*Keywords: market, organic vegetables, health, economic growth, profitability*

### INTRODUCTION

For 50 years, farmers and the general public were made to believe that pesticides are essential in modern agriculture and especially to ensure food for the entire world population. This simply is not true. Pesticides unbalance ecosystems that have sustained agriculture for

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thousands of years by eliminating insects and soil microorganisms. In addition, pests are always under pressure to become resistant to pesticides.

Consumption of organic products is growing and the area devoted to organic crops is also growing. An organic industry grows, which not only commands respect but demands a growing share of research and educational services from agricultural universities and government institutions.

Despite the fact that agriculture provides increasing supplies of food, it contributes greatly to greenhouse agrochemical pollution, gases, biodiversity loss and soil degradation (Rockström J. et al., 2009; Godfray H.C.J. et al. 2010). The most popular alternative farming system in the world is organic agriculture, with global sales growing 170% to \$63 billion from 2002 to 2011 (Willer H. et al., 2013).

Data on areas and production of organic vegetables were collected for the first time in 2004 when the area was 105,000 hectares and so far, it has reached 305,000 ha (Garming H. et al., 2014). The increase can be attributed to the continuous improvement of data collection by governments and the private sector. Major surfaces increase from 2013 is due to the fact that the information was available in China for the first time (Figure 1).

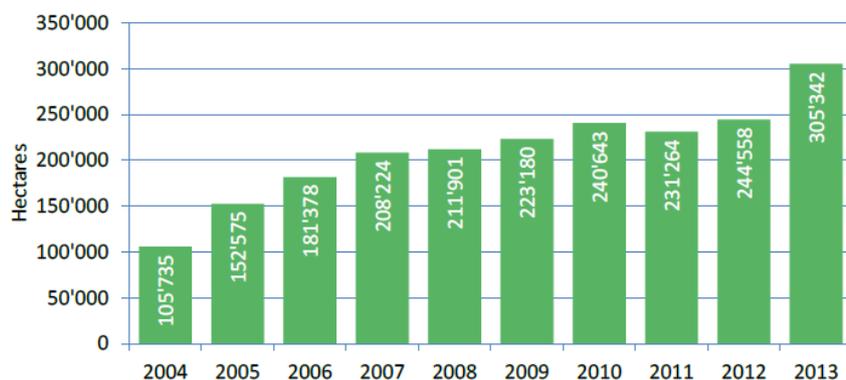


Figure 1 – Production area of organic vegetables worldwide (FIBL-IFOAM-SOEL, 2006-2015)

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Tomatoes (*Solanum lycopersicum* L.) are the most important vegetable worldwide and tomato yield has grown by 33% in just 10 years from 2002 to 2012 (Figure 2).

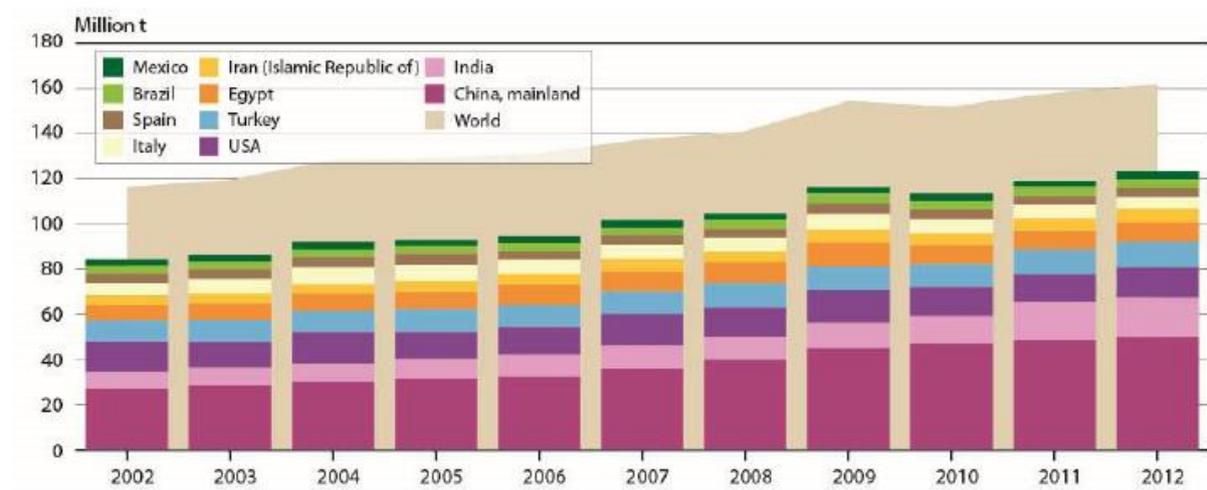


Figure 2 – Evolution of tomato production in top 10 countries (FAOSTAT, 2014)

Even though the Netherlands is not in the top 20 tomato producing countries, it is the second largest exporter of fresh tomatoes in the world. USA occupies the third place in production of tomatoes and first place on imports of fresh tomatoes; instead, they are the first in the export of paste and sauce (Figure 3).

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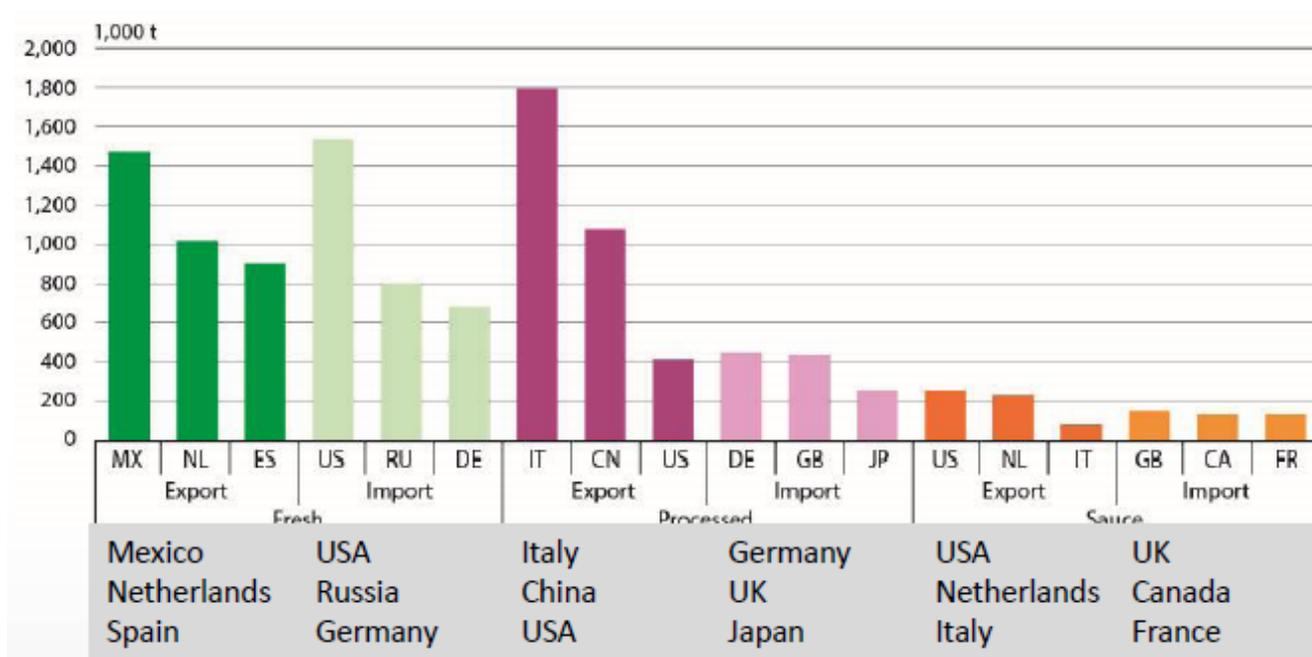


Figure 3 – Top 3 exporting and importing countries for fresh, processed tomatoes and tomato sauce, 2012 (UN Comtrade, 2014)

Organic farming is adopted by 162 countries, but it occupies only 1% of global cropland (Willer H. et al., 2013). The limiting growth factors of organic agriculture are often the low consumer budget, inexperience with growing systems, insufficient marketing, technical infrastructure and government policies (Halberg N. et al., 2007; Reganold J.P. et al., 2011).

For example, global land area intended for the production of organic vegetables is 305,342 ha representing 0.5% of the total (56 mln. ha) land occupied with vegetables (FAOSTAT, 2012). Countries with the largest area of organic vegetables are USA, China, Mexico and Italy, each with over 20,000 ha. The highest levels of production of vegetables are registered in China, India, USA and Turkey (Figure 4).

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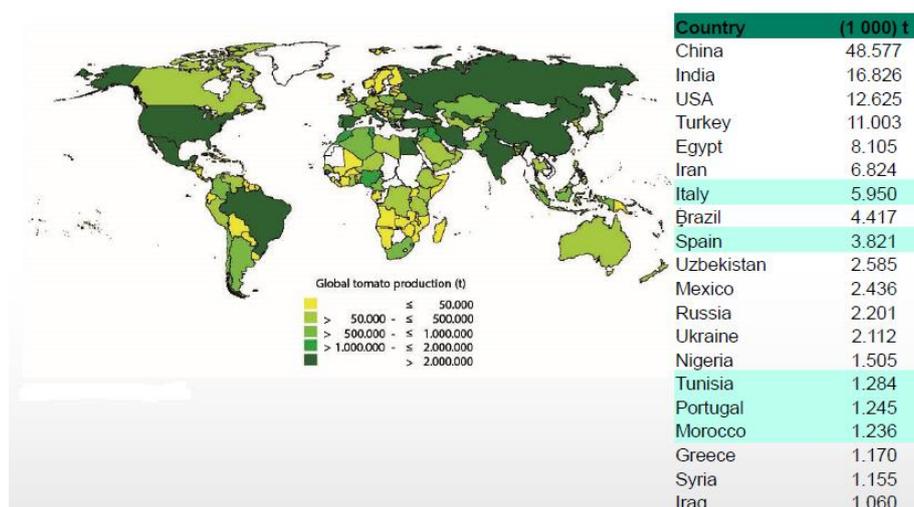


Figure 4 – Global tomato production, 2011 (FAOSTAT, 2012)

Organic agriculture is doubtful, with critics saying that it is inefficient (Trewavas A., 2001; Pickett J.A., 2013), requiring more land to produce the same amount of food as conventional agriculture. In addition, adopting organic agriculture on too large a scale could potentially threaten the entire environment, including forests and grasslands (Trewavas A., 2001, Avery A., 2006), and skeptics contend that it just has poor solutions to agricultural problems (Trewavas A., 2001; Kirchmann H. and Thorvaldsson G. 2000) and will naturally become less relevant in the future (Pickett J.A., 2013). However, there are international agricultural articles that recognize organic agriculture as an original farming system that balances multiple sustainability goals and will be of expanding importance in worldwide food and ecosystem security (Rockström J, et al., 2009; De Schutter O., 2010).

## MATERIAL AND METHOD

The present paper is the result of examining the financial performance of organic agriculture: total costs, variable costs, fixed costs, gross returns, benefit/cost ratio, organic price premiums and yields.

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## RESULTS AND DISCUSSIONS

Any farming system should be able to produce sufficient amounts of high-quality food, enhance the environment, contribute to the well-being of farmers and their communities and make farming financially viable (National Research Council, 2010).

Reviews and analyses have demonstrated that although organic farming produces lower yields compared with conventional agriculture (De Ponti T. et al., 2010; Seufert V. et al., 2012; Ponisio L.C., 2015), it delivers more nourishing foods (Brandt K. et al, 2011; Smith-Spangler C. et al., 2012) with no pesticide residues (Baranski M. et al., 2014; Lu C. et al., 2006). Such aggregate research generally supports the idea that organic farming systems are friendlier to the environment than the conventional farming systems.

The environmental benefits of switching to organic farming cover the following aspects: greater energy efficiency (Alföldi T. et al., 2002; Tuomisto H.L. et al., 2012); enhanced soil carbon (Gattinger A et al., 2012); greater floral and faunal landscape diversity (Gomiero T. et al., 2011); and, subsequently less pollution of soil and water (Lotter D.W., 2003; Gomiero T. et al., 2011).

Collected data was used to examine the financial parameters of organic and conventional agriculture using both individual crops and cropping systems. The financial security of farmers is often based on earnings from multiple crops grown over consecutive seasons.

There was no significant difference between the total costs, variable costs and fixed costs of organic and conventional crops or systems. Labor costs, which belong to variable costs, were significantly higher for organic individual crops (13%) and systems (7%); however, they were offset by not using purchased inputs, such as synthetic fertilizers and plant protection products. The higher labor costs of organic farms is attributed to devoting more resources to mechanical pest control, having a greater diversity of enterprises. Even though one of the accomplishments of conventional agriculture has been the ability to create more with less labor, some have found the extra labor to be beneficial by redistributing resources and promoting

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rural stability in regions where the labor force is underemployed (International Fund for Agricultural Development, 2005).

When organic premiums were not applied, gross returns, benefit/cost ratios, and net present values were significantly lower for organic crops (−10%, −7% and −23%) and systems (−18%, −8% and −27%) compared with their conventional counterparts.

On the contrary, when actual organic premiums were applied, gross returns, benefit/cost ratios and net present values were reliably greater for individual organic crops (21%, 24% and 35%) and systems (9%, 20% and 22%). Additionally, total costs, gross returns, benefit/cost ratios, and net present values for organic compared with conventional crops and systems were consistent.

The financial performance of organic farming was also higher than that of conventional system when organic crops were grown in longer or more diverse rotations, in annual systems compared with perennial ones and in leguminous crops compared with non-leguminous ones.

If the price on the negative externalities caused by farming, such as soil erosion and groundwater poisoning, is also added, then organic farming becomes even more profitable. Organic practices appear to increase the ability of farms to provide some ecosystem services (Wratten S. et al., 2013; Porter J. et al., 2009).

## CONCLUSIONS

Taking into account lower yields and externalities or ecosystem services, organic agriculture is significantly more profitable than conventional agriculture. Organic farming can continue to expand even if premiums decline.

Financial viability of farms is vital, but is only one of four goals that must be met for agriculture to be sustainable. Equally important is enhancing the environment, producing adequate crop yields of high quality and contributing to the well-being of farmers and their communities.

Conventional farming has provided large amounts of food and other products, but at

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the expense of other sustainability goals. Although organic agriculture produces lower yields than conventional agriculture, it unites human health, socioeconomic and environment objectives. In times of climate changes, increasing population growth, environmental degradation and rising energy costs, agricultural systems with a well-balanced portfolio of sustainability benefits are most needed. Organic farming can contribute a larger share in feeding the world, not just 1% of the global agricultural land, especially because of its multiple sustainability benefits.

Foods should be valued based on health benefits, food security and ecosystem services and would allow the public to choose products that push agriculture in a more sustainable direction.

The unifying principle behind the many supporters of organic agriculture is the belief that the health of the soil is crucial to life and is the only sustainable way of farming in order to create a secure future for humanity.

Organic farming does not involve using the best options available, but using options that have been approved. These options are usually more complex and sometimes less effective than conventional ones. Improving the options available for organic farming requires scientific effort, which may also require some reassessment of existing practices.

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