

The Sustainability in Training Hydroponic Production to Smallholder Farmers in the Tshwane Area, Gauteng Province, South Africa

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ABSTRACT Smallholder farmers in the city of Tshwane Metropolitan were given three standard tunnels through comprehensive agricultural support programme to produce vegetables in a hydroponic system. This research sought to determine the sustainability in training hydroponic production to 38 smallholder farmers in the city of Tshwane. The objectives were as follows: (1) To describe socio-economic characteristics of the smallholder farmers, (2) To identify factors that contribute to the sustainability of smallholder farmers and, (3) To assess the effects of the hydroponic production training. The researchers used sustainability approach and Donald Kirkpatrick training evaluation model. The analysis found that most smallholder farmers were not sustainable, while they had increased their knowledge and skills in hydroponic production and their attitude had changed after the training. With regard to production, it was found that trained smallholder farmers increased production, increased quality of hydroponic produce, reduced waste and also increased sales. It can thus be concluded that smallholder farmers must be regularly trained and monitored to achieve the goals of sustainable development.

INTRODUCTION

Around 11 million South Africans are food insecure and it is estimated that a further 15 million in other Southern African countries (including Malawi, Zimbabwe, Namibia and Botswana) also go to bed hungry (Maponya et al. 2015). South Africa is largely deemed a food secure nation producing enough staple foods or having the capacity to import food, if needed in order to meet the basic nutritional requirements of its population but the same cannot be said about households. The Gauteng province is a home for over 12 272 263 peoples. According to GDARD (2010) almost twenty percent of households in Gauteng province go to bed hungry because of food insecurity and unsustainable income.

The term sustainability has been a centre of many farming principles. The interest of sustainability originates from the concept of sustainable agriculture, which can be traced back in the 1950-1960 (ATTRA 2003). Sustainability concept has dominated the policy making-arena hence today, concerns about sustainability cen-

tre on the need to improve agricultural practices that: (i) do not harm the environment, (ii) lead to food productivity, and (iii) are effective to farmers (Ainembabazi and Mugisha 2013). The components of sustainable agriculture can be broken into three: (i) economic, (ii) environmental, and (iii) social (ATTRA 2003). The implementation of sustainability is based on the mentioned components; firstly, the economic components consist of the yield increase, food safety and quality, farm diversity and market information. Secondly, the environmental component takes in soil fertility, water, energy, biodiversity and waste. Lastly, social components embrace human capital and local community (SAI 2009). Practicing sustainable agriculture can be done in any type of farming enterprise including hydroponic production.

Hydroponic production is defined as the science of growing plants without the use of soil. Sawdust, peat, vermiculite, gravel, and sand are used as growing mediums where essential elements are added as nutrient solution for plant growth and development. Advantages of hydroponic production system includes elimination of soil borne pest, weeds and diseases, less labour requirement and high density plant population in a limited space (Du Plooy et al. 2012).

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