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Research article

Smallholder farmers' behavioural intentions towards sustainable agricultural practices

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ABSTRACT

The introduction of sustainable practices is considered a win-win strategy for low-income countries because of its potential to simultaneously improve food security and address environmental issues. Despite the numerous studies that focus on the adoption of technological innovations, little work has been done on the socio-psychological behaviour of farmers with regard to sustainable practices. This study investigates smallholder farmers' intentions towards two practices: minimum tillage and row planting. The decomposed theory of planned behaviour is used as a theoretical framework to analyse the intentions. The findings reveal that attitudes and normative issues positively explain farmers' intentions to adopt both practices. Perceived control also has a positive significant effect on the intention to apply minimum tillage. When the intention is formed, farmers are expected to carry out their intention when opportunities arise. Moreover, perceived usefulness, social capital, and perceived ease of operation are also significant predictors of farmers' attitudes. Furthermore, social capital and training are factors that positively affect the normative issue, which in turn also positively mediates the relationship between training, social capital and intention. Finally, it is shown that neither the perceived resources nor information from the media significantly affect farmers' intentions. This paper thus confirms that social capital, personal efficacy, training and perceived usefulness play significant roles in the decision to adopt sustainable practices. In addition, willingness to adopt seems to be limited by negative attitudes and by weak normative issues. Therefore, to improve adoption of sustainable practices by smallholder farmers, attention should be given to socio-psychological issues. This could lead to improvements in farm productivity and enhance the livelihoods of smallholders.

1. Introduction

Sustainable practices[1] and technological innovation play an important role in improving farm productivity, and enhancing food security and economic growth (Kassie et al., 2013; Teklewold et al., 2013; Asfaw et al., 2012) as well as improving soil fertility, reducing the risk of drought and water shortage, reducing erosion, and maintaining biodiversity and agroecosystem resilience (Mbow et al., 2014; Price and Leviston, 2014; Wauters and Mathijs, 2014; Wezel et al., 2014; Yazdanpanah et al., 2014; Foley, 2013; Power et al., 2013; Reimer et al., 2012; Veisi and Toulabi, 2012; Lee, 2005). Sustainable practices can involve reducing the use of inputs that are potentially harmful to the environment or a shift towards more locally available resources while maintaining the competitiveness and economic viability of agriculture (Wezel et al., 2014; Yazdanpanah et al., 2014; Veisi and Toulabi, 2012; Wollni et al., 2010; Wauters, 2010; Hattam, 2006).

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[1] Sustainable agricultural practices include farming activities that have environmental, societal and economic dimensions such as conservation tillage, crop diversification, composting, biological control, improved varieties (crop/animal), agro-forestry, local seed conservation, rainfall harvesting, area enclosure, animal manure, water conservation, organic fertilizer, improved fallow management, forage management, and soil and water conservation (Mbow et al., 2014; Wezel et al., 2014; Kassie et al., 2013; Teklewold et al., 2013; Veisi and Toulabi, 2012). In this paper, sustainable (agricultural) practices refer to minimum tillage and row planting practices. Minimum tillage can be defined as the least possible amount of soil disturbance to prepare a suitable seedbed for successful crop production while row planting is a system of growing crops in a linear pattern (single or multiple) in at least one direction, rather than planting without any distinct arrangement. Both practices have several benefits such as saving resources (labor cost and energy consumption), conserving soil moisture, minimizing erosion, increasing gas exchange, minimizing pests and diseases, improving soil fertility and preventing excessive humidity. These advantages can, in turn, enhance yield, improve crop quality, and increase biodiversity, thereby generating more income opportunities and strengthening livelihood resilience (Vandercasteelen et al., 2014; Araya, 2012; Ekeberg and Riley, 1997).

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The introduction of improved technologies and the application of sustainable agricultural practices such as agroforestry, use of compost and manure, soil conservation practices, crop rotation, improved seed varieties, water harvesting schemes and intercropping in some Asian and Latin American countries has successfully improved the productivity of the agricultural sector and has significantly reduced food insecurity and poverty (FAO, 2014; Gumataw et al., 2013; Kelsey, 2013; Todaro and Smith, 2011; Dillon, 2011). Therefore, the adoption of improved technologies and sustainable practices has been considered an important agenda in the development policy of the Sub-Saharan African countries since the 1970s (FAO, 2014; Gumataw et al., 2013; Dillon, 2011; Norton et al., 2010).

In spite of this, the adoption of improved technologies and sustainable practices in these countries has remained below expectations. In the literature, several demographic and socioeconomic factors have been suggested as reasons for the low adoption (Mbow et al., 2014; Foley, 2013; Gumataw et al., 2013; Kassie et al., 2013; Kelsey, 2013; Teklewold et al., 2013; Asfaw et al., 2012; Reimer et al., 2012). However, there is still a lack of clear evidence to understand why/how farmers voluntarily adopt improved technologies and sustainable practices (Yazdanpanah et al., 2014). This indicates that there is still a need for further in-depth research on how smallholder farmers can be encouraged to use agricultural practices and technologies.

Previous studies have primarily focused on how demographic factors, economic resources, and biophysical factors affect the adoption of sustainable practices and technological innovation. A few studies have considered perception in relation to socio-psychological[2] influence and access to an extension system to measure the impact of information sources. However, most studies overlook cognitive, social and psychological factors, as well as the influence of others' opinions and alternative information sources, in the analysis of decision behaviour (Martínez-García et al., 2013). As well as the socio-psychological issues, the characteristics of the agricultural practices themselves are also rarely considered (Wauters and Mathijs, 2014; Foley, 2013). Accordingly, most studies do not sufficiently capture socio-psychological behaviour (beliefs and social pressure) and alternative information sources. We believe that by using the theory of planned behaviour greater insight could be gained into people's behaviour (Borges et al., 2014), more specifically adoption decisions.

This issue has recently been highlighted by a few researchers (Borges et al., 2014; Wauters, 2010). Without considering the social-psychological issues, we may not fully understand the intentions and behaviour of farmers in adopting sustainable practices. Additionally, we need to understand the different information dissemination channels and their overall effects in influencing decision-making behaviour. This will help in targeting and integrating information channels that have more predictive power in their promotional campaigns for the adoption of sustainable practices and rural development programs. Therefore, this paper aims to understand farmers' attitudes and intentions as a basis for promoting sustainable practices.

The objectives of the paper are twofold. We first determine the attitudes and intentions of smallholder farmers towards the use sustainable practices on their plots in the future. Next, we explore the influence of attitudes, normative issues and perceived controls on farmers' intentions to adopt sustainable practices. This article contributes to the literature as follows. To our knowledge, this study is the first of its kind for the region under investigation (northern Ethiopia) and it, therefore, provides insights for policy-makers and practitioners to design socio-psychological based initiatives or to readjust the current strategies designed to stimulate the adoption of sustainable practices. Secondly, the article contributes to the scarce literature on the adoption of sustainable practices which takes socio-psychological issues into account. Finally, it will test whether the decomposed theory of planned behaviour adequately explains Ethiopian farmers' intentions to adopt sustainable practices.

This article is organised into five main sections. Section 1 introduces the problem and the objective of the study. The theoretical and conceptual frameworks of the study are reviewed and explained in the section 2. In this section, the hypothesis is also established and the model is explained. Following this, the research design is described including the sampling framework, data collection and data analysis. The assumptions of the structural equation model are briefly assessed and evaluated here. The fourth section presents the results and discusses the main findings of the study. Finally, conclusions and policy implications are given.

2. Review of literature

2.1. Theoretical and conceptual frameworks

The theory of reasoned action is one of the theoretical frameworks that seek to explain human behaviour and adoption decisions. It assumes that human behaviour is under full volitional control and postulates intention, which is captured by attitude and subjective norm, to explain a given behaviour (Fishbein and Ajzen, 1975). However, Ajzen (1991) later criticised the full volitional control assumption. Not all human behaviour is completely under volitional control, since some behaviour relies on external factors. Therefore, Ajzen proposed the theory of planned behaviour, which added perceived control to the existing components of behavioural intention. Under this theory, intention becomes a weighted function of attitude, subjective norm, and perceived control. Both perceived control and intention also explain the adoption behaviour (use) of technologies.

However, the theory of planned behaviour was also criticised by Taylor and Todd (1995) for its monolithic structure of belief. They rejected the uni-dimensional belief and constructed the multidimensional belief. The cognitive component of the belief structure cannot be organised into a single conceptual unit because it is grounded in different ideas. They proposed the decomposed theory of planned behaviour, which further decomposed the attitudinal belief structure into perceived usefulness, perceived compatibility and perceived ease of operation (perceived easiness), and the perceived control into self-efficacy and facilitating conditions. Consequently, according to this theory, behavioural intention becomes a function of several lower-level behavioural constructs.

For this study, the decomposed theory of planned behaviour, which combines the theory of planned behaviour, diffusion of innovation theory[3] and economic constraint theory,[4] is used as a theoretical basis to develop our conceptual framework (Fig. 1) to explain smallholder farmers' intentions to adopt sustainable agricultural practices. Farmers' intentions to adopt sustainable practices is explained by attitude, perceived control, and normative issues. In line with the decomposed theory of planned behaviour, attitude is

[2] In this study, socio-psychological issues refer to a farmer's thoughts, feelings, attitudes and cultural norms regarding sustainable agricultural practices and also the influence of other reference groups and external forces on his behaviour and decisions.

[3] Identifying four factors (technology attributes, communication channels, time and social system) that affect the use and spread of a new technology (Rogers, 1983).

[4] Explaining how the distribution of resources such as land, capital, labor, liquidity and other inputs explain the use and spread of a new technological innovation (Wollni et al., 2010).