Extended Abstract

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Paper/Poster Title	Farmers' preferences for soil and water conservation techniques' attributes and their intensity of adoption? Evidence from Burkina Faso using discrete choice experiment

Abstract prepared for presentation at the 98th Annual Conference of The Agricultural Economics Society will be held at The University of Edinburgh, UK, 18th - 20th March 2024.

Abstract	***200 words max***
Soil degradation is a critical challenge to sustainable development, particularly in sub-Saharan Africa countries where smallholder farmers seem to be reluctant to adopt soil and water conservation techniques at a large scale. According to their socio-economic conditions, farmers have preferences for soil and water conservation techniques' attributes. The main purpose of this study was to analyze the role of farmers' preferences for soil and water conservation techniques' attributes on their adoption intensity. Data were collected from 335 farmers in four rural municipalities using discrete choice experiment approach. Standard Tobit model regression was used. Results show that farmers' preferences for techniques' attributes play a crucial role on their adoption intensity. Our findings suggest that policy makers should design actions plan to promote soil and water conservation techniques adoption, based on farmers preferences for their attributes	

Keywords	Preferences, attributes, discrete choice experiment, soil conservation, Burkina Faso
JEL Code	Micro-analyse des entreprises agricoles, des ménages agricoles et des marchés des intrants agricoles : Q12

Introduction	***100 – 250 words***

Soil degradation is a major challenge to food security and sustainable development in sub-Saharan Africa. In Burkina Faso, soil degradation takes many forms including acidification, erosion and nutrients depletion mainly due to unsustainable agricultural practices. Soil degradation leads to food insecurity and poverty among rural populations (Agidew and Singh, 2018 ; Barbier and Hochard, 2018). Efforts to reduce soil degradation by improving traditional soil and water conservation techniques (SWCT) emerged early in 1960 in the northern part of the country (Nyamekye et *al*., 2018). These techniques include among others compost, half-moon, mulching, stone bund and zaï (Sawadogo and Kini, 2011). They are characterized by several attributes including rehabilitation time, runoff reduction, soil restoration and soil fertilization. Despite the performance of SWCT in terms of reducing runoffs, restoring and improving soil fertility, the intensity of their adoption in Burkina Faso remains low and ranges from 0 to 29% (Dabiré, 2021). Past empirical studies analyzed farmers' preferences for SWCT's attributes. The present research contributes to the literature by examining the role of these preferences on SWCT intensity of adoption.

Methodology	***100 – 250 words***

Discrete choice experiment approach is implemented through a questionnaire survey method in which respondents are asked to choose from different choice containing mutually exclusive hypothetical alternatives representing SWCT. Once the producer makes his choice on one alternative, then he indicates the area on which he would adopt it. SWCT's attributes and their levels selection were carried out in three phases. The first one consisted of a literature review on SWCT and their attributes. In the second phase, soil scientists and agronomists from the national agricultural research institute were consulted to obtain their opinions on SWCT's attributes previously identified through the literature review. Finally, three focus groups were conducted to better define and validate the attributes levels. Based jointly on new consumer theory (Lancaster, 1966) and random utility theory (McFadden, 1974), data was analyzed by conditional logit and standard Tobit model, successively.

Results	***100 – 250 words***

On the one hand, Conditional logit regression shows that farmers find the following attributes important when considering SWCT adoption: runoff reduction, soil restoration, soil fertilization and investment cost per hectare. Regarding the z-statistic values, we note that soil fertilization is the most preferred attribute following by runoff reduction. Nevertheless, the negative sign of the alternative specific constant (ASC) reveals that farmers reluctance toward the proposed SWCT is due to other reasons that their attributes. Furthermore, investment cost negative effect complies with the demand theory, which states that when the price of a good increases, its demand decreases.

Beyond the knowledge of farmers choices among a set of possible SWCT based on their attributes, is interesting to examine the role of these attributes in SWCT intensity of adoption. So, on the other hand, SWCT's attributes have positive and significant effects on their intensity of adoption. With regard to Lancaster's (1966) theory, we can deduce that farmers' total utility associated to SWCT "consumption" derives from their attributes. Out of their attributes, agro-climatic zone, household head's education, access to agriculture extension services influence also positively SWCT intensity of adoption. Conversely, farmers age and farmers-level constraints influence negatively SWCT intensity of adoption.

Discussion and Conclusion	***100 – 250 words***

Close to 97% of surveyed farmers consider their soils to be moderately to severely degraded, justifying their interest in the SWCT's attributes. Also, data analysis shows that 98.5% of household's total income is from agricultural products sale. Indeed, the need for income as an incentive for farmers to conserve soil is noted by Thiombiano and Ouoba (2021) who found that this factor explains farmers' willingness to pay for both soil conservation and protection. In the same line, Roussy (2016) and Kuhfuss (2013) justified the significant effect of techniques' attributes on their adoption intensity by farmers' willingness to avoid environmental and socio-economic issues such as water pollution, lower agricultural yields, loss of income.

Conducted in Burkina Faso, this study analyses the role of farmers' preferences for SWCT's attributes in their adoption intensity. Standard Tobit is used as econometric model. Empirical results showed that SWCT's attributes, agro-climatic zone, household head's education, access

to agriculture extension services and farmers-level constraints are the factors that strongly determine farmers' willingness to intensify SWCT adoption.
These results allow formulating economic policies that could boost SWCT intensity of adoption : design an action plan to promote SWCT, based on farmers' preferences for their attributes order. For example, priority should be given to soil fertilization technique like compost, building farmers' capacities to produce quantity and quality organic fertilizers and set up high-capacity industrial units near towns that can transform household waste into organic manure for agricultural use.