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## Resource-productivity of Smallholder Croppers using an Endogenous Switching Regression: A Study of Farmers within and outside the National Program for Food Security (NPFS) in Nigeria

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### Abstract

The National Program for Food Security (NPFS) is designed to contribute to a sustainable improvement in national food security. The main implementation strategy of the programme is to empower small farmer communities with a timely provision of credit, agricultural input, and technical support services to increase farmers' output and income on a sustainable basis. The present study was designed to examine factors influencing a farmer's participation in the NPFS as well as the resource productivity of farmers within and outside the NPFS activities in Nigeria. We employed an endogenous switching regression with a sample selection model on a total of 176 farmers (89 within and 87 outside) for the econometrics analysis. The empirical evidence from the Probit model indicates that variables such as education, age, extension, farm size and hired labour significantly increased the probability of a farmer's participation in the NPFS. The estimates of the endogenous switching regression model shows that sample selection bias would have resulted if the net returns equations had been estimated without taking into account the decision to participate in the program. The coefficients of the considered conventional production inputs in the net-returns equations (*e.g.*, cost of materials, family labour, hired labour, and farm size) significantly increased the net-returns for both participating and non-participating farmers. The returns-to-scale (RTS) value was computed from the sum of the output elasticities of the inputs; the value shows that an average farmer within the programme exhibits increasing RTS (1.187) while the same number of farmers outside the programme exhibit decreasing RTS (0.861). The implication of this is that, farmers within the programme received higher net-returns from the joint use of inputs compared to the farmers outside the program. Further analyses show that NPFS farmers obtained higher average net-returns as a result of their participation in the programme while those who choose not to participate in the programme have average net-returns. The policy implication from these findings suggests that the NPFS has tremendous benefits in ameliorating household food security and increasing the income generation potential by improving agricultural productivity in the country.

**Keywords:** Endogenous switching, food security, Nigeria, resources-use, sample selection