

Technology adoption and farmers' income:

Evidences from Rainfed agriculture

Josily Samuel^{1*}

ICAR-Central Research Institute for Dryland Agriculture, Hyderabad, Telangana 500 059

Technology and institutional mechanisms are the major strategies in improving farmers' income. Rainfed agriculture will continue to play a major role as major portion of our food demand is met from it. Providing enough food and adequate income to the farmers of rainfed regions will be challenging especially in situations of changing climate. To overcome the fluctuating farm incomes in rainfed regions technology adoption and especially climate resilient technologies and institutional support mechanisms is necessary. The change in the income of the farmers and the dynamics of adoption decisions are studied using the difference in difference method.

Keywords: Difference in differences method, Farm income, Rainfed, Technology

Introduction

Rainfed regions are where 43% of our population live and these regions receive rainfall between 150-1,000 mm per annum and it includes the major 10 States of the Country. The productivity of these regions varies with the quality of resources like soil and water in them. 40% of the country's food demand is still met from these resource poor regions. Despite the strides to increase the productivity of rainfed areas most of the livelihoods here are poor and still face food insecurity, poverty and are vulnerable to natural disasters and frequent droughts.

The rainfed farmers face major challenges like climatic variability, increasing population, health pandemics, degrading natural resource base, poor infrastructure and changing patterns of demand. Data reveals that the crop sector is the major contributor to farm income which contributes 60-70%. The improvement in the crop sector can be from the horticulture sector which has immense potential for doubling overall farmers' income. The livestock sector contributes about 9-10%, which acts as an

important additional income and acts source of support to the farmers facing uncertainties and also provides sustenance to landless farmers. Both the crop and livestock sector contribute towards doubling farmers' income by increasing productivity with cost effective and climate resilient, location specific technology and interventions.

Many studies on the impact of technologies have used the cost benefit analysis and the before-after comparison to quantify the impact of an intervention. Simple by observing the before-after change will not give the programs/ interventions or technologies' actual impact. And on the other hand, there could be unobserved reasons in an area which was selected for the intervention. This study was conducted to identify and quantify the economic impact of technologies demonstrated under the National Innovation for Climate Resilient Agriculture (NICRA) in the adopted village in Nalgonda Telangana.

Methodology

Comparisons between the two groups are a better way to study the

impact, but they cannot give more reliable data like the ones that take data from the same farmers before and after they adopt new technology. In the same way, if we only observe adopters and non-adopters (cross sectional data) we need to know the extent to which the intervention has changed the absolute and relative incomes of farmers. In order to understand better the change in the income of the farmers and the dynamics of adoption decisions, in this study ICAR-CRIDA use the difference in differences method (DiD)/Double difference method. This method compares the changes in outcomes over time between farmers that are enrolled in a scheme or program and farmers that are not.

Primary data on the income of farmers (120) from NICRA adopted village (Nandayalgudem) and non-adopted village (Kasarabad) were collected from Nalgonda district of Telangana. The total sample size was 120 farmers with 60 each from the adopted and nonadopted villages. The data on income of the farmers before and after the interventions were collected with a well-structured schedule (Fig. 1).



Fig. 1. Data collection and Interaction with farmers of Nalgonda, Telangana

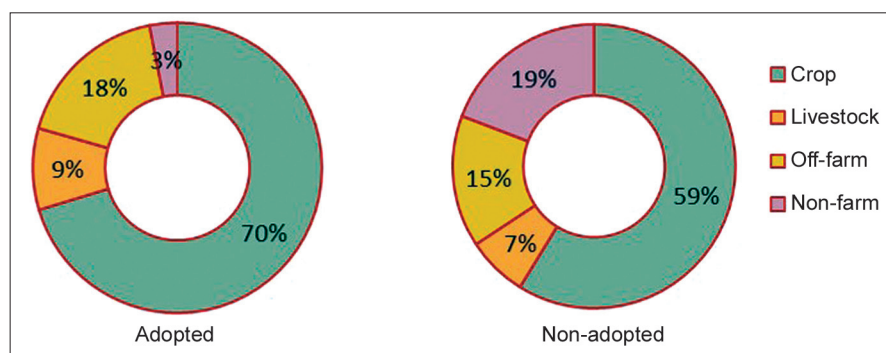


Fig. 2. Income composition of farm households in Nalgonda district.

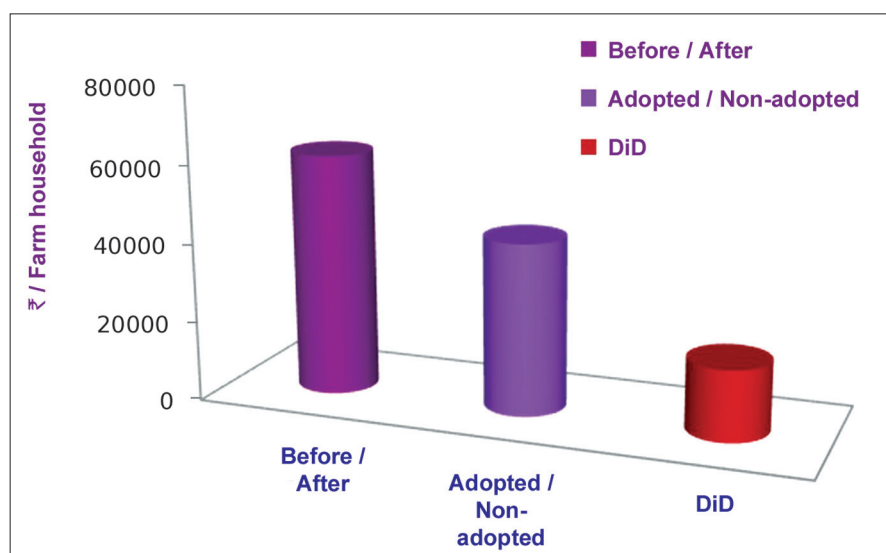


Fig. 3. Technology adoption and farm income

The data was analyzed using the DiD methodology. The composition of income of the farmers in the adopted village shows that in the

adopted village income from crop and livestock was 79% which was lesser than a non-adopted village (Fig 2). The income from non-farm sources was higher in the non-adopted village.

Impact of agricultural technology interventions

The adopted village farmers were adopting various technologies like in-situ moisture conservation, conservation tillage, water saving irrigation methods and had access to crop production interventions and institutional interventions like custom hiring centers, fodder banks and awareness of climate change impact through weather stations. The results of the Double difference analysis reveals that the adopted village farmers average income increased by ₹ 61,545/Farm Household after NICRA interventions while in the non-adopted village the increase in the income during the same period was ₹ 43,617/ Farm Household. The double difference was found to be ₹ 17,928, which is the actual income increase from the interventions on the farm income of farmers (Fig. 3). This method allows us to take into account any differences between the treatment and comparison groups that are constant over time.

SUMMARY

Improving the productivity, income and employment of the rainfed regions of our country is surely going to help feed the poor and generate adequate income. The actual impact of the interventions needs to be quantified and analyzed to better target affordable and profitable technologies to needy communities. Rainfed agriculture particularly needs investment in providing affordable technologies especially in water conservation, improving yields and adoption of a farming-systems approach by diversifying enterprises.

¹Scientist. Corresponding e-mail: "josily samuel" <josilysamuel@gmail.com>

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