

Impact assessment of interventions

under Farmer FIRST Programme

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The Farmers FIRST was initiated in 2016 and is one of the most ambitious projects of Indian Council of Agricultural Research (ICAR) aimed at participatory technology development, assemblage, assessment, refinement for location specific and need based technologies for the farmers to enhance their income and secure the livelihood. The Farmer FIRST Programme is developed as farmer in a centric role for research problem identification, prioritization and conduct of experiments and its management in farmer's condition.

Key words: Farmer FIRST Programme, Impact assessment, Module, Qualitative, Quantitative

THE Farmer FIRST Programme (FFP) brings farmers and scientists together in one platform to understand the requirement of Indian agriculture in modern age. Farmers have their own experiences and knowledge of production environment and knows how to maximize technological gains within the resource constraints at their farms. On the other hand, research institutes have their novel technologies/modules to be demonstrated at farmer's field level. The interplay of available resources at farm and implementing innovation emanating with modern science and technology in research domain at farmer field, led to emergence of farmer centric approach in agricultural research and extension. This necessitates the amalgamation, development and refinement of modern technology from research institutions with knowledge and wisdom of farmers. This process not only enhances the use of appropriate technology capacity of the farmers, but also provides the feedback to the scientists to refine and fine tune it to local setting. There are 52 projects under the FFP throughout the country. The interventions of each project were broadly categorized into six modules viz. crop based,

horticulture based, livestock and fishery based, natural resource management (NRM) based, enterprise based, integrated farming system (IFS) and capacity building measures modules. The nature and scale of intervention under each module were prioritized and implemented based on technological need of farmers, location specificity, availability of technology in the region. There are more than 400 interventions. Based on above criteria number of farmers covered under interventions ranged from even less than 5 for some animal based and NRM based interventions to more than 300 for crop based interventions viz. introduction of prominent varieties of crops developed by research institutes.

Once the interventions in the form of technology, service and information, method, module specificity etc. are at farmer's field, it would generate impact. Impact is defined as positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, and intended or unintended. The Asian Development Bank guidelines state that project impact evaluation establishes whether the intervention had a welfare effect on individuals,

households, and communities, and whether this effect can be attributed to the concerned intervention. Impact assessment should establish the cause of the observed change to draw causal inferences. The deep insights emanating from impact evaluation gives feedback that can be used in technology development or refinement in agriculture. Evidences generated from the impact assessment of technologies can be used as rationale that helps policy makers and planners in deciding for continuation or expansion or reorientation of the FFP. This farmer centric approach not only helps in testing various ways to tackle the farmer's problems but also gives clues on how and what interventions need to be introduced (single or in combination). Such empirical based evidences generating from impact evaluation would be used to justify every penny spent under the Farmer FIRST Programme.

An impact of interventions could be computed after completion of two years in the same treatment group. The parameters of impact evaluation are chosen after discussion with stakeholders and based on research questions. The impact assessment is done employing quantitative and qualitative methods using with-

without and before-after approaches. It was not feasible to conduct the quantitative impact assessment of all interventions, therefore prioritization of interventions was done based on effect of interventions and sample size of adopters. Partners had collected the baseline data of the selected villages. Therefore 'before-after' approach of impact assessment was mostly followed as given in Fig. 1. However, in some cases, where data is available from control, 'with-without' approach of impact assessment was followed.

Researchers from ICAR-National Institute of Agricultural Economics and Policy Research encountered following challenges in impact assessment of Farmer FIRST interventions.

Diverse nature of interventions: each partner had six modules and many interventions under each module ranging from crop based, livestock based, fishery based, etc. The interventions under each module also varied from location to locations based on agro ecological conditions in the areas.

Large variation in sample size: Owing to more cost involved in NRM based, IFS models and livestock based interventions, less number of farmers (2 to 5) could be covered. However, crop based interventions (viz. varieties) were given to large number of farmers (more than 300 or total village). Hence, it involves large variation in the sample size of the interventions to be studied.

Difficulty in finding counterfactuals: The researchers faced the problem of

creating counterfactuals due to dynamics of village politics and farmer's perception. All farmers in a village want equal treatment and respect. Based on research constraint, farmers from study villages were picked up for interventions. The farmers not covered for interventions hindered in creating control and counterfactuals as they would not give information sensing that they have not received the benefits (interventions) of technology.

Criteria used for impact evaluation

Following criteria of impact evaluation were used for study (adopted from OECD).

Relevance: The extent to which the objectives of an intervention are consistent with farmers need and ICAR policies.

Effectiveness: The extent to which objectives of the interventions were achieved, or are expected to be achieved, taking into account their relative importance.

Efficiency: Whether interventions helped in economic use of resources, cost and input saving for the farmers.

Impact: Positive and negative, primary and secondary long-term effects produced by the intervention, whether directly or indirectly, intended or unintended.

Sustainability: The continuation of benefits from the intervention even after the end of the project. How will the interventions help in livelihood

security, environment sustainability, women empowerment, drudgery reduction etc?

Approach used for impact assessment of interventions

After studying the nature of interventions of the partners of the Farmer FIRST Programme, we used following approaches for assessing the impact of interventions (Fig. 2).

Impact at macro level

Macro level impact is measured at aggregate level either at state or national level. Project partners have some promising technologies, which have potential to reach out to large number of farmers owing to its relative advantages over existing technologies. For such promising technologies, researchers computed the impact of these varieties at macro level using economic surplus approach. Ex-ante impact assessment methodology is used when such technologies have not gone to the farmer's field yet. The results of the analysis discuss the extent of distribution out of total economic surplus to various stakeholders (consumers and producers) of the technology. This approach revolves around the parameters viz. increase in yield, reduction in cost as result of technology, adoption rate of technology, supply and demand elasticity of commodity under consideration.

Impact at micro level

Micro level impact is measured on field (yield change), individual (income change), or at household level (livelihood security). Both quantitative and qualitative methods could be employed for assessing the impact at micro level.

Quantitative methods:

The quantitative methods are rigorous econometric tools generally used to establish the path of cause-effect relationship for impact assessment. This can be done with the help of experimental and

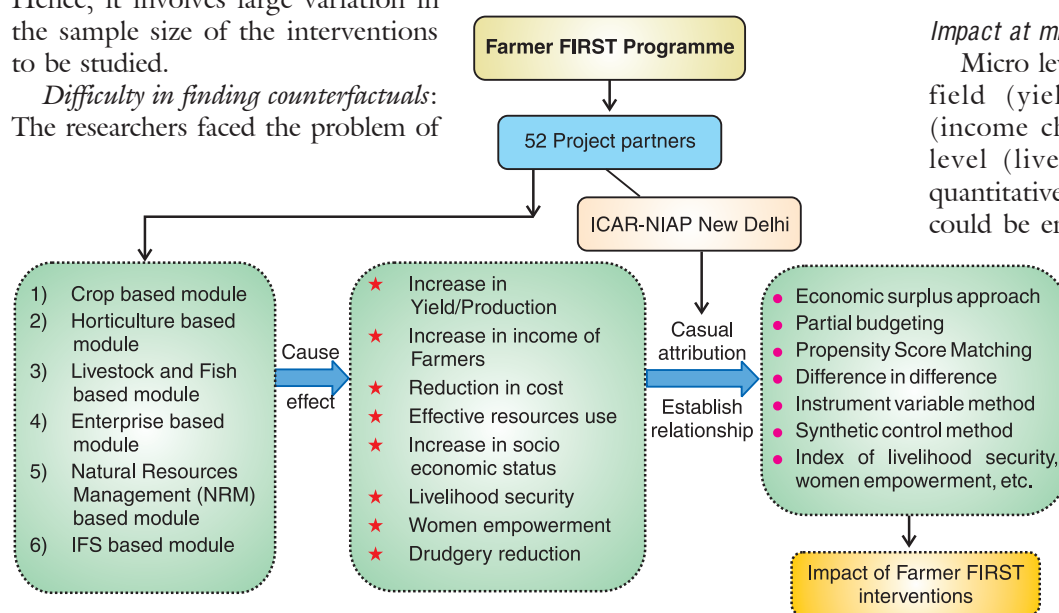


Fig. 1. Framework for impact assessment of interventions under Farmer FIRST Programme

quasi-experimental or non-experimental designs. In social science, experimental design is used with the help of Randomized Control Trial (RCT) design, by randomly distributing the subjects to the treatment (interventions), which gives solid and concrete evidence for impact of the interventions. But herein randomization could not become the basis for giving interventions to the farmers. Since it involved not only lot of cost but also village dynamics and politics. RCT methodology for ascertaining impact of interventions could not be employed.

In absence of any control over the allocation of interventions to the farmers in the village, reliance could be placed more on quasi-experimental methods of impact assessment. Propensity Score Matching method of impact assessment could be used where partners had larger sample size and also data from the farmers to which the interventions were not given (control). In this method, we construct the counterfactual outcome, that is, what would have happened to participants in absence of treatment. Since this counterfactual outcome is never observed, it has to be estimated using statistical methods. Here, we need more sample of the control than the treatment group, so that more match between parameters could be obtained. This method balances both treatment and control groups using propensity score. This is similar to the randomization in experiment design. Once this is done, the difference between the treated and non-treated group is considered as impact of the intervention.

When data is available from both treatment and control and at two point of time i.e. both with-without and before-after, we recommended the Difference in difference method. This method calculates the effect of a treatment (such as new variety, mobile app or any technology) on an outcome (increase in yield,

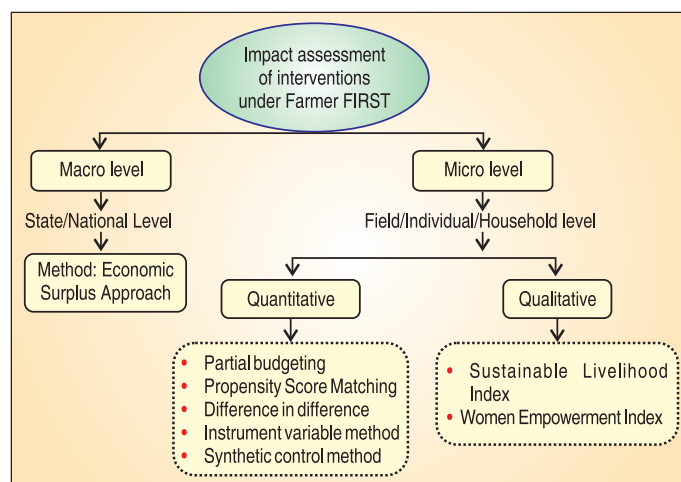


Fig. 2. Impact assessment approaches for interventions under Farmer FIRST Programme

decreasing cost) by comparing the average change over time in the outcome variable for the treatment group, compared to the average change over time for the control group. When sample size of the intervention was small and above methods were not possible, project partners were advised to use partial budgeting technique by calculating B:C ratio per unit area before and after introduction of the intervention.

Qualitative method: Quantitative techniques mentioned above have some limitations. These techniques require more number of samples. In this project, many project partners had given intervention that would help in livelihood sustainability, drudgery reduction, women empowerment, etc. These types of interventions are difficult to assess using quantitative methods. The impact of interventions wherein sample size is very small, could be computed using indexing methodology. Therefore, for such interventions we relied on qualitative methods, particularly on development and construction of index.

Many interventions like honey bee, duck farming, backyard poultry, horticultural crops, etc. aimed at improving sustainable livelihood of the farmers. To quantify the impact of these interventions on the livelihood of the farmers, use of livelihood index containing five broad components viz. social, physical, economical, human and ecological is the opt choice. For each component

different indicators and variables were suggested and partners were advised to choose indicators and variables based on nature of interventions. For women empowerment index, five dimensions of empowerment defined by USAID and 10 broad indicators by IFPRI were suggested to the participants. For drudgery reduction index, variables involving measurement of physiological parameters as well as perceptual based statements were suggested based on nature of intervention.

CONCLUSION

Owing to implementation nature of the Farmer FIRST Programme and dynamics of village politics, application of RCT methodology for impact assessment could not be materialized. Hence the researchers have to rely more on quasi-experimental methods for the impact evaluation wherein sample size was sufficient. Under limitation of sample size, it was advised to go for indexing and partial budgeting methodologies. Impact evaluation of these interventions would help in justifying the interventions for the increasing income of the farmers, sustainability of environment and livelihood of farmers. The empirical evidences emanating after use of standard impact assessment methodologies would help in revisiting the approach and objectives of Farmer FIRST Programme if they are not going in right direction. Such deep insights discern clues to policy makers and planners about what went right and wrong during conceptualization and implementation of the project so that mid-course correction could be done. Project partners would be attempting different approaches for increasing the income of farmers and coming out with suggestions for location specific approaches for sustaining livelihood security of the farmers.

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