

ICAR-NIAP

SOCIAL SCIENCE NETWORK PROJECT

**REGIONAL CROP PLANNING FOR IMPROVING RESOURCE USE
EFFICIENCY AND SUSTAINABILITY**



ICAR- National Institute of Agricultural Economics and Policy Research (NIAP)

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REGIONAL CROP PLANNING FOR IMPROVING RESOURCE USE EFFICIENCY AND SUSTAINABILITY

(ICAR SOCIAL SCIENCE NETWORK PROGRAM)

Problem: Current land use pattern for agriculture in many states are not based on principle of comparative advantage. Crops pattern in various region are inefficient in terms of resource use and unsustainable from natural resource use point of view. This is resulting into serious misallocation of resources, efficiency loss, indiscriminate use of land and water resources, and adversely affecting long term production prospects.

Reason: Policy distortions through support in terms of price guarantee, assured marketing and subsidized inputs particularly energy, water and fertilizers. Absence of right set of policy support and required infrastructure to promote crop pattern consistent with natural endowment.

Justification: In the wake of food shortages India had emphasized increase in food production wherever it could be attained. Result oriented strategy to achieve quick growth in production has been the guiding principle and got precedence over suitability in terms of agro economic factors and natural resource endowments. As a result, crop shifts and crop pattern since early 1970s could not be guided by sound principle of efficiency and comparative advantage. Rice has spread in those areas where it was never grown before. Sugarcane has shifted from water abundant region to water stressed region. Price and marketing policies and input subsidies have created artificial relative advantages for some crops and regions over the crops and regions which have been the natural advantage. A stage has been reached where it has become very costly to sustain current crop choices and practices such as rice cultivation in Punjab, sugarcane cultivation in many parts of Maharashtra. Consequently, policy options available for optimizing profitability of farmers have lacked objectivity and precision. Due to lack of proper crop planning, problems of soil and water degradation are aggravating. So, the need is felt to guide crop planning in the country so that it is consistent with natural endowment and resources use efficiency.

Any further growth in food output in the country depends largely on improvement in management of different resources. It is in this context, the question of allocation and distribution in terms of sustainability, resource use efficiency and optimization of crop plans across regions and production environments in the country becomes important.

The ever-increasing population on the one hand, the progressively shrinking per capita agricultural land availability on other, warrant intensification of cropping. Rising stress on water availability, commercialization of production, higher use of energy and other purchased input in agriculture necessitates optimum use of resources and reallocation of production choices without price distortions. Evaluation of performance of various crops and crop sequences in various regions of the country in terms of economic prices and natural resource valuation will help to gain insight into suitability of various crops in different regions. This information will be useful to prepare optimal land allocation to different crops for sustaining agricultural crop production activities and better resource use efficiency across different agro-eco regions of the Country.

Objectives

The overall objective of the proposed study is to develop regional crop plans for better resource use efficiency and improving natural resource sustainability across production environments. The specific objectives include:

- To study the existing land use, cropping pattern, and resource efficiency across regions
- To estimate the cost and returns of selected crops under different regions of the country based on market prices, economic prices and natural resource valuation techniques.
- To examine current status of natural resources base in different regions of the country.
- To examine the scope for revising the crop plan at regional level
- To develop optimum crop plan at regional levels for better resource use efficiency, sustainability and maximizing farm net income

Methodology

The proposed study will develop regional level crop model which would optimize the level of each activity of different crops, level of input use, and output produced under different resource endowments and price scenarios. This will be achieved by employing linear programming to develop optimal crop plans.

The study will rely on plot level data collected by Directorate of Economics and Statistics, Ministry of Agriculture, Government of India under the Comprehensive Scheme for Studying the Cost of cultivation of Principal Crops in India. A farm level survey across regions would also be planned to collect land use, cropping pattern, cultivation practices, input use etc.

Performance of various crops to be compared based on net income computed in three different ways. These include net income at market prices, economic prices net of subsidies and income based on natural resource valuation technique. Net income in all the three approaches use the

plot level cost of cultivation studies data. Net income at market prices in this study is to be taken as gross return (from main product and by product) less variable Costs (Cost A1+Imputed value of family labour) at market prices actually paid and received by the farmer or imputed in some cases.

Net income based on economic prices is to be taken as net income at market prices less subsidies on inputs like fertilizers and irrigation used in crop production. Fertilizer subsidy includes subsidy on nitrogen and combination of phosphorous and Potassium. The Total irrigation subsidy is to be distributed over selected crops based on area under irrigation under each crop.

Net income based on natural resource valuation techniques is to be computed by adding value of nitrogen fixation by legume crops at economic price of nitrogen and deducting the imputed value of increase in greenhouse gas (GHG) emission cost to the atmosphere.

Mode of Operation

The study will be taken up in a network mode to cover almost all the agro-eco systems in the country. NIAP will be the coordinating Centre for this study. One university from each ICAR agro-eco region will be partner in the study. About 7 states will be involved in the study.

Project partners	Principal Investigator	Co-Principal Investigator
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Expected Output

- Crop budgets based on three alternative approaches for different states
- Development of regional crop plans based on crop budgets and optimization technique
- Research papers in NAAS rated journals, reports, policy briefs, policy papers, books etc.

Project Budget: Rs. 3 crores (Rs. 35 lakhs / Collaborator and Rs. 55 lakhs for NCAP)

Project Duration: July 2013 to March 2017

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