सत्यमेव जयते

Final Report

Based on Survey conducted for

Collection of Farm Activities Data and other related studies (2018-19)

In context with
Gross Value Addition from crop sector in Maharashtra for compilation of Gross State Domestic Product and Gross District Domestic Product

Summary & Findings

Directorate of Economics & Statistics,
Planning Department, Government of Maharashtra.

Outsourced through

AFC India Ltd.(formerly Agriculture Finance Corporation Ltd.), Mumbai.

(Under 13th FC Grant)

Final Report

On

Collection of Farm Activities Data and Other related studies

Based on Survey conducted in line with 'Cost of Cultivation Studies' for District wise Major Crops in context with Gross Value Addition from Crop Sector in Maharashtra for compilation of Gross State Domestic Product and Gross District Domestic Product.

Summary & Findings

Directorate of Economics and Statistics,
Government of Maharashtra

Preface

The Directorate of Economics & Statistics (DES) is a principal statistical organization of the State Government working under Planning Department. The most important activity of DES is compilation of State and District Income estimates for which data of various sectors of economy is required. Agriculture & allied activities is one of the major sector of economy having major impact on the other sectors of the economy. The 'Crop' sub-sector has a prominent share in the Agriculture & allied sector.

As per the methodology and guidance from National Statistical Office (NSO), GoI; the 'Production Approach' is used for estimation of crop sector. For estimation of Gross Value Added (GVA) from the crop sector at State level, crop wise Gross Value of Output (GVO) is compiled using area, production and prices available from administrative records, while Inputs are estimated combined for these crops. Some of the inputs are estimated based on the 'Cost of Cultivation Studies' (CCS) conducted by Ministry of Agriculture and Farmer's Welfare, GoI through various agriculture universities of the states. Results of these studies are used at State level however due to small sample size and representation they are not used at district level. The un-availability of the CCS results for all crops at State level and for major crops at district level is a major data gap which needs to be bridged for improvements of the District Income estimates. This survey and other related studies is an attempt to overcome this data gap.

As per the recommendations of 13th Finance Commission and guidelines from GoI for 'Improvement in the State and District Statistical System', this project was undertaken. Additional Director Dr.J.V.Chaudhari (former Joint Director) initiated the project under the guidance of Shri.P.D.Sohale (ex. Director). I would like to place on record the zeal and passion of Shri.Pushkar Bhagoorkar, Joint Director, National Income (NI) and his team for completion of the study. I would like to appreciate the efforts and hard work of Mrs.Nasira Azim Shaikh who single handedly checked the data, its validity, tabulation and analysis and contributed a lot for the report under the able and encouraging guidance of Shri.Navendu K.Firake, Deputy Director (NI). Due to Covid-19 pandemic situation, the project was bit delayed however in spite of all the difficulties completed successfully.

I am very much thankful to Officers of the National Statistical Office, GoI for their guidance, Dr.D.B.Yadav, Head of the Department of Agriculture Economics, Mahatma Phule Agriculture University & his team Dr.Kumbhar, Dr.Gawali and Dr.Nirgude for their support and expert advice for the project. The project was awarded to M/s.AFC India Ltd and they have completed the job under the supervision of Dr.M.C.Pandey, Assistant General Manager and Shri.D.V.Joglekar, Statistician. I am also thankful to the respondent farmers, the field officers of Agriculture department and the officials of DES and for their co-operation in successful completion of the field work.

I hope this report would be useful to the policy makers, planners and researchers in this field. Comments and suggestions for improvement of this report are welcome.

Mumbai.
Date : 29th June, 2021

(R.R.Shinge)
Director,
Directorate of Economics & Statistics,
Government of Maharashtra.

Foreword

The GSDP and GDDP estimates are compiled by Directorate of Economics and Statistics functioning under the Planning Department. Statistical compilations are normally done using data available from the records of Administrative Departments but in case of data unavailability Field Surveys are undertaken by Directorate of Economics & Statistics. The overall growth of State Economy is captured from data of several sectors amongst which "Agriculture & Allied Activities" is distinct by its significance although its contribution is comparatively less in GSDP and GDDP. However, the direct and indirect impact of "Agriculture & Allied Activities" on other sectors has always been important for sustainable growth of State Economy.

The availability of quality data for compilation of GSDP and GDDP estimates by Directorate of Economics & Statistics requires systemic improvements and thus using funds made available through 13th Finance Commission; a study entitled "Collection of Farm Activities Data" was undertaken by Directorate of Economics and Statistics to remove data gaps for better estimation of growth relating to the Crop Sector under "Agriculture & Allied Activities". Under the able leadership of Shri.R.R.Shinge, Director, DES along with the commendable work of the team led by Shri.P.H.Bhagoorkar, Joint Director, DES has resulted to the publication of "Collection of Farm Activities Data". Shri. Eknath Dawale, IAS, Secretary Agriculture Department also provided his valuable insights while finalizing the report prepared by "AFC India Ltd." an agency outsourced by the Directorate of Economics and Statistics. Senior Officers from National Statistical Office of MOSPI, GoI and team of experts under Dr.D.B.Yadav, HoD, Agriculture Economics Division, Mahatma Phule Krishi Vidyapeeth, Rahuri have extended full co-operation and provided valuable guidance for publication of "Collection of Farm Activities Data" by Directorate of Economics and Statistics.

The 'Collection of Farm Activities Data' covers Districtwise Major Crops and provides insightful Statistical Analysis of Value of Output, Input Costs including Domestic Labour and Family Labour etc. based on the Sample Data and highlights important Key Findings about the Crop Sector. The reports are in Three Volumes, the First Volume focuses mainly on the State Level Results, while the Second Volume gives District Wise Crop Wise information and the Third Volume covers thematic studies such as on Organic farming, Contractual Farming, Backyard Farming, Fodder & Grass etc. I am sure that besides the Agriculture, Marketing and other Departments of Government of Maharashtra, many Students and Researches in the Agricultural Universities as well as other stakeholders involved in development of Crop Sector will find "Collection of Farm Activities Data" report to be very useful and reader friendly publication for reference with insightful outlook regarding sustainable development of "Agriculture & Allied Activities" in Maharashtra.

Mumbai
Date 29th June, 2021

(Debashish Chakraborty)
Additional Chief Secretary (Planning)
Government of Maharashtra,
Mantralaya, Mumbai.

MESSAGE

The estimates of economic parameters like Gross State Domestic Product (GSDP), Gross District Domestic Product (GDDP) and Per Capita Income are quite important in policy decision for the state. But it requires a very huge sample to be screened with a intense precision. The M/s.AFC India Ltd. (formerly Agriculture Finance Corporation Ltd.) appointed by Directorate of Economics and Statistics (DES), Maharashtra for the Survey has made the intensive task very professionally and has surveyed the 34 districts (except Mumbai & Mumbai Suburban) of Maharashtra State.

The collected data and district wise estimates ensure the milestone as "Improvement of data in respect of farm activities" besides fulfilling the enhanced quality data and strengthening the State & District Statistical System. The data reported will be a great help to students, academicians, researchers and policy makers in formulating future research and relevant policies for agricultural sector.

We congratulate the Directorate of Economics & Statistics, Government of Maharashtra for completion of the survey and the report through M/s.AFC India Ltd. (formerly Agriculture Finance Corporation Ltd.) Also, congratulation to team Shri. R.R.Shinge, Director, Shri.P. H. Bhagoorkar, Joint Director (NI) & Shri. N. K. Firake, Deputy Director (NI), DES, Mumbai for successful completion of the task.

Rahuri
Date : 29th June, 2021

(Dr. D. B. Yadav),
Head, Department of Agricultural Economics,
Mahatma Phule Krishi Vidyapeeth, Rahuri,
Rahuri - 413 722, District: Ahmednagar.

ACKNOWLEDGMENT

'Conducting survey for Collection of Farm Activities Data and other related studies' project was entrusted to AFC India Ltd., by the Directorate of Economics and Statistics (DES). The main objective was to enhance the quality of data, through this objective to strengthen State & District Statistical System in the State wherein "Improvement of data in respect of farm activities" is one of the milestones of these studies.

We would like to place on record our thanks to **Shri. R.R.Shinge, Director** DES, Maharashtra for giving us opportunity to work under this project. Also, we would like to place special thanks to **Shri. P.H. Bhagoorkar, Joint Director (NI) & Shri. N.K.Firake, Deputy Director** (NI) DES, Maharashtra for entrusting and extending their support, co-operation and valuable suggestions during the study. We also thank all District Level Statistical Officers, Districts Superintendent of Agriculture Officers (D.S.A.O) for helping in collection of secondary data during the field work.

We are extremely thankful to the Data Analysis officials & support team of DES, Mumbai Head Office, who helped in correcting and analyzing data part of the work implemented under this study. The study team would like to place special recognitions to all the departments, Officials of Agricultural Universities for sparing their valuable time to provide necessary information, sharing their experience and providing feedback. The co-operation received from the respondent farmers is also deeply acknowledged.

DR. M. C. PANDEY
Assistant General Manager,
AFC India Ltd., Mumbai.

Abbreviations

AD	Agriculture Department
AFC	AFC India Ltd. (formerly Agricultural Finance Corporation Limited)
Av.	Average
CCA	Cultivable Command Area
CEO	Chief Executive Officer
DES	Directorate of Economics and Statistics
DSAO	District Superintending Agricultural Officer
FGD	Focused Group Discussion
FY	Financial Year
GDP	Gross Domestic Product
GoM/GOM	Government of Maharashtra
GP	Gram Panchayat
GR	Government Resolution
GVA	Gross Value Added
Ha/ha	Hectare
HP	Horse Power
ICAR	Indian Council of Agricultural Research
L	Liter
M & E	Monitoring & Evaluation
MOU	Memorandum of Understanding
MPKV	Mahatma Phule Krishi Vidyapeeth, Rahuri
MSP	Minimum Support Prices
MT	Metric Tonnes
Qtls/qtls	Quintals /quintals
NA	Not Available
NGO	Non-Governmental Organisation
No.	Number
OBC	Other Backward Classes
PDAU	Panjabrao Deshmukh Agricultural University, Akola
₹	Rupee
SC	Scheduled Caste
ST	Scheduled Tribes

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Introduction :

- The Directorate of Economics and Statistics is functioning as a principal statistical organization of the State Government. Being the principal statistical office in the State, the Directorate has to act as liaison between the State Government and the Central Government on all statistical matters.
- During 1989-90, the State Government had declared 'Directorate of Economics and Statistics' as the 'Nodal Agency' for all the statistical activities in the State. The Directorate has also been authorized as 'Authority of Reference' for all types of statistical proposals.
- Directorate of Economics and Statistics (DES) Maharashtra compiles Gross State Domestic Product (GSDP), Gross District Domestic Product (GDDP) and Per Capita Income as per the guidelines given by National Statistical Office (NSO), MoSPI, GoI. For this compilation, the data available from the administrative records of various sectors is used. In case of unavailability of data, results of survey are being used.

Background :

- During the past three decades or so, agriculture sector has experienced many changes in its production, consumption, distribution and trade regimes due to the changed global economic scenario. In this ambience, the importance of accurate and up to date information on the economics of agricultural crops can hardly be overemphasized.
- The knowledge of the cost and returns structure of different crops is crucial for policy formulation, selecting appropriate production strategies and identifying regional comparative advantages in crop production. The reliable information on costs and returns of various crops helps the farmer in allocating the scarce resources most optimally. Besides, such information is of critical importance to the financial and insurance institutions to make provisions for farm credit and fix insurance premia.
- Moreover, for an effective planning for continuous agricultural development, the knowledge of costs and returns from different crops is of utmost importance. Further to be more precise on policy front, this information needs to be region specific as the inter-regional differences in use of inputs and the outputs received thereof cannot be ruled out. This is primarily due to the inter-regional variations of agro- economic/socio/natural resource endowments. The extent of regional differences in cost of cultivation/production of a particular crop depends on the relative share of different inputs and their respective prices in various regions. With similar soil-climate complex and uniform crop production technology, the inter-regional variations in yield can be of marginal order. Under such situation uniform input use may not lead to the significant differences in cost of cultivation/production and for this the only reason expected is the differences on account of variation in prices paid for inputs and received for outputs. However, in reality, depending on the intensity of input use or difference in natural resource endowments or both the productivity differences are commonly observed among the regions as well as among the farmer of same area. Similarly, inter-regional variations in output prices and input prices like rate of wages, custom hiring services, rental value of land, etc. cannot be ruled out. Thus, any one or combination of above discussed factor may lead to significant variations in monetary cost per unit of area or output of a given crop.

Genesis :

- The estimation of crop sector is done using Production Approach. For estimation of Gross Value Added (GVA) from Crop sector at State level, crop wise Gross Value of Output (GVO) is compiled on the basis of area, production and prices available from administrative records. Intermediate Consumption (IC) or Inputs compiled, combined for all crops is deducted. For the estimation of IC or inputs for the crop production, some of the items are compiled on the basis of Cost of Cultivation Studies (CCS) conducted by Ministry of Agriculture and Farmer's Welfare (MoA&FW), GoI through various agriculture universities in the states. Results of survey are available at State level whereas, similar data at District level is not available. The GDDP, thus compiled, provides only a broad judgment of income at district level.

- Therefore, with the objective of enhancing the quality of data, the Thirteenth Finance Commission (FC-XIII) provided grants to strengthen State & District Statistical System in the State wherein "Improvement of data in respect of farm activities" is one of the milestones. Under this milestone, DES compiled data from various administrative records and from the concerned agencies in the State and report was prepared and submitted to NSO.

- Cost of Cultivation Studies (CCS): The cost of cultivation studies are conducted by Government of India and Government of Maharashtra in Maharashtra state through agricultural universities. These studies are conducted for identified crops for estimating cost of cultivation at a state level for respective crops and not at district level, thus the target sample of respondents is spread over districts, analysis and estimation is done for the state as a whole. These studies are conducted by agricultural universities using 'Cost Accountant Method'. In this method periodic visits, generally weekly, are undertaken to the farms of selected farmers and costs of all activities undertaken by the farmer since earlier visit are recorded in prescribed formats in an elaborate and detailed manner, manually. Generally, 12 to 18 visits are conducted during a crop cycle. The data collected is analyzed by the universities. The entire exercise is undertaken as per guidelines, directions of the central government authorities, which ensures uniformity across various states. These estimates of cost of cultivation having 28 elements are then used to estimate state level Gross Domestic Product. DES intended to conduct a study on cost of cultivation for on an average 20 major crops from 34 districts. Considering the volume of this survey, 'Survey Method using CAPI' of cost of cultivation is used for this survey.

- The CCS are conducted for limited crops in the states mainly for determining Minimum Support Prices (MSPs). This number differs from state to state. In Maharashtra, CCS is conducted for 17 crops. The State of Maharashtra separately conducts CCS for another 29 crops mainly to propose the MSPs of these crops in the State. The study of these CCS reveals that due to relatively small sample size in the districts, though these studies can give results at state level but not at district level. Thus the un-availability of CCS results for all crops at state level and for major crops district wise is a data gap which needs to be filled. As per the guidance of NSO in this regard, DES proposed to conduct survey in line with CCS.

Objective of the Survey :

- 'To conduct survey for estimates of cultivated area, production, peak period arrival prices at primary market/farm harvest prices, inputs, market charges, transportation charges etc. for on an average 10 major crops and 10 major fruits/vegetables (including condiment & spices, medicinal plants/herbs, plantation crops, etc.) (no. of major crops/fruits/vegetables may differ from district to district i.e. less or more than 20. In all, on an average 20 major crops/fruits/vegetables per district are to be surveyed).'
- The desired outcome of the survey is to have per crop input cost for all the three seasons (Summer, Kharif, Rabi) separately as well as average annual input cost for each identified crop for each district and should give the district wise crop wise statistically reliable results of the major crops and fruits & vegetables in that particular district for all districts in the State.
- Along with 'Collection of Farm Activities Data Survey' conducted in the State, Other Related Studies were undertaken specifically in the context of their contribution to income of agriculture sector. In that it was planned to assess the difference in contribution to farmer from same parcel of land either due to primary processing of agricultural produce at farm level or alternate form of cultivation adopted by farmers. In addition, certain other related studies like fodder/grass cultivation, use of diesel engines and consumption of diesel for agriculture were also proposed.

Appointment of Outsourced Agency :

- For conducting the survey for collection of Farm Activities Data and other related studies, DES approached Agriculture Department of State and Mahatma Phule Agriculture University. On the basis of the response, it was decided to undertake the survey through outsourcing as it was not feasible to conduct the same in house due to shortage of manpower and other technical difficulties. A committee was formed for monitoring tendering process and RFP was prepared. The limited tenders were called from the empaneled agencies and through successful completion of e-tendering process; M/s. AFC India Ltd (formerly Agriculture Finance Corporation) of. was selected.

Selection of crops for the Survey :

- The crops to be selected for the study were identified on the basis of Gross value of output (GVO) of a crop compiled using average production of crop in the last three year (2014-15, 2015-16, 2016-17) and the average price realized in the concerned Agriculture Produce Market Committee. The crops were arranged in descending order of GVO and crops covering 95 percent of the total GVO of the crops in the district were included in the study.
- Overall 68 distinct crops were selected for the study, of which 13 crops were in two seasons and 1 crop was in three seasons, thus total 83 crops were covered. The distinct crops selected are given in Table 1 whereas the seasonwise selected crops are given in Table 2.
- As on an average 20 crops were to be selected from each district, all crops where number of crops covering 95 percent of output in a district was less than 20, were selected for the study. For remaining districts where such crops were more than 20, their contribution in descending order was considered for their inclusion in the survey. The total number was capped to 680. Due to this different number of crops were selected from 34 districts.

Table 1 : Distinct crops selected for the Survey

Category	Distinct Crops at State Level	Total
Cereals	Bajra, Maize, Paddy, Jowar, Ragi, Wheat	6
Pulses	Tur, Moong, Udid, Gram, Horsegram (Kulith)	5
Oilseeds	Groundnut, Soyabean	2
Fibre	Cotton	1
Sugar	Sugarcane	1
Condiments & Spices	Garlic, Ginger, Turmeric, Red Chilli, Coriander Seed, Ajwain	6
Fruits	Banana, Limes, Pomegranate, Mandarin, Grapes, Mango, Sapota, Sweet Orange, Papaya, Guava, Custard Apple, Fig, Ber, Strawberry, Other Fruits (Jackfruit), Watermelon, Muskmelon	17
Plantation	Arecanut, Cashewnut, Coconut	3
Vegetables	Beans, Cabbage, Cauliflower, Capsicum, Brinjal, Okra, Onion, Ivy gourd, Potato, Sweet Potato, Pumpkin, Tomato, Bittergourd, Bottlegourd, Pointed Gourd, Ridgegourd, Spongegourd, Peas, Green Chilli, Coriander, Fenugreek, Leafy Vegetables (Spinach), Other Vegetables (Clusterbean), Cucumber, Beetroot, Carrot, Radish	27
Total	Grand Total	68

Table 2 : Seasonwise breakup Crops selected for the Survey

Category	Kharif	Total	Rabi	Total	Summer	Total	Perennial	Total
Cereals	Bajra, Maize, Paddy, Jowar, Ragi	**5**	Maize, Jowar, Wheat	**3**	Bajra, Maize, Paddy	**3**	----	**0**
Pulses	Tur, Moong, Udid	**3**	Gram, Horsegram (Kulith)	**2**	----	**0**	----	**0**
Oilseeds	Groundnut, Soyabean	**2**	----	**0**	Groundnut	**1**	----	**0**
Fibre	Cotton	**1**	----	**0**	----	**0**	----	**0**
Sugar	----	**0**	----	**0**	----	**0**	Sugarcane	**1**
Condiments & Spices	Ginger, Turmeric, Red Chilli, Coriander Seed, Ajwain	**5**	Garlic	**1**	----	**0**	----	**0**
Fruits	----	**0**	----	**0**	Watermelon, Muskmelon	**2**	Banana, Limes, Pomegranate, Mandarin, Grapes, Mango, Sapota, Sweet Orange, Papaya, Guava, Custard Apple, Fig, Ber, Strawberry, Other Fruits (Jackfruit)	**15**
Plantation	----	**0**	----	**0**	----	**0**	Arecanut, Cashewnut, Coconut	**3**
Vegetables	Beans, Cabbage, Cauliflower, Capsicum, Brinjal, Okra, Onion, Ivy gourd, Potato, Sweet Potato, Pumpkin, Tomato, Bitter gourd, Bottlegourd, Pointed Gourd, Ridgegourd, Spongegourd, Peas, Green Chilli, Coriander, Fenugreek, Leafy Vegetables (Spinach), Other Vegetables (Clusterbean)	**23**	Beans, Cauliflower, Capsicum, Brinjal, Cucumber, Pumpkin, Bittergourd, Pointed Gourd, Spongegourd, Beetroot, Carrot, Radish	**12**	Cucumber	**1**	----	**0**
Total		**39**		**18**		**7**		**19**
Grand Total								**83**

Geographical Coverage of the Survey:

- There are 36 districts in Maharashtra State and 34 districts excluding Mumbai & Sub-urban Mumbai were selected for the study.

Approach & Methodology:

- The methodology broadly consists of research, secondary data collection, Primary data collection through field survey, collection of other relevant information and deliberations. Deliberations are mainly done with the Agriculture Department and Agriculture Universities in the State.

- Sampling Design: Three stage sampling technique was used for the selection of farm households in each district. At the first stage of sampling, two blocks from each district were selected having higher area under the selected crops. At the second stage of sampling, four villages/ cluster of villages from each selected blocks were chosen. While selecting the sample villages due consideration was given to the higher area under particular crops grown in that district. At the third stage of sampling, five farmers growing particular crop under study from each village were selected thus total 20 farmers for each identified crop in each district.

- As the sample of the study is spread over all the 34 districts in the state (except Mumbai and Suburban Mumbai) resultantly all the agro climatic zones got covered. It is to be noted that, as the district wise estimation of ratios of gross value addition is the objective of the study, geographical classification with district as a unit is an overarching consideration rather than agro climatic zone, irrigated or rained status of cultivation, as the data pertaining to crop production in districts is available but not according to agro- climatic zone, irrigated/rain fed status of cultivation.

- Based on the sowing report of each district, two blocks having highest area under the identified crop were selected from each district. Further from the respective Taluka Agricultural Office, three or four villages having higher area under the identified crop were selected. Although it was decided to select five farmers each from two villages in a block, in case five farmers are not available during survey days, farmer from third/fourth village were selected. Thus ordinarily, two blocks per crop in a district, two villages per block i.e. 4 villages in a district, and five farmers per village, thus twenty farmers were selected for each identified crop in each district. Although efforts were made to follow the pre decided sampling plan due to non availability of respondents on survey days in approximately 30% of cases either additional village was selected or more than 5 numbers of farmers were selected from a village.

- From a given village, a progressive farmer for identified crop was selected in consultation with Sarpanch/Talathi/Village Development officer/ Circle Agriculture Officer. After covering that farmer, two farmers on the right-hand side of average (imaginary) median of the village and two farmers on the left-hand side of such median were selected to cover five farmer per village. This procedure ensured fairly random selection of farmer. The crop wise district wise coverage of number of farmers selected for the study was 13,600. (34*20*20 =13,600). The details of operational methodology are given in Volume I of this report. The regionwise coverage of sample selected is given in Table 3.

Table 3 : Crop wise Regionwise Coverage of No. of Farmers

Region	Kharif	Rabi	Summer	Perennial	Total
Konkan	860	240	140	560	1800
Nashik	1420	660	40	440	2560
Pune	1180	380	20	440	2020
Aurangabad	2060	880	100	680	3720
Amravati	1160	380	80	280	1900
Nagpur	1160	280	40	120	1600
Total	**7840**	**2820**	**420**	**2520**	**13600**

- The total sample comprised of 7840 farmers for Kharif season, 2820 farmers for Rabi, 420 farmers for Summer and 2520 farmers for Perennial crops, thus total number of farmers selected for the study was 13,600 (34 districts, on an average 20 crops per district, 20 farmers from each district for each selected crop). The seasonwise cropwise coverage of districts, talukas, villages and holdings (farmers) is given in Annexure 1.

- In respect of present study, all crops which are covered in more than 20 districts, a sample of size 20*20=400 (or more) is covered, and for all such crops estimates arrived at are with 95 percent confidence level and 5 percent margin of error, for the state as a whole. Similarly, for all crops which are covered in 5 districts or more, i.e., where a sample of respondents is 100 (or more) the precision of estimate is 95 percent confidence level and 10 percent margin of error. However, when district wise estimates of GVA are arrived at on the basis of sample of size 20, the precision level of estimate is 80 percent confidence level and 15 percent margin of error. In fact, for the sample of size 18, (approximated to 20) the level of confidence is 80 percent confidence and 15 percent margin of error and for the sample of size 20, level of precision can be 90 percent confidence level and 16 percent margin of error.

- Method of estimation of cost of cultivation: As mentioned earlier, Cost of cultivation studies are conducted using ‘cost accounting method’ while due to volume of crops to be covered under the survey, the ‘Survey method’ was used for this survey. In this method, a personal interview is conducted with the selected farmer of identified crop in districts, post harvest, and data on costs incurred is compiled on memory recall basis by trained enumerators. Generally, all paid out costs which are incurred for the specific crop are recorded, information on some of the cost components, say electricity, are apportioned for the crop using area the identified crop. Moreover, some of the norms, as used by the agricultural universities, are adopted for estimating costs under concerned heads. e.g. the entire amount of money spent for the crop during the cropping cycle, is considered as ‘working capital, and interest at a flat rate of six percent is charged as cost, irrespective of the fact whether farmer has borrowed money or not. As the interview length in terms of time is a limiting factor in survey method, compiling information on items like, depreciation, interest on long term loans etc. being very time consuming, was estimated using ratios of respective cost estimates of agricultural universities to working capital costs.

- The format of cost of cultivation obtained from Mahatma Phule Krishi Vidyapeeth (MPKV) was studied and discussed in detail with officials of MPKV. The method of estimation details are given in Volume I and II of this report.

- Wherever incidence of intercrop was reported all cost estimates for the identified crop were apportioned on the basis of crop geometry for the concerned intercrop (it is to be noted that Tur was the only crop for which occurrence of intercropping was reported amongst selected sample). It is to be noted that even if, both the crops in intercropping of the respondent were identified for the district, only one crop was considered for this study, i.e. 20 unique respondents were selected for each identified crop in each district.

- Working cost/capital includes Hired human labour (male, female), bullock pair days, machine power, seed, manures, fertilizers, irrigation charges, plant protection charges, insurance premium, rab material, incidental charges and repair on farm implements. Cost A includes Working cost, interest on working cost, depreciation on farm implements and land revenue & other taxes. Cost B includes Cost A, rental value of land, interest on fixed capital and amortization cost. Cost C includes Cost B and family human labour (male, female).

- Questionnaire was discussed and finalized in the committee meeting.

- The selected agency has completed the field work of the survey using CAPI for Kharif, Rabi and Summer season crops and perennial crops. Total 83 crops were covered from all 34 districts (except Mumbai & Mumbai Suburban). In all 680-district wise crop wise combination have been surveyed. Required fieldwork as well as background research was done for the related special studies and on the basis of field experience, the subjects for the related studies have been modified. The field investigations for this study were conducted for the period June 2018 to May 2019 for all crops during Kharif 2018, Rabi 2018-19, Summer 2019 & fruit bearing Plantation crops in 2018-19. In addition to field supervision and data quality assurance measures by AFC, verification visits were conducted by officials of DES in 06 divisions of Maharashtra.

- The raw data, tables based on the raw data, interim and final draft report of the survey was submitted to DES by the agency. On modifications, this report is being published by DES.

Coverage of the Report :

- Report of this survey and other related studies has been prepared and presented in three volumes. Volume I focus mainly on the state level results, Volume II gives district wise crop wise results and the Volume III covers other related special studies.

- **Volume I** : It is the main introductory part of the report which presents background, introduction, genesis, approach & methodology in details and highlights executive summary and key findings from this Survey. The cost of cultivation results at state level based on the samples selected, benefit cost analysis and crop profiles of all selected crops are also included in this volume.

    - Crop Profile : Each crop profile contains the geographic coverage of districts and revenue region wise break up of number of districts, talukas, villages and farmers covered for the identified crop. Similarly, the breakup of selected holdings according to standard definition of small (< 1Ha.), Medium (<2 Ha) and large (>2 Ha), total area under the crop in respective holding size, percentage of area under the crop to total holding, is presented

in each profile, for complete understanding of sample farmers. The classification of respondents according to social categories, their average family size, average holding size, principal source of income, and awareness about minimum support price for the crop under consideration is also presented in each crop profile.

- For all crops covered in the study, crop profiles have been prepared. Generally, these profiles cover following major parameters.
    - Average and range of per hectare requirement of working capital (essentially paid out costs of cultivation of the crop) across districts
    - Average and range of productivity of crop across districts
    - Average and range of price realization for the crop across districts
    - Range of contribution from crop (gross sales realization less working capital per hectare)
    - Percentage wise major cost component of the crop.
- Cost of Cultivation Tables: The cost of cultivation results of the multi-seasonal crops and season wise crops at state level on the basis of samples selected are presented in this report. The statement of crop wise value of output and input costs per hectare is also given in the report. The districtwise CCS results of the crops are given in Volume II along with the input cost per hectare. Here the input costs in context with calculation of gross value added are considered and hence the input costs like labour etc. are not included in this statement.
- Cost and Return Analysis: The cost and return analysis for the distinct crops covered in the survey is also presented in the report. This analysis gives an idea about the cost and return variations according to size of holdings and for all class of holdings.
- Value of Output and Input Costs: The value of output and inputs for each crop in context with calculation of gross value added for the crop is given in the Statement. The value of outputs and inputs for each crop districtwise are given in Volume II.

- **Volume II** gives introduction, background, approach and methodology in brief and incorporates the cost of cultivation results of 680 district-crop combinations covered under the study along with the state level cost of cultivation results based on the samples selected from various districts. This Volume-II is important particularly for those who intend to analyze the results of crops at district level.
- **Volume III** includes the separate study reports on the other related studies.
    - Assessment of the difference in contribution to farmer from same parcel of land due to alternate form of cultivation adopted by farmers. Studies under this head included

        1) Study on backyard farming,

        2) Study on contract farming,

        3) Study on organic farming.

- Assessment of the difference in contribution to farmer from same parcel of land due to alternate form of cultivation adopted by farmers which includes

  1) Cultivation of coriander seed as a spice and coriander as leafy vegetable,

  2) Cultivation of fenugreek seed as condiment and fenugreek as leafy vegetable,

  3) Processing of green chilies to dry red chilies,

  4) Processing of cashew fruit/nut,

  5) Processing of Grapes to raisins,

  6) Processing of ginger to dry ginger (sunth),

  7) Processing of kokum fruit,

  8.) Processing of sugarcane to gur/jaggery,

  9) Processing of sugarcane to khandsari sugar,

  10) Processing of palmyra sugar/gur

- In addition, certain other related studies like fodder/grass cultivation, use of diesel engines and consumption of diesel for agriculture

Observations from the survey:

- Costs of cultivation (Costs A, B, and C, as adopted by MPKV) according to holding size, separately on the basis of area (per ha.) and output (per quintal) are estimated and presented in each profile. Generally, it is expected that if the principle of economies of scale apply, costs of cultivation for medium holdings is lesser than small holding, and that for large holding is lesser than medium holding. However, no such predominant trend can be observed across various crops identified in this study. In fact no such hypothesis was proposed to be tested in the study, nor does post facto analysis indicate any such phenomenon.
- The extent of use of hired human labour (male and female separately) indicates the extent of wage employment generated for identified crop according to holding class. There are various considerations in deploying hired labour for different crops in different regions, and as such there is no discernible trend in engaging hired human labour for different crops.
- District wise estimates of cost of cultivation can facilitate crop wise estimation of gross value addition for every district and can be used for arriving at the contribution of identified crop in the computation of district domestic product with higher precision than that computed at present.
- The cost of cultivation results of crops were analysed for inter district and intra-district comparison. The inter district analysis was helpful in providing a perspective at state level for that crop whereas the intra-district analysis of crops was outside the purview of the survey.
- The gross value of output per unit area for different holding sizes does not indicate any specific trend. The gross values of input costs per unit value of output and area are also presented in each profile to facilitate computation of Gross Value Added for respective crops.

- The cost of cultivation/production of important crops grown in thirty-four districts of Maharashtra State is presented separately in the report. It is well known that farmers differ with respect to the extent of resources owned and their use. Similarly, some of the resources are owned by farmers fully, some partially and some are hired in different proportions. The farmer gives different weight age to different resources while making the crop production decisions. Cost of crop cultivation/production analysis has, therefore, been carried out by using various farm management cost and production concepts. The relative magnitudes of costs and returns from the crop enterprise indicate the net profitability of the crop cultivation. The season wise and crop wise details provided in this chapter regarding cost of crop cultivation/production and profitability thereof may help in eliciting some general conclusions important for policy formulation.
- The cost and returns analysis shows that for all classes of farm size (holdings), most of the crops were giving overall good returns. For the large holdings, the returns were comparatively better for almost all the crops while for medium and small holdings, such number of crops giving comparatively better returns were lesser. This analysis of cost and returns is indicative and based on the survey results and depends on the samples selected. This analysis can give broad insight about which crops can give comparatively better returns in large holdings, medium holdings and small holdings. This can be mainly important and beneficial for the large number of farmers having small holdings.
- The entire study is essentially empirical in nature and presents factual details as revealed by respondents, and is self-explanatory. No causality (cause – effect relationships) is attempted to be established by this study. This study attempts to answer WHAT, WHEN, WHERE questions of the study but not WHY and HOW questions.

Volume I

Executive Summary, Key Findings from the study and Way forward

- The study covered 34 districts of Maharashtra State out of 36 districts except Mumbai City and Mumbai Suburban districts. From each district, crops having highest gross value of output (all crops up to 95% of the gross value of output of crops in the district) were selected for study.
- Three stage sampling method was used for the selection of farm households for generating the cost estimates for the selected crops. In the first stage two blocks from each district were selected; in the second stage two villages from each selected block were selected; and in the third stage five farm households from each selected village were selected, thus a sample of 20 farmers was selected for each selected crop in every district.
- The total sample comprised of 7,840 farmers for Kharif season, 2,820 farmers for Rabi, 420 farmers for Summer and 2,520 farmers for Perennial crops, thus total number of farmers selected for the study was 13,600.
- The data was collected for the reference year 2018-19 using computer-assisted personal interview (CAPI) method. Various cost concepts used in estimating cost of cultivation/ production of crops were discussed with officials of Mahatma Phule Krishi Vidyapeeth.
- For analysis of data from this survey, the norm for classification of land holdings is used as small holdings less than 1 Ha, Medium holding 1 Ha. to 2 Ha. and Large holding more than 2 Ha and not as per the standard classification of land holdings.
- During Kharif season, Bajra was one of the major crops grown in 20 districts of the State except Konkan Region. The per hectare cost of cultivation (Cost C) of Bajra crop observed to the tune of ₹41,315.55, ₹36,682.26 and ₹33,675.56 for small, medium and large size of land holding respectively. Per quintal cost of production of Bajra crop were ₹2,616.29, ₹2,133.65 and ₹1,857.27 for small, medium and large size of land holding respectively. The overall per hectare cost of cultivation of Bajra Crop was ₹35,378.27 while overall per quintal cost of production was ₹ 2,009.71. However, per hectare gross return of Bajra Crop was positive at Cost A and B while it was negative at Cost C.
- Jowar was another important crop grown in Kharif Season in different districts. The per hectare cost of cultivation (Cost C) of Jowar crop were estimated to be of ₹42,676.16, ₹44,482.21 and ₹45,585.80 for small, medium and large size of land holding respectively. Per quintal cost of production of Jowar crop was₹3,058.96, ₹2,361.08 and ₹1,847.53 for small, medium and large size of land holding respectively. The overall per hectare cost of cultivation of Jowar Crop was ₹44,929.11, while overall per quintal cost of production was ₹ 2,075.08. Per hectare gross value of output of ₹54,535.95 has shown positive returns over all the Costs (Cost A, Cost B and Cost C).
- The overall Cost C i.e. per hectare cost of cultivation for Maize was observed to be ₹60,050.42. Correspondingly the overall per hectare gross return for Maize crop was computed as ₹65,390.11. Per quintal cost of production was estimated to ₹1,356.32.

- The per hectare cost of cultivation of Paddy i.e., Cost C was observed to be ₹66,483.18, ₹58,973.24 and ₹51,631.89 for small, medium and large farmer respectively while overall cost of cultivation was computed to ₹57,476.22. The overall per quintal cost of production was observed as ₹1,647.54.

- Amongst pulses, Tur is an important Kharif pulse crop. The overall per hectare cost of cultivation of this crop was observed as ₹55,855.60, while gross value of output per hectare was estimated to ₹84,061.25. Per quintal cost of production was computed as ₹3,144.89.

- As regards oilseed crops Soyabean and Groundnut has been grown during kharif season in various districts of the State. The overall per hectare cost of cultivation (Cost C) for Soyabean and Groundnut was observed ₹51,194.17 and ₹80,526.23 respectively. While per hectare gross value of output was estimated to ₹68,284.15 and ₹93,739.41 from Soyabean and Groundnut crops respectively. Per quintal cost of production of Soyabean and Groundnut was computed to ₹ 2,540.93 and ₹3,710.15 respectively.

- Cotton has been grown as an important cash crop in Maharashtra. The overall cost of cultivation Cost C, per hectare of cotton was observed ₹65,424.12 while per hectare gross value of output realized was ₹88,290.97. Per quintal cost of cultivation of cotton was estimated as ₹3,534.95.

- Amongst vegetables, Onion and Tomato crops were important cash crops grown in Maharashtra. Per hectare the overall cost of cultivation i.e., Cost C has been computed for Onion as ₹96,310.09 while per hectare gross value of output realized was estimated as ₹91,480.96, showing negative return during the year under study. Per quintal cost of production of Onion crop was observed as ₹529.03. Per hectare the overall cost of cultivation of Tomato crop was observed as ₹2,02,932.59 against per hectare gross value of output realised ₹2,80,089.34. Per quintal cost of cultivation of Tomato crop was estimated to ₹756.47.

- Wheat, Jowar and Maize are major rabi cereal crops grown in the state. Per hectare cost of cultivation (Cost C) for Wheat, Jowar and Maize was observed to be ₹44,025.30, ₹42,033.26, and ₹46,019.18 respectively. While per hectare gross value of output realised of the produce of Wheat, Jowar and Maize was estimated to be ₹64,789.21, ₹61300.75 and ₹62,407.00 respectively. Per quintal cost of production was observed to be ₹1,471.27, ₹1,968.39 and ₹1,117.34 for Wheat, Jowar and Maize crops respectively.

- Gram is an important rabi pulse crop grown in the State. The cost of cultivation per hectare for Gram was observed to be ₹54,170.11 against per hectare gross value of output realised ₹68,085.16. Per quintal cost of production of Gram crop was computed to ₹3,470.57.

- Per hectare cost of cultivation of Garlic was estimated as ₹1,55,586.79 against per hectare gross value of output ₹ 3,46,902. Per quintal cost of cultivation was computed to ₹1,561.60.

- Bajra, Maize and Paddy were the major cereal crops grown during summer season. The cost of cultivation of Bajra, Maize and Paddy was estimated to be of ₹40,752.66, ₹51,746.61 and ₹ 80,087.78 per hectare respectively. Per quintal cost of production of Bajra, Maize and Paddy was observed to be ₹1,250.23, ₹1,196.95 and ₹2,388.70 respectively.

- Groundnut is the main oilseed crop grown in summer. The Cost of cultivation of Groundnut was observed to be ₹ 81,340.44 per hectare while per hectare gross value of output estimated to ₹1,17,155.63. Per quintal cost of production was computed to ₹3,135.89.

- Sugarcane and Banana are the major perennial cash crops grown. The cost of cultivation i.e. Cost C for Sugarcane and Banana crops was estimated at ₹1,46,751.49 and ₹2,46,011.88 respectively. While per hectare gross value of output realized were found to be ₹2,18,381.78 and ₹4,23,450.49 for Sugarcane and Banana crops respectively. Cost of production of Sugarcane was observed to be ₹1,507.50 per MT while cost of production of Banana crop was computed at ₹508.08 per quintal.

- Grape and Pomegranate are major cash fruit crops of Maharashtra. The cost of cultivation of Grape per hectare was estimated at ₹5,41,305.19 against per hectare gross value of output realised ₹10,14,821.41. Per quintal cost of production of Grape was observed as ₹2,029.78. The cost of cultivation of Pomegranate per hectare was computed at ₹3,15,742.95 against gross value of output realised was estimated at ₹7,15,490.60. Per quintal cost of production was observed as ₹1,280.39.

- Sweet Orange (Santra) and Mandarin (Mosambi) were the major perennial cash citrus fruit crops grown mainly in Vidarbha and Marathwada Region. The cost of cultivation per hectare was ₹1,49,319.33 and ₹1,34,990.15 against the gross value of output realised ₹3,27,295.48 and ₹3,32,840.71 for Sweet Orange (Santra) and Mandarin (Mosambi) respectively. Per quintal cost of production of Sweet Orange and Mandarin was estimated at ₹964.14 and ₹828.07 respectively.

- The cost & returns analysis shows that for all classes of farm size (holdings) (small (<1 Ha.),Medium (1 Ha. to 2 Ha.), Large (> 2Ha.)], most of the crops fetched overall good returns. For the large holdings, the returns were comparatively better for almost all the crops while for medium and small holdings, such number of crops giving comparatively better returns were lesser. This analysis of cost and returns is indicative and based on the survey results and depends on the samples selected.

- The cost & returns analysis shows that for all classes of farm size (holdings), most of the crops were giving good returns except Jowar, Onion, Bottle gourd and Pointed gourd.

- The crops having comparatively better returns in the small holdings were observed as Groundnut, Horse gram, Red chili, Ajwain, Garlic, Cucumber, Custard Apple, Jackfruit, Cauliflower, Onion, Ivy gourd, Sweet Potato and Ridge gourd.

- The crops having comparatively better returns in the medium holdings were observed as Sugarcane, Tur, Udid, Ginger, Turmeric, Coriander seed, Muskmelon, Fig, Mango, Papaya, Sweet Orange, Capsicum, Radish and Ivy gourd.

- The crops giving comparatively better returns in the large holdings were observed as ‘ Bajra, Gram, Coconut, Maize, Paddy, Jowar, Ragi, Wheat, Moong, Soyabean, Cotton, Arecanut, Cashewnut, Watermelon, Banana, Ber, Grapes, Guava, Lime, Mandarin, Pomegranate, Sapota, Strawberry, Beans, Bitter gourd, Cabbage, Brinjal, Beetroot, Carrot, Potato, Sweet Potato,

Pumpkin, Tomato, Bottle gourd, Pointed Gourd, Sponge gourd, Peas, Green Chili, Coriander, Fenugreek, Leafy Vegetables (Spinach) and Other Vegetables (Cluster beans).

- Incidentally, the returns were found to be almost same for large and small holdings in case of Potato, Muskmelon and Ber.
- The item wise inputs under consideration for valuation of Gross Value Added are available from this survey for various crops at district level. These inputs are per hectare which can be applied to the area of that particular crop in the particular district and total input cost can be estimated. The districtwise input costs thus arrived can be applied to respective districts whereas for remaining districts, 'Sum of all input costs divided by sum of the area under that crop' ratio can be applied. Thus, crop wise input cost at State level can be estimated. The ratios thus arrived for 2018-19 (reference period used in the survey) can be applied to the area under crops for subsequent years.
- District wise variation in cost of cultivation of various crops in Maharashtra is observed to be significant, thus necessitating separate district wise estimation of inputs and output for estimating contribution of respective crops to district domestic product.
- The district wise requirement of inputs varies according to crops and principal head of cost incurred is also different for different crops. With a special emphasis on policy measures for major heads of costs, possibilities of reducing cost of crops under those heads can be explored. This will eventually lead to enhance income of farmers.
- Interviews with farm households during this survey revealed that various agricultural operations to include land preparation, sowing, application of granular fertilizers, plucking of green Chilis, harvesting of crops, milling of maize/jowar etc. are given on contract to different types of vendors/agencies, after suitable negotiations. Costs incurred on such 'contracts' were easily recalled and shared with enumerators. Hence 'contract' has been added as an additional cost head in cost sheet. Further it was appropriately bifurcated in to 'mechanical power' and 'hired labour' heads for analysis.
- Composition of hired labour to family labour presents a mixed picture and availability of labour influences the output of crop, hence promotion of use of mechanization or technology (viz. use of herbicides for controlling weeds in cotton crop etc.) can be explored to reduce labour cost, thereby enhancing income of farmers.
- Certain dilemmatic situations have been observed in the field e.g. per acre cost of soyabean in Marathwada region using harvester is in the range of ₹2,200-2,500 whereas if labour is employed for harvesting, then cost is around ₹4,000 and time is far more than using harvester. Similar situations could be observed in harvesting sugarcane and some other crops. Organized efforts to mobilize mechanization of harvesting have potential to enhance income of farmers.
- It appears that mechanization may lead to reduced employment opportunities for a section of labour class which can be mitigated by providing skills relating to maintenance and operations of equipments, processing at farm gate or primary processing of the farm produce.

- The composition of working capital contains 'interest on working capital' as one of the components. As per the discussions with MPKV, all the items in the cost sheet from 1 to 14 (essentially all paid out costs) are considered as working capital and interest is considered at a flat rate of 6 percent. In practice farmers generally borrow to the extent of requirements, where there is institutional finance say from commercial/cooperative banks, there is significant quantum of interest subvention by Government of Maharashtra in respect to regular repayment of loan. This can enhance the income of farmers.

- The cost of chemical fertilizers is the cost paid by farmers, net of subsidy by government, and generally the regulated price for respective fertilizers. However, there are several instances where cost paid by farmers is higher than the regulated price and it adversely affects income of farmers. A policy intervention to ensure supply at regulated price can improve farmer's income. This also holds good for some other inputs where price is regulated like seeds, some plant protection chemicals etc.

- The incidence of payment of insurance premium is negligible. This can have policy implication to devise crop insurance schemes and persuading farmers to pay insurance premium.

- The incidence of use of Rab material for preparation of farm land for crop cultivation was not reported by the farmers.

- Rental value of land is estimated as suggested by MPKV ($1/6^{th}$ of gross income from main produce & bye produce less land revenue taxes and other taxes paid). This is a notional cost, and can vary as per price realization of produce/bye produce. Instead, rental value as a fixed multiple of land revenue may be a better estimate of rental value.

- The survey was conducted for the main purpose of finding out the district wise input costs of crop production to calculate district wise crop wise gross value added (GVA).

- For base year revision of State & District Income estimates, such type of survey needs to be undertaken to update the crop wise district wise inputs. It can be undertaken once in five years or every year covering 20 per cent crops so that all crops can be covered in five years. The decision can be taken based on needs and available resources for the same. This survey was undertaken keeping in mind the proposed new base year 2017-18. The agency for conducting survey could not be finalised in time due to the non-response from the empanelled agencies, the tendering and two times retendering was required to be done for finalising agency which was done in June, 2018 and sub-sequently the data for the reference year 2018-19 was collected.

- For many parameters considered in this survey, the findings may need further probing in details. For this purpose, small surveys can be conducted using the available frame as it contains the contact details such as mobile numbers of the respondents.

- The data collected from this survey may be helpful in analysing various questions and areas such as Increasing income of farmers, Impact of reforms in Agriculture sector, Economics of labour intensive and capital intensive crops etc.

- The costs & returns analysis gives broad insight about which crops can fetch comparatively better returns in large (<2 Ha), medium (1 to 2 Ha.) and small (<1 Ha.) holdings. This can be mainly important and beneficial for the large number of farmers having small holdings in the State.

- Crops under Floriculture, Spices & Condiments, and Medicinal Plants etc. could not be covered in this survey. Though the production of these crops is less, may be it is possible that the value addition done by these crops is significant. Hence, for these crops separate surveys can be planned & conducted to quantify its contribution in GVA of Crop Sector.

- DES has also conducted some related studies in which it was attempted to find out the impact of adoption of various other farming patterns like Contract Farming, Backyard Farming and Organic Farming, primary processing of the crop produce for the value addition by farmer and Grass & Fodder crops which are generally not covered in the major crops, diesel consumption for agriculture. Separate report on these studies is presented in Volume III of this report.

- Since, such survey was undertaken for the first time, the results are not comparable with any previous results. One may compare these results with the results obtained from the CCS conducted by the Agriculture Universities in the State, but the comparison should be done keeping in mind that the method of survey is different for both.

- If in case, researchers want to study using the data collected through this Survey, they can get the basic data collected from this survey by contacting DES. Such data can be made available by suppressing the identification details with a condition that the analysis and research done should be shared with DES.

- DES requests to give feedback and comments on this study, so that further improvements can be made while conducting such type of surveys in future.

खंड - १

संक्षिप्त गोषवारा, अभ्यासाचे मुख्य निष्कर्ष आणि पुढील दिशा

- महाराष्ट्रातील ३६ जिल्ह्यांपैकी मुंबई शहर व मुंबई उपनगर हे दोन जिल्हे वगळता उर्वरीत ३४ जिल्ह्यांमधे हा अभ्यास करण्यात आला. प्रत्येक जिल्ह्यातील सर्वाधिक स्थूल उत्पादन मूल्य असलेल्या (जिल्ह्यातील पिकांच्या एकूण स्थूल उत्पादन मूल्याच्या ९५ टक्के पर्यंत) पिकांचा जिल्ह्यातील प्रमुख पिके म्हणून अभ्यासात समावेश करण्यात आला.
- निवड केलेल्या पिकांचा पीक खर्च काढण्यासाठी शेतकरी कुटुंबांच्या निवडीसाठी त्रिस्तरीय नमुना निवड पद्धत अवलंबिण्यात आली. निवड केलेल्या पिकाखालील क्षेत्राच्या आधारावर प्रत्येक जिल्ह्यातील २ तालुक्यांची निवड प्रथम स्तरावर केली, निवड केलेल्या तालुक्यातून प्रत्येकी २ गावांची निवड दुसऱ्या स्तरावर केली. प्रत्येक गावातील पाच शेतकरी कुटुंबांची निवड तिसऱ्या स्तरावर केली. अशा रीतीने प्रत्येक जिल्ह्यात निवड केलेल्या प्रत्येक पिकाकरिता २० शेतकरी कुटुंबांची निवड केली.
- या पाहणीसाठी खरीप हंगामा करिता ७,८४० शेतकरी, रब्बी हंगामाकरिता २,८२० शेतकरी, उन्हाळी हंगामा करिता ४२० शेतकरी व बहुवार्षिक पिकांकरिता २,५२० शेतकरी अशी एकूण १३,६०० शेतकरी कुटुंबे (३४ जिल्हे प्रत्येक जिल्ह्यात सरासरी २० पिके व निवडलेल्या पिकासाठी जिल्ह्यातून २० शेतकरी) निवडण्यात आली. या पाहणीकरीता ६८ वेगवेगळी पिके निवडण्यात आली. त्यापैकी १३ पिके ही दोन हंगामात व १ पिक हे तीन हंगामात होते. याप्रकारे ८३ पिकांचा समावेश झाला व ६८० पीक x जिल्हा करीता पाहणी करण्यात आली.
- संदर्भ वर्ष २०१८-१९ करिता संगणक सहाय्यित वैयक्तिक मुलाखत पद्धतीने या कुटुंबांकडून माहिती गोळा करण्यात आली. पीक खर्च/लागवड खर्च अनुमानित करण्याकरिता उपयोगात आणलेल्या विविध खर्च संकल्पना महात्मा फुले कृषि विद्यापिठातील तज्ञांशी चर्चेच्या आधारे निश्चित केल्या.
- या पाहणीतील आकडेवारीचे विश्लेषण करतांना वहिती क्षेत्राच्या वर्गीकरणासाठी 'छोटे शेतकरी' एक हेक्टर पर्यंत क्षेत्र, 'मध्यम शेतकरी' १ ते २ हेक्टर क्षेत्र, 'मोठे शेतकरी' २ हेक्टर पेक्षा अधिक क्षेत्र असे निकष वापरण्यात आले असून ते वहिती क्षेत्राच्या वर्गीकरणासाठीच्या मानक निकषांपेक्षा थोडे वेगळे आहेत.
- बाजरी हे खरीप हंगामात कोकण विभाग वगळता राज्यातील २० जिल्ह्यात घेतले जाणारे महत्त्वाचे पीक आहे. या पिकाचा दर हेक्टरी उत्पादन खर्च (याला तांत्रिक भाषेत कॉस्ट सी (Cost C) असे म्हटले जाते) हा छोट्या, मध्यम व मोठ्या शेतकऱ्यांकरिता अनुक्रमे ₹ ४१,३१५.५५, ₹ ३६,६८२.२६ व ₹ ३३,६७५.५६ असा दिसून आला. तसेच बाजरी या पिकाकरिता छोट्या, मध्यम व मोठ्या शेतकऱ्यांचा प्रति क्विंटल उत्पादन खर्च अनुक्रमे ₹ २,६१६.२९, ₹ २,१३३.६५ व ₹ १,८५७.२७ एवढा दिसून आला. सरासरीने छोट्या, मध्यम व मोठ्या शेतकऱ्यांकरिता दर हेक्टरी उत्पादन खर्च ₹ ३५,३७८.२७ तर दर क्विंटल उत्पादन खर्च ₹ २,००९.७१ इतका दिसून आला. बाजरी पिकासाठी प्रति हेक्टर स्थूल

परताव्यासाठी कॉस्ट ए व कॉस्ट बी विचारात घेतल्यास शेतकऱ्याला धन (+) परतावा मिळाला परंतु कॉस्ट सी विचारात घेतल्यास ऋण (-) परतावा मिळाला.

- ज्वारी हे अनेक जिल्ह्यात घेतले जाणारे खरीप हंगामातील एक अन्य महत्त्वाचे पीक आहे. ज्वारी करिता छोटया, मध्यम व मोठ्या शेतकऱ्यांकरिता दर हेक्टरी उत्पादन खर्च अनुक्रमे ₹ ४२,६७६.१६, ₹ ४४,४८२.२१ व ₹ ४५,५८५.८० इतका दिसून आला. तसेच प्रति क्विंटल उत्पादन खर्च हा छोट्या, मध्यम व मोठ्या शेतकऱ्यांकरिता अनुक्रमे ₹ ३,०५८.९६, ₹ २,३६१.०८ व ₹ १,८४७.५३ इतका दिसून आला. तर एकूण सरासरीने ज्वारीचा दर हेक्टरी उत्पादन खर्च ₹ ४४,९२९.११ तर प्रति क्विंटल उत्पादन खर्च ₹ २,०७५.०८ इनका दिसून आला. ज्वारीपासून मिळालेले एकूण उत्पन्न दर हेक्टरी ₹५४,५३५.९५ एवढे दिसून आले आणि कॉस्ट ए, कॉस्ट बी व कॉस्ट सी या उत्पादन खर्चाच्या तीनही पातळयांचा विचार करिता ज्वारी पासून शेतकऱ्यांना धन (+) परतावा मिळाला.
- मका या खरीप पिकाकरिता दर हेक्टरी एकूण उत्पादन खर्च कॉस्ट सी ₹ ६०,०५०.४२ तर दर हेक्टरी एकूण उत्पन्न ₹ ६५,३९०.११ एवढे मिळाले. मका या पिकासाठीचा प्रति क्विंटल चा उत्पादन खर्च ₹ १,३५६.३२ एवढा दिसून आला.
- भात या खरीप पिकासाठी छोट्या, मध्यम व मोठ्या शेतकऱ्यांचा दर हेक्टरी उत्पादन खर्च अनुक्रमे ₹ ६६,४८३.१८, ₹ ५८,९७३.२४ व ₹ ५१,६३१.८९ एवढा दिसून आला. भातासाठी दर हेक्टरी सरासरी उत्पादन खर्च ₹ ५७,४७६.२२ तर प्रति क्विंटल सरासरी उत्पादन खर्च ₹ १,६४७.७४ एवढा दिसून आला.
- कडधान्यांपैकी तूर हे खरीप हंगामातील एक महत्त्वाचे कडधान्य पीक आहे. तुरीकरिता दर हेक्टरी, एकूण उत्पादन खर्च ₹ ५५,८५५.६०, तर हेक्टरी एकूण उत्पन्न ₹ ८४,०६१.२५ एवढे दिसून आले. प्रति क्विंटल उत्पादन खर्च ₹ ३,१४४.८९ एवढा दिसून आला.
- सोयाबीन आणि भुईमूग ही तेलबिया पिके खरीप हंगामात राज्यातील अनेक जिल्ह्यात घेतली जातात. सोयाबीन व भुईमूग या पिकांकरिता दर हेक्टरी सरासरी उत्पादन खर्च (कॉस्ट सी) ₹ ५१,१९४.१७ व ₹ ८०,५२६.२३ एवढा दिसून आला तर दर हेक्टरी सरासरी उत्पन्न अनुक्रमे ₹ ६८,२८४.१५ व ₹ ९३,७३९.४१ एवढे दिसून आले. सोयाबीन व भुईमूग या पिकांचा प्रति किंटल उत्पादन खर्च अनुक्रमे ₹ २५४०.९३ व ₹ ३७१०.१५ एवढा दिसून आला.
- कापूस हे महाराष्ट्रातील महत्त्वाचे नगदी पीक आहे. या पिकासाठी एकूण दर हेक्टरी उत्पादन खर्च (कॉस्ट सी) ₹ ६५,४२४.१२ तर एकूण दर हेक्टरी उत्पन्न ₹ ८८,२९०.९७ एवढे दिसून आले. प्रति क्विंटल उत्पादन खर्च ₹ ३,५३४.९५ एवढा दिसून आला.
- भाज्यांमध्ये कांदा व टोमॅटो ही महाराष्ट्रात घेतली जाणारी महत्त्वाची नगदी पिके आहेत. कांदा या पिकाकरिता एकूण दर हेक्टरी उत्पादन खर्च (कॉस्ट सी) ₹ ९६,३१०.०९ तर एकूण दर हेक्टरी उत्पन्न ₹ ९१,४८०.९६ एवढे दिसून झाले म्हणजेच कांदा उत्पादकांना पाहणी अभ्यास घेतलेल्या वर्षी ऋण (-) परतावा मिळाला. कांदा पिकाचा प्रति किंटल उत्पादन खर्च ₹ ५२९.०३ एवढा दिसून आला. टोमॅटो या

पिकासाठी दर हेक्टरी एकूण उत्पादन खर्च, ₹ २,०२,९३२. ५९ तर दर हेक्टरी एकूण उत्पन्न ₹ २,८०,०८९.३४ एवढे दिसून आले. टोमॅटो पिकाचा प्रति क्विंटल उत्पादन खर्च ₹ ७५६.४७ एवढा दिसून आला.

- गहू, ज्वारी व मका ही राज्यात रबी हंगामात पिकवली जाणारी महत्त्वाची तृणधान्ये आहेत. या पिकांचा दर हेक्टरी उत्पादन खर्च (कॉस्ट सी) अनुक्रमे ₹ ४४,०२५.३०, ₹ ४२,०३३.२६ व ₹ ४६,०१९.१८ इतका दिसून आला. तर या पिकांपासून मिळणारे एकूण उत्पन्न अनुक्रमे ₹ ६४,७८९.२१, ₹ ६१,३००.७५ व ₹ ६२,४०७ एवढे दिसून आले. तसेच रबी हंगामातील गहू, ज्वारी व मका या पिकांचा प्रति क्विंटल उत्पादन खर्च अनुक्रमे ₹ १,४७१.२७, ₹ १,९६८.३९ व ₹ १,११७.३४ एवढा दिसून आला.
- चना हे रबी हंगामातील राज्यातील महत्वाचे कडधान्य पीक आहे. या पीकासाठी दर हेक्टरी एकूण उत्पादन खर्च (कॉस्ट सी) ₹ ५४,१७०.११ तर दर हेक्टरी एकूण उत्पन्न ₹ ६८,०८५.१६ एवढे दिसून आले. चना या पिकाचा प्रति क्विंटल उत्पादन खर्च ₹ ३,४७०.५७ एवढा दिसून आला.
- लसूण या पिकाचा दर हेक्टरी एकूण उत्पादन खर्च, कॉस्ट सी, ₹ १,५५,५८६.७९ तर दर हेक्टरी एकूण उत्पन्न ₹ ३,४६,९०२.०० एवढे दिसून आले. लसूण या पिकाचा प्रति क्विंटल उत्पादन खर्च ₹ १,५६१.६० एवढा दिसून आला.
- उन्हाळी हंगामात राज्यात बाजरी, मका व भात या महत्वाच्या तृणधान्य पिकांची लागवड केली जाते. त्यांचा दर हेक्टरी एकूण उत्पादन खर्च (कॉस्ट सी) अनुक्रमे ₹ ४०,७५२.६६ , ₹ ५१,७४६.६१ व ₹ ८०,०८७.७८ एवढा दिसून आला तर प्रति क्विंटल उत्पादन खर्च अनुक्रमे ₹ १,२५०.२३, ₹ १,१९६.९५ , ₹ २,३८८.७० एवढा दिसून आला.
- उन्हाळी हंगामात घेतले जाणारे भुईमूग हे तेलबिया वर्गातील प्रमुख पीक असून त्याचा दर हेक्टरी एकूण उत्पादन खर्च (कॉस्ट सी) ₹ ८१,३४०.४४ तर दर हेक्टरी एकूण उत्पन्न ₹ १,१७,१५५.६३ एवढे दिसून आले. प्रति क्विंटल उत्पादन खर्च ₹ ३,१३५.८९ एवढा दिसून आला.
- ऊस आणि केळी ही राज्यातील महत्वाची बहुवार्षिक नगदी पिके असून त्यांचा दर हेक्टरी सरासरी उत्पादन खर्च (कॉस्ट सी) अनुक्रमे ₹ १,४६,७५१.४९ व ₹ २,४६,०११.८८ एवढा दिसून आला. तर या पिकांचे दर हेक्टरी उत्पन्न रु २,१८,३८१.७८ व ₹ ४,२३,४५०.४९ एवढे दिसून आले. ऊस या पिकाचा प्रतिटन उत्पादन खर्च ₹ १,५०७.५० तर केळ्यांचा प्रति क्विंटल उत्पादन खर्च ₹ ५०८.०८ एवढा दिसून आला.
- द्राक्षे व डाळिंबे ही राज्यात घेतली जाणारी प्रमुख नगदी फळ-पिके आहेत. द्राक्ष पिकाकरिता दर हेक्टरी, एकूण उत्पादन खर्च (कॉस्ट सी) ₹ ५,४१,३०५.१९ तर एकूण उत्पन्न ₹ १०,१४,८२१.४१ एवढे दिसून आले. द्राक्षांचा प्रति क्विंटल उत्पादन खर्च ₹ २,०२९.७८ एवढा दिसून आला. डाळींब या पिकाचा दर हेक्टरी उत्पादन खर्च, कॉस्ट सी ₹ ३,१५,७४२.९५ तर एकूण दर हेक्टरी उत्पन्न ₹ ७,१५,४९०.६० व प्रति क्विंटल उत्पादन खर्च ₹ १,२८०.३९ एवढा दिसून आला.

- संत्री व मोसंबी ही प्रमुख लिंबू वर्गीय बहुवार्षिक फळ-पिके विदर्भ व मराठवाडा या विभागात घेतली जातात. संत्री व मोसंबी या पीकांचा दर हेक्टरी उत्पादन खर्च (कॉस्ट सी) अनुक्रमे ₹ १,४९,३१९.३३ व ₹ १,३४,९९०.१५ तर दर हेक्टरी एकूण उत्पन्न ₹ ३,२७,२९५.४८ व ₹ ३,३२,८४०.७१ एवढे दिसून आले. तसेच संत्री व मोसंबी यांचा प्रति क्विंटल उत्पादन खर्च अनुक्रमे ₹ ९६४.१४ व ₹ ८२८.०७ एवढा दिसून आला.
- पिकांवरील खर्च व परतावा यांच्या विश्लेषणातून असे दिसून येते की तीनही प्रकारच्या भूधारक शेतकऱ्यांना [छोटे (<१ हेक्टर), मध्यम (१ते२ हेक्टर) व मोठे (>२ हेक्टर)] बहुतेक पिकांमधून एकंदरीत चांगला परतावा मिळाला. मोठ्या भूधारक शेतकऱ्यांना सर्वच पिकांमधून तुलनेने अधिक परतावा मिळाला तर छोट्या व मध्यम भूधारक शेतकऱ्यांना अधिक परतावा मिळणाऱ्या पिकांची संख्या कमी होती. खर्च व परतावा यांचे विश्लेषण हे दिशादर्शक असून ते सर्वेक्षणातील निवडलेल्या नमुना कुटुंबांनी दिलेल्या माहितीवरुन काढलेल्या निष्कर्षावर आधारित आहे.
- पिकांवरील खर्च व परतावा यांच्या विश्लेषणातून असे दिसून येते की, तीनही प्रकारच्या भूधारकांना ज्वारी, कांदा, दुधी भोपळा, आणि परवल ही पिके वगळता अन्य पिकांनी चांगला परतावा दिला.
- छोट्या भूधारकांना तुलनेने चांगला परतावा देणाऱ्या पिकांमध्ये भुईमूग, हुलगे, लाल मिरची, ओवा, लसूण, काकडी, सिताफळ, फणस,कॉलीफ्लॉवर, कांदा, तोंडली, रताळी व दोडके या पिकांचा समावेश असल्याचे दिसून आले.
- मध्यम भूधारकांना तुलनेने चांगला परतावा देणाऱ्या पिकांमध्ये ऊस, तूर,उडीद, आले, हळद, धने, खरबूज, अंजीर, आंबे, पपई, मोसंबी, ढोबळी मिरची, तोंडली व मुळा या पिकांचा समावेश असल्याचे दिसून आले.
- मोठ्या भूधारकांना तुलनेने चांगला परतावा देणाऱ्या पिकांमधे बाजरी, चना, नारळ, मका, भात, ज्वारी, रागी, गहू, मूग, सोयाबीन, कपास, सुपारी, काजू, कलिंगड, केळी, बोरे, दाक्ष, पेरू, लिंबू, संत्री, डाळिंब, चिकू, स्ट्रॉबेरी, घेवडा,कारली, कोबी, वांगी, बीट, गाजर, बटाटा, रताळी, लालभोपळा, टोमॅटो, दुधी भोपळा , परवल, घोसाळे, मटार, हिरवी मिरची, धणे, मेथी, पालक, आणि गवार ही पिके समाविष्ट असल्याचे दिसून आले.
- बटाटा, बोरे व खरबूज या पीकांकरिता छोट्या तसेच मोठ्या भूधारकांना मिळणारा परतावा जवळपास सारखा होता असे देखिल दिसून आले.
- जिल्हास्तरावर विविध पिकांची स्थूल मुल्य वृद्धी काढण्याकरीता संबंधित निविष्ठांवरील बाबवार खर्चाची माहिती या सर्वेक्षणातून उपलब्ध होते. या निविष्ठांचा खर्च हा प्रति हेक्टर काढण्यात आला असल्याने त्या त्या पिकांच्या त्या त्या जिल्ह्यातील एकूण क्षेत्राशी संबंध जोडून त्या पिकासाठी त्या जिल्ह्यासाठी निविष्ठांचा खर्च काढता येईल. अशा प्रकारे जिल्हानिहाय काढण्यात आलेल्या पिकांच्या निविष्ठांवरील खर्च संबंधित जिल्ह्यासाठी वापरता येईल तर उर्वरीत जिल्ह्यांसाठी त्या पिकांच्या निविष्ठांवरील एकूण खर्च व त्या पिकाखाली असणाऱ्ये क्षेत्र यांचे गुणोत्तर यांचा वापर करुन निविष्ठा खर्च काढता येईल. २०१८-१९ या

पाहणीच्या संदर्भ वर्षाकरिता अशारितीने काढण्यात आलेली गुणोत्तरे आगामी वर्षातील त्या त्या पिकांखालील क्षेत्राशी उपयोजित करता येतील.

- महाराष्ट्रातील विविध पिकांच्या जिल्हावार उत्पादन खर्चात लक्षणीय फरक दिसून येतो. त्यामुळे स्थूल जिल्हा उत्पन्नात त्या त्या पिकांचे योगदान काढण्यासाठी स्वतंत्रपणे जिल्हा निहाय पीक खर्च व उत्पन्न यांचे अंदाज तयार करण्याची आवश्यकता आहे.
- पिकानुसार जिल्हानिहाय निविष्ठांचे प्रमाण बदलते तसेच वेगवेगळ्या पिकांसाठी एकूण निविष्ठांपैकी मुख्य निविष्ठा ही देखिल वेगवेगळी आहे. अशा मुख्य निविष्ठाबाबतच्या धोरणात्मक उपाययोजनांवर भर दिल्यास निविष्ठांवरील खर्च कमी करण्याच्या शक्यता पडताळून पाहता येतील, परिणामतः शेतकऱ्यांच्या उत्पन्नात भर पडू शकेल.
- सर्वेक्षित शेतकरी कुटुंबांच्या मुलाखती घेतांना असे दिसून आले की, शेती संबंधातील विविध कामे ज्यात जमीन मशागत, पेरणी, पिकांना दाणेदार खते देणे, हिरव्या मिरच्या तोडणे, पिकांची कापणी /मळणी करणे इ. कामे विविध संस्था किंवा सेवा पुरवठादार यांना वाटाघाटी करुन कंत्राट या स्वरुपात दिली जातात. अशा कंत्राटी कामांकरीताचा खर्च चटकन आठवून सहजपणे मुलाखत घेणाऱ्याला सांगण्यात आला. त्यामुळे खर्च पत्रकात कंत्राट असे एक शीर्ष समाविष्ट करण्यात आले. पुढील विश्लेषणात या शीर्षाचे विभाजन यांत्रिक शक्ती आणि मजूरी या शीर्षाखाली करण्यात आले.
- पीक उत्पादन खर्चात घरातील शेत मजुरी व बाहेरून घेतलेली शेत मजुरी यांचे प्रमाण याचे संमिश्र चित्र दिसून येते आणि मजुरांच्या उपलब्धतेवर पिकांची उत्पादकता अवलंबून असते. त्यामुळे यांत्रिकीकरण वा तंत्रज्ञानाला प्रोत्साहन देऊन (उदा. कापूस या पिकामधील तणवाढ नियंत्रणासाठी हर्बीसाईडसचा वापर) मजुरी खर्च कमी करण्याची शक्यता पडताळता येईल जेणेकरुन शेतकऱ्यांचे उत्पन्न वाढू शकेल.
- या अभ्यासात काही पेचात्मक परिस्थिती निदर्शनास आल्या. उदा. सोयाबीन या पिकाची हार्वेस्टर यंत्राने कापणी केल्यास मराठवाड्यातील शेतकऱ्याला एकरी साधारणपणे ₹ २,२०० ते ₹ २,५०० एवढा खर्च येतो परंतु शेतमजूर लावून कापणी केल्यास एकरी जवळपास ₹ ४,००० खर्च येतो. शिवाय हार्वेस्टरने कापणी करतांना लागणाऱ्या वेळेपेक्षा अधिक वेळ लागतो. अशीच परिस्थिती ऊस तोडणी व इतर काही पिकांच्या कापणी मध्येही दिसून येते. म्हणजेच सुगीच्या कामाकरिता यांत्रिकीकरणाचा वापर करण्याच्या दृष्टीने सुसंघटीत प्रयत्नांमध्ये शेतकऱ्यांच्या उत्पन्नात वाढीची क्षमता आहे.
- यांत्रिकीकरणामुळे मजुरांना मिळणाऱ्या रोजगार संधीमधे घट होईल असे दिसते, परंतु अशा मजुरांना योग्य यंत्रांची देखभाल दुरुस्ती, यंत्रचालक, शेतावरील उत्पादित मालाची प्राथमिक प्रक्रिया अशा कामांसाठी आवश्यक असलेले कौशल्य प्रशिक्षण दिल्यास त्यांचेकरिता रोजगार उपलब्ध होऊ शकेल.
- खेळत्या भांडवलाच्या घटकांमध्ये 'खेळत्या भांडवलावरील व्याज' हा एक घटक समाविष्ट आहे. महात्मा फुले कृषि विद्यापीठाशी झालेल्या चर्चेनुसार उत्पादन खर्चाच्या १ ते १४ या व्यय शीर्षाखालील सर्व खर्च हा खेळते भांडवल म्हणून धरला जातो व या खेळत्या भांडवलावर ६ टक्के थेट दराने (दर साल नव्हे) व्याज आकारले जाते. वास्तविक शेतकरी सामान्यतः त्याला आवश्यक तेवढयाच कर्जाची उचल करतो व हे

कर्ज जर वाणिज्यिक/सहकारी बँका सारख्या संस्थांकडून घेतले असेल व त्याची विहित वेळेत परतफेड केली असेल तर अशा कर्जावरील व्याजाचा मोठा हिस्सा महाराष्ट्र शासनामार्फत भरला जातो, ह्यामुळे शेतकऱ्यांच्या उत्पन्नात वाढ होऊ शकते.

- रासायनिक खतांची किंमत म्हणजे खतावरील अनुदानाची रक्कम वगळता शेतकऱ्याने दिलेली किंमत किंवा सामान्यतः अशा खतांच्या नियंत्रित किंमती होय. परंतु अनेक ठिकाणी असे निदर्शनास आले की, शेतकऱ्यांनी रासायनिक खतांसाठी नियंत्रित दरापेक्षा जास्त किंमत मोजली आहे व त्याचा विपरित परिणाम शेतकऱ्यांच्या उत्पन्नावर झाला आहे. नियंत्रित दरात रासायनिक खतांचा पुरवठा सुनिश्चित करण्यासाठी धोरणात्मक हस्तक्षेप केल्यास शेतकऱ्यांचे उत्पन्न वाढेल. नियंत्रित दरात उपलब्ध होणाऱ्या अन्य निविष्ठा जसे बियाणे, फवारणी औषधे इत्यादी करिताही असा धोरणात्मक हस्तक्षेप उपयुक्त ठरू शकतो.
- पीक विम्याचा हप्ता भरण्याचे प्रमाण नगण्य आहे. यासाठी धोरणात्मक सुधारणा करून योग्य पीक विमा योजना तयार करून शेतकऱ्यांना पीक विम्याचा हप्ता भरण्यासाठी प्रवृत्त करता येऊ शकते.
- शेतजमिनीची पीक पूर्व मशागत करण्यासाठी राब वापरत असल्याचे शेतकऱ्यांनी पीक खर्चात नमूद केले नाही.
- जमिनीची भाडे रक्कम महात्मा फुले कृषि विद्यापीठाशी चर्चा केल्यानुसार मुख्य उत्पादन व उप-उत्पादने यांच्या विक्रीच्या रक्कमेतून जमिन महसूल व इतर कर वजा जाता शिल्लक राहिलेल्या एकूण रकमेच्या १/६ (एक षष्टांश) इतकी ठरवली आहे. ही नाममात्र रक्कम असून ती उत्पादनाच्या अथवा उप-उत्पादनाच्या किंमती प्रमाणे बदलते. या पेक्षा जमीन महसूल व इतर करांच्या काही ठराविक पट अशी जमिनीची भाडे रक्कम ठरवणे अधिक योग्य होईल.
- या सर्वेक्षणाचा मुख्य उद्देश जिल्हा निहाय पीक निहाय स्थूल मूल्य वृद्धी काढण्यासाठी पीक उत्पादनाकरिता लागणाऱ्या जिल्हानिहाय निविष्ठांची रक्कम अंदाजित करणे हा आहे.
- राज्य व जिल्हा उत्पन्न परिगणनासाठी पायाभूत वर्षात सुधारणा करण्याच्या अनुषंगाने अशा प्रकारचे सर्वेक्षण घेणे आवश्यक असते ज्यामुळे जिल्हा निहाय पीक निहाय निविष्ठा रकमांचे अद्ययावतीकरण करता येईल. असे सर्वेक्षण ५ वर्षातून एकदा किंवा दरवर्षी २० टक्के पिकांचा समावेश करून करता येईल, जेणेकरुन ५ वर्षात सर्व पिकांचे सर्वेक्षण होऊ शकेल. या संबंधीचा निर्णय सर्वेक्षणाची गरज व आणि उपलब्ध संसाधनांच्या आधारे घेता येईल. हे सर्वेक्षण २०१७-१८ हे संभाव्य नवीन पायाभूत वर्ष विचारात घेऊन हाती घेण्यात आले. परंतु नामिकासूचीतील संस्थांकडून निविदेस प्रतिसाद न मिळाल्याने हे सर्वेक्षण करण्यासाठी संस्था-निवड करता आली नाही. या करिता निविदा प्रक्रिया व दोन वेळा पुर्ननिविदा प्रक्रिया राबवण्यात आली व जून,२०१८ मधे संस्था निश्चित करण्यात आली. त्यानंतर २०१८-१९ या संदर्भ वर्षासाठी माहिती गोळा करण्यात आली.

- या सर्वेक्षणात विचारार्थ घेतलेल्या अनेक मापदंडांच्या निष्कर्षांबाबत अधिक सखोल अभ्यास करण्याची गरज भासू शकते. त्या करिता लहान आकार असलेल्या सर्वेक्षणांचे आयोजन प्रतिसादकांच्या उपलब्ध असलेल्या यादीच्या आधारे करता येऊ शकते.
- या सर्वेक्षणात गोळा करण्यात आलेल्या माहितीचा उपयोग शेतकऱ्यांचे उत्पन्न वाढवणे, कृषि क्षेत्रात केलेल्या सुधारणांचा परिणाम, मजुरी अगर भांडवलाचे उत्पादन खर्चात अधिक प्रमाण असणाऱ्या पिकांचे अर्थकारण इत्यादी विविध प्रश्न व समस्यांच्या विश्लेषणासाठी होऊ शकतो.
- पिकांवरील खर्च व परतावा यांच्या विश्लेषणातून छोट्या, मध्यम व मोठ्या शेतकऱ्यांना (छोटे शेतकरी भूधारणा १ हेक्टरपेक्षा कमी, मध्यम शेतकरी भूधारणा १ ते २ हेक्टर व मोठे शेतकरी भूधारणा २ हेक्टरपेक्षा अधिक) कोणत्या पिकांच्या लागवडीतून तुलनेने अधिक परतावा मिळू शकतो यासंबंधी ढोबळमानाने दिशानिर्देश मिळतात. राज्यात मोठ्या संख्येने असलेल्या छोट्या शेतकऱ्यांच्या दृष्टीकोनातून हे विश्लेषण महत्वपूर्ण व फायदेशीर ठरु शकते.
- पुष्प शेती, मसाले, औषधी वनस्पती इ. अंतर्गत पिकांचा सर्वेक्षणात अंतर्भाव होऊ शकला नाही. यातील पिकांचे उत्पादन जरी तुलनेने कमी असले तरी या पिकांपासून होणारे मूल्य वर्धन लक्षणीय असू शकते. म्हणून अशा पिकांकरिता स्वतंत्र सर्वेक्षण घेऊन अशा पिकांचे सकल मूल्यवर्धनातील योगदान काढता येऊ शकेल.
- अर्थ व सांख्यिकी संचालनालयाने काही अनुषंगिक अभ्यास या सर्वेक्षणा बरोबर केले. या अभ्यासात परसदारातील शेती, करार शेती, सेंद्रीय शेती अशा पद्धतींचा यांचा अवलंब केल्यास पारंपरिक शेतीच्या तुलनेत होणारी मूल्यवृद्धी, शेतकऱ्यांनीच शेतमालाची प्राथमिक प्रक्रिया केल्यास त्यातून शेतकऱ्यांसाठी मिळणारा मूल्यवृद्धीचा परिणाम तसेच प्रमुख पिकांमध्ये अंतर्भाव न होऊ शकणाऱ्या गवत व चारा पिकांमुळे होणारी मूल्य वृद्धी, शेतीसाठी डिझेलचा वापर इत्यादी अभ्यासांचा समावेश होता. या संबंधीचा अहवाल स्वतंत्रपणे भाग ३ मध्ये देण्यात आला आहे.
- अशा प्रकारचे सर्वेक्षण प्रथमच करण्यात येत असल्याने त्यातील निष्कर्षांची तुलना पूर्वीच्या निष्कर्षांशी करता येणार नाही. कृषि विद्यापीठाने केलेल्या उत्पादन खर्च अभ्यासांच्या निष्कर्षांबरोबर या सर्वेक्षणातील निष्कर्षाची तुलना कदाचित होऊ शकते परंतु अशी तुलना करताना या दोन्ही सर्वेक्षणांच्या कार्यपद्धती वेगवेगळ्या आहेत हे लक्षात घेणे आवश्यक आहे.
- संशोधकांना या सर्वेक्षणात गोळा करण्यात आलेल्या माहितीच्या आधारे अभ्यास करावयाचा असल्यास ते अर्थ व सांख्यिकी संचालनालयाशी संपर्क साधू शकतात. प्रतिसादकांची चिन्हीकरण माहिती गुप्त ठेवून उर्वरित माहिती देता येऊ शकेल, तथापि या माहिती आधारे केलेले विश्लेषण व संशोधन संचालनालयाला उपलब्ध करून देणे आवश्यक आहे.
- अर्थ व सांख्यिकी संचालनालय या अभ्यासावर अभिप्राय, टिपण्णी /सूचना देण्याची विनंती करीत आहे, ज्याचा उपयोग भविष्यात अशी सर्वेक्षणे करताना सुधारणा करण्यासाठी होऊ शकेल.

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Volume II

Executive Summary and Key Findings

- District wise estimates of cost of cultivation can facilitate crop wise estimation of gross value added (GVA) for district and can be used for arriving at the contribution of identified crop in the district domestic product with better precision.
- The item wise inputs under consideration for valuation of GVA are available from this survey for various crops at district level. These inputs are per hectare which can be applied to the area of that particular crop in the particular district and total input cost can be estimated. The district wise input costs thus arrived can be applied to respective districts whereas for remaining districts, 'Sum of all input costs divided by sum of the area under that crop' ratio can be applied. Thus, crop wise input cost at State level can be estimated. The ratios thus arrived for 2018-19 (reference period used in the survey) can be applied to the area under crops for subsequent years.
- The survey was conducted with the main purpose of finding out the district wise input costs of crop production to estimate district wise crop wise GVA.
- For base year revision of State & District Income estimates, such type of survey needs to be undertaken to update the crop wise district wise inputs. It can be undertaken once in five years or every year covering 20 per cent crops so that all crops can be covered in five years. The decision can be taken based on needs and available resources for the same. This survey was undertaken keeping in mind the proposed new base year 2017-18. The agency for conducting survey could not be finalised in time due to the non-response from the empanelled agencies, tendering and two times retendering was required to be done for finalizing agency which was done in June, 2018 and subsequently the data for the reference year 2018-19 was collected.
- The data was collected for the reference year 2018-19 using 'computer-assisted personal interview (CAPI)' method. Various cost concepts used in estimating cost of cultivation/ production of crops were discussed with experts of Mahatma Phule Krishi Vidyapeeth.
- The study covered 34 districts of Maharashtra State out of 36 districts except Mumbai City and Mumbai Sub Urban districts. From each district crops having highest gross value of output (all crops up to 95% of the gross value of output of crops in the district) were selected for study.
- Three stage sampling method was used for the selection of farm households for generating the cost estimates for the selected crops. In the first stage two blocks from each district were selected; in the second stage two villages from each selected block were selected; and in the third stage five farm households from each selected village were selected, thus a sample of 20 farmers was selected for each selected crop in every district.
- The total sample comprised of 7840 farmers for Kharif season, 2820 farmers for Rabi, 420 farmers for Summer and 2520 farmers for Perennial crops, thus total number of farmers selected for the study was 13,600 (34 districts, on an average 20 crops per district, 20 farmers from each district for each selected crop). Overall 68 distinct crops were selected for the study, of which 13 crops were in two seasons and 1 crop was in three seasons. Thus the total crops covered were 83 and 680 district x crop combinations were surveyed.

- District wise variation in cost of cultivation of various crops in Maharashtra was observed to be significant, thus necessitating individual district estimation for estimating contribution of respective crops to district domestic product.
- Interviews with farm households during this survey revealed that various agricultural operations to include land preparation, sowing, application of granular fertilizers, plucking of green Chilis, harvesting of crops, milling of maize/jowar etc. are given on contract to different types of vendors/agencies, after suitable negotiations. Costs incurred on such 'contracts' were easily recalled and shared with enumerators. Hence 'contract' has been added as an additional cost head in cost sheet. Further it was appropriately bifurcated in to 'mechanical power' and 'hired labour' heads for analysis.
- The district wise requirement of inputs varies according to crops and principal head of cost incurred is also different for different crops. With a special emphasis on policy measures major heads of costs possibilities of reducing cost of crops under those heads can be explored, this will eventually lead to enhance income of farmers.
- The cost of cultivation results of crops were analysed for inter district and intra-district comparison. The inter district analysis was helpful in providing a perspective at state level for that crop whereas the intra-district analysis of crops was outside the purview of the survey.
- The cost of cultivation/production of important crops grown in thirty-four districts of Maharashtra State is presented separately in the report. It is well known that farmers differ with respect to the extent of resources owned and their use. Similarly, some of the resources are fully owned by farmers, some partially and some are hired in different proportions. The farmer gives different weightage to different resources while making the crop production decisions. Cost of crop cultivation/production analysis has, therefore, been carried out by using various farm management cost and production concepts. The relative magnitudes of costs and returns from the crop enterprise indicate the net profitability of the crop cultivation.
- For many parameters considered in this survey, the findings may need probing in details. For this purpose, small surveys can be conducted using the available frame of farmers.
- The data collected from this survey may be helpful in analyzing various questions and areas such as Increasing income of farmers, Impact of reforms in Agriculture sector, Economics of labour intensive and capital-intensive crops etc.
- The crop profile and cost & returns analysis of season wise crops are presented in Volume I. The comparative analysis and observations regarding crop wise input costs are given in Volume I. Most of the tables and details given in this Volume are at State level (on the basis of samples selected for the crops).
- In Volume II, the district wise, season wise and crop wise cost of cultivation tables and statement of Value of output and input costs for each crop in various districts in the State are presented. In short, the district wise information for each selected crop is given in this Volume.
- DES has also conducted some related studies alongwith the main survey in which it was attempted to find out the impact of processing of the crop for the value addition by farmer, and various other farming patterns like Contract Farming, Backyard Farming and Organic Farming. Grass & Fodder crops which are generally not covered in the major crops are also covered in special studies. Use of diesel for farming activities was also studied. These studies can be helpful for computing the rates and ratios required for computation of GVA. The Volume III of this report gives details about these special studies.

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संक्षिप्त गोषवारा व प्रमुख निष्कर्ष

- जिल्हावार पिक उत्पादन खर्चाच्या अंदाजांमुळे पिकनिहाय स्थूल मुल्य वाढीचे अंदाज प्रत्येक जिल्ह्यासाठी तयार करणे शक्य होणार आहे आणि निवडलेल्या पिकांचे जिल्हा उत्पन्नातील योगदान अधिक अचुकतेने परिगणित करण्यासाठी याचा उपयोग होऊ शकतो.
- जिल्हास्तरावर विविध पिकांची स्थूल मुल्य वृद्धी काढण्याकरीता संबंधित निविष्ठांवरील बाबवार खर्चाची माहिती या सर्वेक्षणातून उपलब्ध होते. या निविष्ठांचा खर्च हा प्रति हेक्टर काढण्यात आला असल्याने त्या त्या पिकांच्या त्या त्या जिल्ह्यातील एकूण क्षेत्राशी संबंध जोडून त्या पिकासाठी त्या जिल्ह्यासाठी निविष्ठांचा खर्च काढता येईल. अशा प्रकारे जिल्हानिहाय काढण्यात आलेल्या पिकांच्या निविष्ठांवरील खर्च संबंधित जिल्ह्यासाठी वापरता येईल तर उर्वरीत जिल्ह्यांसाठी त्या पिकांच्या निविष्ठांवरील एकूण खर्च व त्या पिकाखाली असणाऱ्ये क्षेत्र यांचे गुणोत्तर यांचा वापर करुन निविष्ठा खर्च काढता येईल. २०१८-१९ या पाहणीच्या संदर्भ वर्षाकरिता अशा रितीने काढण्यात आलेली गुणोत्तरे आगामी वर्षातील त्या त्या पिकांखालील क्षेत्राशी उपयोजित करता येतील.
- या सर्वेक्षणाचा मुख्य उद्देश जिल्हा निहाय पीक निहाय स्थूल मूल्य वृद्धी काढण्यासाठी पीक उत्पादनाकरिता लागणाऱ्या जिल्हानिहाय निविष्ठांची रक्कम अंदाजित करणे हा आहे.
- राज्य व जिल्हा उत्पन्न परिगणनेसाठी पायाभूत वर्षात सुधारणा करण्याच्या अनुषंगाने अशा प्रकारच्या सर्वेक्षणे घेणे आवश्यक असते ज्यामुळे जिल्हा निहाय पीक निहाय निविष्ठा रकमांचे अद्ययावतीकरण करता येईल. असे सर्वेक्षण ५ वर्षातून एकदा किंवा दरवर्षी २० टक्के पिकांचा समावेश करून करता येईल, जेणेकरुन ५ वर्षात सर्व पिकांचे सर्वेक्षण होऊ शकेल. या संबंधीचा निर्णय सर्वेक्षणाची गरज व आणि उपलब्ध संसाधनांच्या आधारे घेता येईल. हे सर्वेक्षण २०१७-१८ हे संभाव्य नवीन पायाभूत वर्ष विचारात घेऊन हाती घेण्यात आले. परंतु नामिकासूचीतील संस्थांकडून निविदेस प्रतिसाद न मिळाल्याने हे सर्वेक्षण करण्यासाठी संस्था-निवड करता आली नाही. या करिता निविदा प्रक्रिया व दोन वेळा पुर्ननिविदा प्रक्रिया राबवण्यात आली व जून,२०१८ मध्ये संस्था निश्चित करण्यात आली. त्यानंतर २०१८-१९ या संदर्भ वर्षासाठी माहिती गोळा करण्यात आली.
- संदर्भ वर्ष २०१८-१९ करिता 'संगणक सहाय्यित वैयक्तिक मुलाखत' पद्धतीने या कुटुंबांकडून माहिती गोळा करण्यात आली, पीक खर्च/लागवड खर्च अनुमानित करण्याकरिता उपयोगात आणलेल्या विविध खर्च संकल्पना महात्मा फुले कृषि विद्यापिठातील तज्ञांशी चर्चा करून निश्चित केल्या.
- महाराष्ट्रातील ३६ जिल्ह्यांपैकी मुंबई शहर व मुंबई उपनगर हे दोन जिल्हे वगळता उर्वरीत ३४ जिल्ह्यांमधे हा अभ्यास करण्यात आला. प्रत्येक जिल्ह्यातील सर्वाधिक स्थूल उत्पादन मूल्य असलेल्या (जिल्ह्यातील पिकांच्या एकूण स्थूल उत्पादन मूल्याच्या ९५ टक्के पर्यंत) पिकांचा जिल्ह्यातील प्रमुख पिके म्हणून अभ्यासात समावेश करण्यात आला.

- निवड केलेल्या पिकांचा पीक खर्च काढण्यासाठी शेतकरी कुटुंबांच्या निवडीसाठी त्रिस्तरीय नमुना निवड पद्धत अवलंबिण्यात आली. निवड केलेल्या पिकाखालील क्षेत्राच्या आधारावर प्रत्येक जिल्ह्यातील २ तालुक्यांची निवड प्रथम स्तरावर केली, निवड केलेल्या तालुक्यातून प्रत्येकी २ गावांची निवड दुसऱ्या स्तरावर केली. प्रत्येक गावातील पाच शेतकरी कुटुंबांची निवड तिसऱ्या स्तरावर केली. अशा रीतीने प्रत्येक जिल्ह्यात निवड केलेल्या प्रत्येक पिकाकरिता २० शेतकरी कुटुंबांची निवड केली.
- या पाहणीसाठी खरीप हंगामा करिता ७,८४० शेतकरी, रब्बी हंगामाकरिता २,८२० शेतकरी, उन्हाळी हंगामा करिता ४२० शेतकरी व बहुवार्षिक पिकांकरिता २,५२० शेतकरी अशी एकूण १३,६०० शेतकरी कुटुंबे (३४ जिल्हे प्रत्येक जिल्ह्यात सरासरी २० पिके व निवडलेल्या पिकासाठी जिल्ह्यातून २० शेतकरी) निवडण्यात आली. या पाहणीकरीता ६८ वेगवेगळी पिके निवडण्यात आली. त्यापैकी १३ पिके ही दोन हंगामात व १ पिक हे तीन हंगामात होते. याप्रकारे ८३ पिकांचा समावेश झाला व ६८० पीक x जिल्हा करीता पाहणी करण्यात आली.
- महाराष्ट्रातील विविध पिकांच्या जिल्हावार उत्पादन खर्चात लक्षणीय फरक दिसून येतो. त्यामुळे स्थूल जिल्हा उत्पन्नात त्या त्या पिकांचे योगदान काढण्यासाठी स्वतंत्रपणे जिल्हा निहाय पीक खर्च व उत्पन्न यांचे अंदाज तयार करण्याची आवश्यकता आहे.
- सर्वेक्षित शेतकरी कुटुंबांच्या मुलाखती घेतांना असे दिसून आले की, शेती संबंधातील विविध कामे ज्यात जमीन मशागत, पेरणी, पिकांना दाणेदार खते देणे, हिरव्या मिरच्या तोडणे, पिकांची कापणी /मळणी करणे इ. कामे विविध संस्था किंवा सेवा पुरवठादार यांना वाटाघाटी करुन कंत्राट या स्वरुपात दिली जातात. अशा कंत्राटी कामांकरीताचा खर्च चटकन आठवून सहजपणे मुलाखत घेणाऱ्याला सांगण्यात आला. त्यामुळे खर्च पत्रकात 'कंत्राट' असे एक शीर्ष समाविष्ट करण्यात आले. पुढील विश्लेषणात या शीर्षाचे विभाजन यांत्रिक शक्ती आणि मजूरी या शीर्षाखाली करण्यात आले.
- पिकानुसार जिल्हानिहाय निविष्ठांचे प्रमाण बदलते तसेच वेगवेगळ्या पिकांसाठी एकूण निविष्ठांपैकी मुख्य निविष्ठा ही देखिल वेगवेगळी आहे. अशा मुख्य निविष्ठांबाबतच्या धोरणात्मक उपाययोजनांवर भर दिल्यास निविष्ठांवरील खर्च कमी करण्याच्या शक्यता पडताळून पाहता येतील, परिणामतः शेतकऱ्यांच्या उत्पन्नात भर पडू शकेल.
- पिकांच्या उत्पादन खर्चाचे आंतर जिल्हा व जिल्हा अंतर्गत तुलनात्मक विश्लेषण करण्यात आले. पिकाचे आंतर जिल्हा विश्लेषणातून राज्यस्तरावर त्या पिकासाठी विशिष्ट दृष्टीकोन मिळण्यासाठी उपयुक्त ठरले परंतू जिल्हा अंतर्गत विश्लेषण या पाहणीच्या विचार क्षेत्रामध्ये समाविष्ट नव्हते.
- महाराष्ट्र राज्यातील चौतीस जिल्ह्यांतील उत्पादित होणाऱ्या प्रमुख पिकांच्या पीक उत्पादन खर्चाची माहिती या अहवालात स्वतंत्रपणे मांडण्यात आली आहे. संसाधनांची मालकी आणि त्यांचा वापर यासंदर्भात शेतकऱ्यांमध्ये फरक असतो ही बाब सर्वज्ञात आहे. तसेच विविध प्रमाणात काही संसाधने शेतकऱ्यांच्या पुर्णपणे मालकीची असतात तर काही अंशतः मालकीची आणि काही भाड्याने घेतलेली असतात. पीक

उत्पादनाच्या बाबत निर्णय घेतांना शेतकरी वेगवेगळ्या संसाधनांना वेगवेगळ्या प्रमाणात महत्व देत असतात. त्यामुळे पीक उत्पादन खर्च विश्लेषण करतांना विविध शेती व्यवस्थापन खर्च आणि उत्पादनाच्या संकल्पनांचा वापर करण्यात आला आहे. पीक उपक्रमांतील खर्च व परताव्याचे सापेक्ष परिमाण हे पीक उत्पादनातील निव्वळ नफ्याबाबत निर्देशित करतात.

- या सर्वेक्षणात विचारार्थ घेतलेल्या अनेक मापदंडांच्या निष्कर्षांबाबत अधिक सखोल अभ्यास करण्याची गरज भासू शकते. त्या करिता लहान नमुना आकार असलेल्या सर्वेक्षणांचे आयोजन प्रतिसादकांच्या उपलब्ध असलेल्या यादीच्या आधारे करता येऊ शकते.
- या सर्वेक्षणात गोळा करण्यात आलेल्या माहितीचा उपयोग शेतकऱ्यांचे उत्पन्न वाढवणे, कृषि क्षेत्रात केलेल्या सुधारणांचा परिणाम, मजुरी अगर भांडवलाचे उत्पादन खर्चात अधिक प्रमाण असणाऱ्या पिकांचे अर्थकारण इत्यादी अशा विविध प्रश्न व समस्यांच्या विश्लेषणासाठी होऊ शकतो.
- या अहवालाच्या खंड १ मध्ये हंगामनिहाय पिकांचे पीक परिप्रेक्ष (प्रोफाईल) आणि खर्च व परतावा विश्लेषण देण्यात आले आहे. पिकनिहाय निविष्ठांबाबतचे तुलनात्मक विश्लेषण व निरिक्षणे या खंडामध्ये दिलेली आहेत. म्हणजेच या खंडातील बहुतांश तक्ते व तपशील हे राज्यस्तरावरील (पिकनिहाय निवडलेल्या नमुन्यावर आधारीत) आहेत.
- अहवालाच्या खंड २ मध्ये हंगामनिहाय जिल्हा निहाय पिकांचे उत्पादन खर्चाचे तक्ते आणि वेगवेगळ्या जिल्ह्यातील प्रत्येक निवडलेल्या पिकांच्या उत्पादनाचे मुल्य आणि निविष्ठांच्या किंमती यांची तुलनात्मक सारिणी देण्यात आली आहे. थोडक्यात निवडलेल्या प्रत्येक पिकासाठी जिल्हानिहाय तक्ते या अहवालात समाविष्ट केलेले आहेत.
- अर्थ व सांख्यिकी संचालनालयाने या सर्वेक्षणाबरोबर काही अनुषंगिक अभ्यास केले. या अभ्यासात परसदारातील शेती, करार शेती, सेंद्रीय शेती अशा पद्धतींचा यांचा अवलंब केल्यास पारंपरिक शेतीच्या तुलनेत होणारी मूल्यवृद्धी, शेतकऱ्यांनीच शेतमालाची प्राथमिक प्रक्रिया केल्यास त्यातून शेतकऱ्यांसाठी मिळणारा मूल्यवृद्धीचा परिणाम तसेच प्रमुख पिकांमध्ये अंतर्भाव न होऊ शकणाऱ्या गवत व चारा पिकांमुळे होणारी मूल्य वृद्धी, शेतीसाठी डिझेलचा वापर इत्यादी अभ्यासांचा समावेश होता. या संबंधीचा अहवाल स्वतंत्रपणे खंड ३ मध्ये देण्यात आला आहे.

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Volume III

Summary and Findings

- Along with 'Collection of Farm Activities Data Survey' conducted in the State, Other Related Studies were undertaken specifically in the context of their contribution to income of agriculture sector. In that it was planned to assess the difference in contribution to farmer from same parcel of land either due to primary processing of agricultural produce at farm level or alternate form of cultivation adopted by farmers. In addition, certain other related studies like fodder/grass cultivation, use of diesel engines and consumption of diesel for agriculture were also undertaken.

1. Adoption of Alternate Form/Practice of Cultivation

- Studies under this head included 1.1) Study on backyard farming, 1.2) Study on contract farming, 1.3) Study on organic farming.
- For studies under adoption of alternate form/practice of agriculture and miscellaneous studies a sample of 50 respondents was selected. Salient findings are given below.

1.1 Backyard Farming

- In the case of backyard farming the average savings per family, assuming that if they had purchased the back yard produce from the retail market was found to be around ₹ 1,132 per annum. But quite high variation in this value was observed ranging from minimum of ₹ 160 to maximum of ₹ 2,423 per annum.

1.2 Contract Farming

- Per quintal cost of production of Potato under contract farming was estimated to be ₹ 933 against the amount realized from sale of Potato at contract price of ₹ 1,700 per quintal thus leaving surplus of ₹ 767, much higher than cultivating potato to be sold in open market.
- Per quintal cost of production of White Onion was ₹ 387.32 while per quintal net return was ₹ 112.68 as the contract price for white onion was ₹ 500.00, whereas onion growers suffered losses in open market sales.

1.3 Organic Farming

- Area under organic cultivation in India and Maharashtra in 2019 was 2.0 percent and 1.6 percent respectively.
- Productivity of organic soyabean and gram was higher than traditional soyabean and gram. Productivity of organic tur, wheat and maize was lower than traditional tur, wheat and maize.
- Per hectare cost of cultivation (Cost A, B & C) of all organic crops was lower than traditional crops.
- Benefit cost ratio (BC ratio) at cost C for

a)	Maize	organic	1.84,	traditional	1.09
b)	Soyabean	organic	2.05,	traditional	1.33
c)	Tur	organic	2.45,	traditional	1.50
d)	Wheat	organic	1.78,	traditional	1.47
e)	Gram	organic	1.58	traditional	1.26

2. Primary processing of farm produce by farmers

- Studies under this head included 2.1) Ratio study on cultivation of coriander seed as a spice and coriander as leafy vegetable, 2.2) Ratio study on cultivation of fenugreek seed as condiment and fenugreek as leafy vegetable, 2.3) Processing of green chilies to dry red chilies, 2.4) Processing of cashew fruit/nut, 2.5) Processing of Grapes to raisins, 2.6) Processing of ginger to dry ginger (sunth), 2.7) Processing of kokum fruit, 2.8.) Processing of sugarcane to gur/jaggery, 2.9) Processing of sugarcane to khandsari sugar, 2.10) Processing of palmyra sugar/gur
- For studies on primary processing of farm produce a sample of size 30 was proposed for each study. Salient findings are given as follows.

2.1. Coriander leafy vegetable and coriander seed

- This study revealed that cultivating coriander seed is more remunerative than cultivating coriander as leafy vegetable, since per hectare net return from production of coriander seed was estimated to ₹ 51,830.74 against ₹ 36,415.38 as leafy vegetable.

2.2 Fenugreek leafy vegetable and fenugreek seed

- Farmers reported that the cultivation of fenugreek (methi) as leafy vegetable only is undertaken and not for production of seeds, even for captive purposes.

2.3 Processing of Green chilies to dry red chilies

- Study revealed that the activity of converting green chilies to dry red chilies is undertaken by traders/ or suppliers to chili pounding units. Farmers are not involved in this activity and incremental value addition does not accrue to farmers.

2.4 Processing of Ginger to dry ginger (sunth)

- Study revealed that the incidence of processing ginger to dry ginger i.e Sunth was not reported by growers, hence comparison is not possible.

2.5 Processing of Cashew Apple and Cashew nut

- Study revealed that cashew apple which is either plucked or fallen is allowed to be wasted or given to an outside processor for squash making, (feni is not allowed to be produced). Similarly, cashew nut processing facilities are set up by entrepreneurs catering to a large number of small cashew nut growers. Thus farm/farmer level activity is not taking place.

2.6 Processing of Grapes to Raisins

- The study revealed that the cost of production of one kg. of raisins is ₹ 143.16 and sales realization per kg. is ₹ 191.06. Thus farmers producer of raisins gets a return of ₹ 47.91 per kg. of raisins.

2.7 Processing of Kokum fruits

- Study revealed that ripened kokum fruits are mainly collected from forest areas and sold to processing units set up by entrepreneurs. Farmers are not involved in this processing activity and incremental value addition does not accrue to farmers.

2.8 Sugarcane to Gur/jaggery

- Gur/ jaggery processing is undertaken by entrepreneurs, including that from neighboring Andhra Pradesh, Karnataka. Sugarcane growers are not involved in this activity and incremental value addition does not accrue to farmers.

2.9 Sugarcane to Khandsari Sugar

- Study revealed that only one Khandsari sugar producing unit was reported from Nandurbar district, it's a unit with a turnover exceeding ₹ 100 Cr., thus processing is undertaken by entrepreneurs. Sugarcane growers are not involved in this activity.

2.10. Processing of Palmyra sugar/gur

- Production of palmyra sugar and gur was not reported in the field investigations conducted. Khadi Village Industries Commission has plans for imparting Palmyra sugar/ Jaggery making skills to Tribal's. However informal discussions indicate that making tadi is more lucrative and practiced by tribal's.

3. Other related studies

- These studies included 3.1) Study on cultivation of fodder & grass and 3.2) Study on use of diesel engines and consumption of diesel for agriculture.
- For Fodder & Grass study, a sample of 50 farmer respondents was selected and for diesel engine study a sample of 13,600 farmer respondents covered for cost of cultivation studies was selected. Salient findings of these studies are as under

3.1. Fodder & grass

- Study revealed that fodder is produced mainly from Jowar, Maize and Bajra. Average yield is 7.76 MT per hectare, cost of production is ₹ 6,871 per MT and price realized is about ₹ 15,000/- per MT.
- Study revealed that the production of green grass per hectare of irrigated land is 46.68 MT per annum (ranges from about 43 MT to 50 MT), and sales realization is ₹ 2,808.60 per MT. Popular varieties are Napier, Lucerne, Guinea. Per MT cost of production is ₹ 2,497.
- The dry grass grows naturally on fallow land/government land/forest land (Thane/Palghar districts). Cutting rights for these are auctioned. Contractor pays generally about ₹ 100 per bale of a quintal as labour and baling charges and realizes about ₹ 180 per bale.

3.2. Use of diesel engines and consumption of diesel for agriculture

- Out of 13,600 farmers covered in the study it was reported that 364 (2.68 per cent) farmers are using diesel engine for irrigation purpose and their average diesel consumption was 22.34 liters per annum.
- Other than irrigation, diesel is used by farmers for tractors; rotavators etc. 649 (4.77 per cent) farmers reported use of diesel for captive non irrigation use and average consumption of diesel was reported as 16.38 liters.

- Most of the studies undertaken reveals that the farmers are not involved in the processing of farm produce. It can be observed that the items of daily use in condiments and spices like coriander seeds, fenugreek seeds are not produced in the state as the processing was not found to be beneficial, which also means that these items are processed somewhere. Some farmers may possibly be processing for their own consumption purpose. It is possible that processing at small scale may not be beneficial to farmers, but if it is done at large scale through group of farmers, it may prove beneficial. In case of Grapes to Raisins, we can see that it is beneficial to farmers. If a system is developed which can enable the farmers to undertake processing on the farm produce and sell the processed produce instead of solely depending on the market mechanism for selling the perishable farm produce, it can definitely help in increasing income of farmers e.g. If the members of Farmer Producer Organization (FPO) of Chilli growers are provided training in converting wet chillies to red dry chillies and equipped to undertake activity by providing rented land and working capital at reasonable rate of interest to procure chillies from farmers, then after sale of red dry chillies, member farmers can get bonus from FPO. Moreover, there can be good labour opportunities to family members of producer farmers.
- Above observations and findings are based on the enquiries conducted for the studies undertaken. There may be some cases which are not conforming to these observations. The concerned can report such cases to Directorate of Economics & Statistics so that these can be incorporated in further studies.

खंड - ३

संक्षिप्त गोषवारा व निष्कर्ष

❖ कृषिक कार्य विषयक आकडेवारी संकलनासाठी राज्यात घेण्यात आलेल्या पाहणीसमवेत कृषि क्षेत्रातील उत्पादनासाठीचे योगदान विशेषत्वाने जाणून घेण्याच्या उद्देशाने काही अनुषंगिक अभ्यास हाती घेण्यात आले. शेतकऱ्यांनी त्यांच्या जमिनीतून मिळणाऱ्या शेतमालावर प्राथमिक प्रक्रिया केली किंवा पर्यायी लागवड / कृषि व्यवस्थापन पद्धतीचा वापर केला असता उत्पन्नात मिळणाऱ्या फरकाचा अंदाज या अभ्यासातून घेण्यात आला. या शिवाय गवत(चारा) व वैरण पिकांची लागवड, तसेच डीझेल इंजिनचा वापर व डीझेलचा वापर अशा काही इतर संबंधित अभ्यासांचा समावेश होता.

१) पर्यायी लागवड / कृषि व्यवस्थापन पद्धतीचा अंगीकार

- या शिर्षाखाली १.१) परसदरातील शेती, १.२)करार शेती, १.३) सेंद्रिय शेती यांचा समावेश करण्यात आला.
- पर्यायी लागवड / कृषि व्यवस्थापन पद्धतीचा अंगीकार आणि संकीर्ण अभ्यासाठी प्रत्येकी ५० शेतकरी कुटुंबाची नमुना निवड करण्यात आली. या अभ्यासाचे महत्वाचे निष्कर्ष खालील प्रमाणे आहेत.

१.१ परसदारातील शेती

- परसदारातील शेती करणारी कुटुंबे तेथे उत्पादित माल कौटुंबिक गरजा भागवण्यासाठी करतात व तो माल त्यांनी किरकोळ बाजारातून विकत घेतला असता तर तेवढ्या खर्चाची बचत होते. अशा कुटुंबांची सरासरी बचत ₹ १,१३२ प्रतीवर्षी एवढी होती. तथापि, या रकमेमध्ये मोठ्या प्रमाणात फरक आढळून आला. (किमान बचत ₹ १६० ते कमाल बचत ₹ २,४२३ प्रति वर्षी).

१.२ करार शेती

- करार शेती खालील बटाटा उत्पादनाचा खर्च ₹ ९३३ प्रति क्विंटल होता तर करारानुसार त्याची खरेदी ₹ १,७०० प्रति क्विंटल या दराने झाली त्या योगे शेतकऱ्यांना ₹ ७६७ प्रति क्विंटल इतका वाढावा मिळाला, खुल्या बाजारात विक्री केली असता मिळणाऱ्या वाढाव्याच्या कित्येक पट हा वाढावा होता.
- तसेच करार शेती खालील पांढऱ्या कांद्याचा उत्पादन खर्च ₹ ३८७.३२ प्रति क्विंटल होता तर करारा नुसार ₹ ५००.०० प्रति क्विंटल या दराने खरेदी झाल्याने शेतकऱ्यांना प्रति क्विंटल ₹ ११२.६८ एवढा परतावा मिळाला.

१.३ सेंद्रीय शेती

- सेंद्रीय शेतीचे क्षेत्र २०१९ मधे भारतात २.० टक्के तर महाराष्ट्रात १.६ टक्के होते
- सेंद्रीय सोयाबीन आणि चना या पिकांची उत्पादकता पारंपारिक सोयाबीन व चना या पिकांपेक्षा अधिक होती तर सेंद्रीय तूर, गहू व मका या पिकांची उत्पादकता पारंपारिक तूर, गहू व मका या पिकांपेक्षा कमी होती.
- सर्व सेंद्रीय पिकांकरिता प्रति हेक्टरी उत्पादन खर्च (कॉस्ट ए, कॉस्ट बी आणि कॉस्ट सी) पारंपरिक पिकांपेक्षा कमी होता.

- नफा खर्च गुणोत्तर हे सेंद्रीय व पारंपरिक पिकांकरिता खालील प्रमाणे होते. (कॉस्ट सी आधारे)

अ) मका	सेंद्रीय	१.८४	पारंपरिक	१.०९
ब) सोयाबीन	सेंद्रीय	२.०५	पारंपरिक	१.३३
क) तूर	सेंद्रीय	२.४५	पारंपरिक	१.५०
ड) गहू	सेंद्रीय	१.७८	पारंपरिक	१.४७.
इ) चना	सेंद्रीय	१.५८	पारंपरिक	१.२६.

२) कृषि मालावर प्राथमिक प्रक्रिया

- या शिर्षाखाली २.१) कोथिंबिर व धणे उत्पादन यांचा गुणोत्तर अभ्यास २.२) मेथी पालेभाजी व मेथीदाणे उत्पादन यांचा गुणोत्तर अभ्यास, २.३) हिरव्या मिरच्यापासून सुक्या लाल मिरच्या बनविणे, २.४) आल्या पासून सुंठ बनविणे, २.५) काजू बोंड व काजू बी यावर प्रक्रिया करणे, २.६) द्राक्षांपासून बेदाणे बनविणे, २.७) कोकण फळावरील प्रक्रीया, २.८) उसापासून गूळ निर्मिती, २.९) ऊसापासून खांडसरी साखर निर्मिती, २.१०) ताड गूळ/शर्करा बनविणे या अभ्यासांचा समावेश होता.
- कृषि मालावरील प्राथमिक प्रक्रिया अभ्यासासाठी प्रत्येकी ३० शेतकरी कुटुंबांची नमुना निवड प्रस्तावित होती. या अभ्यासांचे संक्षिप्त निष्कर्ष खालीलप्रमाणे आहेत.

२.१. कोथिंबिर व धणे उत्पादन

- या अभ्यासातून असे दिसून आले की धणे उत्पादन करणे हे कोथिंबिर उत्पादन करण्यापेक्षा अधिक लाभदायक आहे, कारण धण्यांपासून दर हेक्टरी ₹ ५१,८३०.३४ एवढे उत्पन्न मिळाले तर कोथिंबिरी पासून दर हेक्टरी ₹ ३६,४१५.३८ एवढे उत्पन्न मिळाले.

२.२ मेथी पालेभाजी व मेथी दाणे उत्पादन

- शेतकऱ्यांनी फक्त मेथी पालेभाजीचेच उत्पादन घेतो असे नमूद केले, तर मेथी दाण्यांचे उत्पादन घरगुती वापरासाठीही घेत नाही असे नमूद केले.

२.३ हिरवी मिरची ते सुकी लाल मिरची

- या अभ्यासात असे दिसून आले की, हिरव्या मिरचीचे रुपांतर सुक्या लाल मिरचीत करणे हे व्यापारी अगर तिखट उत्पादन करणारी पेढी यांचे तर्फे केले जाते, शेतकरी यात सहभागी नसतो. त्यामुळे अशा रूपांतरामुळे होणारा वाढीव नफा शेतकऱ्यांना मिळत नाही.

२.४ आल्यापासून सुंठ बनविणे

- या अभ्यासात असे दिसून आले की आल्यापासून सुंठ बनविण्याची प्रक्रिया महाराष्ट्रात शेतकरी करीत नाहीत, त्यामुळे तुलना करता आली नाही.

२.५ काजू बोंड व काजू बी प्रक्रिया

- या अभ्यासात असे दिसून आले की काजू बोंड तोडून अगर गळून जाऊन वाया जाऊ दिले जाते किंवा बाहेरील प्रक्रिया करणाऱ्या उद्योजकाला सरबत अर्क बनवण्यासाठी दिले जाते (महाराष्ट्रात काजू बोडांपासून फेणी बनवत नाहीत) तसेच अनेक काजू उत्पादकांकडून काजू बी खरेदी करून

प्रक्रिया उद्योजक त्यावर प्रक्रिया करतात. शेतकरी काजू बी वर प्रक्रिया करीत नाहीत.

२.६ द्राक्षापासून बेदाणे बनविणे

- या अभ्यासात असे दिसून आले की, १ किलो बेदाणे बनविण्याचा उत्पादन खर्च दर किलोला ₹ १४३.१६ इतका आहे व १ किलो बेदाणे विकून ₹ १९१.०६ मिळतात. म्हणजेच बेदाण्याच्या शेतकरी उत्पादकाला दर किलो बेदाण्यासाठी ₹ ४७.९१ इतका परतावा मिळतो.

२.७ कोकम फळांवरील प्रक्रिया

- या अभ्यासात असे दिसून आले की, पक्व (पिकलेली) कोकम फळे प्रामुख्याने जंगलातून गोळा केली जातात व कोकम प्रक्रिया करणाऱ्या उद्योजकांना विकली जातात. या प्रक्रियेत शेतकऱ्यांचा सहभाग नसतो व त्यामुळे अशा प्रक्रियेमुळे मिळणारा वाढीव नफा शेतकऱ्यांना मिळत नाही.

२.८ ऊसापासून गूळ निर्मिती

- ऊसापासून गूळ निर्मिती उद्योजकांकडून केली जाते अशा उद्योजकात सर्वसाधारणपणे शेजारील आंध्र प्रदेश, कर्नाटक इ. राज्यातील उद्योजकांचा समावेश आहे. ऊस उत्पादक या निर्मितीत सहभागी नसतात व त्यामुळे अशा निर्मिती मुळे होणार वाढीव नफा शेतकऱ्यांना मिळत नाही.

२.९ ऊसापासून खांडसरी साखर निर्मिती

- खांडसरी साखर तयार करणारा महाराष्ट्रातील केवळ एक कारखाना नंदुरबार जिल्ह्यात आढळून आला व त्याची वार्षिक उलाढाल ₹ १०० कोटी इतकी आहे. त्यानुसार खांडसरी साखर निर्मिती ही उदयोजकांद्वारे करण्यात येते. शेतकऱ्यांकडून करण्यात येत नाही असे या अभ्यासात दिसून आले.

२.१० ताडगूळ/शर्करा निर्मिती

- या अभ्यासात असे दिसून आले की ताडा पासून गूळ/शर्करा निर्मिती महाराष्ट्रात कोठेही होत नाही. खादी ग्रामोद्योग मंडळा तर्फे आदिवासांना ताडगूळ बनविण्याची प्रशिक्षण देण्याची योजना आहे. परंतु ताडा पासून ताडी बनविणे अधिक फायदेशीर असल्याचे निरिक्षण काही लोकांनी नोंदविले.

३) संकीर्ण अभ्यास

- या शिर्षाखाली ३.१) वैरणपिके व गवत (चारा) लागवड, ३.२) डीझेल इंजिन व डीझेलचा शेतीसाठी वापर या अभ्यासांचा समावेश होता.
- वैरणपिके व गवत (चारा) लागवड या अभ्यासासाठी ५० शेतकऱ्यांची नमूना निवड केली तर डीझेल इंजिन व डीझेलचा शेतीसाठी वापर या अभ्यासासाठी पीक उत्पादन खर्च काढण्याच्या अभ्यासातील सर्व म्हणजे १३,६०० शेतकरी कुटुंबांची निवड केली होती. संक्षिप्त निष्कर्ष खालीलप्रमाणे आहेत.

३.१. वैरण पिके व चारा (गवत) लागवड

- या अभ्यासात असे दिसून आले की वैरण पिकांसाठी ज्वारी, मका व बाजरी यांची लागवड होते. वैरणीची सरासरी उत्पादकत्ता ७.७६ टन प्रति हेक्टरी आहे, उत्पादन खर्च ₹ ६,८७१ प्रति टन तर विक्री ₹ १५,००० प्रति टन या दराने होते.

- या अभ्यासात असे दिसून आले की हिरव्या चाऱ्याचे सिंचित क्षेत्रा खालील दर हेक्टरी उत्पादन सरासरी ४६.६८ टन (किमान ४३ टन ते कमाल ५० टन) येते, नेपियर, ल्युसर्न, गिनी या गवताच्या लोकप्रिय जाती आहेत. गवताच्या विक्रीतून सरासरी ₹ २,८०८,६० प्रति टन एवढे उत्पन्न मिळते तर उत्पादन खर्च ₹ २,४९७ प्रति टन एवढा आहे.
- वन खात्याच्या वा पडीक जमिनीवर सुके गवत नैसर्गिक रित्या उगवते. गवत कटाईचा हक्क लिलावाने दिला जातो. कंत्राटदार १०० किलो वजनाच्या गवताच्या गासडीला रु.१०० एवढी किंमत देतो तर त्याला अशा गाठींच्या विक्रीतून रु १८० प्रति गाठ एवढे उत्पन्न मिळते.

३.२ डीझेल इंजिनांचा व डीझेलचा शेतीसाठी वापर

- अभ्यासासाठी निवडलेल्या १३,६०० शेतकरी कुटुंबां पैकी ३६४ (२.६८ टक्के) शेतकरी डीझेल इंजिनांचा वापर सिंचनासाठी करतात व त्यांचा डीझेलचा सरासरी वापर २२.३४ लिटर दरवर्षी एवढा असतो.
- सिंचना व्यतिरिक्त शेतकरी डीझेलचा वापर ट्रक्टर, रोटाव्हेटर आदी यंत्रासाठी करतात. ६४९ शेतकऱ्यांनी (४.७७ टके) स्वतःच्या शेतीकामांसाठी डीझेल वापराचे सरासरी वार्षिक प्रमाण १६.३८ लिटर होते असे सांगितले.

❖ शेतमालावरील प्राथमिक प्रक्रीया करण्यासंबंधीच्या बहुतांश अभ्यासांत असे दिसून आले की, त्यात शेतकऱ्यांचा सहभाग नसतो. दैनंदीन गरजेच्या धणे, मेथीदाणे ह्यासारख्या मसाल्याच्या पदार्थांचे उत्पादन राज्यात होत नाही असे दिसून आले त्याचे कारण अशी प्रक्रीया करणे फायदेशीर नाही हे असू शकते, परंतू ह्या प्रक्रीया इतरत्र केल्या जात असाव्यात. तसेच काही प्रमाणात शेतकरी केवळ घरगुती वापरासाठी करत असावेत. विक्रीसाठी लघु प्रमाणावर प्रक्रीया करणे फायदेशीर ठरणार नाही हे शक्य आहे, परंतू हे शेतकऱ्यांच्या मोठ्या गटाने केल्यास फायदेशीर होऊ शकेल. द्राक्षांपासून बेदाणे बनविण्याची प्रक्रीया शेतकऱ्यांना फायदेशीर असल्याचे दिसून आले आहे. जर शेतकऱ्यांच्या गटाला सक्षम करुन, प्रक्रीया केलेला शेतमाल बाजारात विकण्याची व्यवस्था विकसित केली तर नाशवंत मालाच्या केवळ बाजार विक्रीवर अवलंबून राहण्यापेक्षा शेतकऱ्यांना अधिक उत्पन्न मिळविण्यासाठी नक्कीच मदत होईल. उदा. जर मिरची उत्पादक शेतकऱ्यांच्या शेतकरी उत्पादक गटाला हिरव्या मिरचीपासून लाल सुकी मिरची बनविण्याचे प्रशिक्षण दिले, आणि या करिता जागा भाड्याने देवून व शेतकऱ्यांकडून मिरच्या विकत घेण्यासाठी खेळते भांडवल रास्त दराने उपलब्ध करुन दिले तर लाल मिरचीच्या विक्री पश्चात शेतकऱ्यांना अशा गटाकडून बोनस रक्कम मिळू शकेल तसेच या कामासाठी उत्पादक शेतकऱ्यांच्या कुटुंबियांना रोजगाराची संधी पण मिळू शकते.

❖ उपरोक्त विविध अभ्यासांतील निरिक्षणे व निष्कर्ष या अभ्यासादरम्यान नमूना पद्धतीने घेतलेल्या माहितीवर आधारीत आहेत. अशा निरिक्षणांशी मिळत्या जुळत्या नसणाऱ्या काही घटना प्रत्यक्षात असू शकतात. अशा घटनांबाबतची माहिती संबंधितांनी अर्थ व सांख्यिकी संचालनालयाच्या निदर्शनास आणल्यास पुढील अभ्यासांत त्यांचा समावेश करता येईल.

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Annexure I

Table 4.1 : Crop wise sample selected for the Survey – Kharif

Sr. No.	Crops	Number of			
		Districts	Talukas	Villages	Holdings
1	Ajwain	1	1	2	20
2	Bajra	20	41	82	400
3	Beans	19	39	76	380
4	Bitter gourd	3	6	12	60
5	Bottle gourd	2	4	8	40
6	Brinjal	19	39	77	380
7	Cabbage	6	14	25	120
8	Capsicum	3	6	12	60
9	Cauliflower	17	34	66	340
10	Coriander	8	17	32	160
11	Coriander seed	1	2	4	20
12	Cotton	22	44	90	440
13	Fenugreek	3	6	13	60
14	Ginger	15	30	61	300
15	Green Chili	16	32	66	320
16	Groundnut	11	20	43	220
17	Jowar	12	27	52	240
18	Leafy Vegetable (Spinach)	3	6	12	60
19	Maize	15	33	64	300
20	Moong	17	35	66	340
21	Okra	12	26	49	240
22	Onion	15	32	60	300
23	Other Vegetable (Cluster bean)	7	14	28	140
24	Paddy	16	31	65	320
25	Ivy gourd	1	2	4	20
26	Peas	1	2	4	20
27	Pointed gourd	1	2	4	20
28	Potato	3	7	12	60
29	Pumpkin	2	4	8	40
30	Ragi	6	12	24	120
31	Red Chili	4	7	16	80
32	Ridge gourd	4	8	16	80
33	Soyabean	26	52	106	520
34	Sponge gourd	1	2	4	20
35	Sweet Potato	3	6	12	60
36	Tomato	17	34	67	340
37	Tur	25	48	104	500
38	Turmeric	17	32	60	340
39	Udid	18	36	75	360

Table 4.2 : Cropwise sample selected for the Survey – Rabi

Sr. No.	Crops	Number of			
		Districts	Talukas	Villages	Holdings
1	Beans	2	4	8	40
2	Beetroot	1	2	4	20
3	Bitter gourd	2	4	8	40
4	Brinjal	3	6	10	60
5	Capsicum	2	4	9	40
6	Carrot	1	2	3	20
7	Cauliflower	1	2	4	20
8	Cucumber	20	38	89	400
9	Garlic	16	30	61	320
10	Gram	30	59	117	600
11	Jowar	16	36	64	320
12	Kulith	1	2	4	20
13	Maize	13	25	55	260
14	Pumpkin	1	2	4	20
15	Pointed gourd	3	6	12	60
16	Radish	1	2	4	20
17	Sponge gourd	1	2	4	20
18	Wheat	27	55	106	540

Table 4.3 : Cropwise sample selected for the Survey – Summer

Sr. No.	Crops	Number of			
		Districts	Talukas	Villages	Holdings
1	Bajra	1	1	4	20
2	Cucumber	1	2	4	20
3	Groundnut	5	10	20	100
4	Maize	1	2	4	20
5	Muskmelon	1	2	5	20
6	Paddy	7	13	26	140
7	Watermelon	5	10	20	100

Table 4.4 : Cropwise sample selected for the Survey - Perennial Crops

Sr. No.	Crops	Number of			
		Districts	Talukas	Villages	Holdings
1	Arecanut	3	5	9	60
2	Banana	14	26	63	280
3	Ber	1	2	4	20
4	Cashewnut	4	8	15	80
5	Coconut	4	6	10	80
6	Custard Apple	3	4	9	60
7	Fig	1	1	3	20
8	Grapes	5	11	21	100
9	Guava	6	12	24	120
10	Limes	8	16	33	160
11	Mandarin	5	9	20	100
12	Mango	10	19	37	200
13	Other Fruit (Jackfruit)	1	2	4	20
14	Papaya	8	15	31	160
15	Pomegranate	12	26	52	240
16	Sapota	7	13	28	140
17	Strawberry	1	1	2	20
18	Sugarcane	26	50	104	520
19	Sweet Orange	7	14	28	140

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