



IMPACT ASSESSMENT OF APCNF

(ANDHRA PRADESH COMMUNITY MANAGED NATURAL FARMING)

Rabi-2019-20 Report



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December, 2020

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Rabi-2019-20 Report

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Acknowledgments

In completion of the Impact Assessment of Zero Budget Natural Farming in Andhra Pradesh, a large number of persons and agencies have helped us. First and foremost, we are grateful to our Chairman Prof. R. Radhakrishna for his encouragement to take up this study and for his insightful comments at every stage of the work.

Special thanks are due to Shri. T. Vijay Kumar, IAS (Retired), Executive Vice Chairman, Rythu Sadhikara Samasta (RySS), Government of Andhra Pradesh for entrusting the project and reposing faith in us. We owe gratitude to Dr D V Raidu, IAS (Retired), Sri. G. Muralidhar, Dr. C.P. Nagi Reddy, RySS for their active participation, suggestions and continuous support in completion of this project. Our thanks are also due to Dr. (Smt.) Poonam Malakondiah, IAS, Principal Secretary, Department of Agriculture and Cooperation, Government of Andhra Pradesh and Sri. H. Arun Kumar IAS., Special Commissioner, Department of Agriculture and Chief Executive Officer (CEO), RySS, Government of Andhra Pradesh for their support to the study. We thank the other members of the ZBNF team at headquarters.

A number of RySS officials at field level have extended their help in facilitating our fieldwork. District Project Managers in all the thirteen districts in the state and their staff gave all the support we needed to complete the fieldwork. We thank to Community Resource Persons (CRPs), Internal Community Resource Persons (ICRPs), and other staff in all the districts for their help and sharing their insights with us while conducting field survey, especially CCEs.

We profusely thank Prof. Vepa Swarna, Prof.A.Narayanamoorthy, Prof.Kareemulla, Prof.A Venkteswarulu and Prof. J. Ramu Naidu for their support in editing and offering suggestions and comments on the earlier version of the Report.

We acknowledge the services render by Prof. E. Nagabhusana Rao, Sri. C M Reddy, Sri. P. Sam Sanjeev and their colleagues from NSSO and Sri NSP Rao, V. Bapi Raju, B. Anjaneyulu and V. Nagabhushanam for their staunch support in their respective areas.

All the field supervisory personnel and field investigators have actively participated in the field work with all devotion, commitment and sincerity. CESS supervisory staff also helped the team in data cleaning with at most sincerity. Our special thanks to Mr. K T Shyamsundar, Data Manager who has effectively monitored and maintained the log of data from different districts besides overseeing the data entry. We also thank Mr. Mallikarjuna Naik for creating suitable App for CCEs and his support in continuous monitoring of CCEs with district teams.

We also thank Mrs. Panchakshari, Mrs. Rama Devi, Mrs. Bhushana, and Mrs. Lakshmi for helping us in the completion of the data entry in time and other support activities. Our thanks are also due to Mr. P. Raja Narendra Reddy for his secretarial help.

Project Team

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Acronyms

AHH	:	Agriculture Household
AP	:	Andhra Pradesh
APCNF	:	Andhra Pradesh Community Managed Natural Farming
AWC	:	Anganwadi Centre
CA	:	Cluster Assistant
CCE	:	Crop Cutting Experiment
CRP	:	Community Resource Person
CS	:	Case Study
CSPro	:	Census and Survey Processing System
DES	:	Directorate of Economics and Statistics
DPM	:	District Project Manager
FGD	:	Focus Group Discussion
FPO	:	Farmer Producers Organization
GCA	:	Gross Cropped Area
GCC	:	Girijan Co-operative Corporation
HH	:	Household
IASRI	:	Indian Agricultural Statistical Research Institute
ICRP	:	Internal Community Resource Person
ICT	:	Information and Communication Technology
NGO	:	Non-Governmental Organization
NPM	:	Non-Pesticide Management
NSSO	:	National Sample Survey Organization
PDS	:	Public Distribution System
PNPIs	:	Plant Nutrients and Protection Inputs
RySS	:	Rythu Sadhikara Samstha
S2S	:	Seed to Seed
SHG	:	Self Help Group
SI	:	Strategic Interview

Executive Summary

1. This report is a part of the larger monitoring and learning annual study of the Andhra Pradesh Community Managed Natural Farming (APCNF) and continuation of the APCNF Kharif Report 2019-20.
2. The mandate of the present study is to assess the impact, and to provide the insights for mid-course corrections, and to make available the facts and figures for the advocacy.
3. Objectives of the study are:
 - a. To learn and measure the changes in expenditure on plant nutrients and protection inputs (PNPIs) (commonly referred to the expenditure on biological inputs under APCNF and chemical inputs under non-APCNF), paid-out costs of cultivation and gross and net returns from crop cultivation, due to APCNF; and impact of these changes.
 - b. To estimate the changes in the crop yields due to APCNF.
 - c. To learn the impact of the APCNF on soil quality
 - d. To know the qualitative changes in the crop output due to APCNF
 - e. To understand the farmer's experience and perceptions about APCNF, in terms of outlook towards farming; and environmental and health benefits
 - f. To comprehend the changes in the marketing of crop output, and
 - g. To provide insights for mid-course corrections/ improvement and recommendations for the policy changes.
4. The evaluation methodology adopted was what is known as “with and without” approach; wherein the outcomes of a random sample of APCNF farmers cultivating a set of selected crops are compared with the outcomes of a random sample of farmers cultivating the same set of crops using chemical inputs.
5. Six crops, viz. 1. Paddy, 2. Maize, 3. Groundnut, 4. Sesamum, 5. Black gram, 6. Onion are covered in the crop wise detailed analysis in this report.
6. In total, household data was collected from 902 APCNF farmers, including panel and best farmers; and 601 non-APCNF farmers.
7. Due to Covid 19 related restrictions, crop cutting experiments (CCEs) could not be completed as per the plan. For six select crops analyzed in this report, total 263 APCNF and 101 non-APCNF CCEs were collected. This is the limitation of this report. To

understand the severity of this limitation, the crop wise yields obtained through CCEs and reported yields were compared. It is reassuring to know that similar patterns were observed in almost all crops. The variations observed in the CCEs yield and reported yields have the same sign in five out of six crops analyzed in the report; the only exception is Onion. It implies that despite smaller number of CCEs, the data gives reasonably a good picture of the ground reality.

8. The expenditure on biological inputs under APCNF and the expenditure on chemical inputs under non-APCNF are commonly referred, for the sake of comparison, as expenditure on PNPIs. The (weighted) averages of six sample crops with respect to per hectore expenditure on PNPIs, total paid-out costs, gross and net returns, and differences between APCNF and non-APCNF are presented at Table 0.1. On average, the APCNF farmers have incurred ₹8,120 per hectore less expenditure on PNPIs vis-à-vis non-APCNF farmers. It is 55% less, in terms of the rate of change. By adopting to APCNF, the farmers on average have incurred ₹8,400 (17%) per hectore less on total paid-out costs and earned ₹3,308 (3%) per ha higher gross returns and ₹11,708 (17%) per hectore higher net returns during the Rabi season.

Table 0.1: Differences between APCNF and non-APCNF average costs and returns during Rabi 2020

₹/ hectore				
Indicator	APCNF	Non-APNF	Difference in Rs	Difference in %
1	2	3	4 = 2-3	5 = (3/2)*100
Exp. on PNPIs	6,676	14,796	-8,120	-55
Paid-out costs	41,312	49,712	-8,400	-17
Gross returns	1,23,423	1,20,115	3,308	3
Net returns	82,111	70,403	11,708	17

Sources: IDSAP Field Survey, 2019-20

9. A comparison with the reported yields, indicates that CCE yields are reasonably reliable, despite smaller number of CCEs conducted this time, due to Covid 19 related restrictions and apprehensions.
10. Out of six sample crops, four crops have recorded higher yields under APCNF. The two crops, Paddy and Onion, which recorded lower yield under APCNF (by -7.02% and -12.35%), have given positive net returns of 15% and 13% respectively, due to better price realization and steep reduction in the cost of production.
11. The study results indicate that APCNF can also resolve the farm practices of zero/ least investment/ input practices of some crops and the issue of shortage of farm investment.

12. Another important benefit of APCNF is that it has resulted in reduction in farmers' exposure to/dependence on the input and credit markets. Consequently, their stress levels and despondency are giving way to optimism and buoyancy.
13. APCNF has been improving the farmers' perceptions towards agriculture and the overall wellbeing of the farmers.
14. About 94 percent of APCNF farmers in the state have perceived that the quality of the soils in their fields have improved.
15. Of those perceived an improvement in soil quality, one third each observed soil softening followed by presence of more earthworms and improvement in greenery.
16. In total 42.99% APCNF farmers stated that the APCNF crops are more resilient, vis-à-vis non-APCNF crops, to the weather anomalies such as heavy rains, untimely rains, flooding, gales, dry spells, moisture stress, etc. About 63% of the farmers, at the state level, have perceived that APCNF grains are heavier and about 43% have acknowledged that APCNF crops' stems are strong.
17. One of the *expected* benefits of the APCNF is elimination of health risks associated with the use of fertilizers and pesticides. There are clear and positive indicators for accomplishment of this goal.
18. In total 81.48% off APCNF farmers have stated that their families' health status has increased due to APCNF and ***89.11 percent sample farmers have experienced a reduction in their out-of-pocket expenditure on the health due to APCNF.***
19. By addressing the major farming issues such as profitability, health hazards, risks, tensions, etc, the APCNF programme has changed the sample farmers' outlook towards agriculture.
20. At the state level, 98.83% sample farmers like to continue the farming.
21. Because of APCNF, 71.69% sample farmers, in the state, have stated an improvement in their financial position and 78.23% sample farmers have indicated an improvement in their family happiness, through the reduction in the stress and improved health outcomes.
22. APCNF products have more diverse market channels. Three APCNF crop outputs, viz., Paddy, Groundnut and Black gram are sold in three additional channels compared to that of non-APCNF. The bulk of Sesamum output was sold to factories directly, which is an additional channel to three channels, where non-APCNF produces were sold.
23. APCNF farmers, albeit in smaller numbers, have started processing their crop outputs before selling.

24. APCNF farmers are able to withhold at least a small part of the output to sell at later date. Out of six sample crops, APCNF farmers have withheld more output, than that of non-APCNF, for second time sale in four crops. One of the possible reasons could be the lower cost of cultivation and farmers are not under pressure from creditors/ lenders.
25. Major challenges reported and identified in adopting APCNF are:
- a. Lower and fluctuating yields in some crops.
 - b. Not able to realize the premium prices for APCNF produce
 - c. Non-availability of some raw materials to prepare the biological inputs
 - d. Lack of adequate skills and confidence to prepare the biological inputs especially Kashayams and Asthrams.
26. To address the challenge of **lower yields**, RySS has initiated, on a large scale, the pre-monsoon dry sowing (PMDS) to boost the soil quality and productivity. Other natural farming methods such as tree-based farming and System of Root Intensifications (SRI) may also be implemented at the appropriate places. The process of introducing the medicinal and cosmetic plants may be widened.
27. To promote the marketing opportunities for APCNF produces, RySS may:
- a. Facilitate the procurement of APCNF products for the Public Distribution System (PDS), School Mid-day Meals programme, Anganwadi programmes, etc.
 - b. Rope in the Girijana Cooperative Corporation (GCC) in the marketing of the APCNF products, in the Tribal areas.
 - c. Facilitate the tie-ups between big malls and certain villages/mandals. The SHG institutions may also be roped in for simple preparation of agri-products/food processing such as cleaning, grading, grinding, deseeding, shelling, packing, etc.
 - d. As and when the medicinal plants and cosmetic related plants are introduced in the farming systems, simultaneously, their processing and marketing interventions have to be initiated.
28. To strengthen the extension services and awareness generation, APCNF may print and distribute the self-learning literatures, along with case studies, such as booklets, pamphlets, etc, extensively and frequently. All the television channels in the state may be encouraged and facilitated, under corporate social responsibility, to cover APCNF program, food quality, health issues, etc.
29. Towards strengthening the institutions and influencing the Governance:

- a. Facilitate a close coordination of all departments and institutions dealing with farmers and farming, such as agriculture, rural development, animal husbandry, forestry, civil supplies, Rythu Bharosa Kendras, Grama Sachivalayas, etc.
- b. Internal evaluations methods such as inter-district evaluation by the DPM staff for mutual learning may be facilitated and institutionalized.
- c. Persuade the Directorate of Economics and Statistics to incorporate the APCNF data in their annual publications/ data compilations.

Chapter 1: Context, Objectives and Methodology

1.1. Introduction

This report is a part of the larger monitoring and learning annual study of the Andhra Pradesh Community Managed Natural Farming (APCNF) and continuation of the APCNF Kharif Report 2019-20. The details of the context, objectives, methodology, including sampling design, etc were discussed in details in the previous (Kharif) report (IDSAP, 2020). In this chapter, the same are summarised. The changes and modifications relevant to the current report are also discussed in this chapter.

1.2. The Study

The main objective of the APCNF is to make agriculture economically viable, agrarian livelihoods profitable and climate-resilient. APCNF aims at reduction in cost of cultivation, enhance yields, increase incomes, reduce risks, and protect the farming and farmers from uncertainties of climate change by promoting the adoption of an agroecology principles and practices. It is expected that APCNF would result in substantial reduction in the expenditure on plant nutrients and protection inputs (PNPIs), due to replacement of the very expensive and harmful chemical inputs with the inexpensive and benevolent biological inputs. The reduction in PNPIs expenditure, in turn, is expected to reduce the total cost of cultivation; and result in the higher net returns from crop cultivation. Further, APCNF would likely to improve the yield rates of crops and the quality of crop output and fetch better prices and lead to higher gross returns. APCNF is also expected to improve the quality of natural resources, especially the soil quality, and the quality of the environmental services. The mandate of the present study is to assess the impact, and to provide the insights for mid-course corrections, and to make available the facts and figures for the advocacy.

1.3. Objectives of the study

1. To learn and measure the changes in expenditure on PNPI, total cost of cultivation and gross and net returns from crop cultivation, due to APCNF; and impact of these changes.
2. To estimate changes in the crop yields due to APCNF.
3. To learn the impact of the APCNF on soil quality
4. To know the qualitative changes in the crop output due to APCNF
5. To understand the farmer's experience and perceptions about APCNF, in terms of outlook towards farming; and environmental and health benefits,
6. To comprehend the changes in the marketing of crop output, and
7. To provide insights for mid-course corrections/ improvement and recommendations for the policy changes.

1.4. Methodology

The method “**with and without**”, was used in the study; i.e. the outcomes of APCNF farmers, cultivating a particular crop, are compared with the outcomes of the non-APCNF farmers cultivating the same crop, using chemical inputs. The field data collection started during February 2020 and continued to July, due to Covid 19 related lockdown and travel restrictions. The study has planned to collect data of 11 crops, viz. 1. Paddy, 2. Maize, 3. Groundnut, 4. Sesamum, 5. Black gram, 6. Onion, 7. Ragi, 8. Bengal gram, 9. Green gram, 10. Jowar, and 11. Chillies. To get reliable estimates, crops with minimum of 30 records/observations were used in the detailed analysis in this report. Out of 11 crops listed above and covered in the data collection, only first six crops, which have 30 plus samples/observations, were used in the analysis.

In total, household data was collected from 902 APCNF farmers, including panel and best farmers; and 601 non-APCNF farmers. Farmer category wise number of sample households, area owned, area cultivated during Rabi 2019-20 and area put under APCNF are given at Table 1.1.

Table 1.1: Number of sample farmers, area cultivated and allocated during Rabi 2019-20

Farmer Category	Number of Households		Average Area Owned (Ha)		Average Area Cultivated (hector)		Average Area Under APCNF (hector)		Percentage APCNF Area (%)	
	APCNF	Non-APCNF	APCNF	Non-APCNF	APCNF	Non-APCNF	APCNF	Non-APCNF	APCNF	Non-APCNF
Landless	50	43	0.00	0.00	0.86	1.47	0.44	0.00	51.22	0.00
Marginal	399	305	0.64	0.87	0.72	0.74	0.44	0.00	61.03	0.00
Small	305	171	1.55	1.53	1.11	1.21	0.64	0.00	57.34	0.00
Others	148	82	3.95	3.61	1.99	1.54	1.04	0.00	52.15	0.00
All	902	601	1.46	1.37	1.07	1.03	0.61	0.00	56.58	0.00

IDSAP Field Survey, 2019-20

Crop cutting experiments (CCEs) were conducted scientifically to obtain reliable estimates of yields of crops under APCNF and Non-APCNF; and the difference between them. It was planned to conduct CCE with each sample farmer. However, due to Covid 19 related restrictions, CCEs could not be completed as per the plan. Total 433 CCEs covering 11 crops were conducted; including 299 APCNF and 134 Non-APCNF farmers. For six select crops analyzed in this report, 263 APCNF and 101 non-APCNF CCEs were collected (Table 1.2). In the report, unless stated otherwise, the yields obtained through CCEs were used in all tables and calculations such as gross and net returns.

Table 1.2: Number o CCEs conducted for six select sample crops during Rabi 2019-20

Crop	APCNF	Non-APCNF
Paddy	35	12
Maize	86	43
Groundnut	68	20
Black gram	44	7
Sesamum	15	10
Onion	15	9
Total	263	101

Sources: IDSAP Field Survey, 2019-20

1.5. Data Collection and the Management Process

Total four research tools, viz: (1) Household listing schedules, (2) Village schedules (3) Questionnaire for APCNF HHs, and (4) Questionnaire for Non-APCNF HHs were used in the

current survey. These instruments for all field-based evaluations have in-built checks with appropriate skip patterns over and above the supportive manual with instructions and clarification for all questionnaires.

A separate mobile-based app was developed/ generated to enter the CCEs' information; and training was given to all the supervisors, after duly installing the app in their mobiles. Senior team members visited the field and cross-checked the information filled. The data entry programme was written in CSPro software and used for data entry and processing.

1.6. Limitations of the data

Amid Covid 19 restrictions, on average, 44 samples/ CCEs per each of six APCNF crops and 17 samples/ CCEs per each of six non-APCNF crop were collected. Among the six APCNF crops, the benchmark 30 plus CCEs/ observations, were obtained for four crops, viz. Paddy, Maize, Groundnut and Black gram. Only 15 CCEs were completed for each of remaining two crops, viz. Sesamum and Onion. The scenario is even more depressing in case of non-APCNF crops. Out of six select crops analyzed in this report, only Maize has more than 30 CCEs. The number of CCEs vary from 7 to 20 in the remaining five crops. This is the major limitation of this report. To understand the severity of this limitation, the crop wise yields obtained through CCEs and reported yields were compared. It is encouraging to know that similar patterns were observed in almost all crops. The variations observed in the CCEs yield and reported yields have same sign in five out of six crops analyzed in the report; the only exception is Onion. It implies that despite smaller CCEs, the data gives reasonably a good picture of ground reality. Because of the smaller number of CCEs, the analyses – comparison of yields, gross and net returns were limited to state level only.

1.7. Structure of the Report

The context, objectives and methodology of the study have been presented in this Chapter 1. Chapter 2 consists of the analyses of the impact of biological input on the production conditions and farmers. It includes changes in expenditure on PNPIs, paid-out costs, crop yields, gross and net returns. The issues of emerging marketing channels under APCNF have been analyzed in chapter 3. The environmental and health benefits of the APCNF are presented in Chapter 4. Chapter 5 discusses the issues and challenges and gives policy suggestions.

Chapter 2: Impact of APCNF on Farming Conditions

2.1. Introduction

This chapter covers the all-important subject of the study, i.e., changes in the costs of cultivation, crops' yields, gross and net returns from the cultivation. The analysis includes the impact of APCNF on cost of plant nutrients and protection inputs (PNPIs), total paid out costs of cultivation of different crops, crop yields, and crop wise gross and net returns. Out of total 11 sample crops for which detailed data was collected during the study period, crop wise cost of cultivation and returns are estimated for only six crops, who have a minimum of 30 APCNF and non-APCNF sample-observations/ records. Individual estimates are provided for Paddy, Mize, Groundnut, Black gram, Sesamum and Onion.

2.2. Plant Nutrients and Protection Inputs

The principal intervention of the APCNF is the introduction of biological inputs such as Beejamrutham, Ghanajeevamrutham and Dravajeevamrutham in place of chemical fertilizers; and variety of Kashayams and Asthrams, made out of strong (bitter, sour, hot, etc) spicy plant extractions and sour butter milk, in place of pesticides and vermicides. These biological and chemical inputs together are referred, in this report and also in the previous report, as plant nutrient and protection inputs (PNPIs).

The crop wise variations between the biological inputs' costs, in APCNF, and chemical inputs costs, under Non-APCNF, in Rabi 2019-20, are presented at Table 2.1. The costs of chemical inputs, under Non-APCNF vary from ₹1,975 per hectare in Sesamum to ₹53,376 per hectare in Onion. In the remaining four crops, the per hectare cost of PNPI is nearly ₹20,000 in Maize and more than ₹14,000 in Groundnut and Paddy. At the same time, the costs of biological inputs, under APCNF, have varied from ₹2,386 per hectare in Black gram to ₹11,595 per hectare in Onions (Table 2.1). In absolute terms, by adapting to the biological inputs, the farmers have saved ₹88 per hectare in Black gram to ₹41,781 per hectare in Onion in the expenditure on PNPIs due to APCNF. The farmers have incurred ₹5,848 less per ha in PNPIs in Paddy, the principal crop in the state. In another principal crop, Groundnut, the farmers have incurred ₹7,499 less per ha on PNPIs, due to APCNF. In percentage terms, the cost of biological inputs is less than that of chemical inputs by 4% percent in Black gram to 78 percent in Onion. In Maize also, the savings are 70%. *Out of total six crops, five crops have experienced a*

reduction in PNPIs. Out of these five crops, the reductions in more than 40% in four crops. Only in Black gram the reduction is just 4%. On the other hand, the expenditure on PNPIs has increased by 91% in Sesamum. It may be worth noting, that the farmers under rainfed conditions invest very little in agriculture, including on chemical fertilizers and pesticides, either to averse the risks or due to their inability to invest in all crops. In two sample crops, viz. Black gram and Sesamum, the non-APCNF farmers have invested just ₹2,474 and ₹1,975 respectively on agri-chemicals. Farmers usually grow Black gram, and also other pulses crops with quite little investment in Rabi season after harvesting Kharif Paddy. Under such conditions, it is very difficult to obtain any savings in the expenditure on PNPIs. In fact, APCNF project encourage all farmers to invest required funds and time on all crops. As a result, there may be some increase in the expenditure on PNPIs in less resource incentive crops. As farmers invest very less in less resource intensive crops, a marginal increase of ₹1,798, in absolute terms, in PNPI in Sesamum, turnout to be a whopping 91% increase in relative terms. On average the expenditure on biological inputs, under APCNF, is ₹6,676 per ha. The average expenditure on chemical inputs, under non-APCNF, is ₹14,796 per hectore. The PNPI expenditure is less under APCNF by ₹8,120 (55%) per hectore.

Table 2.1: Crop wise expenditure on PNPIs under APCNF and non-APCNF & differences in Rabi 2019-20

(₹/hectore)

Crops	Expenditure on Biological Inputs under APCNF	Expenditure On Agri chemicals under Non-APCNF	Difference due to APCNF in Rs	Difference due to APCNF in %
1	2	3	4= 2-3	5 = (4/3)*100
Onion	11,595	53,376	-41,781	-78
Maize	5,841	19,633	-13,792	-70
Groundnut	6,566	14,064	-7,499	-53
Paddy	8,660	14,508	-5,848	-40
Black gram	2,386	2,474	-88	-4
Sesamum	3,772	1,975	1,798	91
Weighted¹ average	6,676	14,796	-8,120	-55

Sources: IDSAP Field Survey, 2019-20

¹ To get the net impact of APCNF, the weighted average is calculated with common weights in this chapter. The common weights, used, are the areas under the APCNF crops.

2.3. Paid out costs of cultivation

After the analysis of the changes in the expenditure on PNPIs, the curiosity would be to know the impact of those changes on the overall cost of cultivation and the composition of total costs. In this section, only the paid-out costs of cultivation are analysed. The paid-out costs under APCNF and non-APCNF and differences in absolute terms and rates of variations are presented at Table 2.2. Total paid out costs of six sample crops, under non-APCNF, vary from ₹14,016 per hectare in Black gram to ₹1,22,471 per hectare in Onion. The same, under APCNF, varies from ₹16,727 in Sesamum to ₹70,529 in Onion. By adapting the APCNF, the sample farmers have saved moderate to substantial amounts in total paid-out costs in four out of total six crops, viz. Onion, Groundnut, Maize and Paddy. The per hectare savings are ₹51,000 in Onion and in the range of ₹7,583 to ₹10,753 in the remaining three crops. However, there are small increases, in absolute terms, in the total paid-out costs in Black gram (₹2,961) per hectare and Sesamum (₹3,394) per hectare. As the farmers, under non-APCNF, invest very less in the cultivation of crops like Sesamum and Black gram, the smaller increase in total paid-out costs, under APCNF, turns into over 20% rate of change. On average the total paid out cost has declined by ₹8,400 (17%) per ha. On average, it looks that the reduction in the total paid-out costs is mostly due to reduction in the expenditure on PNPIs. However, there are variations across the crops. It is interesting to note that the difference in the paid-out costs in three major crops of the state i.e., Paddy, Groundnut and Maize vary between 15 to 17 percent between CNF and non-CNF. In other words, CNF farmers got benefit to that extent

Table 2.2: Total paid-out costs under APCNF and Non-APCNF and Difference in Rabi 2019-20

Crops	Paid out cost under APCNF (₹/hector)	Paid out cost under non-APCNF (₹/hector)	Difference in ₹	Difference in %
1	2	3	4 = (2-3)	5 = (4/3)*100
Onion	70,529	1,22,471	-51,942	-42
Groundnut	55,650	66,403	-10,753	-16
Maize	41,839	50,658	-8,819	-17
Paddy	41,406	48,989	-7,583	-15
Black gram	16,976	14,016	2,961	21
Sesamum	17,727	14,333	3,394	24
Weighted average	41,312	49,712	-8,400	-17

Sources: IDSAP Field Survey, 2019-20

Another dimension to investigate with respect to total paid-out costs, is the changes in the composition of the total cost. In the previous reports, it was observed that labour costs have increased under APCNF because of labour intensive processes of preparation and application of biological inputs and more labour use in various stages of harvesting operations. It was also observed that as APCNF is encouraging and facilitating use of own and traditional seeds, the costs of seed was also recoded substantial reduction in some instances. Cost of cultivation of crops under APCNF have also declined owing to mulching, improvement of soil quality, etc.

The difference in the expenditure on major agriculture inputs, under APCNF and non-APCNF, are presented at Table 2.3. In all, eight major inputs considered in this analysis, viz. Seeds, PNPIs, FYM, Hired Labour, Bullock Labour, Machine Labour, Implements and Water Fee. Among the eight inputs considered here, four inputs, viz. Seeds, PNPIs, Hired Labour and Machine Labour account for lion share of total cost of cultivation, in the sample crops. While the expenditure on PNPIs declined due to APCNF in five out of total six crops, it has increased in Hired Labour in five crops. Due to APCNF, the expenditure on Seeds and FYM has declined in four crops. The same has declined in two crops in Bullock and Machine Labour. In Implements, it has declined in three crops and in Irrigation it has registered a decline only in one crop. It may be noted that most of the declines are by a larger amounts and increases are by smaller amounts.

Table 2.3: Differences in expenditure on major agriculture inputs between APCNF and Non-APCNF

(₹/Hector)

category	Seeds	PNPIs	FYM	Hired labour	Bullock Labour	Machine Labour	Implements	Water Fees
Paddy	-235	-5,848	-73	-2,353	14	936	-38	12
Maize	211	-13,792	1,129	1,421	-752	1,647	586	730
Groundnut	-4,246	-7,499	1,076	3,079	-993	-2,068	-254	151
Black gram	766	-88	-128	401	284	1,504	62	159
Sesamum	-21	1,798	-329	1,296	100	479	320	-249
Onion	-7,937	-41,781	-775	837	1,421	-3,219	-711	223
No. of declines	4 / 6	5 / 6	4 / 6	1 / 6	2 / 6	2 / 6	3 / 6	1 / 6

Sources: IDSAP Field Survey, 2019-20

The expenditure on major inputs under APCNF and non-APCNF are shown in absolute terms and in percentage terms at Table 2.4. As mentioned above, four inputs, viz. Seeds, PNPIs, Hired Labour and Machine Labour account for lion share in the total paid-out costs discussed in all crops analysed here.

As can be seen above, the farmers were able to save substantial amounts on plant nutrients and plant protection without any significant loss in the yields of almost all crops (see next section). ***Another important benefit of APCNF is that it has resulted in a considerable reduction in farmers' exposure to the input market.*** It is well known fact that farmers have to procure each and every item of chemical inputs for plant nourishment and plant protection from the market. As the chemical inputs form the major component in the conventional/ Non-APCNF farming, the farmers' major worry, always, is timely procurement and application of agri-chemical inputs. To procure those inputs the farmers, often, enter into credit agreements with the input suppliers with unfair terms or borrow money with exploitative terms and conditions. The scenario has been changing. Apart from the monitory issues, the adulteration of agri-chemical inputs, especially, the pesticides pose another set of risks to the farmers. APCNF farming has relieved the participating farmers from those risks, exploitations and vulnerabilities. Another benefit of biological inputs is their long term and continuous benefits to the farmers and farming. Normally the positive impact of chemical inputs lasts for very short period of time. All their positive benefits would end with the harvesting of the crop; the inputs have to be applied in subsequent season/ year in the same dose or package. On the other hand, the toxic residuals of chemical inputs not only pollute the natural resources such as land/ soils, water bodies, atmosphere, but also adversely affect the health of human beings and other living beings for longer periods. In sharp contrast, the positive benefits of biological inputs last long and have benevolent cascading effects. The negative² impact, if any, would be short lived.

²The common negative features, reported in the field, of biological inputs are (1) foul smell during the preparation of the cultures, (2) higher demand on the family labour, (3) shortage of raw materials, (4) production losses in the initial years in a few crops, etc.

Table 2.4: Expenditure on major agriculture inputs under APCNF and Non-APCNF

₹/ hectore

Indicator	Paddy		Maize		Groundnut		Black gram		Sesamum		Onion	
	APCNF	Non-APCNF	APCNF	Non-APCNF	APCNF	Non-APCNF	APCNF	Non-APCNF	APCNF	Non-APCNF	APCNF	Non-APCNF
Seed	2,641	2,876	6,284	6,073	18,875	23,122	2,075	1,308	1,221	1,243	10,129	18,066
PNPIs	8,660	14,508	5,841	19,633	6,566	14,064	2,386	2,474	3,772	1,975	11,595	53,376
FYM	836	908	1,240	110	1,853	777	158	285	368	697	-	775
Hired labour	14,687	17,040	14,861	13,440	18,369	15,290	7,961	7,560	4,878	3,582	35,130	34,294
Bullock Labour	368	354	1,206	1,959	1,949	2,942	395	110	918	817	2,331	910
Machine Labour	13,117	12,181	9,427	7,779	7,478	9,546	3,668	2,164	5,433	4,955	9,758	12,977
Implements	514	551	1,220	634	248	501	141	79	568	248	-	711
Water Fees	582	570	1,761	1,030	312	161	193	34	568	817	1,586	1,363
Total	41,406	48,989	41,839	50,658	55,650	66,403	16,976	14,016	17,727	14,333	70,529	1,22,471
	In percentages (of columns)											
Seed	6.38	5.87	15.02	11.99	33.92	34.82	12.22	9.33	6.89	8.67	14.36	14.75
PNPIs	20.92	29.62	13.96	38.76	11.80	21.18	14.06	17.65	21.28	13.78	16.44	43.58
FYM	2.02	1.85	2.96	0.22	3.33	1.17	0.93	2.04	2.07	4.86	-	0.63
Hired labour	35.47	34.78	35.52	26.53	33.01	23.03	46.90	53.94	27.52	24.99	49.81	28.00
Bullock Labour	0.89	0.72	2.88	3.87	3.50	4.43	2.32	0.79	5.18	5.70	3.30	0.74
Machine Labour	31.68	24.87	22.53	15.36	13.44	14.38	21.61	15.44	30.65	34.57	13.84	10.60
Implements	1.24	1.12	2.92	1.25	0.44	0.75	0.83	0.56	3.21	1.73	-	0.58
Water Fees	1.41	1.16	4.21	2.03	0.56	0.24	1.14	0.25	3.21	5.70	2.25	1.11
Total	100	100	100	100	100	100	100	100	100	100	100	100

Sources: IDSAP Field Survey, 2019-20

2.4. Crop yields

The study is mandated to estimate the crop yields through CCEs. The results are less reliable compared to earlier rounds. However, the results are closely related to the reported yields. The crop wise yields under APCNF and non-APCNF obtained thru CCEs and differences in quantities and percentages are presented at Table 2.5. Four crops have registered higher yields under APCNF. In quantity terms, highest increase is in Maize (6.31 quintals per hectore), followed by Sesamum (1.3 quintals per hectore) and Groundnut (1.28 quintals per hectore). On the other hand, Onion has recorded a decline of 24.45 quintals per hectore, preceded by Paddy (4.81 quintals per hectore).

Table 2.5: Crop yields under APCNF and non-APCNF during Rabi

Crop	Yields under APCNF (quintals/hectore)	Yields under non-APCNF (quintals/hectore)	Differences in quintals.	Differences in %
1	2	3	4 = 2-3	5 = (4/3)*100
Maize	76.90	70.59	6.31	8.94
Sesamum	5.26	3.96	1.30	32.78
Groundnut	28.19	26.91	1.28	4.76
Black gram	11.53	11.26	0.28	2.45
Paddy	63.67	68.48	-4.81	-7.02
Onion	173.45	197.90	-24.45	-12.35

Sources: IDSAP Field Survey, 2019-20

Because of the smaller number of CCEs, the yields are compared with the reported yields by the farmers, to gain additional insights. The gap between yields obtained through CCEs and the farmers reported yields are presented at Table 2.6. The assumption that farmers usually underreport their yields proved to be correct. Both APCNF and non-APCNF farmers' reported yields are less than their respective CCE yields, in almost all crops. The only exception is Sesamum under APCNF. APCNF farmers have overreported the Sesamum yields by 0.91 quintals (14.71%). Though the reported yields of non-APCNF Maize are higher than the CCE yields, the gap (0.19%) is negligible. The highest gap between CCE and reported yields are observed in non-APCNF Black gram (189.71%), followed by APCNF Black gram (40.87%). The gaps are higher in non-APCNF crops.

Table 2.6: Crop wise gap between the CCE and reported yields during Rabi 2019-20
(Quintal/Hector)

Crop	APCNF				Non-APCNF			
	Yields from CCEs	Reported yields	Gap between CCE and reported yields	Gap between CCE and reported yields (%)	Yields from CCEs	Reported Yields	Gap between CCE and reported yields	Gap between CCE and reported yields (%)
1	2	3	4=2-3	5=(4/3)*100	6	7	8=6-7	9=(8/7)*100
Paddy	63.67	55.33	8.34	15.07	68.48	58.09	10.39	17.88
Maize	76.90	76.84	0.06	0.08	70.59	70.73	-0.13	-0.19
Groundnut	28.19	25.08	3.11	12.42	26.91	22.06	4.85	21.98
Black gram	11.53	8.19	3.35	40.87	11.26	3.89	7.37	189.71
Sesamum	5.26	6.16	-0.91	-14.71	3.96	3.94	0.02	0.47
Onion	173.45	172.47	0.98	0.57	197.90	162.28	35.62	21.95

Sources: IDSAP Field Survey, 2019-20

The gap between APCNF and non-APCNF reported yields are shown at Table 2.7. In all crops, except Paddy, the reported APCNF yields are higher than that of non-APCNF by considerable margin. The increase is in the range of 2.22 quintals in Black gram to 10.19 quintals in Onion. The reported APCNF paddy yields are less than that of non-APCNF by 2.76 quintals. It may be noted that Paddy yields obtained through CCEs also confirmed this observation. The huge gaps obtained in the reported yields between APCNF and non-APCNF, in case of Black gram (110.71%) and Sesamum (56.41%) need an explanation. As mentioned elsewhere in this report and also in the previous reports, that farmers in the state cultivate, particularly the rain-fed crops, with zero investment/ inputs and reap very low yields. Pulses crops taken after the Paddy crop is one good illustration. The practice is a risk aversion strategy. It may also due to lack of investable funds. The present study results indicate that by a small additional investment in the rainfed crops like Black gram and Sesamum, significantly higher yields can be achieved. Thus, *APCNF can also address the farm practices of zero investment/ input practices and the issue of shortage of farm investment.* Though the reported yields appeared to be more reasonable than the yields obtained with (a smaller number of) CCEs, as per the mandate, the CCE yields are used in the estimates of gross and net returns, below.

Table 2.7: Gaps in reported APCNF and non-APCNF yields during Rabi 2019-20

Crop	APCNF in quintals/ hectore	Non-APCNF in quintals/ hectore	Gap in Q/ha	Gap in %
1	2	3	4=2-3	5=(4/3)*100
Paddy	55.33	58.09	-2.76	-4.75
Maize	76.84	70.73	6.11	8.64
Groundnut	25.08	22.06	3.01	13.66
Black gram	8.19	3.89	4.30	110.71
Sesamum	6.16	3.94	2.22	56.41
Onion	172.47	162.28	10.19	6.28

Sources: IDSAP Field Survey, 2019-20

2.5. Gross Returns

Gross returns of a crop are the value of crop output and the by-product. Naturally it depends on crop yield and prices. The gross returns obtained under APCNF and non-APCNF and the gap between them, of the sample six crops, are shown at Table 2.8. The gross returns, under APCNF, are higher than that of non-APCNF in five out of six sample crops. The gaps vary from ₹1,805 per hectore in Black gram to ₹10,378 per hectore in Groundnut. The rates of change vary from 2% in Black gram and Paddy to 28% in Sesamum. *It is interesting to note that though the Paddy yields, under APCNF, are less than that of non-APCNF, the gross returns are higher. It implies that APCNF Paddy is fetching higher/ premium prices.* The gross returns of APCNF Onion are substantially lower than that of non-APCNF Onion. It may be remembered that the reported APCNF yields are higher than that of non-APCNF. On average the gross returns have increased by ₹3,308 per hectore (3%) due to APCNF.

Table 2.8: Gap between gross returns under APCNF and non-APCNF during Rabi 2019-20

Crop	Gross Return under APCNF in ₹/hectore	Gross Return under Non-APCNF in ₹/hectore	Gap in gross returns in ₹/hectore	Gap in gross returns in %
1	2	3	4 = 2-3	5 = (4/3)*100
Groundnut	1,74,272	1,63,895	10,378	6
Sesamum	39,589	30,824	8,766	28
Maize	1,21,044	1,15,948	5,096	4
Paddy	1,19,863	1,17,450	2,413	2
Black gram	76,057	74,252	1,805	2
Onion	1,74,661	2,14,405	-39,744	-19
Weighted average	1,23,423	1,20,115	3,308	3

Sources: IDSAP Field Survey, 2019-20

2.6. Net Returns

Crop wise net returns are obtained by subtracting cost of cultivation (total paid-out costs) of a crop from the gross returns from the same crop. The crop wise net returns under APCNF and non-APCNF and gap between them in absolute and percentage terms are presented at Table 2.9. The net returns under APCNF are higher than that of non-APCNF, in five out of six sample crops. Only Black gram is an exception. However, the gap is very small of ₹1,156 (2%) per ha. In all five crops the variation is in the range of ₹5,372 to ₹21,131 per hectore. The net returns under APCNF are higher than that of non-APCNF by 13% in Onion to 33% in Sesamum. In case of Onion, despite possible steep overestimation of non-APCNF yields, the net returns are higher under APCNF, due to steep decline in the expenditure on PNPIs. Though the expenditure on PNPIs and total paid-out costs in Sesamum under APCNF is higher than that of non-APCNF, the crop recorded higher increase of 33% in net returns among all sample crops, due to higher yields and possibly because of the better prices. Had the gross and net returns were estimated based on the reported yields, the gross and net returns of all sample crops would be substantially high under APCNF. On average the net returns have increased by ₹11,708 per hectore (17%) because of APCNF.

Table 2.9: Gap between net returns under APCNF and non-APCNF during Rabi 2019-20

Crop	Net Returns under APCNF (₹/hectore)	Net Returns under non-APCNF (₹/hectore)	Gap in net returns (₹/hectore)	Gap in net returns in %
1	2	3	4 = 2-3	5 = (4/3)*100
Groundnut	1,18,623	97,492	21,131	22
Maize	79,205	65,290	13,915	21
Onion	1,04,132	91,934	12,198	13
Paddy	78,457	68,461	9,996	15
Sesamum	21,862	16,491	5,372	33
Black gram	59,081	60,237	-1,156	-2
Weighted average	82,111	70,403	11,708	17

Sources: IDSAP Field Survey 2019-20

2.7. Conclusions

The results have re-established the efficacy of the APCNF/ biological inputs in reducing the cost of cultivation, without affecting the crop yields; and enhancing the gross and net returns. Though there are some estimation issues, the overall trends are very positive. Other evidence, particularly the reported yields, reconfirm the earlier established positive and progressive trends/ result of APCNF.

Chapter 3: Marketing

3.1. Introduction

At the behest of the RySS, marketing is focused in this study. This chapter discuss the emerging changes in the marketing of APCNF products. The chapter covers the issues of emerging market channels for APCNF output, processing and marketing, timing of marketing, place of marketing, reasons for choosing a particular marketing channel, etc.

3.2. Emerging channels of marketing

There is a good consumer demand for chemical free food among the urban consumers, especially, among the rich and middle-class farmers. RySS is facilitating marketing place for APCNF at Rythu Bazars, Weekly/ Irregular Bazars (Shandies) and dedicated shops. The farmers themselves have developed new market channels such as online marketing, selling to friends and relatives, urban consumers, factories, etc. Table 3.1 has data about the sale of six sample crops output in different market channels. It is clear that APCNF products have more diverse market channels. It is very encouraging development. The APCNF output of Paddy, Groundnut and Black gram were sold in three additional channels compared to non-APCNF. The bulk of Sesamum output was sold to factories directly, which is an additional channel to three channels, where non-APCNF produces were also sold, during the Rabi season.

Table 3.1: Crop outputs sold according to different market channels (in quintals)

Market Channels	Paddy		Maize		Groundnut		Black gram		Sesamum		Onion	
	APCNF	Non-APCNF	APCNF	Non-APCNF	APCNF	Non-APCNF	APCNF	Non-APCNF	APCNF	Non-APCNF	APCNF	Non-APCNF
Market yard	5.43	10.89	8.34	11.65	2.70	4.12	0.24	-	0.07	36.73	42.73	-
Within village	52.76	57.57	43.51	50.11	71.15	77.91	33.60	94.59	2.11	2.39	26.37	71.93
Outside village	8.42	23.20	32.04	32.80	21.99	17.97	65.94	5.41	1.82	60.89	30.90	-
Contract	0.01	4.77	0.44	1.07	-	-	-	-	-	-	-	28.07
Factories	15.37	-	15.68	3.61	-	-	0.01	-	96.00	-	-	-
Rythu bazaars	0.06	-	-	-	1.35	-	0.05	-	-	-	-	-
Online	17.85	2.81	-	-	-	-	-	-	-	-	-	-
ZBNF outlets	0.07	-	-	-	1.64	-	0.17	-	-	-	-	-
Others	0.02	0.75	-	0.76	1.18	-	-	-	-	-	-	-
Total in %	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total (quintal).	36,184.59	9,488.41	13,593.62	10,303.98	2,372.64	1,423.08	19,719.65	140.60	7,291.52	3,686.66	3,625.00	21.20

Sources: IDSAP Field Survey 2019-20

3.3. Processing

Processing of agriculture output generates additional employment and fetches higher prices. Processing, here, include just simple processes such as drying, cleaning, grading, milling, shelling, packing, etc. It is to note that APCNF farmers, albeit in smaller numbers, have started processing their crop outputs before selling. Out of 902 sample APCNF farmers, 19 farmers have reported that they have processed the produce before selling. The same is 4 out of 601 non-APCNF sample. On average, the APCNF farmers have processed and sold larger quantities compared to non-APCNF farmers (Table 3.2). These may be considered as anecdotal evidence. In coming days, the trend is expected to gain the momentum.

Table 3.2: Number of APCNF and non-APCNF farmers reported processing of output and average quantity sold

Crop name	Number of farmers		Average Quantity Processed and Sold (Qtls.)	
	APCNF	Non-APCNF	APCNF	Non-APCNF
Paddy	13	1	54.20	18.00
Maize	2	1	34.00	32.00
Groundnut		1		11.60
Black gram	2		21.00	
Sesamum	1		70.00	
Onion	1	1	45.00	40.00
Total	19	4		

Sources: IDSAP Field Survey, 2019-20

3.4. Selling practices

Normally farmers sell their crop output immediately after the harvest in one lot. The reasons for this age-old practice, include lack of space for storing, need for cash, loan conditions, uncertainties about the future prices, etc. However, APCNF farmers are able to withhold at least a small part of the output to sell at later date. Out of six sample crops, APCNF farmers have withheld more output, than that of non-APCNF, for second time sale in four crops. The non-APCNF farmers have withheld more Sesamum output than APCNF farmers, for second time sale (Table 4.3). Such a practices not necessarily fetch, always, higher prices. Perhaps the gap between the harvesting time and actual time of sale may have better impact on the prices. Such data would be collected from next survey onwards.

Table 3.3: Distribution of crop wise output sold in the 1st and 2nd lots during Rabi

In percentages

Crop	First Lot		Second Lot	
	APCNF	Non-APCNF	APCNF	Non-APCNF
Paddy	94.06	99.72	5.94	0.28
Maize	100.00	100.00	-	-
Groundnut	96.13	100.00	3.87	-
Black gram	99.94	100.00	0.06	-
Sesamum	99.85	90.90	0.15	9.10
Onion	75.92	84.15	24.08	15.85

Sources: IDSAP Field Survey, 2019-20

3.5. Conclusions

The APCNF farmers are getting new market channels to sell their produces. Relatively more number of APCNF farmers, albeit in lower numbers, are processing their output before selling. It is an encouraging development. The project participants are able to withhold a part of the crop output to sell at higher prices. These are early and baby steps. The trends are expected to gather momentum in coming seasons.

Chapter 4: Environmental, Health and Well-being Benefits

4.1. Introduction

APCNF has been improving the farmers' perceptions towards agriculture and the overall well-being of the farmers. Farmers' well-being is broad term. Here, farmers' perceptions about their income, health, farming, and happiness have been analysed.

This chapter deals with the following three research questions:

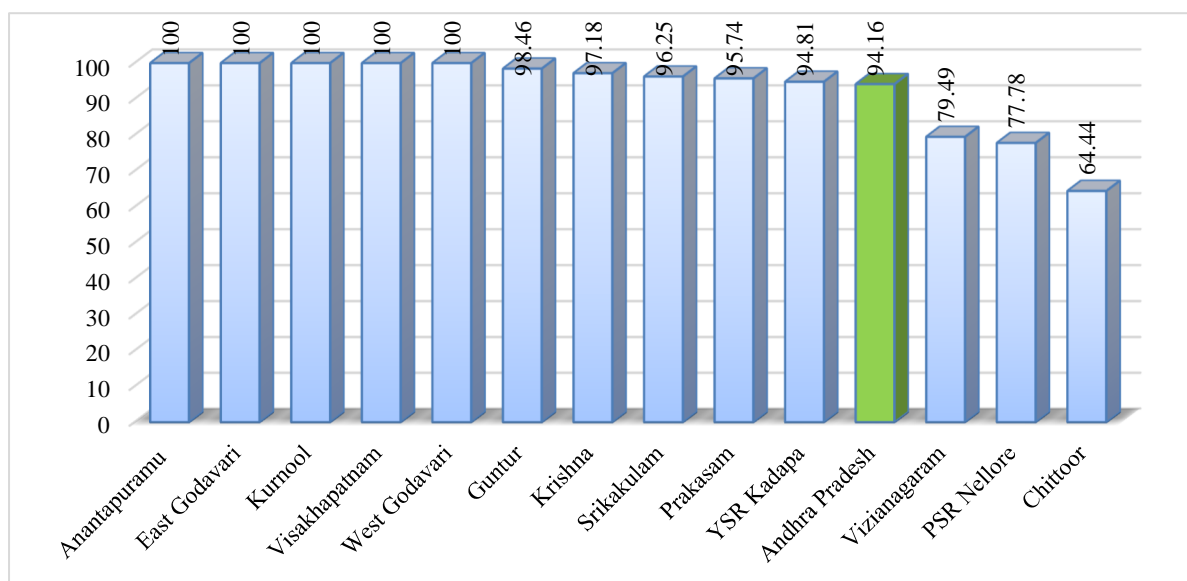
- i. What are the ecological and environmental improvements observed and experienced in the fields due to the APCNF interventions?
- ii. What are the impacts of the APCNF on the health status of the farmers' families?
- iii. What are the improvements observed in farmers' well-being due to APCNF?

The data from household schedule for APCNF farmers is used of the analysis in this chapter

4.2. Improvements in soil quality

About 94 percent of APCNF farmers in the state have perceived that the quality of the soils in their fields have improved. It is interesting to note that in five districts, 100% farmers have reported and experienced improvement in their soil quality (Figure 4.1). Out of total 13 districts, in 10 districts, higher than the state average percentage of farmers, have reported an improvement in the soil quality. It is an encouraging development. The qualitative and environmental benefits of APCNF are being widely experienced.

Figure 4.1: District wise percentage of APCNF farmers reported improvement of soil quality



Sources: IDSAP Field Survey, 2019-20

Further, APCNF farmers were asked about their experience with respect to a few soil quality improvement indicators, such as softening of soils, presence of earthworms, green cover in their fields. District wise farmers responses are shown at Table 4.1. Out of total APCNF farmers, who have experienced and reported an improvement in their soils, 37.43% have informed that soil softening was major benefit; 32.2% have stated that presence of earthworms as the major benefit and 30.37% have expressed that improvement in greenery as the first benefit. Needless to say, each farmer might have experienced multiple benefits in different orders of importance. Among the farmers, who experienced soil improvements, across the districts, 33.17% to 50% farmers have described that the softening of soil is their first or major benefit; 14.39% to 48.89% have testified that increase in earthworms is their top benefit; and 1.11% to 35.61% have stated that increase in the greenery as the major benefit.

Table 4.1: District wise percentage of APCNF farmers response to soil improvement indicators during Rabi 2019-20

District	Soil softened	Presence of more earthworms	Increased green cover
Anantapuramu	42.47	23.29	34.25
Chittoor	50.00	48.89	1.11
East Godavari	38.96	29.22	31.82
Guntur	36.14	36.75	27.11

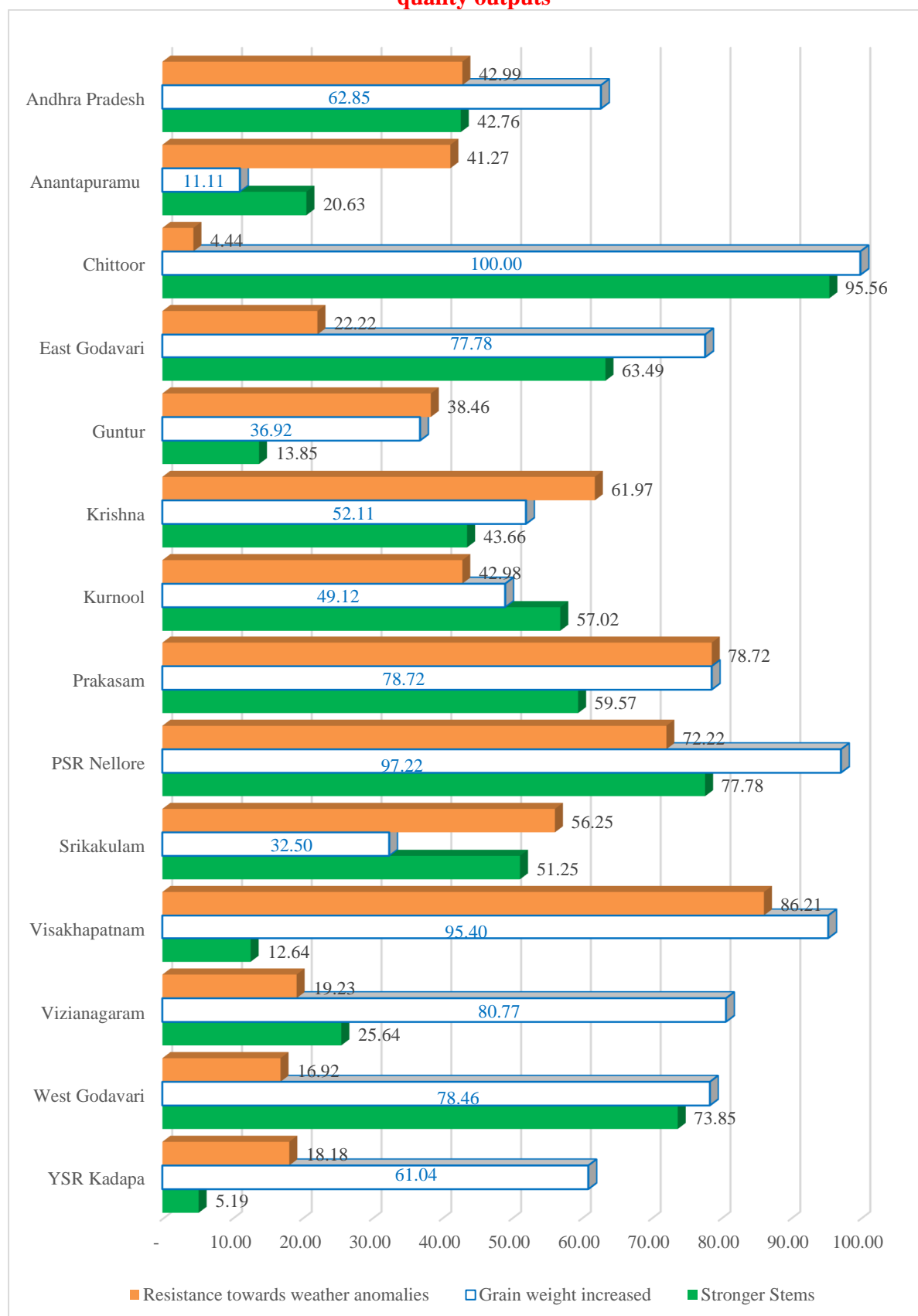
Krishna	33.17	34.16	32.67
Kurnool	34.97	31.05	33.99
Prakasam	37.10	33.06	29.84
PSR Nellore	37.37	36.36	26.26
Srikakulam	37.81	36.32	25.87
Visakhapatnam	33.33	32.95	33.72
Vizianagaram	36.31	31.55	32.14
West Godavari	33.68	34.21	32.11
YSR Kadapa	50.00	14.39	35.61
Andhra Pradesh	37.43	32.20	30.37

Sources: IDSAP Field Survey, 2019-20

4.3. Higher and resilient crop yields and quality outputs

The above discussed soil improvements are not just the farmers' perceptions, they have manifested into higher and resilient crop yields and quality crop outputs. As discussed in the previous chapter, despite complete withdrawal of the critical agri-chemicals, under APCNF, the estimated yields are higher than that of non-APCNF in four out of six sample crops. As per the reported yields, the APCNF yields are higher than non-APCNF yields in five out of six sample crops by notable margins. The APCNF farmers have stated that their crops are resilient to weather anomalies, such as heavy rains, strong winds, moisture stress, etc. They said, further, the stems of the plants are stronger and grains are heavier than that of non-APCNF. In total 42.99% APCNF farmers stated that the APCNF crops are more resilient, vis-à-vis non-APCNF crops, to the weather anomalies such as heavy rains, untimely rains, water-logging, dry spells, moisture stress, etc. About 63% of the farmers, at the state level, have stated that APCNF grains are heavier and about 43% have declared that APCNF crops' stems are strong. However, there are wide variations across the districts. The number of farmers testified higher crops' resilience varies from 4.44% in Chittoor to 86.21% in Visakhapatnam; the percentage of farmers who declared heavier grains varies from 11.11% in Anantapuramu to 100% in Chittoor; and who described stronger stems, varies from 5.19% in YSR Kadapa to 95.56% in Chittoor (Figure 4.2). The issues of crop output quality are discussed in the next section and next chapter.

Figure 4.2: District wise percentage of APCNF farmers affirming crops' resilience and quality outputs



Sources: IDSAP Field Survey, 2019-20

4.4. Health outcomes

Some of the dreaded consequences of the use of fertilizer and pesticide in the country are disastrous health risks to the farmers and contaminated food to the consumers, which leads to several health issues among the general public. One of the expected benefits of the APCNF is elimination of health risks associated with the use of fertilizers and pesticides. There are clear and positive indicators for accomplishment of this goal. One of the principal objectives of the APCNF is to spread the awareness about the benefits of the chemical free food among the farmers and encourage them to consume the APCNF food. It is heartening to learn that 92.03 percent of sample households are consuming the APCNF food. The same varies from 36.11 percent in Nellore district to 100 percent in five districts (Table 42). It may be noted that consumption of APCNF food not only depends on the awareness, taste, and interest of the farmers; but also, on the type of crops cultivated, traditions and cultures. It is possible that some of farmers, who are not consuming the APCNF food, may not be cultivating the food crops or food crops of their choice food. It is reassuring that 81.48% off APCNF farmers have stated that their families' health status has increased due to APCNF; the same varies from 22.22% in PSR Nellore to 100% in Vizianagaram. ***More encouraging trend is that 89.11 percent sample farmers have experienced a reduction in their out-of-pocket expenditure on the health due to APCNF;*** the same varies from 58.33% in PSR Nellore to 100% in East Godavari.

Table 4.2: District wise percentage of APCNF farmers responses with respect to health-related indicators during Rabi 2019-20

District	Consuming APCNF food	Improvement in family health status	Reduction in out-of-pocket exp. On health
Anantapuramu	96.83	79.37	85.71
Chittoor	80.00	91.11	95.56
East Godavari	100.00	98.41	100.00
Guntur	100.00	96.92	87.69
YSR Kadapa	98.70	59.74	87.01
Krishna	78.87	98.59	98.59
Kurnool	100.00	99.12	97.37
PSR Nellore	36.11	22.22	58.33
Prakasam	74.47	76.60	78.72
Srikakulam	92.50	33.75	72.50
Visakhapatnam	100.00	95.40	98.85
Vizianagaram	100.00	100.00	98.72
West Godavari	95.38	75.38	76.92

Andhra Pradesh	92.03	81.48	89.11
Most desirable	100.00	100.00	100.00
Least desirable	36.11	22.22	58.33

Sources: IDSAP Field Survey, 2019-20

4.5. Well-being

By addressing the major farming issues such as profitability, health hazards, risks, tensions, etc, the APCNF programme is changing the farmers' outlook towards agriculture. Farmers are liking the food they are eating and liking the farming, which is chemical free. As discussed in the previous section and previous reports, the financial position has improved due to APCNF. As discussed in the previous chapter, the APCNF farmers are freed from their dependence on the exploitative agri-chemical market completely and unfair credit markets, at least partially. These developments, naturally, reduce the farming related pressures and improves the family happiness.

It is encouraging that 83.09% of APCNF families find that APCNF food is tastier. The same varies from 22.22% in PSR Nellore to 100% in Chittoor. It is heartening that 100% APCNF farmers, in eight out of 13 districts, would like to continue the APCNF farming. In fact, at the state level, 98.83% farmers like to continue the farming. Nearly 72% farmers, in the state, have stated an improvement in their financial positions. The same varies from 26.58% in Srikakulam to 97.44% in Vizianagaram. In total, 78.23% sample farmers have indicated an improvement in their family happiness. The same varies from 22.22% in PSR Nellore to 100% in Vizianagaram (Table 4.3).

Table 4.3: District wise percentage of APCNF farmers reported improvement in family financial and happiness conditions

District	APCNF food is tastier	Like to continue APCNF farming	Improvement in Family Financial position	Improvement in family happiness
Anantapuramu	98.41	98.36	60.00	73.02
Chittoor	100.00	95.56	28.89	95.56
East Godavari	79.37	100.00	95.00	98.41
Guntur	90.77	100.00	78.46	86.15
Krishna	97.14	100.00	91.55	95.77
Kurnool	88.50	100.00	91.23	87.72
Prakasam	42.55	100.00	59.57	74.47

PSR Nellore	22.22	100.00	33.33	22.22
Srikakulam	97.47	96.20	26.58	31.25
Visakhapatnam	56.32	100.00	94.19	96.55
Vizianagaram	97.44	96.15	97.44	100.00
West Godavari	90.77	98.44	61.54	96.92
YSR Kadapa	84.21	100.00	63.64	37.66
Andhra Pradesh	83.09	98.83	71.69	78.23

Sources: IDSAP Field Survey, 2019-20

4.6. Conclusions

At the state level, APCNF is appeared to be deepening and widening its impact on improvement of soil quality, crops resilience, output quality, family health and well-being. The wider variations across the districts in some indicators need attention from the project.

Chapter 5: Challenges and Policy Options

5.1. Introduction

It is important to identify the challenges and address them for rapid expansion and sustainability of the project. In this context the survey has elicited the farmers, in the household schedule, to report their difficulties in adapting the APCNF. The survey has also collected the qualitative information through strategic interviews (SIs) with District Project Managers (DPMs), and Focus Group Discussions (FGDs) with the primary stakeholders and key resource persons. All the inputs received from households' survey, FGDs and SIs with respect to challenges and policy implications are summarized below.

5.2. Challenges

The major challenges reported and identified are:

1. Low and fluctuating yields in some crops. In all rounds of previous surveys and research reports, it is noticed that the APCNF yields of two-three crops, in each survey, are lower than that of non-APCNF. Further, they fluctuate from year to year and season to season. For example, the APCNF Paddy yields have been consistently lower than the non-APCNF yield during last year Kharif and Rabi seasons; but it was higher during this year Kharif, and lower in this Rabi.
2. Not able to get the premium prices for APCNF produce
3. Non-availability of some raw materials for the preparation of the biological inputs
4. Lack of adequate skills and confidence to prepare the biological inputs, especially Kashayams and Asthrams.

These issues are elaborated below and policy options are discussed in the next section.

The challenges such as marketing, scarcity of Desi cow, and non-availability of raw materials are commonly reported in all previous reports. The ranking of the problems also almost remained the same during the last two years. Marketing is a widely felt challenge followed by the scarcity of Desi cows, difficulties in procuring and/ or preparation of the biological inputs and lack of knowledge and confidence for preparation of biological inputs, especially

Kashayams and Asthrams in the state as a whole (Table 5.1). While marketing is a serious problem in Srikakulam, Visakhapatnam, Guntur, and East Godavari districts; scarcity of Desi cow is a severe problem in PSR Nellore, Chittoor and Kurnool. Except marketing, there are no systematic patterns across the districts, in case of other challenges. It implies that these challenges are local specific. These are teething problems, and would get resolved over the period.

Table 5.1: District wise percentage of farmers experienced various challenges in adopting APCNF

Districts	Marketing	Scarcity of local cow	Difficulty in procuring inputs	Lack of adequate knowledge
Anantapuramu	88.89	33.33	22.22	5.56
Chittoor	0.00	100.00	0.00	0.00
East Godavari	92.31	53.85	46.15	23.08
Guntur	96.00	32.00	40.00	24.00
Krishna	86.84	81.58	21.05	18.42
Kurnool	56.45	98.39	56.45	43.55
Prakasam	91.67	66.67	16.67	25.00
PSR Nellore	63.64	100.00	54.55	63.64
Srikakulam	100.00	6.76	2.70	0.00
Visakhapatnam	100.00	22.41	67.24	0.00
Vizianagaram	0.00	0.00	100.00	0.00
West Godavari	87.18	71.79	7.69	7.69
YSR Kadapa	67.74	17.74	30.65	17.74
Andhra Pradesh	75.55	51.09	29.48	14.85

Sources: IDSAP Field Survey, 2019-20

Table 5.2 gives farmers categories wise number of sample farmers, who have reported or experienced various challenges in adopting APCNF. Marketing is the major challenge experienced by all categories of the farmers, followed by shortage of Desi cows and procurement of inputs, including the raw materials for the preparation of biological inputs. Apart from scarcity of labour and family labour, nearly 15% farmers said that they do not have adequate knowledge and skills to prepare various biological inputs, especially the Kashayams and Asthrams. There are some broad patterns in the responses across the farmers' categories. For example., while relatively a greater number of landless and marginal farmers experienced challenges in marketing, a greater number of other farmers experienced the shortage of hired labour and family labour (Table 5.2).

Table 5.2: Farmer category wise percentage of farmers reported various challenges in adopting APCNF

Challenges	Landless	Marginal	Small	Others	All
Marketing	88.24	76.96	73.72	72.06	75.55
Scarcity of local cow	41.18	54.38	44.87	57.35	51.09
Procurement of inputs	47.06	20.74	33.97	42.65	29.48
Lack of adequate knowledge	11.76	11.52	14.74	26.47	14.85

Sources: IDSAP Field Survey, 2019-20

5.3. Policy Options

5.3.1. Improvement of crop yields

Low and fluctuations in some crops is a serious issue. RySS has initiated, on a large scale, the pre-monsoon dry sowing (PMDS) to boost the soil quality and productivity. This measure is expected to increase and stabilizing the crop productivity in coming days. Other natural farming methods such as tree-based farming and System of Root Intensifications (SRI) may also be implemented at the appropriate places. The process of introducing the medicinal and cosmetic plants may be encouraged.

5.3.2. Marketing

RySS may initiate the following measures:

- a. RySS may facilitate the procurement of APCNF products for the Public Distribution System (PDS), School Mid-day Meals, Anganwadi programs, etc.
- b. RySS may rope in the Girijana Cooperative Corporation (GCC) in the marketing of the APCNF products, in the Tribal areas.
- c. RySS may establish the marketing link between big malls and farmers. The SHG institutions may also be roped in for simple preparation of agri-products/ food processing such as cleaning, grading, grinding, deseeding, shelling, packing, etc.
- d. As and when the medicinal plants and cosmetic related plants are introduced in the farming systems; simultaneously, their processing and marketing interventions have to be initiated.

5.3.3. Non-availability of Raw Materials for Biological Inputs

- a. RySS may introduce the required forest species in the cropping systems; and may also facilitate the growing of the required species in the village common lands and homesteads.
- b. The project may consider to strengthen the biological inputs shops in the villages, which are facing an acute shortage; and challenges in preparing their own inputs.

5.3.4. Strengthening of Extension and Awareness

- a. Self-learning literatures, along with case studies, such as booklets, pamphlets, etc, may be printed and distributed extensively and frequently.
- b. All the television channels in the state may be encouraged and facilitated, under corporate social responsibility, to cover APCNF program, food quality, health issues, etc.

5.3.5. Strengthening the Institutions and Influencing the Governance

- a. There is a need for a close coordination of all departments and institutions, dealing with the farmers and farming, such as agriculture, rural development, animal husbandry, forestry, civil supplies, Rythu Bharosa Kendras, Gram Sachivalayas, etc. Such integration enables the RySS/ field staff to share their resources and responsibilities for the productive/ fruitful engagement with the farmers and for the rapid expansion of the program/ project.
- b. Internal evaluations, inter-district evaluation by the DPM staff for mutual learning, which is in practice now, may be institutionalized. Such visits could be instrumental to appreciate the good work done by DPMs and their colleagues. Third party evaluations by organisations like IDS, dissemination of successful innovations would enthuse the DPMs and their staff in implementing APCNF programme effectively. Visits of popular personalities to the innovative works done by DPMs and their staff and adoption APCNF by people's representatives at different levels will further boost the morale of the DPMs and their staff.
- c. The conduct of crop cutting experiments by Directorate of Economics and Statistics and estimating area under APCNF and publication of this information in their documents do further enthuse the DPMs and their field staff in the implementation of APCNF.

Refences

IDSAP (2020): Impact Assessment of APCNF (Andhra Pradesh Community Managed Natural Farming): Kharif -2019-20 Report, Mimeograph, Institute for Development Studies, Andhra Pradesh, Visakhapatnam.