

# Community Managed Sustainable Agriculture, Economically Viable, Ecologically Sustainable

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## 1. Introduction

Society for Elimination of Rural Poverty (SERP) is implementing the largest poverty alleviation programme in the country Velugu in the state of Andhra Pradesh. SERP believes that poor have a strong desire and innate ability to come out of poverty. Further they have a strong sense of self help and volunteerism. They are poor on account of various obstacles - social, psychological, political and economic, and it is these obstacles which are suppressing poor people's innate abilities. SERP believes that only by building their own institutions can they unleash their innate energies and come out of poverty. The process of social mobilisation and empowerment does not happen on its own and it needs to be induced.

Velugu comprises of two large World Bank financed poverty eradication projects, and the SGSY programme of Government of India and State Government's Interest Subsidy Scheme. The programme was initiated in the year 2000 in 6 districts and has subsequently been expanded to all the districts in phases. By 2008, the programme covered all villages of Andhra Pradesh and had succeeded in organising 65 lakh women into self-help groups (SHGs). These self-help groups have been federated into Village Organisations (VOs) and the VOs in turn have been federated into Mandal Mahila Samakhyas (MMSs). The Mandal Mahila Samakhyas have been further federated into Zilla Samakhyas. All poverty eradication initiatives are formulated and implemented by these institutions.

The process of mobilization starts with the poor organizing into SHGs of 1015 members to form groups that save together and inter-lend small amounts of money to each other to stimulate household economic activity. The SHGs also collect repayment from the group members. It is this practice of collective thrift and credit that builds an asset base for the poor, disciplines them to work together and gives them confidence. The more the group transactions of saving and lending, the higher the build of social capital and trust in the groups from these repeated interactions.

SERP initiated Community Managed Sustainable Agriculture (CMSA) as a part of its mandate to eradicate rural poverty, since agriculture is the most important means of livelihoods for a majority of the rural poor. This initiative was taken up to address the major causes of agriculture distress - high costs of agriculture, extensive use of chemical inputs, displacement of local knowledge and unsustainable agricultural practices like mono cropping among others.

Agriculture is vital to the economy of Andhra Pradesh, but farming in the state has been fraught with a number of challenges. Seventy percent of the workforce depends on agriculture in the state and generates a quarter of the state GDP. Since adoption of the Green Revolution in the seventies, Andhra Pradesh continues to be one of India's major producers of rice, cotton, groundnut and lentils. However, agricultural growth rate and growth rates of yield of major crops has begun to decline in the last decade.

CMSA is managed entirely by community institutions – federations of selfhelp groups (SHGs), with knowledge and capacity building services from SERP which has supported and nurtured a powerful institutional model of federations of poor women. The village organization is entrusted with overall programme management at the village level and is the center of all CMSA activities in the village, which starts with forming “Sasya Mithra Sanghas”. The Sasya Mithra Sanghas and VOs develop a CMSA plan on capacity building, production, maintaining internal controls and marketing. Mandal level (sub-district) federations monitor implementation, handle extension services, coordinate with service-provider NGOs, and liaison with Department of Agriculture's Krishi Vigyan Kendras (KVKs). District level federation oversees implementation, forms tie-ups for marketing, and coordinates with the District Rural Development Agency to link up with relevant government programs.

Farmers pay registration fee for extension services. Until 2015, Rs. 2.92 Crores was collected as registration fee. On an average, CSMA cost per farmer is Rs. 700 or Rs. 200 per acre per year and the participant farmers fund a small part of it. Eventually, the project aims to move to a self-financed user-fee based extension system.

Village Activist (VA) and Cluster Activist (CA) are the best practicing farmers. VAs are identified by Village Organisation (VO) and Cluster Activists (CA) are identified by Mandal Mahila Samakhyas. Both the VA and CA are responsible for organizing farmer field schools (FFS) and village level capacity building programs. CAs are responsible for managing data and coordinating with line departments.

Table 1: Cost of CMSA Extension System

S.No	Cost item	Amount in Rs. per year
1	Honorarium of village activist	12000
2	Honorarium of cluster activist	48000
3	Subcommittee meetings	24000
4	Total cost	84,000
5	Total farmers in a cluster of five villages	800
6	Registration fee@120 per farmer per year	96,000

## 2. Technologies Promoted Under CMSA

Technologies promoted under Community Managed Sustainable Agriculture (CMSA) are blend of scientifically proven technology, local wisdom, and, farmers' innovations. Over a period of time these technologies are building good ecology where there is a balance between friendly insects and crop pests, and this is leading to reducing the costs on pest management to 'zero'. Following interventions were promoted under Community Managed Sustainable Agriculture (CMSA):

### 2.1 Non Pesticide Management (NPM)

The main principle underlying NPM is that pests can be managed by understanding their behavior and lifecycle. The emphasis is on prevention rather than control. A comprehensive strategy is evolved for pest management. These include: deep summer ploughing, community bonfires, seed treatment, bird perches, border crops, trap crops, yellow and white plates, intercrops, light traps, pheromone traps, delta traps in groundnut, alleys in paddy and cutting of the tips in paddy at the time of transplantation. The above practices are called as 'non-negotiables' and are mandatory for all NPM farmers. The application of botanical extracts is only as a last resort.

Another key part is the Comprehensive Soil Fertility Management. As part of this the focus is on building soil microbial activity. Every crop removes substantial amount of nutrients from soil. However the share of grains would be in the range of 15%. The core principle of natural soil fertility enhancement is to return the crop residues to the soil, either directly or through animal feed route during the crop period. To sustain the productivity level, the nutrients removed by the crop have to be replenish soil nutrients particularly soil carbon. Mulching, incorporation of straw and other crop residues into soil will replenish the soil. Role of earthworms is critical in soil fertility management. Soil is treated as living organism and the focus is on enriching soil health.

## **2.2 Household Nutritional Security Model (36X36 model)**

36\*36 model has been promoted by CMSA as a tool to achieve nutritional security at the household's level. As the crops diversity ranges from tuber crops to fruit crops, from vegetables to pulses, all the nutritional requirements for a family are met. This model is unique as it promotes nutritional security and round the year income to the family, in the smallest land area possible.

## **2.3 Poorest of the Poor (POP) Strategy**

PoP Strategy in CMSA is to facilitate the land lease to the landless laborers and promote CMSA in these lands. 0.5 acre land will be leased in to PoP households, and they undertake SRI paddy cultivation in 0.25 acre and vegetable cultivation in the remaining 0.25 acres. It is designed to achieve two objectives. The first objective is that the PoP family should earn a net income of Rs. 50, 000 in a year and second is that by growing paddy and vegetables the PoP family shall have food security. Apart from selling the produce, they can save something for their own consumption.

## **2.4 Rain Fed Sustainable Agriculture (RFSA)**

Soil and moisture conservation works which include conservation furrows at every 4mts, trench around farm, farm pond and compost pit. Main objective of this intervention is to harvest rainwater and to increase cropping intensity.

## **2.5 System of Rice Intensification (SRI)**

System of Rice Intensification (SRI) is a cost effective and resource efficient method of cultivation of paddy. SRI is promoted to reduce ground water exploitation and to increase yields.

## **2.6 Marketing Premiums for Pesticide Free and Organic Products**

In addition to reducing the cost of production, crops grown without the use of pesticides and fertilizers are commanding higher prices in the market. Although CMSA produce is not certified as 'organic', there is a growing recognition of the benefits of pesticide and fertilizer-free vegetables, lentils and cereals, especially in the urban retail market. The premium in prices fetched is currently in the range of 14 to 33 percent for vegetables, red gram (lentils), chilli and rice. Also this price realization comes directly to the producer without middlemen in between, as marketing operations are handled by the district and sub-district federations.

### 3. Scale of Interventions

Table 2 shows intervention wise number of farmers benefited and the incomes realized by them over a period of time. Total population refers to the population in CMSA villages.

Table 2: Scale of Interventions

S.No	Intervention	Districts	Mandals	Population covered
1	Non pesticide Management and Comprehensive soil fertility management (NPM)	13	392	14,06,044
2	Rain fed sustainable Agriculture (RFSA) in convergence with MGNREGA	13	105	12,450
3	System of Rice Intensification (SRI)	13	392	21,820
4	House hold level nutritional security model (36X36 models)	13	392	40,982
5	Poorest of the poor (POP) strategy	13	250	21,683
6	Marketing premiums for pesticide free and organic products	5	25	10,250

Source: Internal MIS

The key investment in CMSA is not in subsidizing external inputs but to build the knowledge base of the farmers. The idea is to move from the mainstream external input based model to a model based on local resources and knowledge. The knowledge investment refers to knowledge and understanding of local natural resources and how they can be used for seed treatment, pest management, soil fertility management practices etc. Knowledge also refers to understanding sustainable agronomical practices, revisiting or rediscovering traditional wisdom, etc.

In this paradigm, the farmers are encouraged to experiment and innovate and their innovations are shared with other farmers. Respect is accorded to farmer's own initiatives. This approach is different from the mainstream attitude where the farmer is a passive recipient of 'knowledge' produced informal agriculture research stations or universities. It is a very liberating

approach and the momentum in our programme is fuelled by countless innovations of farmers and the pride they take in their ‘research’ efforts.

Farmers upgrade knowledge by sharing, observations and experiments. The transfer of technology is through community based local practicing farmers, which has helped the farmers learn from each other. Farmers Field School (FFS) is the key activity for transfer of technology, sharing of best practices and demonstrating the effectiveness of CMSA techniques. Village activists and cluster activists, who are paid by the communities, facilitate the knowledge sharing processes and are accountable to them. The creation of a community based extension system has made technologies offered by CMSA as an ‘open source platform’ for poor farmers to tap into. These farmers customize and tailor these technologies according to their needs and bring back the knowledge to the Farmer Field Schools. This accumulation of knowledge has catalyzed agriculture from input centric to a knowledge driven activity.

Since 2012, SERP has been engaging Digital Green, a social enterprise to build on its existing extension systems to use digital extension approach to accelerate the adoption rates. The focus has been on low cost and effective peer-to-peer learning processes, thus, empowering women farmers’ households to increase their productivity and incomes in a sustainable manner.

The digital extension system is a technology-enabled means of agricultural extension, which brings together various stakeholders and farmers to produce and share locally relevant information. The project uses videos as a basis for disseminating information on themes such as Non-Pesticide Management (NPM) agriculture practices and institution building approaches. The medium is optimally designed for interpersonal behavior change communication with smallholder farmers, as it overcomes problems of illiteracy. It is an intuitively accessible technology as local farmers convey the advice as well as access information through video.

To blends technology with social organizations such that village-level mediators’ i.e Cluster Activists use locally produced videos to motivate and train small-holding farmers and increases the adoption of sustainable agricultural practices. This, ultimately enhances productivity, lowers input costs and mitigates the effects of climate change. The project derives its impact from integrating an innovative use of appropriate technology into existing, people-based extension systems and improving their effectiveness.

SERP-CMSA functionaries and Digital Green personnel guide communitylevel Video Resource Persons (VRPs) to produce 3-4 videos each month by

modularizing NPM, institution building and related practices into short, 8-10 minute segments. The videos feature local farmers on a variety of topics including testimonials and demonstrations of improved production techniques, market linkages, and government schemes.

Based on the season, at the start of each month a schedule for dissemination of these videos is prepared for each SHG in each of the project villages. Small groups of 15-20 women farmers belonging to self-help groups participate in weekly screenings of the videos, which are mediated by Cluster Activists in an interactive, reflective forum. Following the dissemination of videos the Cluster Activists need to encourage farmers to adopt the relevant seasonal practice.

The flow of information from the project villages is supported by an opensource data management framework developed by Digital Green, called COCO (Connect Online, Connect Offline). This allows relational data to be captured and analyzed in locations with limited or intermittent internet connectivity. Disseminations conducted and the achieved adoptions are reported on fortnightly basis.

The project had reached out to over 1, 71,730 farmers in 2, 159 villages in 13 districts. Over 40 Video Resource Persons from the grass root level were trained and they have produced 128 community videos. 1600 outreach functionaries (of various cadres) have been trained to use these videos through a 'Human Mediated Extension Approach' with 77,665 disseminations (video shows) resulting in 1, 19, 354 adoptions of new practices.

Digital Green is working with SERP-AP to further grass root level process in motivating farmers to form Farmer Producer Groups as well as focus on value chain interventions.

Capacity building is the key component in CMSA. Financial support is only in the form of capacity building and transfer of technology. Components of capacity building includes learning about life cycles of pests and enabling climatic condition for disease prevalence and spreading, farming systems, sustainable use of resources, maximizing output from a unit land area, effective utilization of inputs like seed, organic fertilizers, sun light, water, land etc. Conservation of Renewable Natural Resources and genetic biodiversity both flora and fauna, and SRI in paddy received special attention.

The results of the intervention have been so beneficial to the farmers that there has been an exponential increase in the area under sustainable agriculture. It is an expansion driven by the positive experience of the farmers. CMSA was first piloted in 2004 with only 250 farmers in 10 villages and on 400 acres. It has now reached around 1.4 million farmers in 8,772 villages and 2.2 million acres (gross cropped area) are under cultivation.

CMSA is biased towards SC/STs, small and marginal farmers. As per our estimation total SC/STs in CMSA villages are around 8 lakhs and CMSA covered 5.38 lakhs of SC/ST farmers which accounts for 67.25% of the total SC/ST population and about 90% of the SC/STs who have land.

these is the creation of single - window system, which lowered the transaction cost of adopting the technology, which became an “open source platform” for these farmers. Furthermore, it’s scale – up through community institutions also helped the program acquire “social movement” characteristics. CMSA was swiftly adopted as the results of this technique were quickly visible in terms of farm economics, health and environment.

## 4. Impact of the Project

CMSA is based on the premise that ecologically sustainable agriculture makes sound economic sense. As per the study conducted by Acharya N G Ranga Agriculture University (ANGRAU), farmers through adoption of CMSA methods were able to save Rs. 220 crores per annum by avoiding chemical pesticides and fertilizers. Further ANGRAU reported 8-25% increase in yield depending on the crop. Average net benefit per farmer from different interventions under CMSA is Rs. 9000.

### 4.1 Increased Yields

Third party evaluation done by ANGRAU reveals that CMSA methods enabled the farmers to increase their yields by 1-2 qtls per acre. Table 3 shows increase in yields in different crops:

*Table 3: Increased Yields due to Adoption of CMSA Methods*

S.No	Name of the district	Crop	Increase in yield (qtls/acre)
1	Kadapa	Paddy	2.0
2	Chittor	Paddy	2.5
3	Visakhapatnam	Paddy	2

Source: ANGRAU, Third Party Evaluation Under RKVY in 2011

### 4.2 Increased Savings

Farmers adopting CMSA methods are able to save considerable amounts by avoiding chemical pesticides and reducing chemical fertilizers. Internal studies conducted by SERP-AP reveal that savings range between Rs. 1200/ acre to Rs.16, 000/- acre based on the crop. Table 4 shows crop wise savings by CMSA farmers:

Table 4: Crop wise Savings due to Adoption of CMSA Methods

S.No.	Crop	Total savings (Rs./acre)
1	Paddy	1650
2	Chilies	16,300
3	Red gram	1550
4	Groundnut	1200
5	Cotton	5800
6	Vegetables	200

Source: Internal MIS

### 4.3 Net Additional Income

ANGRAU study in 300 villages in 13 districts reveals that CMSA methods increased net additional incomes to farmers. The net additional incomes range between Rs. 3000 to Rs. 7000 per acre based on the crop. The below table shows the net additional incomes realized by CMSA farmers:

Table 5: Net Additional Income due to Adoption of CMSA methods

S.No	Crop	Net additional income(Rs./Acre)
1	Paddy	5590
2	Maize	5676
3	Cotton	5676
4	Chilies	7701
5	Groundnut	10483
6	Vegetables	3790

Source: ANGRAU, Third Party Evaluation Under RKVY

### 4.4 Reduced Health Risks

CMSA Farmers report a noticeable drop in pesticide related health problems. Women who have traditionally performed the task of spraying the crops and suffered numerous health problems due to the resultant high exposure to pesticides are now strong advocates of the NPM/CMSA movement. A quick survey of three districts has shown that the number of cases of hospitalization due to pesticide poisoning has reduced from 242 cases per year before adoption of NPM to 146 cases per year—a 40 percent drop. Table 6 shows that farmers who have adopted non-pesticide management agriculture have been totally free of pesticide related hospitalisation.

Table 6: Cases of Hospitalization due to Pesticide Poisoning

No of districts	Cases of hospitalization		
	Before NPM	After NPM	
		Inside NPM village	Outside NPM village
3	242	Nil	146

Source: Season End Reports, SERP

## 4.5 Increased Access to Food and Nutrition

Achieving self – reliance and self sufficiency in food production at community level are very important aspects of CMSA. CMSA ensures year round food security. Crop diversity and multistoried cropping systems ensures nutritional security to farm families. Perennial species such as Red Gram, Moringa, Guava and Papaya take care of very critical nutritional requirements for the family throughout the year. Pesticide free produce is integrated into the existing food security scheme.

Poorest of the Poor (POP) strategy enabled 5000 landless labourers to access irrigated land and adopted SRI method of paddy cultivation. This strategy increased availability of food grains at household level. Further CMSA methods enable the farmers to reduce expenditure on food grains.

## 4.6 Lowering of Risk Perception, Increasing Investment in Agriculture

CMSA methods build confidence on agriculture among the farmers particularly in resource poor farmers. SERP conducted a sample study in seven districts. The study reveals that large farmers prefer to give their land on lease to farmers under the CMSA fold. Picture 2 shows number of resource poor farmers taken additional land on lease:

## 4.7 Business Innovation and New Livelihood Opportunities

Village organizations have begun to benefit from jobs and enterprises catering to inputs for sustainable agriculture and by providing services like quality control and procurement of CMSA produce. 6156 jobs have been created in villages through the establishment of Organic Manure Outlets for supply of bio-pesticides and organic nutrients, and agricultural implements hiring centers (custom hiring centers). In addition, about 10,500 small and marginal farmers are generating additional income through the operation of vermi-composting units. Apart from individual benefits to farmers, the most important outcome of this intervention for the society is the positive impact this approach has in enabling farmers to adapt to climate change. When this

approach is taken to scale it can help in mitigating climate change and global warming.

## 4.8 Social Capital

CMSA invested heavily on building social capital and created huge social capital viz Community Resource Persons (CRPs), Cluster Activists (CAs), Village Activists (VAs), subcommittee members etc. Role of social capital is critical for scaling up of CMSA. Village Activist (a practicing farmer) and a Cluster Activist (for a group of five villages, he/she is also a practicing farmer) facilitate the knowledge sharing processes. These practicing farmers are role models, who have adopted CMSA practices successfully in their fields and improved their net incomes. They are paid by the SHG federations, the VOs and the MMSs to work as para extension workers, and are completely accountable to them.

The key benefits of the decentralized extension system, led by practicing farmers and women SHGs, are that the adoption rates of sustainable agriculture practices are very high (above 90%) resulting in drastic reduction in pesticide and fertilizer consumption.

There are 392 state level CRPs, 8772 village activists, 1465 and 1530 subcommittee members are there in the CMSA program. In total 12, 159 trained community level people are available in 13 districts. Services of the social capital created in CMSA are being utilized by National Rural Livelihoods Mission (NRLM) for sustainable agriculture livelihoods programs in Chhattisgarh, Jharkhand, Maharashtra, Rajasthan, Madhya Pradesh, J&K, Haryana and West Bengal.

CMSA is not confined only to provision of extension services. Since it is anchored in the SHG network, members are able to get credit for agriculture, credit for expanding their asset base etc. The setting up of NPM enterprises and custom hiring centres by the VO is another service to the farmer. Many VOs have also set up community seed banks to provide quality seed to the members. Many VOs are providing marketing support. CMSA has promoted decentralised marketing initiatives to obtain market premiums for pesticide free produce. In CMSA there is convergence of existing government schemes like RKVY, NREGS, SGSY, Mahila Kisan Sashkthikaran Pariyojana, National Horticulture

Mission, etc. The most important scheme is the National Rural Employment Guarantee Scheme (NREGS). So far, in 2008 in a short span of four months period, 10,349 compost pits were dug for effective composting and timely supply of compost. 1197 farm ponds were dug to harvest rain water and

recharge ground water. 12,293 Vermi compost units were constructed. Land development activities were taken up to benefit poorest of the poor families. Tank silt application was done in 5246.8 ha of 7,539 farmers. The response of the poor farmers to these interventions has been very positive. In the coming months the programme will intensify and cover many more farmers.

Several ICT tools were used to monitor the program and to reach out the farmers. Robust mobile based MIS for monitoring and decision making. SERP has tied with a mobile software company to build a mobile-based monitoring and MIS gathering system for facilitating better policy decision making at

the State level. Each Cluster Activist is given a mobile with the m-CMSA app and they are responsible for entering the implementation data of various interventions and agricultural details of the participant farmers. This data is collected at the central server and presented as a dashboard and publicly available on the project website.

An SMS-based service has been provided to CMSA farmers to connect them with *mandi* agents and potential buyers in the urban markets in collaboration with Intuit. Farmers are given regular updates on the price offered by various buyers in the nearby *mandi* as well as the nearest urban market. This information has helped the farmers get a better price for their produce by increasing their bargaining power. The transaction time in the *mandi* has also been reduced. This initiative was first piloted in 5 districts and has now been scaled up to 12 districts and more than 25,000 farmers have participated in it.

The Community Managed Sustainable Agriculture Program has gone through several phases since its inception in 2004. In 2004 – 06, piloting was done for proof of concept with 250 farmers in 400 acres in about 10 villages. Farmers used Integrated Pest management (IPM) methods with botanical extracts and technical support was provided by NGOs. During the Incubation Phase between 2007 and 2009, focus was on moving from IPM to Non Pesticide Management (NPM). Non-negotiables for pest management were standardized and movement was towards comprehensive soil fertility management. Farmers started adoption of non negotiable developed under NPM and stopped using chemical pesticides.

In the Rapid Expansion Phase between 2010 and 2014, the program was expanded into new mandals and villages and also several new concepts were introduced in the program. Mandal Mahila Samakhyas started owning up the programme. New concepts like soil and moisture conservation activities, household nutritional security models (36X36 models), System of Rice Intensification, Poorest of the Poor strategy (1/2 acre irrigated land lease

model), organic certification through Participatory Guarantee System (PGS) etc. were introduced in the program. Farmer Field Schools were stabilized. ICT tools like mobile based MIS system, digital extension were brought into the program. Samakhya were assisted by para professionals and community resource persons. Program was supported by Government of India through Mahila Kisan Sashikaran Pariyojana (MKSP). Huge investments were made on building social capital.

In the Stabilization Period between 2012 and 2015, geographical expansion is stopped. Focus is on quality improvement of the program. Social capital built in the program is being used to spread the concept at the national level through National Rural Livelihoods Mission (NRLM).

## **5. Augmenting CMSA for Next Generation Livelihoods Pathways**

From 2015 onwards, CMSA has moved into next phase of building Farmer Producer Organizations (FPOs). Farmers in 110 mandals are being organized into Farmer Producer Organisations (FPOs) under World Bank supported Andhra Pradesh Rural Inclusive Growth Project (APRIGP). Farmers are being mobilized into Farmer Producer Groups (FPGs) and these groups will be federated at mandal level as Farmer Producer Companies. Focus is now shifting from production systems to value chain investments. Partnerships are built along the value chain. Private players have been roped in to support the farmers in production, post-harvest management, value addition and marketing of their produce.

With proven impacts on productivity, income, nutrition, jobs and ecological benefits, Community Managed Sustainable Agriculture has emerged as a very powerful tool for poverty eradication. Society for Elimination of Rural Poverty is now making serious efforts to ensure direct benefits to the poorest of the poor households by adopting innovative approaches under CMSA such as mobilising the CMSA farmers into producer companies and linking them to markets through private sector partnerships and value chain investments. CMSA has the potential to bring sustainability in agriculture and agriculture based livelihoods.