

## PARTICIPATORY RURAL APPRAISAL APPROACH FOR THE IDENTIFICATION OF THE PROBLEMS AND DEVELOPMENT OF VILLAGE AGRICULTURAL DEVELOPMENT PLAN OF SAALAIVEMBU VILLAGE

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### Abstract

Successful research programmes can be proposed after understanding the grassroot problems faced by the farmers for which participatory rural approach paves way. The present study was carried out in Saalaivembu village of Coimbatore district. The PRA tools used include transect walk, agro-ecological mapping, social mapping, time trend, seasonal calendar, gender analysis, time line, livelihood analysis, technology mapping, consequence diagram, problem – solving tree. Around eleven major problems were identified among which Labour scarcity, Wild animals problem and Pest problem in Banana were ranked first three position. The action plans for the various problems were formulated by the researchers which would serve as solution for the problems faced by the famers.

**Key words:** Agro-ecosystem analysis; Participatory rural appraisal; Problem identification; Field experience training

**Introduction** Despite the unprecedented economic growth in recent past marked by industrial and services output, agriculture remains dominant sector of Indian economy, as over 70 per cent of the population earn their livelihoods from agriculture and its allied sectors. The climatic condition in India is perfectly suitable for agricultural activities and has been one of the major reasons behind people choosing farming as their principal occupation. In the contemporary period, the change in the climatic condition has made this occupation as a challenging task. There are other reasons like impact of trade liberalization and globalization, degrading natural resources has created a disinterest of rural youth in agriculture (Basavarajappa and Rajkumar 2016). The report from the National Commission of farmers is alarming, which states that “given a chance, 40 per cent of the Indian farmers wanted to quit agriculture and moved to secondary and tertiary sector for their livelihood”, implied in this statement are the facts that valuable agriculture lands are being converted for attractive business enterprises (Rajgopal, 2005).

Learning the present scenario of Indian villages will help the agricultural scientists working throughout the country to carryout a need based research. There is a need of special tools to understand and gather information from the farmers. PRA is the use of hands on methods such as participatory mapping and diagramming resources flows, which are through to over-come communication barriers that may exist between outside researchers and community members (Freudenberge, 1999). Chambers (1992) described the features of PRA methods: a reversal of learning, to learn from rural people; learning rapidly and progressively with flexible use of methods, improvisation and cross checking; offsetting biases; optimizing tradeoffs between quantity, relevance, accuracy and timeliness; triangulation and cross checking and seeking diversity. As a part of training for newly recruited scientist undergoing field experience training is mandatory to learn the real farmer’s situation. The present work was carried out with the following objectives,

To gain insights in to the dynamics of agriculture-based village agriculture development planning.

To inculcate multi-disciplinary perspective, teamwork culture, and empathy towards needs and aspirations among scientist-trainees.

To develop Village Agricultural Development Plan.

### Methodology

The ARS probationers scientists underwent 21 days FET (Field Experience Training) programme at KVK, Karamadai of Coimbatore district (Tamil Nadu) during August, 2016. After rapport building with villages and other stakeholders, Focused Group Discussion was conducted with the progressive farmers, KVK officials, and line departments at the village.

**Data Collection:** The primary as well as secondary data were collected to get insight of the village facilities and to develop a sound workable Village Agricultural Development Plan. Different PRA tools and a semi structured questionnaire were used to collect both primary and secondary data of the village from the Assistant Director of Agriculture, Assistant Director of Horticulture, concerned Agricultural Officers, and the villagers.

**PRA Tools used:** The PRA tools used include transect walk, agro-ecological mapping, social mapping, time trend, seasonal calendar, gender analysis, time line, livelihood analysis, technology mapping, consequence diagram, problem – solving tree. Diagrammatic charts of each tool were made in association with opinion leaders of the village. Transect walk was made with villagers across the village and data regarding topography, soil type, land use pattern, major crops, trees, livestock, cropping pattern, technologies adopted, socio-economic and cultural settings and agricultural problems were compiled and analyzed.

**Problem Identification:** The major problems identified in the village Salaivembu were found out during Focus Group Discussion and with the help of 20 progressive farmers of the village. These problems were prioritized using a method called Rank Based Quotient (RBQ) given by Sabarathnam (1988). The formula as follows:

$$RBQ = \frac{\sum_{i=1}^n f_i(n+1-i) \times 100}{N \times n}$$

Where, i = Concerned ranks, N = Numbers of farmers, n = Numbers of ranks,

f<sub>i</sub> = Frequency of farmers for i<sup>th</sup> rank of the technological need

### Results And Discussions

The name Saalaivembu was originated from two words; Saalai – Road :Vembu –Neem which means abundance of neem trees in both sides of the roads. The average rainfall of the village is about 700mm

with a RH of 25-60%, temperature ranges between 14°C – 37°C. More than eighty per cent of the villagers earn livelihood from agriculture. In comparison to nearby villages, this village is less developed due to poor infrastructure and lower technology adoption which gives ample scope for intervention in the village related to agriculture and allied sectors.

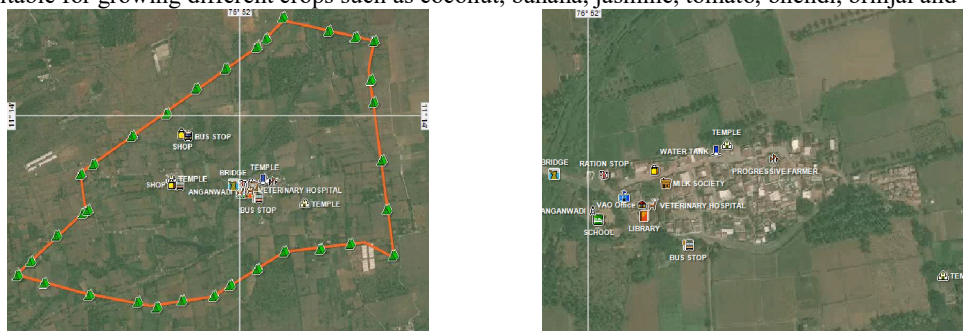
The transect walk was carried out from north west towards the south east direction of Saalaivembu village along with key informants covering an area of around 10 km<sup>2</sup>. During transect each person of the group identified the researchable areas and allied problems corresponding to their respective fields of specialization. While

carrying out the transect walk at most care was taken in noting down the GPS location of the various natural, social and the other resources present in the area together with the boundary points. The details are presented in Table1.

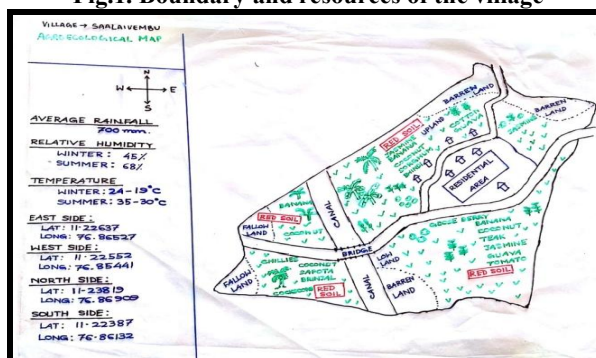
**Table 1. General transect of Saalaivembu Village**

Criteria	Low Land	Up Land
Soil	Red Soil	Red Soil
Topography	Steep	Steep
Crops	Tomato, Okra, Chilli, Banana, Coconut, Jasmine	Cotton, Teak, Banana, Coconut, Jasmine
Livestocks	Cattle, Goat	Cattle, Goat
Water Source	Tube Well, Bore Well	Bore Well
Weeds	Prosopis, Manjanethi, Clitoria, Calotrophis	Parthenium, Tridex, Lantana camara, Prosopis, Manjanethi, Clitoria, Calotrophis
Diseases	Banana: Leaf spot Coconut: Wilt Jasmine: Bud necrosis	Banana: Leaf spot Coconut: Wilt Jasmine: Bud necrosis
Pests	Banana: Stem weevil Coconut: Rhinocerus beetle Tomato and Brinjal: Peacock and wild animals	
Fauna	Peacock, Boars, Rats and Snakes	
Engineering intervention	Tractor, power tiller, cultivator, rotavator, sprayer, drip irrigation, electric fences, solar light panels.	
Problems	Low yield due to pests and diseases, Labour shortage, wild animals, wind damage in banana.	
Opportunities	Development of Resistant Varieties, Custom hiring for avoiding labour shortage at peak crop season, Development and use of eco-friendly chemicals and biocontrol agents, Community based approach for the control of wild animals, Planting of wind breaking trees around the field	

The village boundary and infrastructure are depicted in the Figure 1a & b. Saalaivembu is bestowed with natural flora and fauna with good climatic conditions suitable for growing different crops such as coconut, banana, jasmine, tomato, bhendi, brinjal and cotton.



**Fig.1. Boundary and resources of the village**



**Fig.2. Agro ecological map of Saalaivembu village**

Besides these, almost all households own cattle, goat and backyard poultry. The wide variability in crops and livestock resources makes the village suitable for different farming practices like integrated farming system, organic farming etc. However, red soil with alkaline characteristics causes difficulty cultivation of crops which results in lower productivity and thus lower net income to the farmers in most

of the time. There were 151 families all engaged in agricultural sector.

**Agro ecological map:** Saalaivembu village map was drawn to identify the various agro ecological zones present in the village (Fig.2). Special emphasis was given to mark the various topographical areas, cropping systems and crops, soil types, water

bodies, weeds, water sources and irrigation system, livestock, trees and other aspects related to agro ecology. Average temperature, rainfall and relative humidity of village are 21.5°C, 700 mm and 57% respectively. The village can be classified into low land and uplands, dominated by red soil.

**Resources in the village:** The village is connected with the nearby places and Coimbatore market through roads. Bike, tractor, cars and tempo are the vehicles in the village for transport. Mobiles and TV are found in most of the households whereas villagers have not yet adopted latest communication technology like internet. Also basic facilities like health centre and medical shop are also not seen in the village. In terms of farm implements, villagers are quite advanced with tractors, sprayers, cultivators and rotavators. But, storage and processing facilities are not yet been introduced in the village. Use of bore wells (25 numbers) also found in considerable number in the village.

**Social system of Saalaivembu village:** The social structure of the village indicates that Backward (Okkalikkar) and Most Backward communities (Valayar) are living together in village. The village leaders are generally from these two communities and leadership is based on consensus in most of the cases in panchayat elections. The Scheduled Caste community lives separately in one colony. SC community people are mostly landless labourers goes for work like coconut climbing, jasmine flower picking, weeding etc. Most of the villagers are engaged in agriculture and livestock rearing and only few people go to work outside especially to Indian Tobacco Company (ITC) situated near to the village.

There are three registered Self Help Group in the village operating for more than 15 years. However, they are not undertaking any commercial group activities apart from the savings. One dairy cooperative society is working on the centre of the village, which is run by the villagers themselves. One anganwadi and one primary school are present in the village whereas there is no agricultural office present. Veterinary doctor will be available once in a week in veterinary clinics centre which is held centre of village.

Majority of the population residing in Saalaivembu gives greater importance to education as observed by the high literacy rate (80%). The youths and younger generations are well educated. However gender discriminations are present, dominated by male. Most of the families are joint families; nuclear families are very much less forming just 9 per cent of the village population. The village is also not an exemption from social evils like alcohol consumption, cigar smoking and dowry system.

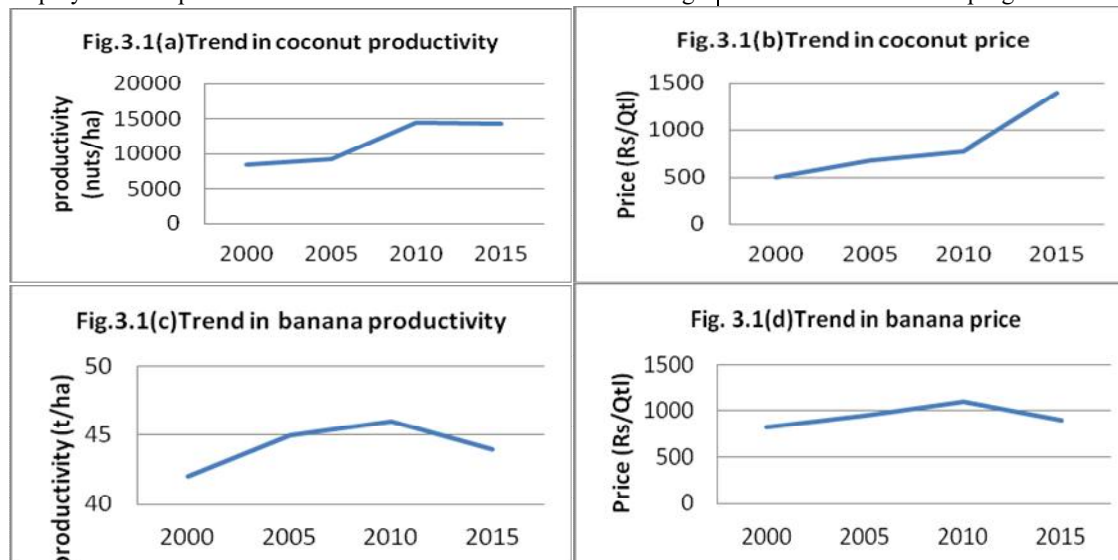
Rural youths don't want to remain in agriculture, and they goes to Coimbatore or other cities in Tamilnadu and even outside the state for employment. At present there is no financial institution in the village.

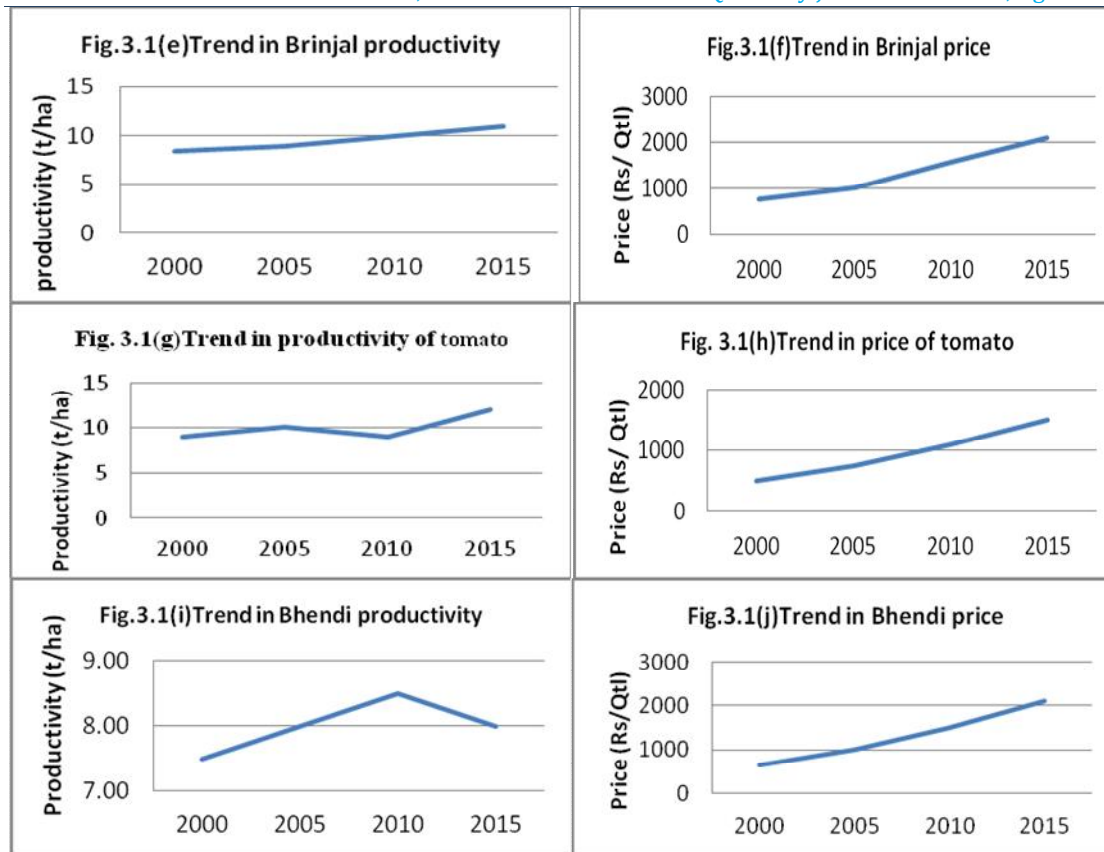
Villagers are mostly averse to credit facility from the banks. Villagers burrow money from the relatives and repay it on harvest of the crop. They also get all agriculture inputs from dealers on credit basis and repay it on harvest of the crop.

In Saalaivembu village, private agricultural shop in Karamadai plays a vital role in providing seeds, fertilizer and some plant protection measures information. Jasmine scent factory, sharada textiles are also important to villagers as they have by back arrangement with the villagers. Surprisingly, state agricultural department and KVK have only little influence in the village as perceived by the farmers.

**Time line of the village:** Time line is used to know the history of major remembered events in community and their significance which also indicates the casual link between past and present. The purpose of this tool is to obtain historical accounts of changes in demography, socioeconomic, communication, social relationship and interaction, technology diffusion and adoption, information regarding the important such as like the development in agriculture, animal husbandry. From the time line of agriculture of Saalaivembu, it was evident that the speed with which villagers adopt the new technologies and services is slow. The village was established during 1816. Though electricity came in 1960, other facilities like television, computer were came lately as compared to other villages. As we move on to the twenty first century, internet has not yet get placement in the village. Being abundant with cattle population, Veterinary hospital was introduced lately in the village in 2015, where there is no agriculture office established till now. This is one of the lacunas that we have observed in the village where more than 70 per cent of the people make lives out of agriculture. Initially paddy (varieties like IR-8, IR-20 & IR-50) was cultivated in the village and the people shifted to cotton and vegetable cultivation followed by the drought in the year 1974. Now the villagers have shifted to banana and jasmine due to the market facilities available and few areas are covered by vegetable cultivation. Bore well is the major source of irrigation at present which was introduced after the drought in 1992.

**Time trend:** Time trend was examined in productivity and price of different crops to understand the progress in the cultivation over the period and also to get the idea about price fluctuations (Fig.3a- 3j). This would help in putting lights in the improved farming practices that result in higher productivity and higher net income. Even though coconut productivity in the area is higher as compared to other states, productivity has stagnated after 2010. This can be attributed to the higher number of old palms in the area. Price of the coconut has increased significantly over the span of 15 years. Similarly, productivity and price banana also revolved around 30 t/ha and 600 Rs/Qtl over these years. Other vegetables like bhendi, brinjal and tomato also not showed progress in the productivity over these years.





**Fig.3. Time trend of major crops in Saalaivembu village**

**Note: prices are based on the wholesale market at Karamadai and Coimbatore**

**Gender disaggregated seasonal calendar:** Seasonal analysis helps in identifying the period which are critical in respect of labour demand, pest and disease problems, non-availability of fodder during dry months. It is clear from the table 2 that most of agricultural operations are performed by both men and women. Farmers are busy throughout the years in the case of jasmine cultivation. It is also clear from the table that in the kharif season farmers mainly focuses on cultivation of vegetable like tomato, okra, brinjal and chillies. It is also observed that farmers are relatively free in the rabi season. Some operations like weeding, flower picking are done in these period.

**Table 2. Gender disaggregated seasonal calendar for major crops**

Particular	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept
Jasmine	FP (B)	FP (B)	W (F)	P (M)	P (M)	W, FA(F), (M)	W (F)	FP (B)	FP(B), FA(M)	FP (B)	FP (B)	FP (B), FA(M)
Banana	PL (M)	PL (M)			W(F)	W(F)	W(F)			H (M)	H (M)	H (M)
Cotton							S (B)	S(B)	S (B)	W (F)	PK (B)	PK (B)
Brinjal								S (B)	S(B) & TP (B)	W (F)	H (B)	H(B)
Bhendi									S(B)	W (F)	H (B)	H(B)
Chillies	H(B)	H(B)							S(B) & TP (B)	S(B) & TP (B)	W(F)	W(F)
Tomato							S(B) TP(B)	S(B) TP(B)	ST(B)	ST (B)	H(B)	H(B)
Guards				S (B)	W(F) T(M)	T (M)	H(B)	H(B)				

FA- Fertilizer application, H- Harvesting, PK- Picking, S- Sowing, W- Weeding, FP- Flower picking, PL- Planting, T- Trailing, ST- Staking; F- Female, M- Male, B- Both

**Seasonal analysis: Problems in major crops:** Seasonal analysis was carried out to identify the major problems faced by villagers in raising crops and livestock (Table 3). Rhinoceros beetle attack is severe in

the kharif season in coconut which was observed in more than 80 per cent of the palms in the area. The pseudostem weevil attack and leaf spot in the banana are the problems faced by the farmers. Shoot and fruit borer causes problems in brinjal in kharif season. Also, bhendi fruit malformation reduces the profitability of the farmers. Seasonal analysis also revealed that establishment of bird scarers in the field

could control pea cock attack to some extent. Chilli fruit borer, cotton ball worm, tomato leaf curl virus are the commonly found problems in the area. Bud worm attack in Jasmine causes considerable reduction in income of the farmers in the village. Foot and Mouth Disease (FMD) is the major problem in cow which point out the lack of proper vaccination programme in the village.

**Table 3. Seasonal analysis of major problems in crops of Saalaivembu village**

Particular	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept
Jasmine	Bud worm		Phyllody						Bud worm			
Coconut									Rhinoceros beetle, tanjore wilt			
Banana									Pseudostem weevil, leaf spot			
Cotton												Ball worm
Brinjal										Shoot and fruit borer		
Bhendi											Fruit bending	
Chillies	Fruit borer											
Tomato									Peacock attack , leaf curl virus			
Cow	Foot and Mouth Disease											

**Technological diffusion in the village:** The details of different technologies and their status are depicted in the following table (Table 4). In banana, Rasthali variety is over adopted due to its unique fruit quality and aroma, shorter duration and resistance to diseases. In tomato star 9009 was rejected due to its susceptibility to disease and longer shelf life. Another variety sivam was discontinued due to low yield and susceptibility to disease. OH-102 is the over

adopted variety in bhendi as it having short duration and resistance to yellow mosaic virus and also have higher yield. CO-2 pithi, a mutant of CO-1 pitchi is the widely cultivated variety of jasmine in the village. Holstein friesian and jersi are the common cattle breed adopted in the village. In the case of goat, indigenous and malabari breed are raised in the farm.

**Table 4. Technology adoption status of the village**

Sl.No	Crop	Variety	Status	Reason
1	Banana	Nendhran	A	High yield, less duration, less production cost, highly susceptible to banana bract mosaic virus, nematode
		Robusta	A	high yield, highly susceptible to sigatoka disease.
		Rasthali	OA	Resistant to disease, short duration, susceptible to Fusarium wilt, unique fruit quality with good aroma
2	Tomato	Sivam	D	Less price, Low yield, susceptible to disease
		Lakshmi	A	Good yield, resistant to disease, drought tolerant
		Amrutha	OA	High yield, good keeping quality, tolerant to leaf curl disease
		Star-9009	R	Long shelf life, Susceptible to disease and medium maturity duration
3	Bhendi	Green gold	A	Tolerant to yellow vein mosaic disease, long fruits with dark green color, profitable
		Mono	I	Tender fruits, resistant to disease, highly responsive to micronutrient application
		OH-102	OA	Tolerant to yellow vein mosaic virus, High yield, good reflusing and easy picking, short duration, Regular picking
4	Jasmine	CO-1 pitchi	A	Clonal selection from germplasm, highly suitable for loose flower production and oil extraction, low yield
		CO-2 Pitchi	OA	Induced mutant from CO-1 Pitchi, bolder pink bud with long corolla tube, more fragrance, tolerant to phyllody disease, high yield
5	Cow	Holstein friesian	A	High milk yield
		Jersi	A	High milk yield
6	Goat	Indigenous breed	A	High market value and low maintenance cost
		Malabari	A	Good milk yield, good for meat purpose
7	Cow	Holstein friesian	A	High milk yield

A- Adopted; I- Introduced; OA- Over Adopted; R-Rejected; D- Discontinued

**SWOT analysis of Saalaivembu village:** Major strengths of the village are well connectivity to nearby villages and markets, higher literacy rate, proximity to the research institutions like Tamil Nadu Agricultural University (TNAU), Sugarcane Breeding Institute (SBI), Central Institute of Cotton Research (CICR), presence of extension agencies like KVK and State department of agriculture. Whereas weaknesses are labour scarcity, fragmented land holding, lack of extension reach, low level of knowledge about new technologies and government schemes. As large area is under coconut plantations in the village, export of coconut and processing unit for coconut based

product has large scope. There is ample scope for tender coconut water. There is also good scope for drying of coconut units. There is good potential for setting up small scale coconut oil extraction units in the village. As the Coconut oil producing companies are demanding copra, dried coconut, there is growing demand for drier unit. Formation of SHGs, FIGs, contract farming arrangement, establishment of coconut and banana value addition based processing industry, and other agro based industries are the scope lying in the village. There is a milk cooperative society working in the village which can be upgraded to processing plant. However, migration to urban cities, problems of pest, disease and wild animals, lack of

interest in farming, land fragmentation are the major threats faced by the village for further development.

Through the PRA techniques major problems faced by the farmers were identified which are presented in table 5 and table 6. The major policy and research gaps found in the village are labour scarcity, Wild animals problem, lack of awareness about government schemes and new technology, fluctuation in market prices, lack of training facilities, lack of institutional support, lack of storage facilities, problem of water scarcity, pest problem in banana, pest problem in coconut, problem of Prosopis juliflora tree.

**Table 5. Major problems identified in the village**

Categorization of problems			
S.No.	Problems	Rank	Category
1.	Lack of institutional support	IX	Developmental( policy gap)
2.	Wild animals problem	II	Developmental (Policy and infrastructure gap)
3.	Fluctuation in market prices	V	Developmental ( Policy gap)
4.	Lack of storage facilities	X	Developmental ( Infrastructure gap)
5.	Labour scarcity	I	Developmental ( policy gap)
6.	Problem of water scarcity	XI	Developmental and Researchable (Policy and research gap)
7.	Pest problem in Banana	III	Researchable ( Research gap)
8.	Pest problem in coconut	VI	Researchable ( Research gap)
9.	Lack of awareness about government schemes and new technology	IV	Developmental (Extension gap)
10.	Lack of training facilities	VII	Developmental (Extension gap)
11.	Problem of Karovelem tree	VIII	Researchable (Research gap)

**Table 6. Top problems as perceived by the farmers**

Problems	Ranks (N=40)										
	1	2	3	4	5	6	7	8	9	10	11
Labour scarcity	25	10	5	-	-	-	-	-	-	-	-
Wild animals problem	20	15	3	2							
Pest problem in Banana	14	10	8	8							
Lack of awareness about government schemes and new technology	11	8	7	4							

#### STRATEGIC SOLUTIONS FOR PROBLEM MITIGATION:

**Labour scarcity:** At state government level, farmers can go for custom hiring and NAM reforms and at Central government schemes like MNREGA reforms, investment in R&D and Role of farmer in 'Make India' can be utilized.

**Wild animals:** Development and implementation of Community-Based Conflict Management (CBCM) model. CBCM allows farmers to use simple, low-cost crop guarding techniques such as trip alarm bells, Burning 'Chudi'- 10 ft high grass bundle filled with red chilli pods, tobacco and coconut shells, Crackers, Swinging fire balls and Bed Scare.

**Pest problem in banana:** Development of in-situ, cheaper and quick detection molecular technologies for testing pathogens in the planting material by farmers themselves, improving the substrate dynamics of banana growing soils to reduce the predisposition of plants to pathogen attack.

Development of varieties with durable resistance against Plant disease and cultural practices like avoiding monoculture and following crop

rotation with vegetable crops should be followed. Development and supply of certified disease free planting material. Optimum use of Fungicides/Insecticides, Cultural practices and bio-control agents for reducing the pest damage as well as to maintain ecological integrity.

#### Conclusion

The information collected in the village Salaivembu through various PRA techniques were in helpful in bringing out various plan for the development of the village. The social scenario is evident that this village calls for improvement in many sectors. The villagers are still deprived of new technologies, adoption of which can improve their socio-economic status. This clearly highlights the fact that it's not just the dumping of technologies or information on farmers' field but also the proper institutional policy and support in the form of better input & output market and infrastructure that has to be considered in order to make farming a profitable venture. Considering the increasing risk involved in agriculture, efforts should be made to diversify the farm enterprises of small and marginal farmers to have a sustainable farming system thereby to double the farmer's income.

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