



Report on Field Experience Training



At

**KVK, Mohol, Solapur
(07-08-2015 to 28-08-2015)**

Submitted by:

Bibwe BhushanRatnakar

Phuke Rahul Madhavarao

Paramesha,V.

Kumaranag, K. M.

SmrutirekhaMallick

Gomathi P.

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With regards

Bibwe BhushanRatnakar

Phuke Rahul Madhavarao

Paramesha, V.

Kumaranag, K.M.

SmrutirekhaMallick

Gomathi P.

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1. INTRODUCTION

1.1 Indian Agriculture

Modern agriculture is considered as solution to solve the problem of food insecurity in the country to meet the food demand of burgeoning human population. Agriculture contributes only about 13% of India's GDP, its importance in the country's economic, social, and political fabric goes well beyond this indicator. About forty-nine per cent of Indian population still depend on agriculture and allied activities for their livelihood.

The new and diverse challenges and constraints of growing population like increasing food demand, natural resource degradation, climate change, new pests and diseases, stagnated growth in farm income, increase in cost of cultivation and new global trade regulations demand a paradigm shift in formulating and implementing the agricultural research programmes. The emerging scenario necessitates the institutions of ICAR to have perspective vision (Vision-2030) which could be translated through proactive, novel and innovative research approach based on cutting edge science.

The green revolution has brought sharp rise in food grain production during 1970's enabled the country to achieve self-sufficiency in food grains except mainly in cereals but we didn't achieved self-sufficiency in pulses and oilseed even today. Green revolution contributed much to reduce the poverty in rural areas by increasing food production and by enhancing rural employment thereby the purchasing power of rural population is increased and leads to change in living standard of farm families. However, the slowdown in agricultural growth over the year has become a major concern. In the new millennium, the challenges in Indian agricultural sector are quite different and diversified from those faced in early decades after independence. The enormous pressure to produce more food per unit land area and shrinking resource base is a tough task for farmers as well as agricultural scientists at present and in future. To keep up the momentum of agricultural growth a careful economic evaluation of critical inputs like seeds, fertilizers, irrigation sources etc. are of major importance. Public investment in irrigation, market, education, communication, health, sanitation and other rural infrastructure, research and extension together with improved crop production practices has significantly helped the country from food deficit to food surplus.

In this context, Participatory Rural Appraisal (PRA) is an important tool to find out location specific problems and researchable issues, and to come up with possible solutions for both short and long-term benefits. PRA is a good exposure for the trainee scientists to understand the problems faced by farmers by allowing them to think at an individual level in his/her area of interest for necessary intervention. PRA also provides an opportunity to the

farmers to analyze their livelihood issues.

PRA is an exercise that deals with temporal and spatial issues in agricultural activities. Spatial information supplies database about soil type, natural resources, land use, land pattern, water source and topography of different life supporting system. Temporal data helps in seasonal analysis, adoption behaviour and awareness about the new technologies with human dimension helping to understand the facts regarding participation, gender issues, disaggregation, cultural values and ethics of the people of the study areas.

As a part of 102ndFOCARS (Foundation Course for Agricultural Research services) training programme offered at NAARM, Hyderabad, we the ARS scientists (Probationers) had undergone 21 days FET (Field Experience Training) programme at KVK, Mohol, Solapur(Maharashtra) from 08-08-2015 to 28-08-2015. This Field Experience Training (FET) report has been prepared by multidisciplinary team of six members from different disciplines namely Plant breeding, Agronomy, Entomology, Animal physiology, Fisheries resource management and Agricultural process engineering. The information collected under different PRA tools is presented in different sections of this report.

During this period, we have assessed the agricultural situation in the village, the felt needs of the farmers, resources available, livelihood, technology adoption, rejection and transfer process, problems faced with prospects related to agriculture and animal husbandry, opportunities and research strategies that need to be addressed for the issues identified. A brief report of the work done during the period is presented in the following pages.

2. OBJECTIVES OF THE FIELD EXPERIENCE TRAINING (FET)

The overall objective of the FET is to provide the ARS probationers the opportunity for gaining first-hand experience and an insight into agricultural and rural development scenario in general and the problems of the farming community in particular. It also provides an opportunity to the young scientists to have an insight about the various complex interactions of agricultural research with production, processing, value addition and marketing systems in the rural areas.

The specific objectives of the FET are:

1. To provide an opportunity to the trainee scientists for interaction with the farming community and to get an insight into their ways of living, needs, resources, priorities, problems and prospects.
2. To enable the trainee scientists to understand the adoption profile of farming community.

3. To provide an opportunity to the trainee scientists to understand the technology adoption and diffusion process and the factors associated with adoption and related concepts.
4. To provide an opportunity to the trainee scientists to understand the extension system and transfer of technology (TOT) operating in the village.
5. To provide an opportunity to the trainee scientists to gain an insight and appreciation about indigenous technical knowledge (ITK) of farmers and to generate appropriate technologies if scientifically valid.
6. To enable the trainee scientists to discuss the problem and identify field related problems.
7. To inculcate the culture of teamwork and multi-disciplinary perspective among scientist-trainees.
8. To study socio-economic implications and consequences of technologies, products and processes.
9. To generate a detailed account of technology products and processes used by producers with respect to production scenario, problems, opportunities, and futuristic approaches.
10. To provide comprehensive insight into the role of private industry and other stakeholders in value chain.

3. PARTICIPATORY RURAL APPRAISAL (PRA) TOOLS

Participatory Rural Appraisal (PRA) is a systematic, semi structured activity conducted on site, by a multidisciplinary team. It is basically a bottom to top approach of learning rural life forms with and by rural people. Due to active participation of community members as well as scientists, PRA has become a useful method to focus attention on people, their livelihood and relationship with social and economic factors. It is a good technique to help the community members make an appraisal of their livelihoods and issues related to it.

Diverse information is collected during PRA using a number of techniques. This information is verified by triangulation among various key informants (KI's) in addition to on-site observation by the team members. The various techniques used by the FET team to collect information are as follows:

1. Direct observation, collection and verification of primary data.

2. Collection of secondary data from Panchayat members and officials of the State Dept. of Agriculture, Horticulture and Veterinary.
3. Semi structured interview by raising some general issues to motivate villagers' participation in different aspects of the village.
4. Collection of detailed views by approaching some representative key informants.
5. Use of snowball technique to know more about some specific issues.
6. Participatory mapping for rapport building, easy interaction and spontaneous involvement.
7. Seasonal analyses to understand different time bound farm activities, problems and opportunities throughout the year.
8. Problem identification and preference ranking to identify the top most problems and preparing solution plan accordingly.

4. FET METHODOLOGY

The FET is a learning process. It is firmly anchored on the principle of “**seeing is believing**” and “**learning by doing**”. FET has three phases. In the first phase, the village for PRA work was selected in consultation with the FET coordinator, Dr. Dinesh Nandre, Programme Coordinator, KVK, Mohol. We selected the village Konheri in Mohol, Solapur District of Maharashtra located at a distance of 17 km from Mohol.

In Konheri, we identified three main Key Informants (KI's) Mr. Nivruti Mahanava, Mr. Devdas Deokate and Mr. Popat Shelke, progressive farmers of the village relevant to the PRA techniques. We walked in a team along with the main KI's, interacted with other KI's and villagers, observed the livelihood and noted the information. For each PRA technique up to three to five KI's were selected. Interaction with KI's was initiated from the semi-structured questionnaires and then branched as per need. The given information by one KI was triangulated (verification) with other KI's and on the spot analysis.

In the second phase of FET, we visited and interacted with various stakeholders like Village Administrative Officer, AAO, (Assistant Agricultural Officer), ADA (Assistant Director of Agriculture) and Veterinary Officer and SMS from KVK Scientists. The interaction with stakeholders also helped to understand the agricultural problems and prospects in the village and to prioritize the major agricultural problems. With this information we conducted village seminar on 19th August, 2015 to discuss these major agricultural and livestock related problems and also suggested some possible measures. We obtained feedback from the farmers and the scientists, in the light of which the action plan

was prepared.

In the third phase, we organized industrial visit related to the livelihood of villagers to understand the industrial scenario prevailing in the area. We have visited Loknete sugar industry in Mohol, Solapur and Shivamrutmilk processing plant at Akluj in pandharpurtalukwith regard to basic enterprises identified in the village. We also visited MPKV, Rahuri to know the various research and extension activities carried out related to agriculture, horticulture and in veterinary fields. In final phase, we organized institute seminar at KVK, Mohol, Solapur on 24th August 2015. We obtained suggestions from the specialists from specified fields in the light of which the action plan was modified and proposed.

5. PRA TECHNIQUES USED IN THE VILLAGE

PRA is a research technique developed in early 1980's as an alternative and complement to conventional sample survey. PRA is a way of learning from and with farmers to investigate, analyze and evaluate constraints and opportunities and to formulate research plan to address the problems. The complexities of problem involved in agriculture can be understood through PRA and hence, it is a system approach for systematic and rapid collection of information.

The principle and methods of PRA was adhered for gathering information on 21 topics.

1. Basic information about the village
2. Village Transect
3. Mobility Map
4. Time Line
5. Time Trend
6. Seasonal Calendar and Seasonal Analysis
7. Bio-Resource Flow
8. Daily Activity Profile
9. Agro-Ecological Map
10. Resource Map

11. Social Map
12. Indigenous Technical Know-how (ITK)
13. Technology Map
14. Matrix Ranking
15. Venn Diagram
16. Wealth Ranking
17. Livelihood Analysis
18. Problem Identification and Prioritization
19. Consequence Diagram
20. Problem-Solution Tree
21. Action Plan

6. FINDINGS

The analyzed results of various PRA techniques done in Konheri village in Moholtaluk of Solapur district of Maharashtra were given below.

6.1 Basic information of the Village

Key Informants (KIs): BhimaGanjale (Sarpanch's husband), ShatruganKamble (Clerk), NivrutiMahanava, Suresh Dhane (AAO), PopatShelke

The basic information about Konheri village was collected from villagers (KIs), which constituted the primary data. The secondary data related to the population (demographic), livestock, cropping pattern and technological data was also collected from the Agriculture Department, Panchayat office, Land Revenue Department and School. The primary and secondary data collected from different sources was then validated by triangulation with different stakeholders.

Village Name: Konheri
 Village Panchayat: Konheri
 Taluk : Mohol
 District: Solapur
 State: Maharashtra

Village Boundaries

East: Mohol, Chikhali
 West: Papri, Devadi
 North: Wadachiwadi
 South: Pennur

Area

Total geographic area: 2087.86 ha

Net cultivable area: 1588.52 ha

Irrigated area: 816.74 ha

Rainfed area: 771.78 ha

Demographic pattern

Total population: 3643

Male: 1928

Female: 1715

Backward Classes: 1200

Other Backward Classes: 529

Scheduled Caste: 200

Schedule Tribe: 500

Muslim: 100

General: 3

Agricultural scenario

Number of open wells: 395 (Registered)+200(Non Registered)

Number of bore wells: 91 (Registered)+ 1000 (Non Registered)

Well irrigated area: 709 ha

Bore well irrigated area: 513 ha

Common property land area: 39.92 ha

Number of Farm ponds: 6 (Area: 42 ha)

No of Watershed: 6

Drip Irrigated Area: 218 ha

Climatic Variables

Particulars Weather data (2013-2014)

Rainfall: 507.0 mm

Average Temperature: 37⁰C

Relative Humidity: 70%

Soil characteristics

Soil type: Deep black soil and red soil

Soil pH: 8.5

EC: <4

Calcareous: Low

Suitable crops: Cotton, Jowar, Gram, Grape, Pomegranate, Ber, Tur

Macronutrient status

Nitrogen: < 122 kg/ ha

Phosphorus: 6 – 9.0 kg/ ha

Potassium: >154 kg/ha

Major crops and animals

Irrigated: Grape, Pomegranate, Ber, Tomato, Brinjal, Chilli, Sugarcane

Rainfed: Rabisorghum, Gram, Maize, Tur

Animal	Breed	Population	Economic Yield	
			Milk (Lt/day)	Other Purpose
Cattle	HF cross	760	10-16	Manure
	Jersey cross	410	8-10	Manure
	Khillar cow	270	2	Manure
	Khillar Bullocks	72	-	Draught
Buffalo	Pandharpuri	530	5-6	Manure
	Graded Murrah	31	6-8	Manure
Goat	Osmanabadi	373	-	Meat , Manure
	Non descript	400	-	Meat, Manure
Sheep	Local	40	-	Meat
Backyard Poultry (Layer)	Local	250	-	Meat & eggs
Total livestock Population		2994		

Agricultural Implements

Small tractors:	60
Tractors:	92
Country Plough:	53
Bullock cart:	40
Seed sower:	5
Broad bed furrow making:	2
Oil engine:	100
Weighing machine:	1
Knapsack Sprayer:	100
Power Sprayer (Aspee):	300
Thrashers:	4

Power tiller:	1
Electric motors:	2000

Classification of villagers (Based on land holding)

Marginal farmers (0-1 ha):	386
Small farmers (1-2 ha):	212
Medium Farmers (2-4 ha):	202
Large farmers (>4 ha):	91
Land less labours:	123
Rural artisans:	5
Business:	32
SHG's:	21
Youth organisations:	3
Unemployed:	150

Other information

Educational Facilities:	Five Anganawadi, primary school, high school, college
Number of literate citizens:	2775
Population below Poverty Line:	202
Non agricultural occupations:	Construction, auto rickshaw driving,
Auto rickshaw driving:	55

FIGURE 3: ANIMAL HUSBANDRY IN KONHERI VILLAGE

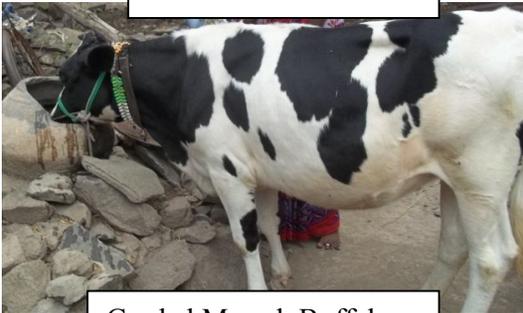
Khillar Bullock



Khillar Cow



HF crossbred Cow



Jersey crossbred Cow



Graded Murrah Buffalo



Pandharpuri Buffalo



Osmanabadi goat



Local Poultry birds

6.2 VILLAGE TRANSECT

Transect is the walk through the village in a particular direction along with some key informants. The main objective of the transect is to understand and study the major land uses, topographical pattern, water resources, natural vegetation and different ecological zones by observing, interacting and discussing with the key informants, while walking in the deciding direction. The items for discussion include topics such as land use pattern, land slope, soil type, soil fertility status, water resources, agro ecological zones, crops, trees, lives stock institutions.

Key informants (KI's): Bhima Ganjale, Nivruti Mahanavar, Vijay kumar, Popat Shelke

Transect is a walk through the village in a particular direction along with some key informants. The main objective of the transect is to understand and study the major land uses, demographic pattern, water resources, crop pattern, soil types, natural vegetation, livestock and different ecological zones by observing, interacting and discussing with the key informants, while walking in the decided direction. The discussion included topics like land use pattern, land slope, soil type, soil fertility status, water resources, agro-ecological zones, crops, weeds, trees and livestock. The entire village is divided in to three zones, viz. black soil, red soil and rocky land.

Farming is practiced with all the modern equipment's and implements like tractor, seed drill, disk plough, power sprayer. The livestock population of the village consists of cross breed cows, buffaloes, goats, poultry birds and bullocks.

Table 1: General transect of Village Konheri

Criteria	Medium Black soil	Red & Black mixture soil	Rocky (shallow soil)
Slope	<2 %	2-4%	>6%
Topography	Low land	Upland	Upland
Crops	Jowar (Maldandi), gram, grape (Thompson seedless), pomegranate (Bhagwa), Chilli, maize, Sugarcane (C0-86032)	Tomato, brinjal, water melon, grape, wheat	Ber, jowar, custard
Livestock	Buffalo (Pandharpuri), Bullock (Khillar), Goat (Osmanabadi, Local)	Poultry (Desi), Buffalo (Pandharpuri, graded Murrah), Cow (Jersey and HF cross),	Goat (Local)
Tree crops	Banana, mango, sapota	Sapota	Sapota, Custard
Other vegetation	Anjan, babul, acacia, neem	Cassia, neem, subabul	Gulmohar,
Water resources	Openwells, borewells, farmponds	Openwells, borewells, farmponds	-

Diseases and pest	Bacterial blight in pomegranate, downey mildew and podery mildew in grapes, fruit borer and leaf minor in tomato, whitefly, leaf curl and early blight, shoot fly of sorghum	Anthrachnose and mosoic in watermelon, thrips and mealy bugs in grapes	Fruitflyin ber andmealybug in custard apple
Weeds	Digitaria, Harali	Parthenium, cynodon	Datura, coxcomb
Problems	Water scarcity, soil cracking and crusting, diseases, insects and weeds	Water scarcity, low water holding capacity of soil, diseases, insects and weeds, livestock diseases	Steep slope, soil erosion,weeds
Opportunities	Growing resistant varieties, selection of disease free seedlings, tissue culture pomegranate, IPM-use of pheromone traps, compartmental bunding, mulching	Compartmental bunding, mulching, fish rearing	Contour bunds, vegetative bunds

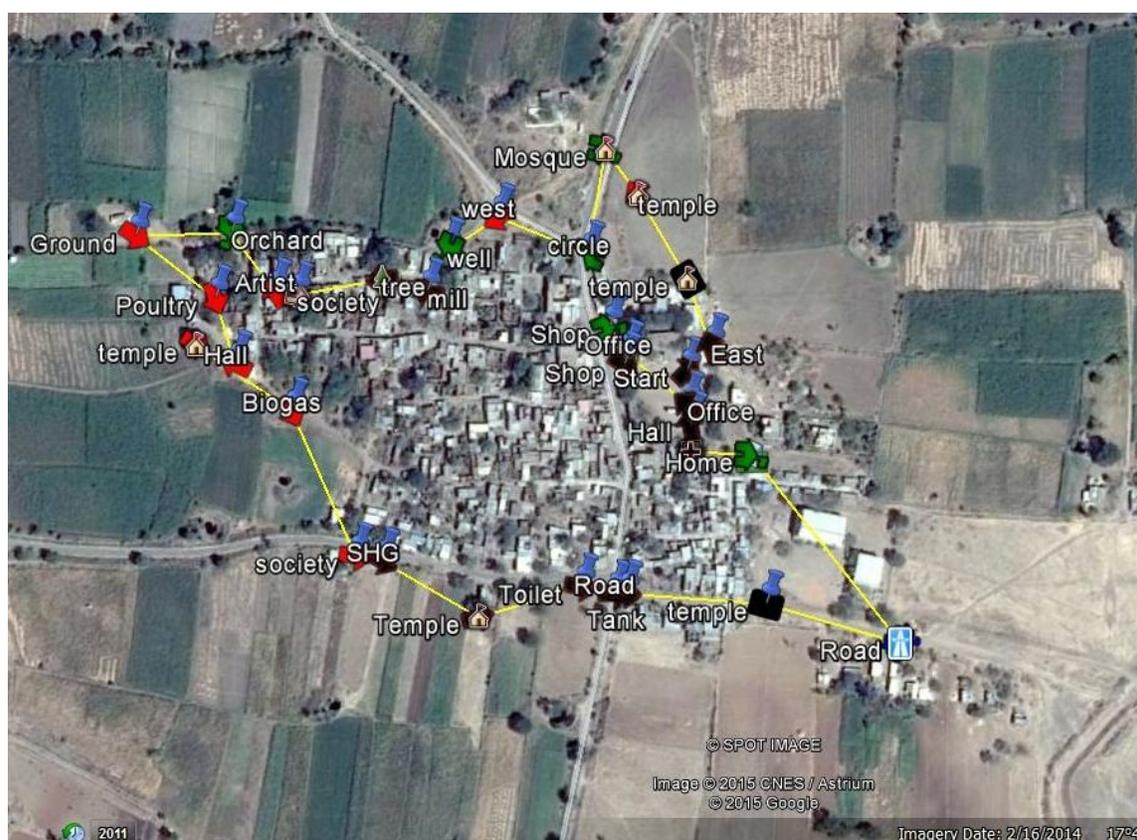


Fig. GPS map of Konheri village

TRANSECT WALK





Western Tamarind



Babul



Noni



Banian



Peepal



Neem

6.3 MOBILITY MAP

Mobility map is to study day in and out movement of villagers for different purpose. This map leads to explore the spatial mobility of the villagers for different activities like health/medical, marketing, education and entertainment. The KI's were asked to give information on mobility of villagers and information was collected on the basis of location, purpose, distance, mode of transport and transport cost to each location. It was observed that Pennur, Pandharpur and Mohol are three most important places which are frequently visited by the villagers for majority of the agricultural needs because of the availability of the resources and well connectivity with the village.

Villagers are going to Mohol and Pennur for education, market, to purchase agricultural implements, hospital, veterinary hospital, bus stand and training at KVK. In the neighbouring village Papri they go for labour work and for cattle and goat market they go to Modinib. To purchase the seedlings of pomegranate farmers go to MPKV, Rahuri. In Pandharapur, there is availability for cold storage facility for vegetables.

Some of the students of this village are also pursuing their higher studies in Solapur, Pune and Mumbai. The villager's frequent mode of transport is public transport like buses and autos due to its location near by the national highway.

KIs : Pandurang Lawate, Rahul Mane, Hanumath Ghore, Rajesh Shinde

Table 2: Mobility table for Konheri village

Sl.no	Place	Distance (km)	Mode	Cost (Rs)	Purpose
1	Pennur	5	Auto/Bike	10	<ul style="list-style-type: none"> - Agricultural implement - Market - Bus stand - Veterinary hospital - Training - Bank - Hospital - Education
2	Mohol	15	Bus/Auto/Bike	30	<ul style="list-style-type: none"> - Training - Education - Hospital
3	Papri	4	Auto/Bike	5	<ul style="list-style-type: none"> - Market

					- Agricultural labour
4	Solapur	40	Bus/Bike	55	- Education - Market - Agricultural implements
5	Pandarapur	26	Bus/Bike	40	- Cold storage - Market - Agricultural implements
6	Modinib	35	Bus/Bike	48	- Cattle and goat market
7	Pune	207	Bus/Car	250	- Job and migration - Market
8	MPKV Rahuri	241	Bus	300	- Pomegranate seedlings - Training
9	Mumbai	365	Bus	450	- Job and migration

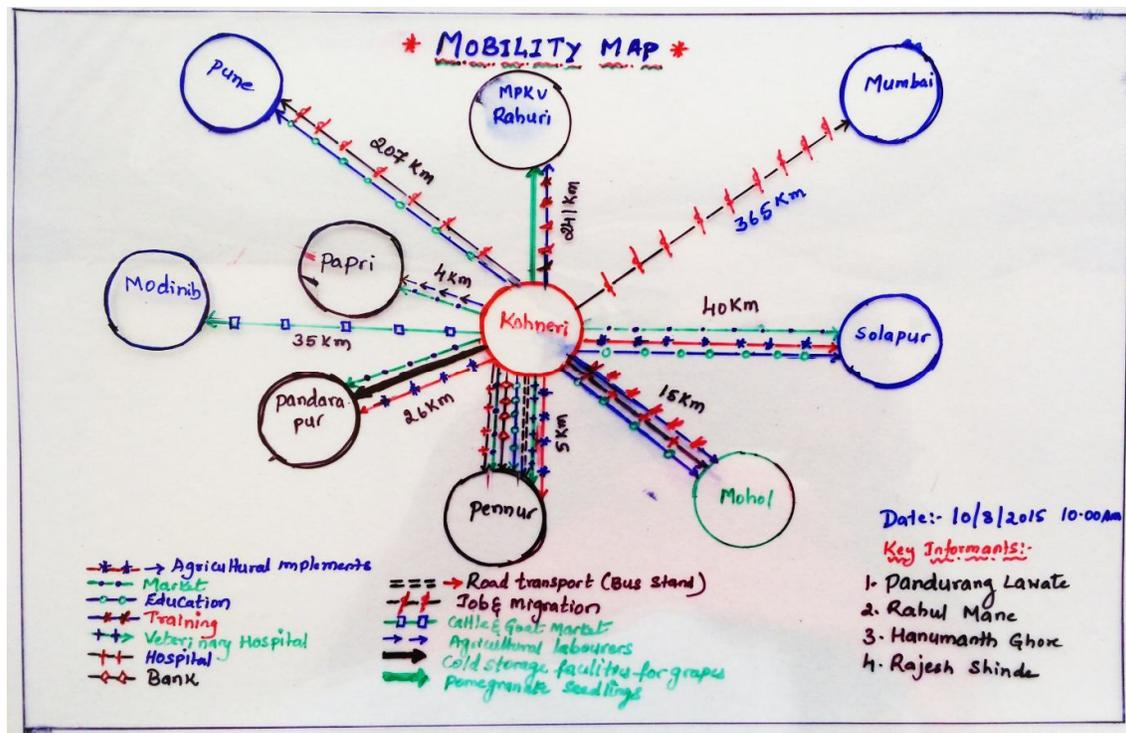


Fig. 2: Mobility map of Konheri village

6.4 TIME LINE

Time line is a tool of PRA technique is used to know the history of major remembered events in community and their significance. It indicates the causal link between past and present. The purpose of this tool is to obtain historical account of changes in demography, socioeconomic, communication, social relationship and interaction, technology diffusion and adoption etc. information regarding the important events like the development in agriculture, animal husbandry are collected from the key informants, preferably elderly people of the village. The information was obtained from the elder persons of the village who had witnessed the changes in the key characteristics such as cropping and resource use pattern, advances in crop cultivation, animal husbandry and introduction of important agricultural technologies as well as the establishment of village institutions such as educational, health, administration and financial institutions.

Time line analyses showed that the introduction of Maldandi variety of sorghum and farmers were started growing, educational facilities in the village had been developed during 1937 which reveals the importance of education in overall progress of social life in village. The cultivation of grape, pomegranate and ber were started in the 1985. Cultivation of these crops has brought change in the standard of living of farmers in the village. The adoption of drip irrigation in the year 1996 had contributed much to increase the crop production, increased water use efficiency and economy of the farmers in the village. Use of fertilizers and pesticides helped the farmers to mitigate the nutrient deficiency of fertilizer responsive crop varieties and to control the diseases and insecticides of crops.

The public water supply in the village started by 1990, the primary health center and anganawadi in the village were established in the year 2005 and solar electricity as street lights shows the development of village. The introduction of tractors and improved machinery has made intervention in terms of mechanization reduced the drudgery and reduced the labour shortage and made noticeable contribution to the development in the village.

In livestock the HF and Jersey crossbred cows, Pandharpuri buffalo, Osmanabadi goat and backyard poultry rearing has made significant contribution to increased income and the farmers have achieved self-sufficiency in terms of dietary needs of animal and milk protein.

The village has experienced three severe drought years at 1965, 1972 and 2003 and these caused significant economic loss to the farmers and thereby the farmers have adopted water harvesting structures in the means of construction of check dams and nala bund in the

year 2005 and many farmers are practicing compartmental bunding and paired row system of crop sowing.

KI's: Nivruti Krishna Mahanva, Digambar Devkate,

Table 3: Time line of major events in Konheri Village

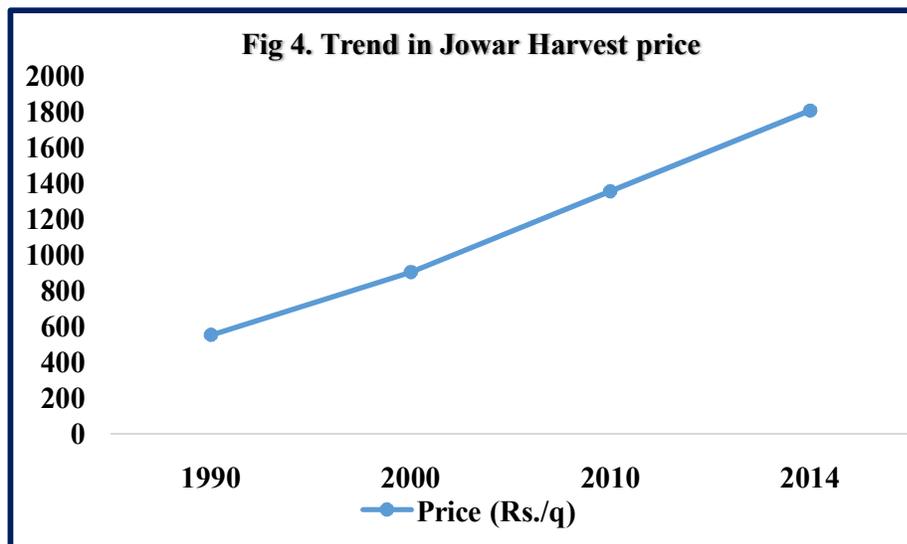
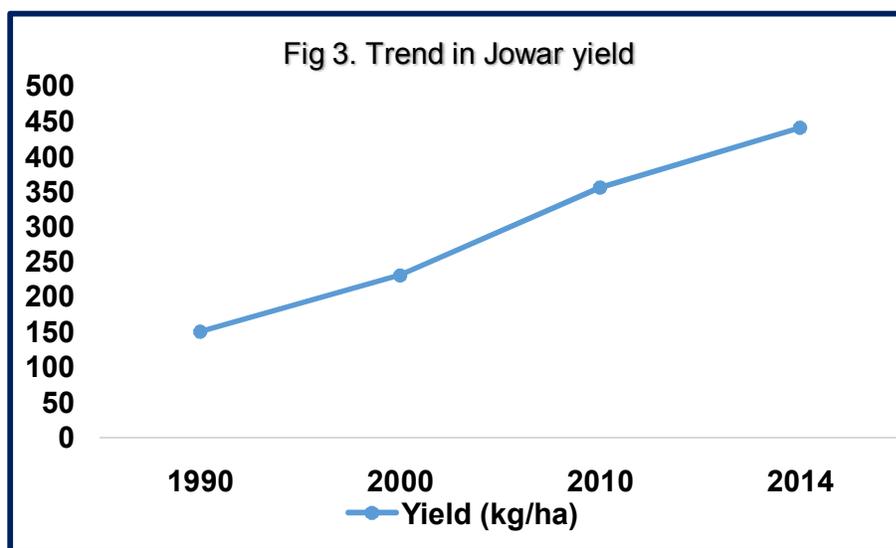
Year	Event
1937	Primary school
1938	Introduction of Maldandi variety of Sorghum
1943	Village panchayat office
1965	Motor cycle
1965	Drought year
1967	Village Cooperative society
1972	Electricity
1972	Drought year
1978	District central cooperative bank
1980	Grape cultivation started
1980	Ford tractor
1985	Pomegranate
1985	Pakka road
1985	State Bus transport
1985	Introduction of Ber (Chameli, Umran)
1985	Introduction of pomegranate
1987	Water soluble fertilizers
1990	Public Water supply
1990	Petrol power sprayer
1995	HTP power sprayer
1996	Drip irrigation started
1997	Data sport and education Gym
1997	Television
2000	Dairy society
2000	Introduction of HF/Jersey cross
2001	Fertilizer shop
2001	Household water supply
2003	Drought year
2005	Anganawadi, primary health centre, midday meal
2005	Infestation of bacterial blight

2006	Establishment of check dam and nala bund
2010	Post office
2010	Power tiller
2011	Solar electricity
2011	Junior college
2014	Poly house and community nursery

6.5 TIME TREND

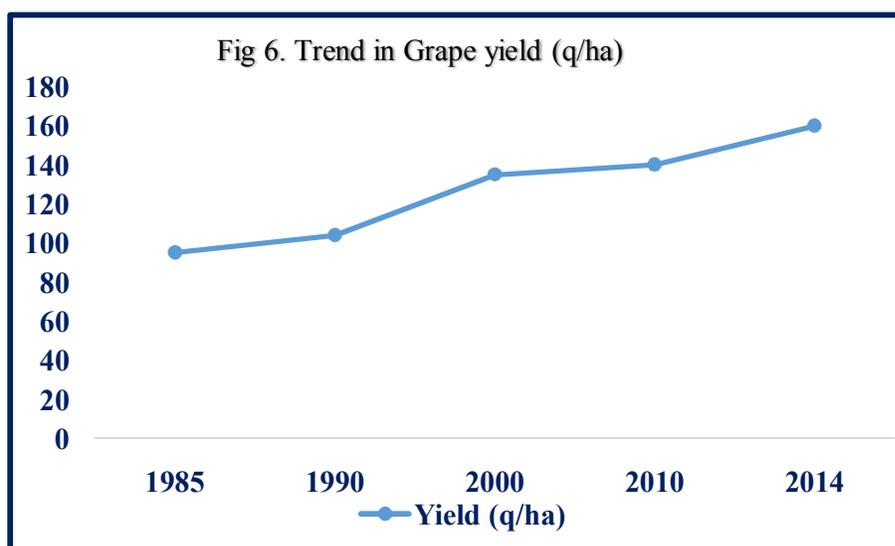
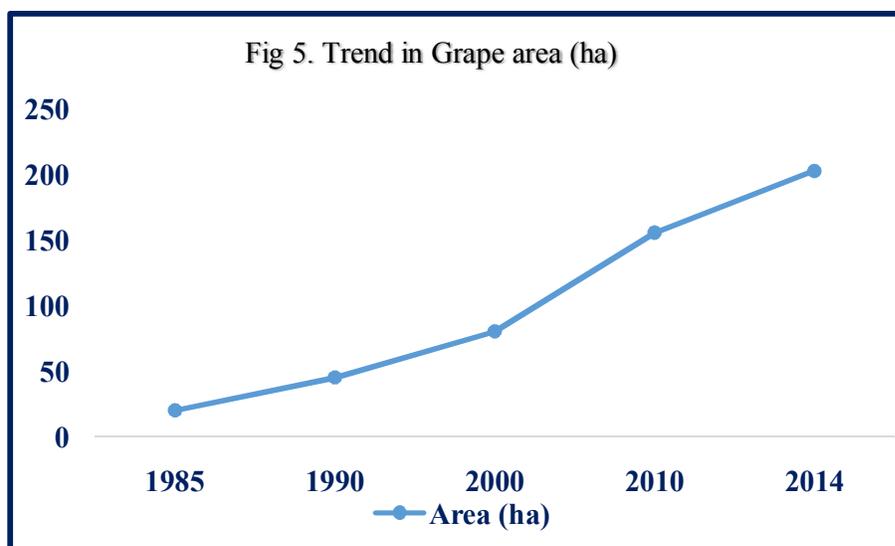
Time trend is a simple PRA technique, usually depicted in the form of graph (bar/line) to show the trend of crop/animal production, commodity prices, human/cattle population etc. The specific objective of this tool is to identify the changes/ fluctuations that have occurred over a period of time in the variables influencing village life.

Time Trend in Jowar: Gradual increase in the yield of Jowar due to adoption of improved package of practices and better management of diseases and flood irrigation at critical stages of crop growth from farm ponds.



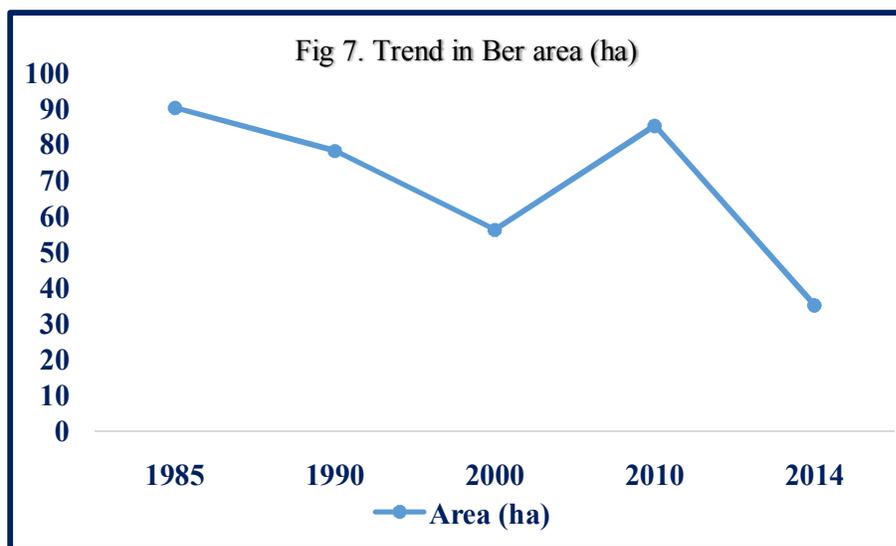
Positive increase in price of Jowar due to increased awareness of consumers about the nutritional value of Jowar and due to decrease in area under Jowar cultivation.

Time trend in Grape: The area under grape is increased because of suitable weather condition, adoption of drip irrigation, higher tonnage yield, better market availability in Pune and Hyderabad, subsidy to the farmers to grow the grape and higher market price had led to more area under cultivation.

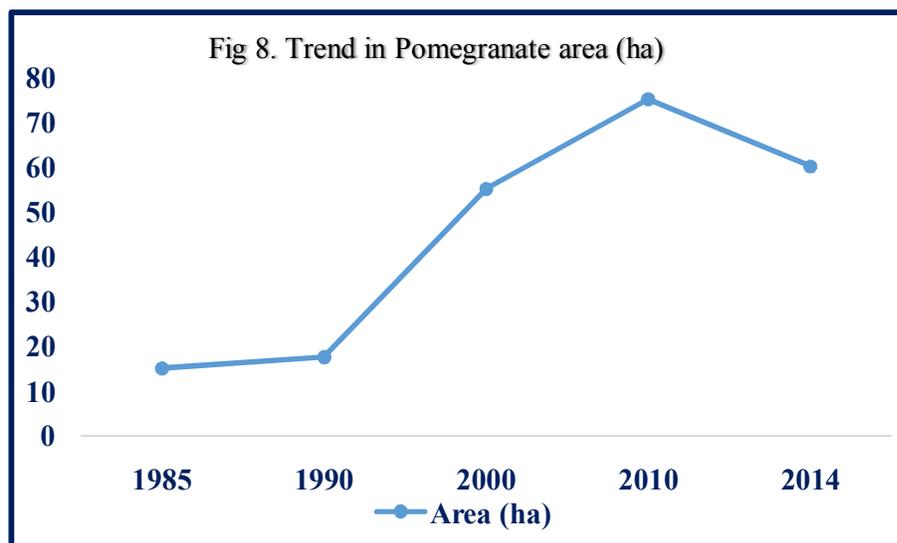


The grape yield is increased over the year due to adoption of improved varieties, package of practices, better management of insect pests and diseases and higher price to the produce.

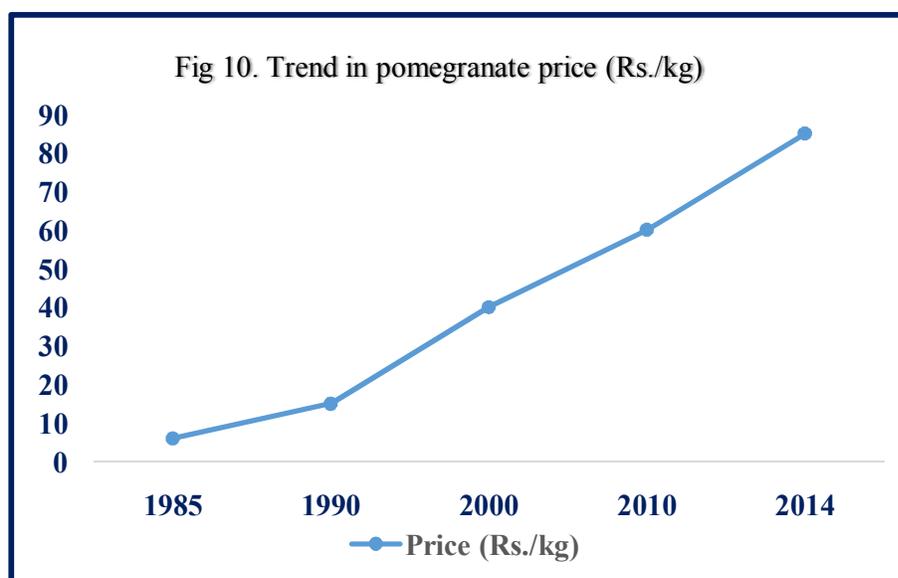
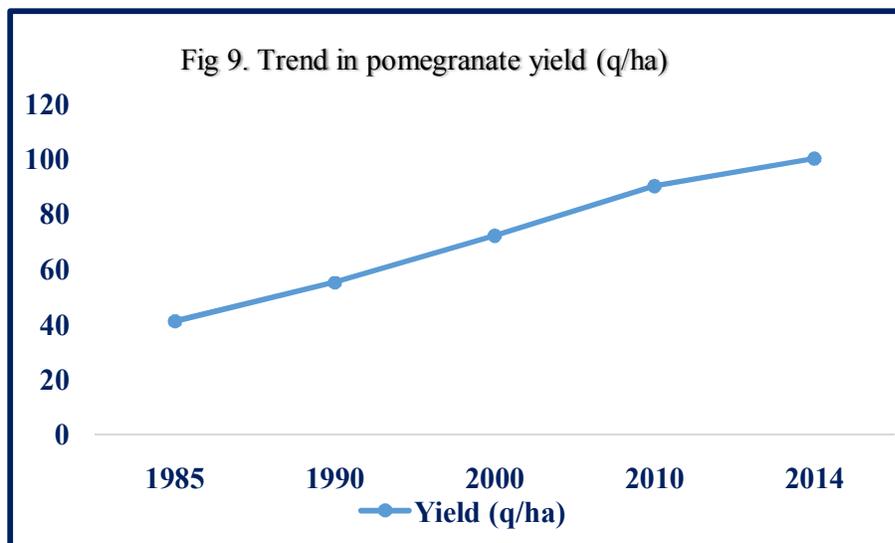
Time trend in Ber: The area under Ber initially shows decreasing trend, increased after 2000 up to 2010 due to incidence of bacterial blight in pomegranate and later decreased considerably due to increase in area under grapes and more diseases, pests in ber and decreases yield and market price.



Trend in pomegranate: The pomegranate area is increased gradually over the year up to 2010 because of higher yield and adoption of Bhagwa variety and later decreased gradually due to infestation of field with bacterial blight.



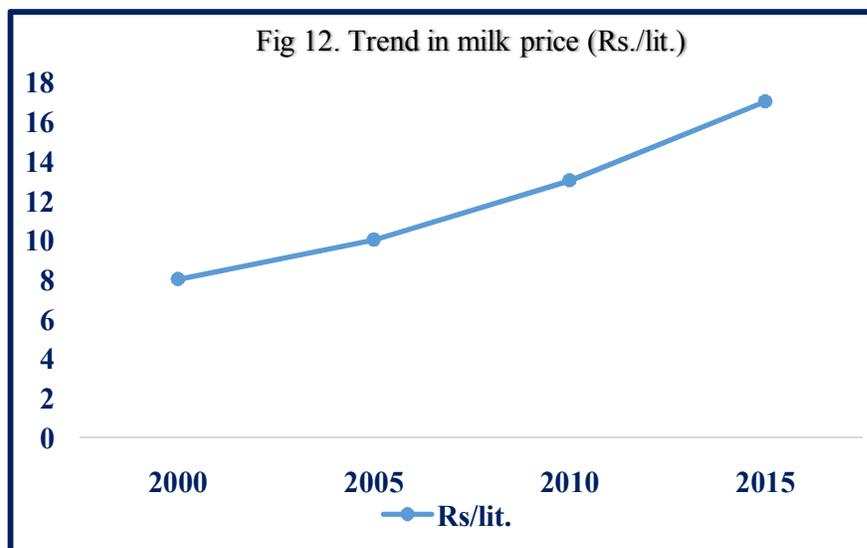
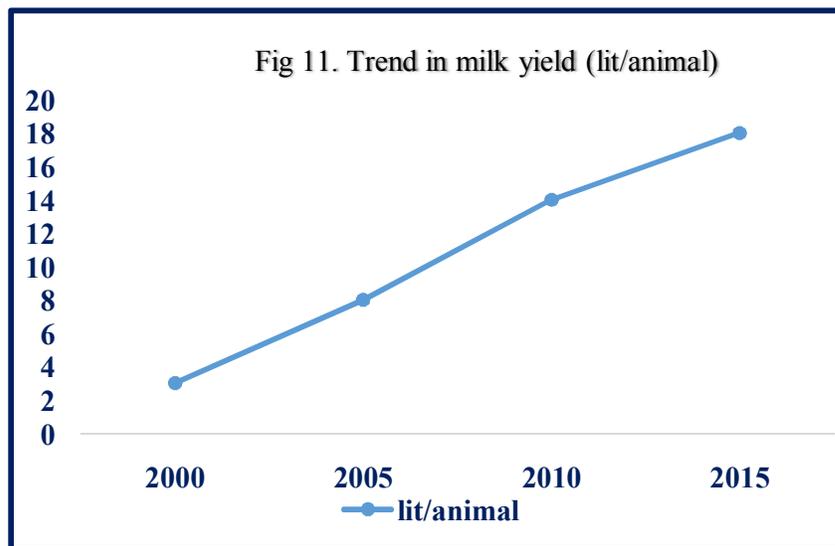
There is a considerable increase in yield of pomegranate due to adoption of improved variety Bhagwa, improved package of practices, drip irrigation and control of weeds, insects and pests.



The price of pomegranate was increased significantly over the year from 1985 to till date due to increased buying capacity of consumers and demand for pomegranate in international market.

Time trend of milk yield: There is a positive increase in the yield of milk over the year due

to adoption of improved cross breeds like HF and Jersey and feeding of livestock with concentrated feeds and better care in terms of disease and pest control.



The price of milk has increased due to increase in purchasing power of consumers, and better marketing facility.

6.6 SEASONAL CALENDAR AND SEASONAL ANALYSIS

Key Informants:BhagwatShelke, RajkumarGodge, ParushramLawate, Rahul Devkate

Seasonal analysis is also called as seasonal calendar. This is a calendar, which indicates month wise the abnormalities, specialties, threats, problems, abundance, and shortage with regard to agriculture in a diagrammatic way. The items to be included in seasonal analysis must be of those items, which really affect the agriculture. This explores seasonal constraints and opportunities by diagramming changes, month by month throughout the year.

Table 4. Seasonal calendar of Konheri village

Particulars	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
Crops												
Rabi Season												
Rabi Sorghum				LP, SW	FA	W	H					
Wheat					LP, SW	FA	W	H				
Greengram				LP, SW	FA	W	H					
KharifSeason												
Maize	LP, SW	FA	W	H								
Pigeon pea	LP, SW	FA	IC	W	H							
Sugarcane	PS		PS			H	LP	CP, FA	I, FA		IC, FA,PS	IC,FA
Fruit crops												
Grapes	TP, S	FrP, S	FiP	SiP, PS	DS, PS		H, BD			FP		SP,S
Pomegranate	I, FA	P	P, W	PS, FA				H				BT
Ber	I, FA	PS			PS, H	H				P	I, FA	
Vegetable crops												
Tomato	FA, S	PS, H									LP	SW
Watermelon				SW	S, IC,N	S,H				SW	S,IC,N	H
Ridge gourd	H										SW	S,IC
Bitter gourd	H H										SW	S,IC

Livestock				
Cattle/Buffalo	OG	GF	OG	SG/DF
Goat	OG			SG
Poultry	B&CF			

FP- First pruning, SP-Second pruning, TP- third pruning, FrP- fourth pruning, S- Growth regulator spray, FiP- Fifth pruning, SiP- Sixth pruning, DS- Dormex spray, H- Harvesting, BD- Bunch dipping, PS- Pesticide Spray, BT- Bahar treatment, I- Irrigation, FA- Fertilizer application, P- pruning, W- Weeding, LP- Land preparation, SW- Sowing, IA- Insecticide application, M- Mulching, IC-Intercultural operations, N- nipping, OG- Open grazing, SG- Shade grazing, B& CF-Backyard and Controlled feeding, DF-Dry fodder, GF-Green fodder

In rain fed conditions, the major cropping system of the Konheri village is *rabi* sorghum based cropping system with farmers going for sowing of this crop in the month of October followed by fertilizer application and weeding in the month of November and December, respectively. The crop will be harvested by the end of January month. Some farmers also go for the cultivation of crops like wheat and green gram during the *rabi* season. The sowing of the wheat crop was carried out during the month of November. Fertilizer application and intercultural operations were carried out subsequently in the months of December and January. The crop will be ready for the harvesting in the month of February and March. The seasonal activities in the green gram crop extend between October and January with sowing, fertilizer application, weeding and harvesting were carried out respectively in the months of October, November, December and January.

The key informants also informed that if the rains are abundant during *khari*fseason they will take up sowing of maize and pigeon pea crops in the month of July along with application of basal dose of fertilizers. The top dressing with urea followed by intercultural operations and weeding were carried out during the months of August and September. The harvesting of the maize crop will be completed in November month, while the pigeon pea crop will reach its maturity for harvesting in the month of December. The seasonal activities in sugarcane crop starts with its planting in the month of January. Fertilizer application in splits and frequent irrigation along with pesticide sprays were given throughout the crop growth period. The crop is harvested in the month of December.

Farmers with assured irrigation source opt for the cultivation of fruit crops. The major fruit crops grown in the village are grapes, pomegranate and ber along with few custard apple orchards. The seasonal operations in the grape orchard start with farmers going for heavy first

pruning in the month of April. It was followed next six pruning's one at each bud stage in every month up to October. The growth regulators were simultaneously applied at the time of third and fourth pruning for the better development and growth of buds. Whereas, pesticide sprays were applied along with fifth and sixth pruning for the management of thrips and downey mildew. Growth regulator, dormex spray was given for fruit bunch initiation in the month of November along with pesticide spray for the management of downey mildew. The bunches are harvested after bunch dipping treatment for the fresh market consumption in the months of January and February. For raisins making the grape bunches are harvested in the month of March and then berries are dried and graded in the month of April. In pomegranate crop the seasonal work initiate with Bahar treatment in the month of June and it was immediately followed by irrigation and fertilizer application in the month of July. The pruning of secondary branches and water suckers will be done during August and September months. The split doses of nitrogenous fertilizers along with pesticide sprays were given during the period between October to January. The crop will be harvested during the month of February and continued till March. In ber crop, pruning will be done during the month of April followed by fertilizer application and irrigation in May, June and July months. The pesticides were frequently applied between August and November. The harvesting of the crop starts from November month and continued till February month.

Many farmers also practice vegetable cultivation under drip irrigated conditions along with the use of plastic mulching for moisture conservation. Tomato, Watermelon, Ridge gourd and Bitter gourd are the major vegetables cultivated by the farmers. The seasonal activities in the tomato crop begin with land preparation in the month of April and transplanting in May. Irrigation and fertilizer application were carried out during the months June and July. The application of pesticides and harvesting of the fruits carried out during the months of August to October. Two crops of watermelon was grown during a year, one during the summer and other in rabi season The summer season crop sown in the month of April followed by growth regulator spray, intercultivation and nipping in the month of May. The harvesting fruits started in the month June and continued till July. The ridge gourd and bitter gourds were sown in the month April. The intercultivation, growth regulators spray and frequent insecticide applications carried out in the month of May and June. The harvesting of the fruits starts in the month of June and it extends up to August along with frequent pesticide sprays.

The major livestock population of the Konheri village as informed by the key informants were cattle (HF and Jersey crossbreds, Khillar), Pandharpuri buffalo, Osmanabadi and local breed of Goat and Backyard poultry of local breed. The farmers prefer open grazing of cattle and buffalo during July to November months. Green fodder was provided to cattle and buffalo between December and February months. The shade grazing of cattle/ buffalo with dry fodder was usually done during the peak summer months i.e. April to June. Similarly, in case of goats open grazing is followed throughout the year except in summer months, wherein shade grazing with grains and concentrates was followed. In poultry rearing the farmers are following both Backyard and controlled feeding in cages.

Table 5. Seasonal Calendar-Problems

Particulars	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
Crops												
Rabi Season												
Rabi Sorghum					SB		CR, SM					
Wheat						PD/R						
Greengram					PB YV							
Kharij Season												
Maize		SB	LB									
Pigeon pea		W	SP	PB								
Sugarcane	WA/TSB		TS B	RR						WA		WA/T SB
Fruit crops												
Grapes	A			TH DM		PD	PD/PB					
Pomegranate	FD	FB/ AN				PD		OP				FD
Ber	FD		PD	PD/ FB		FB						FD
Vegetable crops												
Tomato	LM	EB/ FB	FB									LM
Watermelon					Th, MO						Th, M	TH
Ridge gourd	LM FF/ MO	FF										MO, LM
Bitter gourd	MO, LM	FF									SW	MO, LM
Livestock												
Cattle	FMD & PI											BQ
	MA											
Buffalo	FMD										AE & RB	

Goat	PPR & AM										
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SB- Stem borer, CR- Charcoal rot, SM-Smut, PD- Powdery mildew, R-Rust, PB-Pod Borer, YV-Yellow vein Mosaic, LB-Leaf Blight, W- Wilt, SP-Sucking pests, WA-Woolly Aphid, TSB- Top Shoot Borer, RR- Red rot, AN- Anthracnose, FD- flower drop, FB- Fruit borer, Th- Thrips, DW- Downey mildew, OP- Oily spot, PB- Pink berry, LM-Leaf miner, EB-Early Blight, MO- Mosaic, FF- Fruit fly, AM- Amphistomiasis, AE- Anestrous, RB- Repeat Breeding, FMD- Foot & Mouth disease, BQ- Black quarter, PI- Parasite infestation, MS- Mastitis.

The seasonal calendar for the problems faced by the farmers in different cropping systems and livestock in a year is prepared and presented in the above table. The major problems faced by the farmers among the crops cultivated in *rabiseason* were stem borer menace during November month and charcoal rot and smut disease in January months in *rabisorghum* crop. Powdery mildew and Rust occurs in the months December and January months are the major problems in wheat cultivation in this village. Pod borers and Yellow vein mosaic are the major constraints in the cultivation of Green gram and these diseases commonly appear in the month of November.

Among the crops grown during the *kharif* season the major problems identified by the farmers were stem borer, leaf blight in case of maize crop, wilt, sucking pests and pod borer damage in pigeon pea crop. In sugarcane crop, farmers face severe threat to crop from woolly aphid infestation during April to July months, top shoot borer damage between June and August months and severe infection of red rot disease during the months of September, October and November.

In case of fruit crops, the major problems in grape crop mentioned by the farmers were anthracnose disease in July and August months, thrips damage and downey mildew disease in October, November and December months. Powdery mildew and pink berry formation were observed between December and February months. The pomegranate crop is mainly affected by flower drop during the months of June and July. Fruit borer and anthracnose infect the crop during August, September and October months. The powdery mildew infection in pomegranate was the common problem during November, December and January months. The severe infestation of Bacterial blight was noticed between March and April. Flower drop, Powdery mildew and fruit borer and fruit fly damage were the major problems observed by the farmers in case of ber crop.

The infestation of the leaf miner was the common problem observed in all vegetable crops cultivated in the village. The other major problems mentioned by the key informants were fruit borer infestation, early blight disease in tomato crop. Thrips infestation and mosaic disease affect the cultivation of water melon most often. The severe infestation viral disease and damage by fruit fly was most common in cucurbit vegetables like ridge gourd and bitter gourd.

In livestock the major diseases that affect the cattle were foot and mouth disease and parasitic infestation during July and August months. Black quarter disease was most prevalent during May and June months. Mastitis is another major problem observed throughout the year in crossbred cattle. In buffalo, apart from foot and mouth disease in July and August months the problem of anestrus and repeat breeding mostly seen in May and June months. The goat population usually suffered from PPR and amphistomiasis during July and August months.

Gender disaggregation pattern

Gender disaggregation pattern for different categories of farmers were also analysed and most of the works carried out by both men and women. Here we pointed out the role of male and female during crop cultivation according to the seasonality of major crops. This analysis helps us to get a general idea about the specific activities of male and female in the field or we can demarcate the activities done by male and female during crop cultivation. From the gender disaggregated activity calendar we can see that most laborious works like land preparation, pruning, fertilizer application, pesticide and growth regulator sprays were performed by men whereas the works like weeding and other intercultural operations were carried out by female. The works like sowing and harvesting were carried out by both men and women. Cattle and buffaloes reared by both men and women through open grazing and shade grazing. Whereas, are actively involving in most of the activities and they have joined as SHG's (Self Help Groups) other than agricultural activities.

Table 6. Gender disaggregate pattern of Konheri village

Particulars	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
Crops												
Rabi Season												
Rabi Sorghum				LP ♂	FA♂	W♀	H♂♀					
				SW♂♀								
Wheat					FA♂	W♀	H♂♀					
								LP♂	SW♂♀			
Greengram				LP	FA♂	W♀	H♂♀					
				SW								
KharifSeason												
Maize	LP♂	FA♂	W♀	H♂♀								
	SW											
Pigeon pea	LP,	FA♂	IC♀	W♀	H♂♀							
	SW♂♀											
Sugarcane	PS♂		PS♂			H♂♀	LP♂	CP ♂♀	I ♂	I♂	IC ♂♀	IC ♂♀
					FA♂			FA♂	FA♂	FA ♂	PS ♂	FA♂
Fruit crops												
Grapes	TP, S♂	FrP, S ♂	FiP♂	SiP, PS ♂	DS, PS ♂		H, BD ♂♀	H, BD ♂♀	H, BD ♂♀	FP♂		SP,S ♂
Pomegranate	I, FA	P♂	P ♂	PS, FA ♂	PS, FA♂	PS, FA♂	PS, FA♂	H ♂♀	H ♂♀			BT ♂
			W♀									
Ber	I, FA ♂	PS ♂	PS ♂	PS ♂	PS♂	H ♂♀	H ♂♀			P ♂	I, FA ♂	I, FA ♂
					H♂♀							
Vegetable crops												
Tomato	FA, S ♂♀	PS♂	PS♂	PS♂							LP ♂	SW ♂♀
		H♂♀	H♂♀	H♂♀								

Watermelon				SW♂♀	S♂ IC ♂♀N ♂♀	S♂ H ♂♀				SW ♂♀	S♂ IC ♂♀ N ♂♀	H ♂♀
Ridge gourd	H ♂♀	H ♂♀									SW ♂♀	S♂ IC ♂♀
Bitter gourd	H ♂♀	H ♂♀									SW ♂♀	S♂ IC ♂♀
Livestock												
Cattle/Buffalo	OG ♂♀	OG ♂♀	OG ♂♀	OG ♂♀	OG ♂♀	GF ♂♀	GF ♂♀	GF ♂♀	OG ♂♀	SG/DF ♂♀	SG/DF ♂♀	SG/DF ♂♀
Goat	OG ♂♀	OG ♂♀	OG ♂♀	OG ♂♀	OG ♂♀	OG ♂♀	OG ♂♀	OG ♂♀	OG ♂♀	SG ♂♀	SG ♂♀	SG ♂♀
Poultry	BY&CF ♀											

6.7 BIO RESOURCE FLOW

In Bio resource flow diagram, output from one enterprise serves as the input for other enterprises, thereby it reduces major input cost which in turn increases income of the farmer. It enables to identify the existing flow channel, analyze the efficient of use of farm products and propose the alternative channels to make effective utilization of any resource that is left unused. In a way, this model provides a vehicle for farmers and researchers to exchange technical ideas about how new flows and new enterprises can be integrated in to ongoing farming systems.

Keyinformants: Mr. BhagwanShelke, Mr.Popat Shelke, Mrs. Vanita

A household of the village with typical farming activities including various farm and livestock enterprises was selected. The information regarding bio-resource flow from the farm to households and *vice versa* was collected. All the bio resources like agricultural and animal produces, their byproducts and wastes, were taken into consideration for the diagram construction.

The following bio-resource flow diagram depicts the existing resources present in a typical house hold of the village, the mode of use of the resources for the household purposes as well as economic use.

The household which was taken for the Bio resource flow study has various resources like osmnabadi goats, graded Murrah buffaloes and Khillar cows, Desi birds (Poultry), agricultural crops like fodder maize , Thompson seedless grapes, ridge guard variety like Naga, Bhagwa pomegranate,Ber fruit, one well, 5 bore wells , bio-gas plant , water closet and a pack house.

In their household it was observed that, cow dung from the livestock and water closet wastes serves as input material for biogas production and the output i.e is slurry from the biogas plant are directly used for agricultural fields and also for fodder crops. Milk and meat products livestock are utilized for household consumption and excess of milk and meat were sold at market. Vegetables and fruits from the field are packed in pack yard and sold in the Solapur, Hyderabad and Nasik markets without middlemen involvement thereby he earns maximum profit. Well water is used for agricultural field, household and livestock rearing. Bore well water and rain water are used for recharging the farm ponds. Additional incorporations or interventions that can be added in the system have been proposed in the flow diagram, which ensures additional income and efficient use of the resources.

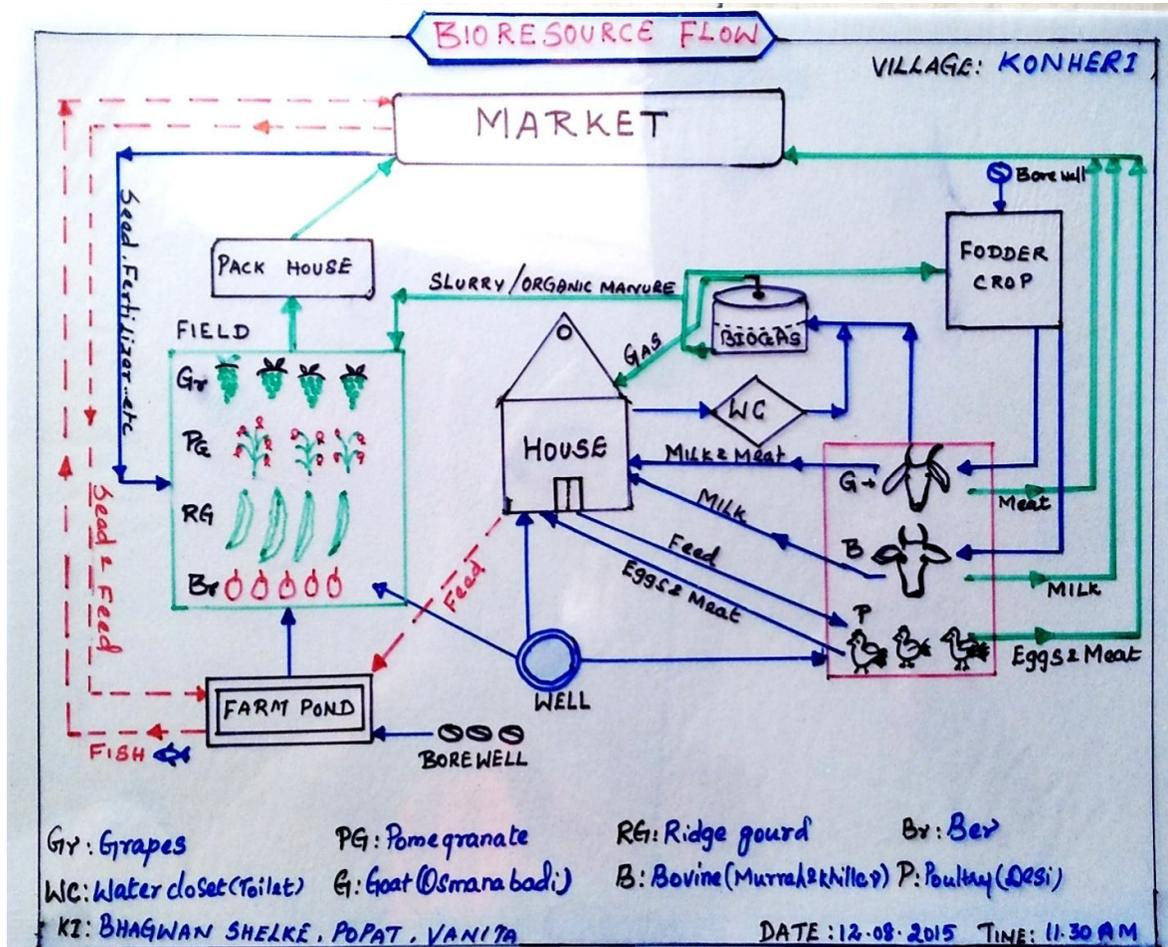


Fig: Bio-resource flow in Konheri village

Apart from irrigation purpose this farm pond water can be well utilized for fish culture practices. In the farm pond, fishes like Catla, Rohu, Common carp can be stocked and grown with low cost feed of rice bran/wheat bran and Ground nut oilcake. Undigested feed materials and excreta of fishes enrich the farm pond water and that can be used effectively for agricultural crops. The proposed flow included utilization and recycling of all the available bio resources.

6.8 DAILY ACTIVITY PROFILE AND DAILY ROUTINE DIAGRAM

KI's: Mr. Sarad Mali, Mahadev Hariba Deokate, Mrs. Bamabai

This tool depicts how the rural men and women spend their quality time in various farm related activities. Daily activity includes only the economic activity of the men and women of the villages, whereas daily routine refers to both economic and other household and allied activities. This daily activity and routine varies with the poor and rich farmers.

The key informants, interviewed were middle-aged men or women who are belonging to farming communities. The main purpose of this PRA tool is to sort out proper time to intervene with various extension activities.

Table 7. Daily activity profile for rural men and rural women

Time	Men	Women
5.30 to 6:30 AM	Cleaning of cattle shed collection of fodder and milk delivery to dairy plant	Cleaning of cattle shed and Milking
6.30-7: 00 AM	Copping of grasses	
7:30 to 8:30 AM	Arranging materials , labour and tools for farm activities	
9:00 AM to 6:00 PM	Labour activities like construction and ploughing	Farm and labour activities like weeding and road construction
6 to 6:30 PM	Fodder collection and milking and delivery	Milking
8.00-9.30 PM	recording of daily wages, searching labour for next day farm activities	-

Table 8. Daily routine diagram for rural men

Time	Men
5.00 to 6:30 AM	Wake up/ Cleaning of cattle shed collection of fodder and milk delivery to dairy plant
6.30-7: 00 AM	Copping of grasses and refreshing
7:30 to 8:30 AM	Arranging materials , labour and tools for farm activities
8.30 AM to 9.00 AM	Fetching of drinking water, Have food
9:00 AM to 6:00 PM	Farm activities / Labour activities like construction and ploughing
6 to 6:30 PM	Fodder collection and feeding of cattle
6:30 to 7.30 PM	Milking and milk delivery
7:00 to 8:00 PM	Social interaction

8.00-9.30 PM	Dinner/watching TV / recording of daily wages, searching labour for next day farm activities
10.30 PM	Sleeping

Table 9. Daily routine diagram for rural women

Time	Women
4.30 AM	Wake up/brushing
5.00 to 6.00 AM	Heating of water, Cleaning of home and cattle shed
6 to 7:00 AM	Milking
7: 00- 7.30 AM	Taking bath, making tea
7:30 to9.00 AM	Cooking food for morning and lunch
8.30 AM to 9.00 AM	Breakfast
9:00 AM to 6:00 PM	Farm activities / Labour activities like construction and weeding
6 to 6:30 PM	Milking of cattle
7.00 to 9.00 PM	Household work, cooking food for dinner
9:30 PM	Dinner
9.30 to 10.30 PM	watching TV
10.30 PM	Sleeping

6.9 AGRO ECOLOGY MAP

Agro-ecological map indicates the macro and micro ecological (subsystem) features in a village. The meteorological parameters like rainfall, temperature, relative humidity, flora and fauna of the village and the basic land use pattern such as agro-forestry, forest cover and wasteland is depicted in the map.

KI's: Nivruti Mahanavar, Vijay kumar, Devidas, Vijay Kumar

The village Konheri is located at 17 km from KVK, Mohol. The village is situated at 17.80736° N Latitude and 75.51814° E Longitude. The total geographic area of the village is 2087.86 ha, net cultivated area is 1588.52 ha out of this irrigated area is 816.74 ha and rainfed area is 771.78 ha. The Mean Annual Rainfall is about 507 mm/ year and majority of total annual rainfall is recorded in the period of July to September. The maximum temperature is about 45°C and minimum temp is about 16°C with Relative Humidity 70-85%. Major field crops grown in this village are *rabi*Jowar, gram, sugarcane and tur. The vegetable include tomato, brinjal, chilly and cucurbit. Major fruit crops found in the village are pomegranate, grape, ber. The major weeds seen were *Amaranthusviridis*, *Datura*, *Argemonamexicana*, *Lucas aspara*, *Partheniumhysterophorus* and *Acalyphaspp*, etc.



Fig 13. Agroecology map of Konheri village

6.10 RESOURCE MAP

Resource map indicates both the natural and manmade resources needed for the development of agriculture *viz.*, main crops, trees, animals, farm implements communication items, human resources for agriculture like skilled labour, technical manpower (Agri. Officer, Veterinary Officer) etc. Konheri village owns a wide range of natural and man-made resources. Those resources required for agricultural development in Konheri was depicted in the resource map. For sketching it out, transect walk was carried out in the village to identify the agricultural resources including the natural resources, crop and livestock resources, government and other co-operatives etc. The resource map shows the different kind of natural and manmade resources such as land, vegetation, common land use, soil types, water source, transport and communication source and different service organizations.

KIs: AbhimanHande, SubhashDevkate, Manichandar Dole

The map gives an idea of the various resources available in the village such as agricultural implements, water sources, irrigation facilities, crop and forest trees, communication means, livestock, soil etc. Land and farm pond water resources are the major resources available in Konheri.

The resource of map was drawn based on the information from the identified key informants and by village transect carried out by our team members. Three key informants were identified. They are:

Land resources: A large area of the village is under cultivation. Red soil, black soil is the predominant soil types of the village under low land and rocky red soil in the upland having steep slopes. The area with black soil has Jowar, gram, tur, maize, pomegranate and grape cultivated largely and in red soil mainly farmers cultivating tomato, water melon, grape, brinjal and wheat. In rocky red soil ber and Jowar are the major crops.

Water resources: The village owns huge water resources like ponds, wells, hand pumps and an overhead tank.

Agricultural implements and mechanization: The agricultural implements available in the village include tractors, cultivators, ridge maker, power tillers, power sprayers, threshers, electric motors etc. still there exists a scope for complete mechanization.

Animal resources: HF and Jersey crossbred cows, Pandharapuri buffalo, Osmanabadi goat and Khillarbullocks are the major animal resources available in the village. Cows and buffaloes are reared for milk, bullocks for agricultural activities, goats for meat, poultry for meat and egg and all the animal waste is recycled for manure purpose.

Social resources: The village also has important resources like, solar lamps at streets, electricity supply, cable connection, radio, dish antenna, television, mobile phones, LPG connection, three community halls and other social institutions like primary school, middle and high school and one junior college and 5 anganwadicentres, temples and mosque etc.

Crop resources: Major crops in the village constitute rabi sorghum, tur, maize, grape, pomegranate, ber and custard apple. Other crops include okra, chilli, tomato and leafy vegetables. For the inputs like fertilizers, pesticides and fungicides the farmers depend on retail fertilizer and pesticide shop available in the village itself.

Table 10: Resources of Konheri village

Particulars	Articles
Transport facilities	Auto, two wheelers, cars
Drinking water facilities	Bore wells
Communication facilities	Telephone, mobile, internet
Health and welfare societies information	Primary health center
Agriculture implements	Tractors, cultivator, seed cum fertilizer drill, power sprayer, tiller, power sprayer
Animals use for agriculture	Ox
Advisory facilities information	KVK, Mohol, AAO and VO, Pennur

Human Resources: Labour availability is a major problem at cropping season in the village. Skilled labourers are available in the village to pruning and for bahar treatment of grape and pomegranate in the village. All the agricultural activities are carried out by the farmer himself. Women are involved in agricultural activities. Women are mainly involved in household activities and in milking the cows, drying the agricultural products and in farming activities as well etc.

Input Resources: Villagers are dependent on the private dealer for most of the agricultural inputs such as seeds and pesticides. The retail shops are playing main role in supply of hybrid seeds, pesticides and insecticides.

Communicational Resources: Television, radio, telephone, mobile phones, dish antenna are the main resource of communication. Farmers mainly use mobile phones to communicate with others. Farmers have What'sapp groups to share the information. In the village Jai hanuman Grape association is formed in the year 2005 and they share the majority of information with respect to crop diseases, pests and nutrient recommendations to farmers.



Fig 14. Resource map of Konheri village



School



Open well



Nursery



Phandarpuri buffalo



Osmanabadi goat



Cultivator



Auto



Farm pond Drip Irrigation



Chaff cutter

Resource Map Photos

6.11 SOCIAL MAP

KIs: Mohan Mahanavar, Tanaji Mane, Shivaji Hanumant Gund

Social map gives the information to understand and analyze the social structure, stratification, social institutions and availability of social facilities in the context of existing socio-economic condition of the village.

According to key informants and Gram Panchayat data, Konheri has a population of 3643 with 891 households. The total area of the village is 2087.86 ha. Agriculture, horticulture and livestock are the main occupation in the village. A group of villagers were encouraged to draw the social map of the village in the form of Rangoli. A rough sketch of the map was made on a chart sheet and the key informants were asked to locate the social institutions like hospitals / primary health centres, cooperative bank, schools, junior college, anganwadi, community halls etc. and water tank, and residential areas, cropping areas, caste distributions and other social stratification of the village.

6.11.1. Caste distribution

Neighborhood of the village: Mohol (E), Papri (W), Wadachiwadi (N) and Pennur (S) in the south are the neighboring villages of Konheri. There are interactions among these villages in various social, agricultural and marketing activities.

Community information: The major communities in the village are Marathas and Harijan among Hindus followed by other backward classes.

Social institutions: The social institutes of Konheri include temples, mosques and other government, non-government and private institutions. The government institutions include,

1. Anganwadi
2. Primary school
3. High school
4. Junior college
5. Primary health center
6. Panchayat office
7. Public distribution system
8. Village revenue office

Private institutes in the village include milk collection center and fertilizer shop.

Family information: Majority of the families in the village are poor and middle and a few are rich. Nuclear families dominate in the village, and only a few families are joint in nature.

Religion information: Hindus and Muslim are the religions present in the village. 95% of the village populations are Hindus the rest 5% is constituted by Muslims.

Government institutions: The government institutions in Konheri include primary schools, high school, 5 Anganwadi centers, primary health center, village revenue office and PDS Shop.

Education background of villagers: Majority of the villagers are 10th class pass and a few are intermediate pass. The literacy rate of the village is approximately 76%.

Social group's information: There are 21 Self Help Groups in the village, but only 3 are active provides loan to the members in the group thus aiding in self-employment.

Leadership patterns existing in the village: The head of the village is the village Sarpanch. The community which dominates in the village is Maratha and Harijan and thus they enjoy the leadership among the villagers.

Value systems information of the village: Irrespective of the caste, women are very much respected in this village. Elders are respected by younger generations and hospitality is highly valued.

Social interactions information: Interactions between different castes and religions are good, but intercaste marriages are not encouraged.

Co-operation information: The villagers live in a good co-operation in all the aspects of agriculture and economy and all the programs, rituals, puja etc. are conducted together by the villagers. The initiatives for these are taken by the youth.

Competition information: Co-operation and healthy competition between the farmers in farming activities can be observed in the village.

Conflict information: There are no reported conflicts among the villagers as such.

Assimilation and accommodation information: The villagers have a mentality to accept the changing values and trends in daily life and exhibit an open accommodation in the village.

Media of communication: The media of communication in the village include newspapers, television, radio and mobile phones.

Social evils: Dowry system exists in the village. The dowry is finalized according to the demand by the groom family. Dowry includes money, gold, vehicles and other household items.

6.11.2. Other information

Road: The village has a very good road which connects NH-9. The entire village has kaccha roads.

Transport: The most commonly used mode of transport is auto, bicycle and motor bike, rarely by cars.

Fuel: Almost 80% of the households own gas connections, but preparation of feed for cattle

is majorly done using animal dung cake.

Household items: Two grocery shops in the village cater the need of the grocery items such as rice, dhal, oil etc. to the villagers. Also a petty shop which sells pan, cigar, match boxes etc. is also present. The village also has medical shops that supplies medicine to households.

Drinking water: The villagers depend on the bore wells in the village. Two public water tanks are situated in the village.



Fig 15. Rangoli Map of Konheri village

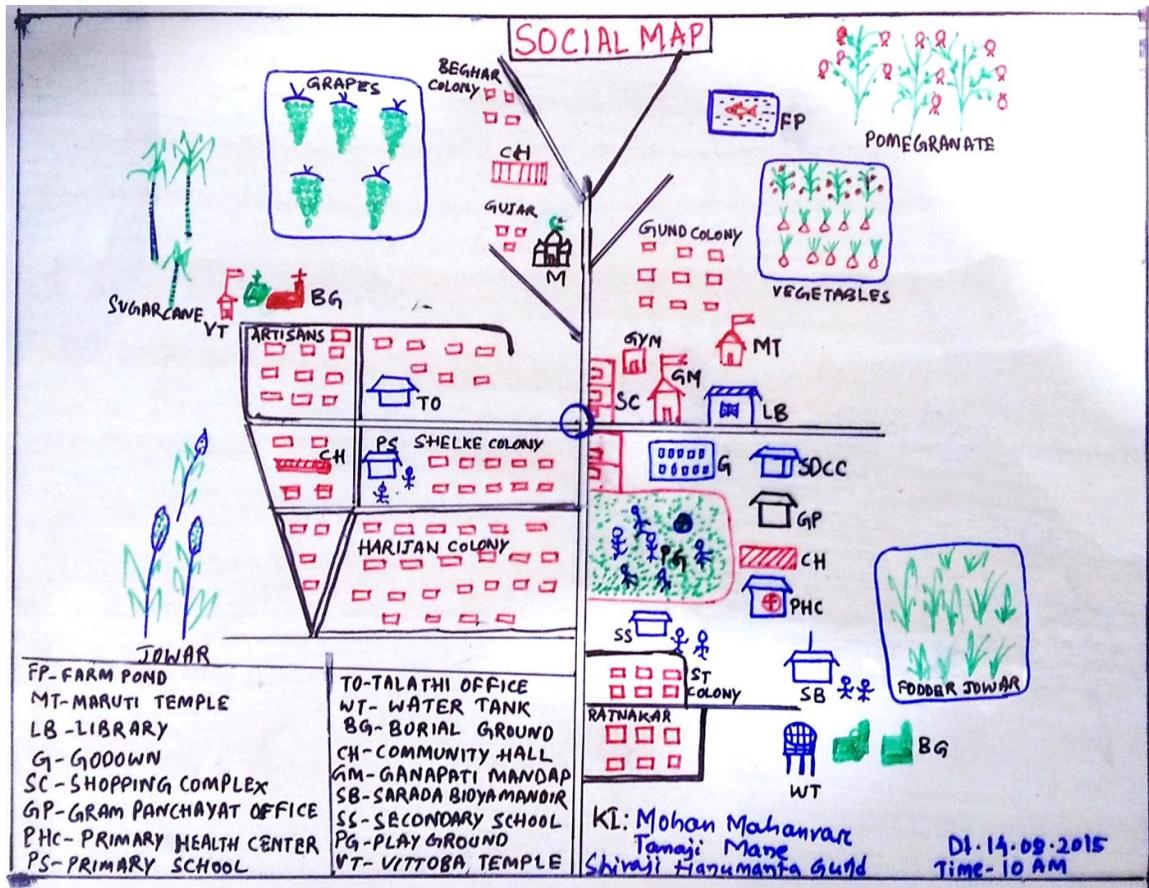


Fig 16. Social map of Konheri village

6.12 INDIGENOUS TECHNICAL KNOWLEDGE (ITK)

KI's: Mr. Mahadev Hariba Deokate, Mrs Savithri Bhagwan Shelke, Mrs. Archana Samadan Shelke

ITK is the traditional, unique and technical knowledge present in the cultural fabric of the village passed from one generation to next generations orally. ITK was widely used in agricultural crops, animal health and also human health related problems as first aid medication especially remote villages where accessibility is less to the health care system like hospitals very is less or nil.

To know about the various indigenous technical knowledge practiced among the villagers, we interacted with group of elders to discuss about their accumulated experiences in dealing with the situations and problems related to human health, Animal health and agricultural crops, etc. and we listed the remedies are as follows.

Table 11. Indigenous technical knowledge

Sl.No	Source /Ingredients	Application
Seed grains storage		
1	Dried Neem Leaves +ash	To prevent Insect and pest attack in seed grains
2	Neem seed kernel extract	Repellent and antifeedent in crops
Human health		
2	<i>Cissusquadrangularis</i> whole plant	For healing bone fracture
3	Mustard oil +cumin	To prevent stomach pain
4	Paste of Turmeric +Dalchini+jaggery+loung and luke warm water	To cure throat infection
5	Holi basil	Cough, Relieve stress
6	<i>Calotropis sp.</i>	To prevent tooth aches
Animal health		
7	Gunny bag tied in poultry cage	To lay the eggs
8	Plastic bags tied in the lumbar region of bucks	To avoid unwanted mating
9	Feeding of western tamarind Leaves to goats	To prevent diarrhoea in goats
10	Jaggery + soda +Ground nut oil	Calf scour
11	Cumin powder +turmeric+ground nut oil	To heal horn injury in animals
11.	Wooden baskets for chicks	To avoid predation

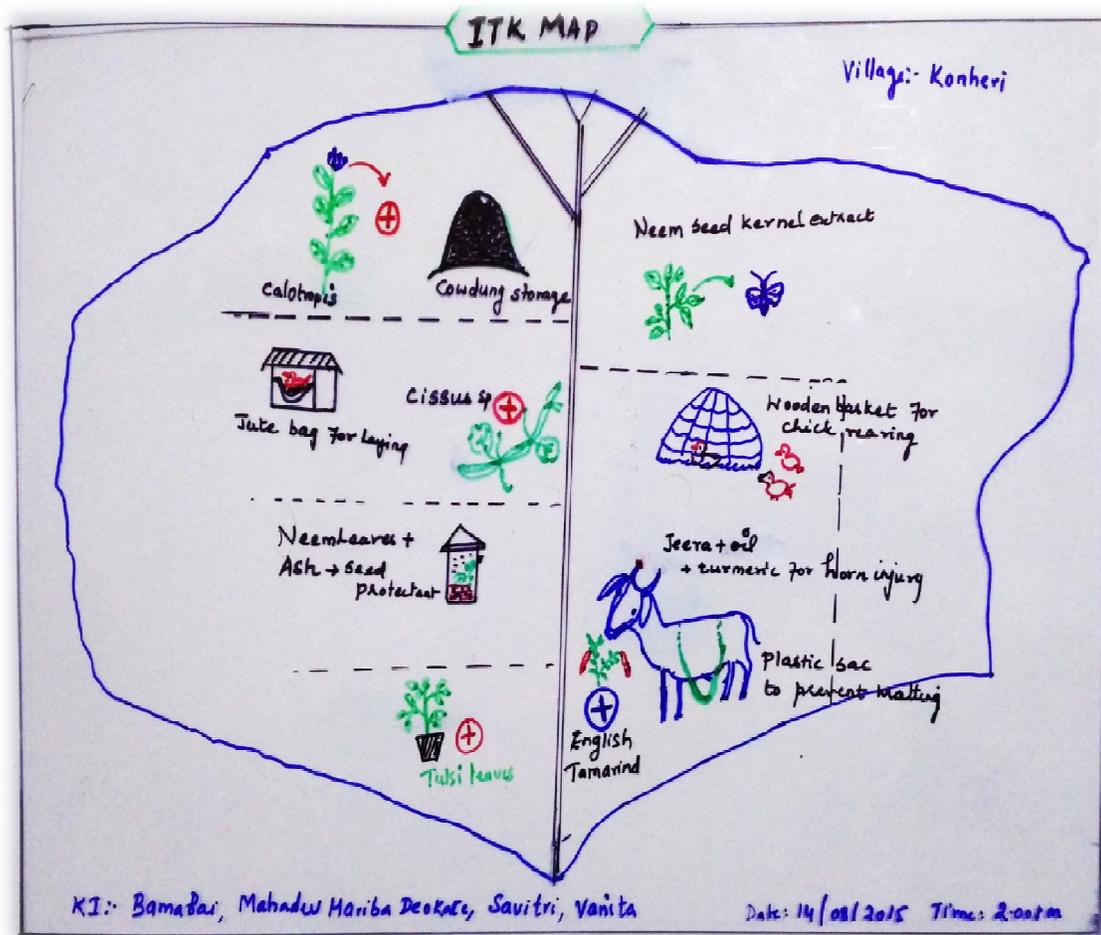


Fig 17: Indigenous technical knowledge (ITK)



6.13 TECHNOLOGY MAP

The different technologies which have been adopted, discontinued and rejected in the village Konheri are depicted in table. The farmers of the village were found to have adopted different varieties of pomegranate, grape, jowar, tomato, water melon, cucumber, wheat, ridge gourd and different breeds of livestock and various farm implements.

KI's: SathishHande, Jarag Baba, GadePrakash

Rabi sorghum: Maldandi variety is largely adopted in the village because of good taste and good fodder quality. The variety DagdiSolapur is rejected due to hard roti, hard fodder and more water requirement.

Grapes: the farmers in the village are cultivating three varieties of grapes i.e. Thomson seedless, Sonaka and Clone 2.

Pomegranate: The variety Bhagwa was largely adopted in the village and Ganesh variety was discontinued.

Tomato: The farmers are cultivation two varieties namely Laxmi 50005 and Alankar.

Watermelon: The variety sugar queen is largely cultivating in the village over Kiranbanjali.

Cucumber: Gypsy and GK are cultivating in the village.

Wheat: The variety HD-909 and Lok-1 are cultivated in the village.

Table. Technology table for crop varieties

Category	Technology	Technology adoption behaviour	Reasons
Rabi Sorghum	Maldandi	Adopted	Good taste, good fodder quality
	DagdiSolapur	Discontinued	Hard roti, hard fodder and more water requirement
Grapes	Thompson seedless	Adopted	Less disease incidence
	Sonaka	Adopted	Good quality fruits for fresh consumption and good market price
	Clone 2	Adopted	Good for raisin making
Pomegranate	Ganesh	Discontinued	Bigger fruits, low market price, less attractive colour

	Bhagwa	Adopted	Medium size fruits, more attractive colour and better market price
Tomato	Laxmi 50005	Adopted	Higher yield and income
	Alankar	Adopted	Higher yield and less disease incidence
Water melon	Kiranbanjali	Rejected	High virus disease incidence and reduction in quality
	Sugar queen	Adopted	High yield, lower disease incidence and good quality fruits
Cucumber	Gypsy	Adopted	Higher yield, medium sized fruits
	GK	Adopted	Higher yield
Bitter gourd	US 305	Adopted	Higher yield and less disease incidence
Ridge gourd	Naga	Adopted	Higher yield
Wheat	HD-989	Adopted	Higher yield and better adoptability
	LOK-1	Adopted	Good taste and better adoptability
Red gram	BDN	Adopted	Medium to large sized pods and dhal recovery percentage

Farm implements:

The farm machinery like tractor, power tiller, small tractor, seed planter, power sprayer, electric motor, plastic mulching and drip irrigation are largely adopted. The hand operated sprayer was rejected and oil engine was discontinued. Nearly 65% of farmers in the village adopted drip irrigation to solve the problem of water shortage and thereby they bring more area irrigation.

Table 12. Technology table for farm implements

Sl No.	Technology	Technology adoption behaviour	Reasons
1	Tractor	Adopted	Labour and time saving farm operation
2	Power tiller	Adopted	Small operations are easily carried out
3	Small tractor	Adopted	Easy to operate in orchards
4	Seed planter	Adopted	Labour and time saving

5	Power sprayer	Adopted	Easy to operate and can maintain optimum pressure
6	Hand operated sprayer	Rejected	More drudgery, more time and non-uniform spray
7	Electrical motor	Adopted	Lifting water from the well for irrigation
8	Oil engines	Discontinued	High fuel cost
9	Plastic mulching	Adopted	Moisture conservation, weed and disease control
10	Drip irrigation	Adopted	Save in irrigation water, less weed growth

Livestock: The farmers in the village adopted improved breeds of cow like Jersey and HF cross, Osmanabadi in goat, Pandarapuri in buffalo, Khillar in bullock and they are rearing desi breed of poultry.

Table 13. Technology table for animals

SI No.	Technology	Technology adoption behaviour	Reasons
1	Crossbred Cow (HF and Jersey)	Adopted	High milk yield and high income
2	Goat (Osmanabadi)	Adopted	Higher dressing percentage
3	Buffalo (Pandharpuri)	Adopted	Disease resistance, adoptable to local climatic conditions
4	Khillar	Adopted	Better for draught purpose
5	Backyard poultry (Desi)	Adopted	Regular income, meat and egg for household purpose

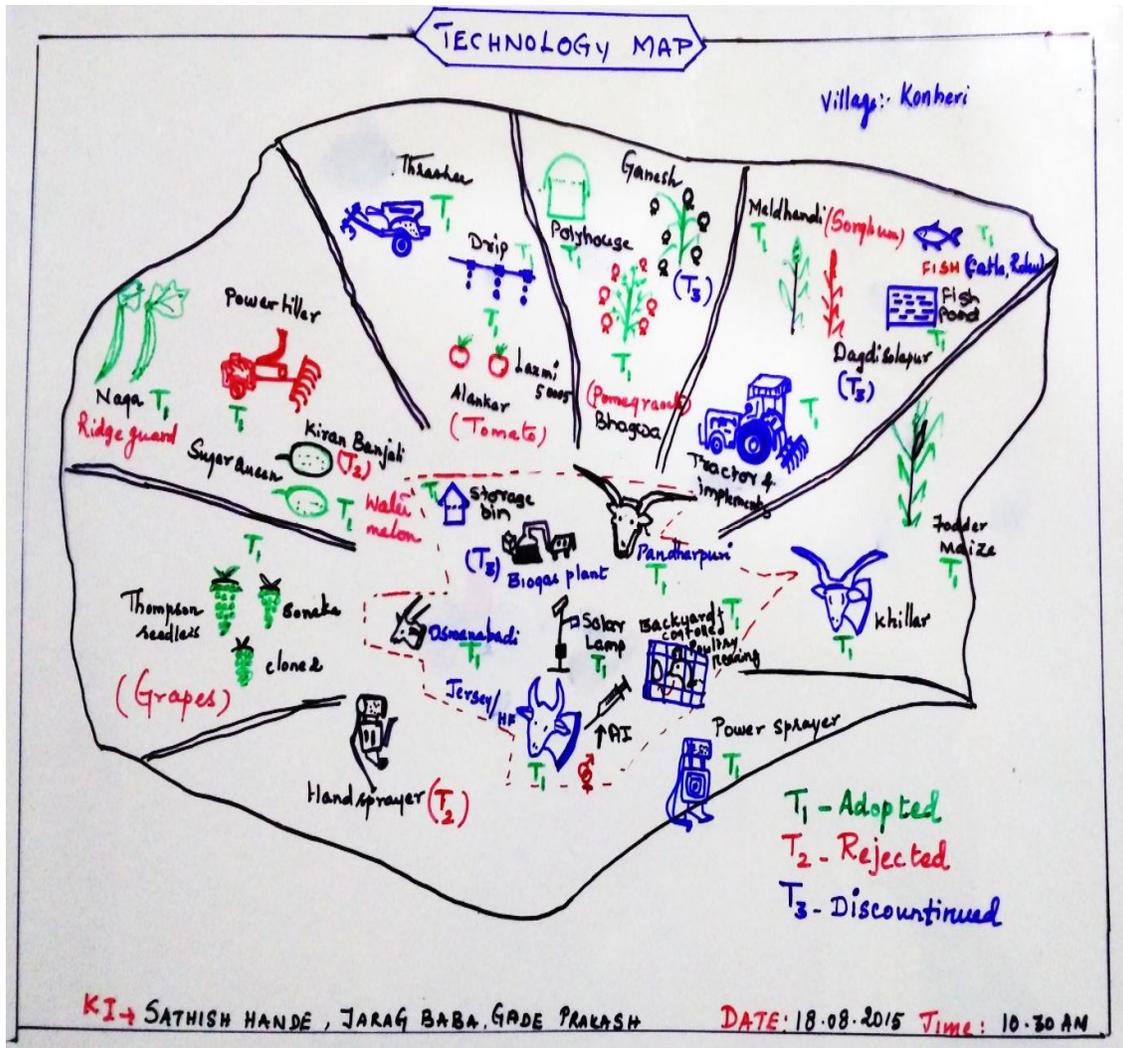


Fig 18. Technology map of Konheri village

6.14 MARIX RANKING

Matrix ranking is a PRA tool to know the preferences of the farmers for the particular crop, varieties of the crop and breeds of the livestock based on different parameters. The key informants were asked to assign the ranks among the cultivated crops, varieties of the crop and breeds of the livestock for selected parameters. The scores were allotted for each rank then fine score and fine rank were calculated for each category. The crop, variety and breed of the livestock having highest fine score and fine rank will be the most preferred crop, variety and breed by the farmers.

Table 14. Matrix ranking for different fruit crops adopted in the village

Particulars	KI's	Grape		Pomegranate		Ber	
		Rank	Score	Rank	Score	Rank	Score
Yield	K1	B	4	A	5	D	2
	K2	A	5	B	4	D	2
	K3	A	5	B	4	E	1
	Total		14		13		5
Income	K1	A	5	B	4	E	1
	K2	A	5	B	4	D	2
	K3	A	5	B	4	D	2
	Total		15		12		5
Water requirement	K1	D	2	D	2	A	5
	K2	E	1	D	2	B	4
	K3	C	3	D	2	B	4
	Total		6		6		13
Pest and diseases occurrence	K1	D	2	C	3	B	4
	K2	C	3	C	3	B	4
	K3	C	3	B	4	C	3
	Total		7		10		11
Cost of cultivation	K1	D	2	C	3	B	4
	K2	D	2	D	2	B	4
	K3	E	1	C	3	C	3
	Total		5		8		11
Fine score			47		49		45
Fine rank			II		I		III

The results of the matrix ranking for different fruit crops grown in the Konheri village indicated that farmers relatively prefers grapes cultivation over pomegranate and ber crop cultivation in terms yield and income per ha. Ber crop is more preferred over grapes and pomegranate crop for the parameters such as less water requirement, pest and disease occurrence as well as lower cost of cultivation. However, the fine score revealed that pomegranate is most favoured crop of the

village based on its yield, income, moderate levels of water requirement and pest and disease occurrence on the crop.

Table 15. Matrix ranking for varieties of pomegranate of the Konheri village

Particulars	KI's	Ganesh		Bhagwa	
		Rank	Score	Rank	Score
Availability of planting material	K1	D	2	A	5
	K2	C	3	B	4
	K3	C	3	B	4
	Total		8		13
Fruit size	K1	B	4	B	4
	K2	B	4	C	3
	K3	A	5	B	4
	Total		13		11
Fruit color	K1	C	3	B	4
	K2	D	2	A	5
	K3	C	3	A	5
	Total		8		14
Bacterial blight resistance	K1	B	4	D	2
	K2	C	3	C	3
	K3	B	4	C	3
	Total		11		8
Market price	K1	C	3	A	5
	K2	C	3	B	4
	K3	B	4	A	5
	Total		10		14
Yield	K1	A	5	A	5
	K2	A	5	B	4
	K3	A	5	A	5
	Total		15		14
Fine score			65		74
Fine rank			II		I

The matrix ranking for the two cultivated varieties of the pomegranate revealed that 'Bhagwa' variety of the pomegranate was the most preferred variety by the farmers compared to 'Ganesh' variety for ease of availability of the planting material, attractive fruit colour and more market price. Ganesh variety is having many positive attributes like bigger fruit size, less bacterial blight incidence, higher yield potential in comparison to 'Bhagwa' variety. However, it is the market price for the attractive fruit colour makes Bhagwa variety a favorite choice among the farmers.

Table 16. Matrix ranking for varieties of Jowar in Konheri village

Particulars	KI's	Maldandi		Dagadisolapur	
		Rank	Score	Rank	Score
Yield	K1	A	5	D	2
	K2	B	4	C	3
	K3	B	4	C	3
	Total		13		8
Flour quality	K1	B	4	B	4
	K2	A	4	C	3
	K3	A	5	C	3
	Total		13		10
Fodder quality	K1	B	4	C	3
	K2	A	5	D	2
	K3	A	5	C	3
	Total		14		8
Drought resistance	K1	B	4	B	4
	K2	A	5	C	3
	K3	B	4	C	3
	Total		13		10
Pest and diseases	K1	A	5	C	3
	K2	B	4	D	2
	K3	A	5	C	3
	Total		14		8
Fine score			67		44
Fine rank			I		II

Table 17. Matrix ranking for varieties of grapes in Konheri village

Particulars	KI's	Thomson seedless		Sonaka		Clone 2	
		Rank	Score	Rank	Score	Rank	Score
Disease and Pest resistance	K1	A	5	C	3	B	3
	K2	A	5	D	2	C	3
	K3	B	4	D	2	B	4
	Total		14		7		10
Fruit size and quality	K1	B	4	A	5	C	3
	K2	C	3	A	5	D	2
	K3	C	3	B	4	C	3
	Total		10		14		8
Raisin Yield	K1	B	4	B	4	A	5
	K2	B	4	B	4	B	4
	K3	A	5	C	3	A	5
	Total		13		11		14
Profit	K1	B	4	A	5	B	4
	K2	B	4	A	5	B	4
	K3	C	3	B	4	A	5
	Total		11		14		13
Fine score			48		46		45
Fine rank			I		II		III

Grape is one of the important commercial horticulture crop grown in Konheri village with farmers cultivating varieties like Thompson seedless, sonaka and clone-2. Among the varieties farmers choose to go for Thompson seedless for parameters like pest and disease resistance, while fruit size and quality and profit were good in sonaka variety as perceived by the farmers. The raisin yield is more in clone -2 variety of the grape compare to Thompson seedless and sonaka varieties. The fine score and fine rank revealed that Thompson seedless variety is the most preferred variety among the farmers of the Konheri village.

Table 18. Matrix Ranking for Different Milch Animals Adopted in the Village

Particulars	KI's	HF cross		Jersey cross		Khillar		Pandharpuri	
		Rank	Score	Rank	Score	Rank	Score	Rank	Score
Milk Yield	K1	A	5	B	4	E	1	B	4
	K2	A	5	B	4	D	2	C	3
	K3	A	5	B	4	E	1	C	3
	Total		15		12		4		10
Rearing cost	K1	C	3	C	3	A	5	C	3
	K2	C	3	B	4	B	4	C	3
	K3	C	3	C	3	B	4	C	3
	Total		9		10		13		9
Disease resistance	K1	B	4	B	4	B	4	C	3
	K2	B	4	B	4	B	4	B	4
	K3	C	3	B	4	A	5	C	3
	Total		11		12		13		10
Milk price	K1	B	4	B	4	B	4	A	5
	K2	B	4	B	4	C	3	B	4
	K3	C	3	B	4	C	3	A	5
	Total		11		12		10		14
Fine score			46		46		40		43
Fine rank			I		II		IV		III

Among the milch animals that are reared in the Konheri village, farmers showed their relative preference to HF crossbred in terms of higher milk yield. Whereas with respect to rearing cost and resistance to diseases. Khillar breed is the first choice among the farmers which obtained highest scores for these parameters. Based on the overall score the highest rank is given to the HF/Jersey crossbred followed by Pandharpuri breed of buffalo and Khillar breed of cattle.

Table 19. Matrix ranking for varieties of Jowar

Particulars	KI's	Maldandi		Dagadisolapur	
		Rank	Score	Rank	Score
Yield	K1	A	5	D	2
	K2	B	4	C	3
	K3	B	4	C	3
	Total		13		8
Floor quality	K1	B	4	B	4
	K2	A	4	C	3
	K3	A	5	C	3
	Total		13		10
Fodder quality	K1	B	4	C	3
	K2	A	5	D	2
	K3	A	5	C	3
	Total		14		8
Drought resistance	K1	B	4	B	4
	K2	A	5	C	3
	K3	B	4	C	3
	Total		13		10
Pest and diseases	K1	A	5	C	3
	K2	B	4	D	2
	K3	A	5	C	3
	Total		14		8
Fine score			67		44
Fine rank			I		II

The *rabi*Jowar is the main crop for marginal and small farmers, farmers are growing mainly local varieties *i.e.* Maldandi and Dagdisolapur these two varieties are rank based on yield, flour quality, fodder quality, drought resistance and pest and disease resistance. Maldandi is most preferred variety by the farmers as it showed excellent grain and fodder quality, also it has good drought and disease and insect resistance which gives more yield than Dagdisolapur.

6.15 VENN DIAGRAM

Key informants: Mr. Sharad Mali, Mr. AravindMitkari

The Venn diagram showed various existing institutions both inside and outside the village, their relative importance in the village, relationship and linkages among them, weaknesses with respect to their decision making process, their contribution in the development of the village. It also showed various organizations, groups and important individuals found in the village as well as the villagers view on their importance in the community.

The progressive farmers had very good interaction with the other institutes, farmers and shared information related to improved practices in crop production activities. The importance of various organizations/ individuals for a phenomenon is indicated in terms of size of the circles and the interaction among these is represented by the overlapping of the circles.

The dairy farmers in the Konherivillage are selling the milk in the five milk cooperative societies located inside the village. The society is also giving loan to the farmers for purchase of animals. Veterinary dispensary located at pennur is doing the vaccination, deworming and other extension activities sponsored by the Government. One private livestock supervisor staying in the village is providing the doorstep health care facilities. The farmers are getting latest information about livestock management from Agrowon newspaper. In collaboration with Veterinary department KVK, Mohol conducts training programmes. Bank of Maharashtra located at pennur is financing the farmers for livestock rearing.

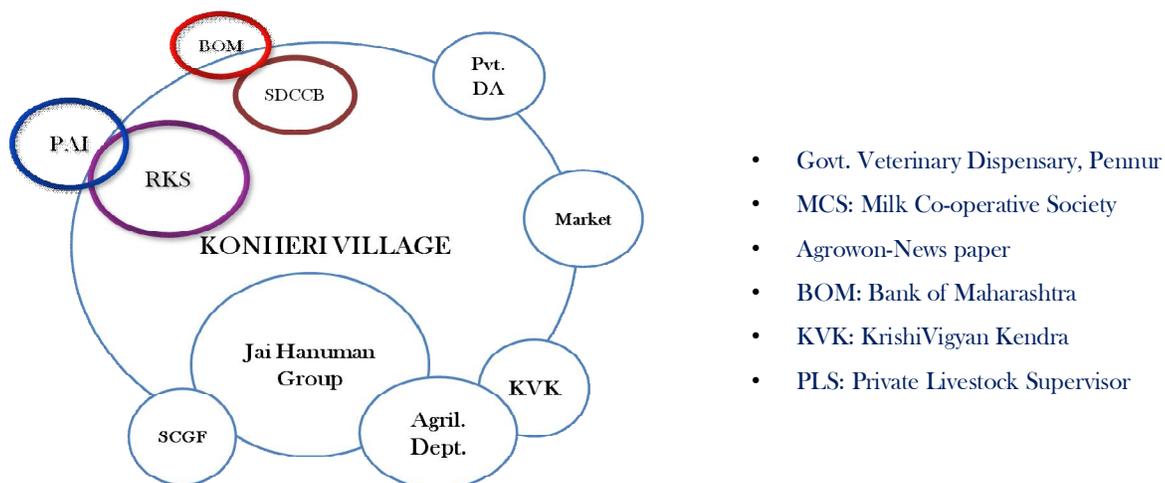


Fig. 19 Venn Diagram- Grape Cultivation

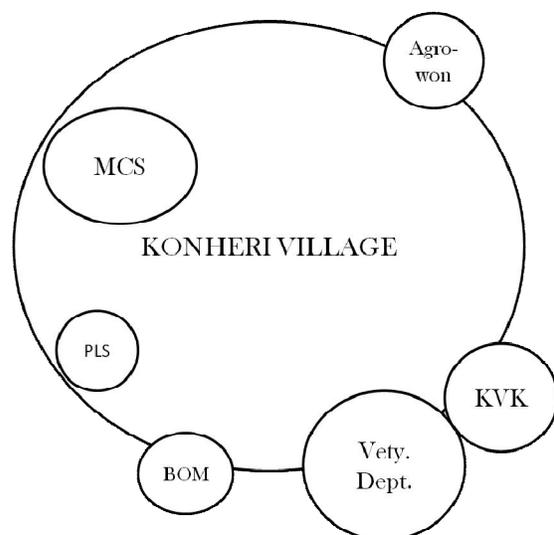


Fig. 20 Venn Diagram- Livestock

- Jai Hanuman Farmer's Group
- RKS: RajamataKrishiSeva Kendra
- SDCC: Solapur Dist. Central Co-oprative Bank
- BOM: Bank of Maharashtra, Mohol
- SCGF: State Co-operative Grape Growers Federation
- PAI: Private Agro Industry (Syngenta, Bayer etc.)
- PDA: Private Drip Agencies (Shreya Agro, Sonali Agro)
- Agricultural Department, Pennur
- KVK: KrishiVigyan Kendra, Mohol
- Private Nursery (Root stock), Nannaj
- Resins Market (Pandhapur, Pune, Hyderabad etc)
- PF1: Progressive farmer (PopatShelke)
- PF2: Progressive Farmer (YuvrajHande)

The **Venn diagram** shown above represents contribution of various Department, Institutes, groups, banks, agencies and progressive farmers in the cultivation of grape in Konheri village. As depicted in diagram, Jai Hanuman grape cultivator farmer's group (52 Members) found to be playing major role in grape cultivation & its marketing. This group is specially formed to consult & solve the issues and problems related to grape cultivation. Mr. PopatShelke is the chairman of the group. This group in contribution with various Department, institutes, agencies like State grape grower farmer's association, State Agriculture Department, Krishi Vigyan Kendra, Mohol etc. work for consultation and for solving various problems in grape cultivation. Farmers purchase the grape root stocks from private nurseries of Nannaj village, Pune district. Farmers mainly found to be purchasing different farm inputs like fertilizers, growth regulators, insecticide & pesticides from RajamataKrishiSeva Kendra, Konheri. Various private agro industries like Syngenta, Bayer etc. also interacted, consulted and advised the farmers in various events organized with RajamataKrishiSeva Kendra. Most of the drip irrigation facility has been installed in village by private drip agencies like Shreya Agro, Sonali Agro. etc after consultation with drip manufacturer companies. State Agricultural department also helped farmers by providing various government policies, subsidies for drip and also in grape cultivation practices. In terms of finance, farmers are dependent on Solapur district central co-operative bank branch Konheri and Bank of Maharashtra, Mohol. Farmers are selling their produce to markets of Pune, Pandharpur and Hyderabad after preparing resins from grapes. The key informants also informed about the role of progressive farmer like Mr. PopatShelke, YuvrajHande in grape cultivation.

6.16 WEALTH RANKING

Wealth ranking entails about the percentage distribution of village population in different wealth classes like rich, middle and poor based on their asset holdings and income generation capacity. A total list of households in the Konheri village collected from the local panchayat office. Three key informants who have good knowledge about the village status were selected and were asked individually to group all the households into different wealth categories on their own criteria. The KI's grouped the households mostly based on agricultural and other income generation sources.

KI's: ShindeLaxmanDhamu, KambleYashwanthDevidas, GundSumanTanaji, PandareMangeshBabu,

Step1

$$\begin{aligned} \text{Average number of categories} &= \frac{\text{Number of categories made by farmers}}{\text{Number of key informants}} \\ &= (3+3+3)/3 \\ &= 3 \end{aligned}$$

Step 2

$$\begin{aligned} \text{Correction factor} &= \frac{\text{Maximum Av score} - \text{minimum Av score}}{\text{Average number of categories}} \\ &= (100-33.3)/3 \\ &= 22.2 \end{aligned}$$

Step 3

Determination of categories

1. Poor : 33.4 to 55.5
2. Medium : 55.6 to 77.7
3. Rich : 77.8 to 100

Table 20. Economic status of farmers identified by key informants

Sl no.	Name	KI-1	KI-2	KI-3	Avge. Score	Category
1	GadgeDatatreya	33.3	33.3	33.3	33.3	P
2	PhakreLaxmibhai	66.6	33.3	33.3	44.4	P
3	SheteVithal	33.3	33.3	33.3	33.3	P
4	Waghmore Shankar	100	100	100	100	R
5	Gore Navnath	66.6	100	66.6	77.7	M
6	GadePrakash	66.6	100	66.6	77.7	M
7	SheteJambavant	66.6	66.6	66.6	66.6	M
8	PopatShelke	100	100	100	100	R
9	Jarag Baba	33.3	33.3	33.3	33.3	P
10	HandeSathish	66.6	66.6	66.6	66.6	M
..						
..						
886	DongreMahadev	66.6	66.6	33.3	55.5	P
887	ShelkePoorna	33.3	33.3	33.3	33.3	P
888	ShendeAbhiman	33.3	66.6	33.3	44.4	P
889	LawateShreemanth	100	100	100	100	P
890	ShemdeSanthosh	66.6	33.3	66.6	55.5	P
891	GanjaleAvinash	66.6	66.6	66.6	66.6	M

Number of households in each category

Table 21: Wealth ranking of households of Konherivillage

Sl No.	Category	Households	% Households
1	Poor	598	66.4
2	Medium	202	23
3	Rich	91	10.2

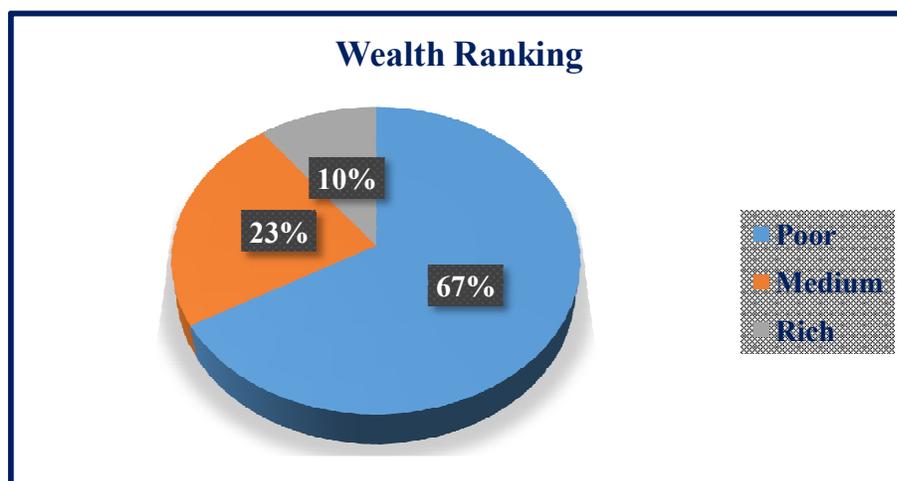


Fig 21. Wealth ranking of Konheri village

Table 22. Category of households

Sl no.	Category	Description
1	Rich	*Land area >10 acre *Business *Govt. Job *Concrete house *assets like tractor, car, tillers, cultivators,
2	Medium	*Land area 3-5 acre *Livestock >5 *Two wheelers *Moderate house
3	Poor	*Land area <3 acre * Kaccha House

The analysis indicated that 66.4% of the villagers came under the poor category, 23% under the middle class and 10.2% under the rich category. As per the KI's category land less laborers belong to the poor category. This indicates that majority of the fertile land in Konheri village belongs to the middle and rich class families and these have irrigation facility. The analysis also indicates that the adoption of any technology in this village depends on the few rich and middle class farmers.

6.17 LIVELIHOOD ANALYSIS

Livelihood analysis was conducted after wealth ranking procedure by collecting information from one representative household selected in random from each rich, medium and poor agricultural families. The income and expenditure pattern of these households was studied and is represented in the form of pie diagram which helps in analyzing the priorities of the households for various goods and services. The annual consumption and expenditure pattern of different households are presented in the following sections.

Table 23: Livelihood analysis of farmers of Konheri village

Sl No	Item	Rich (PopatShelke)	Medium (MahadevHaribaDevkat)	Poor (ShivajiHanumantaGound)
1	Family members a. Adult b. Children	6 4	8 -	3 2
2	Occupation	Agriculture	Agriculture, Driver Private company	Agriculture Land labor
3	Assets	Land 17 acre (13 acre-irrigated + 3 acre-Rainfed) Borewells:13 Goat:15 Poultry:20 Buffalo:6 Packing house and Cow shed:1 Farm pond:1 House:1 Tractor:1 Direct seed planter:1 Sprayer:3 Thresher:1 Alto:1	Land: 3 acre (Rainfed) Cross breeds:12 Khillar:1 Goat:6 Poultry:20 Bicycle:1 House:1 Cattle shed:1	Land: 2 acre (Rainfed) Cows:2 Bullock:2 Buffalo:2 Chaff cutter:1 Bike:1 House:1 Cattle shed:1
4	Total income	15,77,000/-	430000/-	135000/-
5	Total expenditure	10,73,000/-	255600/-	96200/-
6	Savings	5,04,000/-	174400/-	38800/-
7	Decision making	Single head decision	Joint decision	Joint decision
8	Coping strategy	Bank deposits Crop and life insurance	Bank deposits Crop and livestock insurance	-
9	Migration	-	Temporary	Temporary

Rich

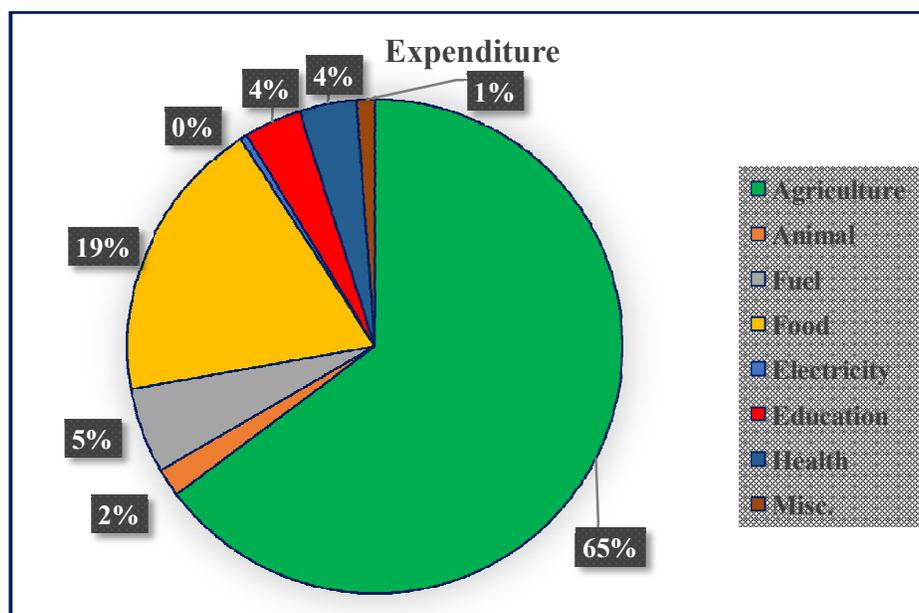
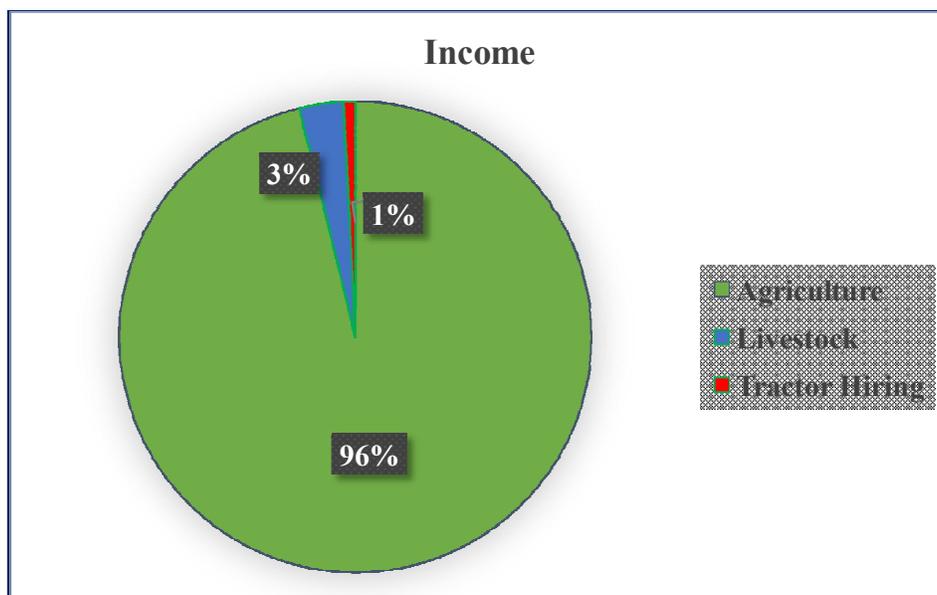


Fig 22. Income and expenditure of rich farmers

Rich farmers of the village generally progressive farmers and they are the first persons to adopt any new technology. The main source of their income was agriculture (96%) and remaining from the dairy and from tractor hiring. Out of total expenditure 65% spent

towards agriculture, 2% on animal, 19% on food, 4% on health and electricity and 5% is spent on fuel.

Medium

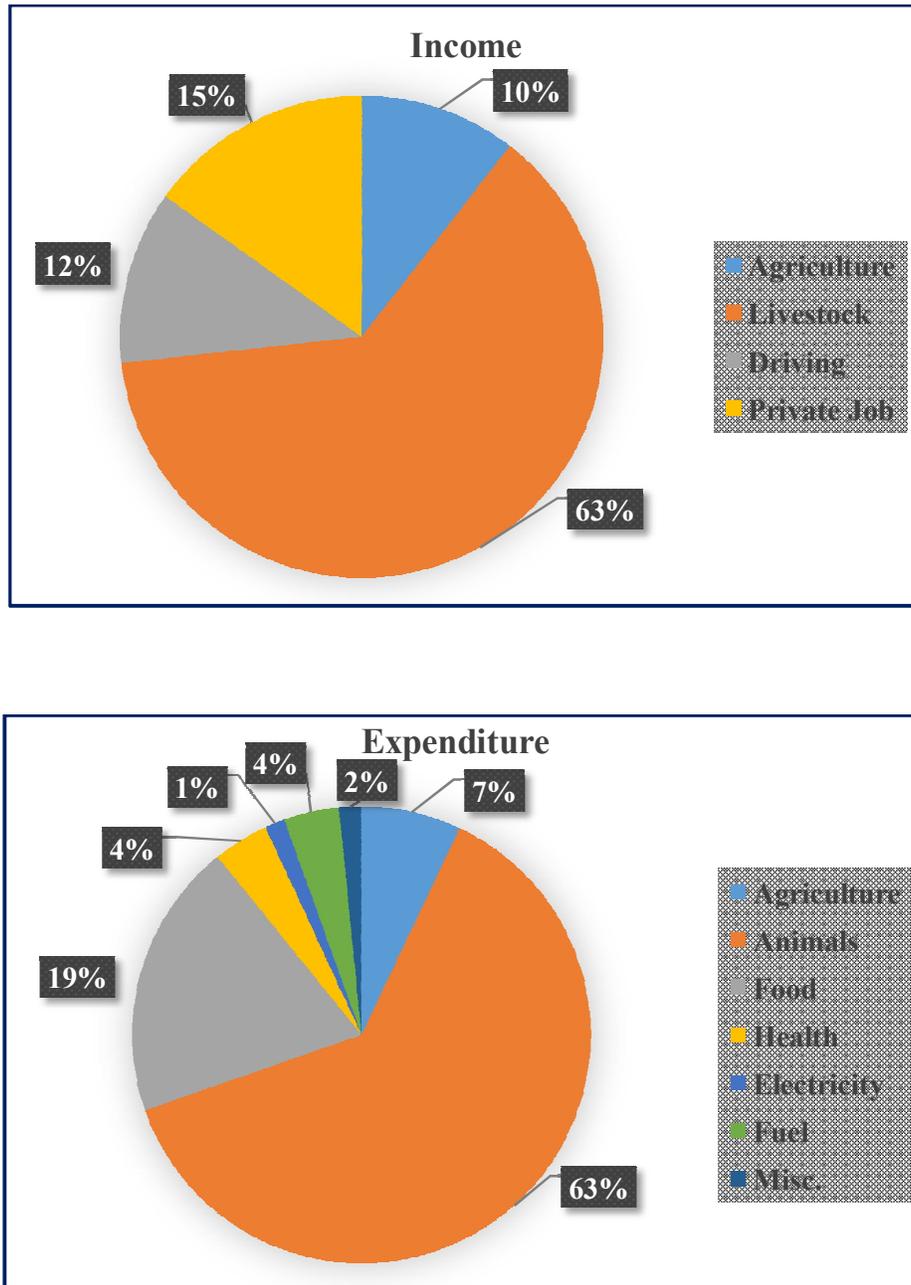


Fig 23. Income and expenditure of medium farmers

The medium farmers were getting their income mainly from dairy (63%) because the farmer is having twelve cross breed cows followed by private jobs (15%), driving (12%) and least from agriculture (10%) because the farmer is growing *rabi sorghum* and tur and mainly the farm is under rainfed. They were spending 63% on livestock, 19% on food, 4% on electricity.

Poor

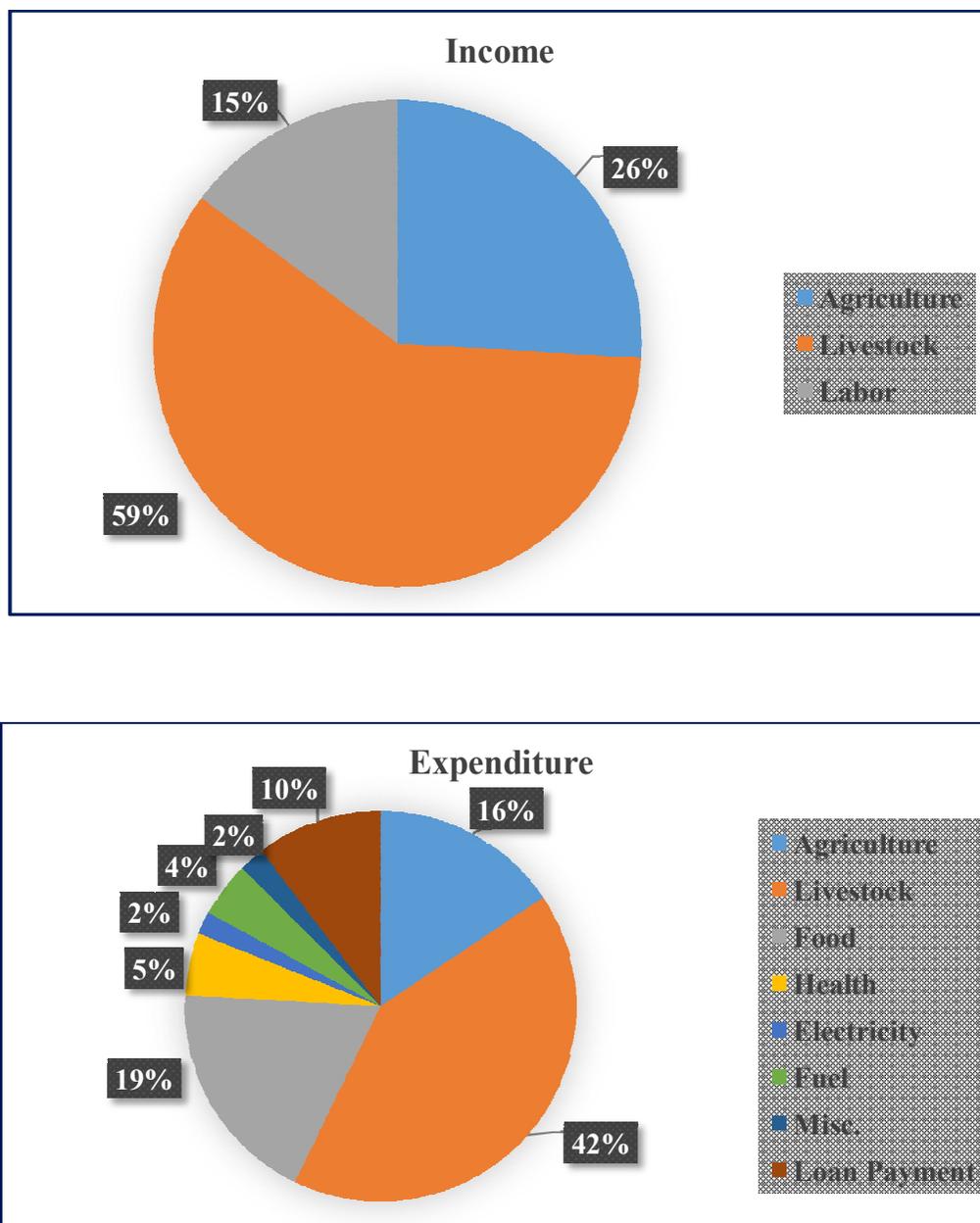


Fig 24. Income and expenditure of poor farmer

The major sources of income of poor farmer were livestock (59%), agriculture (26%) and followed by labour (15%). Most of the income they earned were spent on livestock (42%), agriculture (16%), food (19%) and on repayment of loan (10%).

6.18 PROBLEM IDENTIFICATION AND PRIORITIZATION

Once all the other PRA tools are studied the rank based quotient technique is used to identify the top most researchable problem of the area under study. A sample of 30 farmers were taken and asked to rank the problems identified and given by them. A total of ten ranks were taken up. The problems identified in the study area are listed below.

Table 24: Major problems identified

1	Bacterial blight in pomegranate
2	Fruit borer and leaf minor in tomato
3	Mosaic virus in watermelon and other cucurbit crops
4	Water shortage in <i>kharif</i> season
5	Low milk price
6	Fodder shortage
7	Repeat breeding in buffalo
8	Powdery mildew and downey mildew in grapes
9	Micronutrient deficiency in tomato
10	Fruit borer of ber
11	Low yield of <i>rabi</i> sorghum

The formula for the RBQ is given below

Rank Based Quotient:

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

Where,

i = Concerned ranks (1 to 5)

N = Total numbers of farmers (30)

n = Numbers of rank

f_i = Frequency (Number of farmers reporting that particular problem)

Once the RBQ are found out for each problem, the top most researchable issue in the village is identified by calculating the value based index for each RBQ.

Table 25: Problems identified in Konheri village: Rank frequency table

Sl No.	Problems	Ranks										Total
		1	2	3	4	5	6	7	8	9	10	
1	Bacterial blight in pomegranate	12	8	5	5							30
2	Fruit borer and leaf minor in tomato	5	7	6	3	5	4					30
3	Mosaic virus in watermelon and other cucurbit crops	7	5	4	8	2	4					30
4	Water shortage in <i>kharif</i>	20	7	3								30
5	Low milk price	7	6	7	5	3	2					30
6	Fodder shortage	10	8	7	5							30
7	Repeat breeding in buffalo	9	8	6	5	2						30
8	Powdery mildew and downey mildew in grapes	10	8	6	6							30
9	Micronutrient deficiency	5	6	5	7	4	3					30
10	Fruit fly of ber	8	6	5	3	5	3					30
11	low yield of <i>rabi</i> sorghum	9	8	8	5							30

Value Based Index: $VBI = RBQ \times \text{Average economic loss percentage per annum}$. The problem with the maximum value based index is identified as the top most researchable problem. The table given below shows that water scarcity in *kharif* is having the maximum VBI and hence identified as the most important researchable issue.

Table 26: Problems identified based on ranks

Sl No.	Identified Problem	RBQ	Average economic % loss per annum	VBI
1	Bacterial blight in pomegranate	89.0	66.7	5933
2	Fruit borer and leaf minor in tomato	77.3	50.0	3867
3	Mosaic virus in watermelon and other cucurbit crops	78.3	52.0	4073
4	Water shortage in <i>kharif</i> season	95.7	91.7	8769
5	Low milk price	81.0	40.0	3240
6	Fodder shortage	87.7	20.0	1753
7	Repeat breeding in buffalo	85.7	28.0	2399
8	Powdery mildew and downey mildew in grapes	87.3	56.0	4891
9	Micronutrient deficiency in tomato	77.3	20.0	1547
10	Fruit borer of ber	80.0	37.5	3000
11	Low yield of <i>rabi</i> sorghum	87.0	42.9	3729

6.19 CONSEQUENCE DIAGRAM

Consequence diagrams are prepared to understand the various positive and negative effects of a particular technology as perceived by the farmers.

1) Drip irrigation

Key informants-Vijay Lawate, Abhijitshelke, Sanjay Gound, ChandrakantShelke.

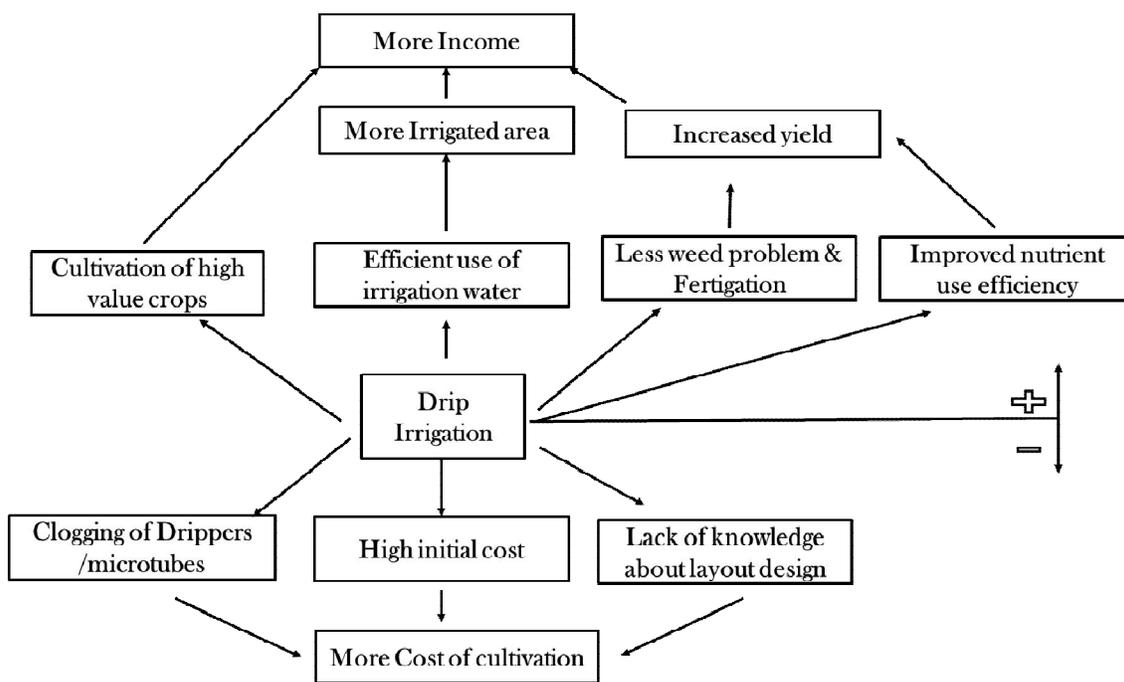


Fig 25: Consequence diagram for drip irrigation in Konheri village

Most of the horticulture crops in Konheri village are found to be grow using the drip irrigation. Farmers were asked for different positive and negative aspect of drip irrigation, based on their suggestion consequence diagram is drawn, among positive things effective use of irrigation water due to which more area brought under irrigation, the drip irrigation leads to cultivation of high value crops such as grapes, pomegranate, watermelon, tomato *etc.*, and drip irrigation also used to maintain less weeds, efficient use of nutrients using fertigation, these all things leads to more yield and more income from limited water compare to flood and sprinkler irrigation. On the negative side however, the initial cost for installing drip irrigation system is high, also many marginal farmers facing problem for designing layout in different

crops and problem of clogging of micro tubes, designing layout and maintains problem can be avoided by conducting training program for farmers

2) Crops

Key informants :DevidasDevkate, PurushotamLawte, ShuhasLawate

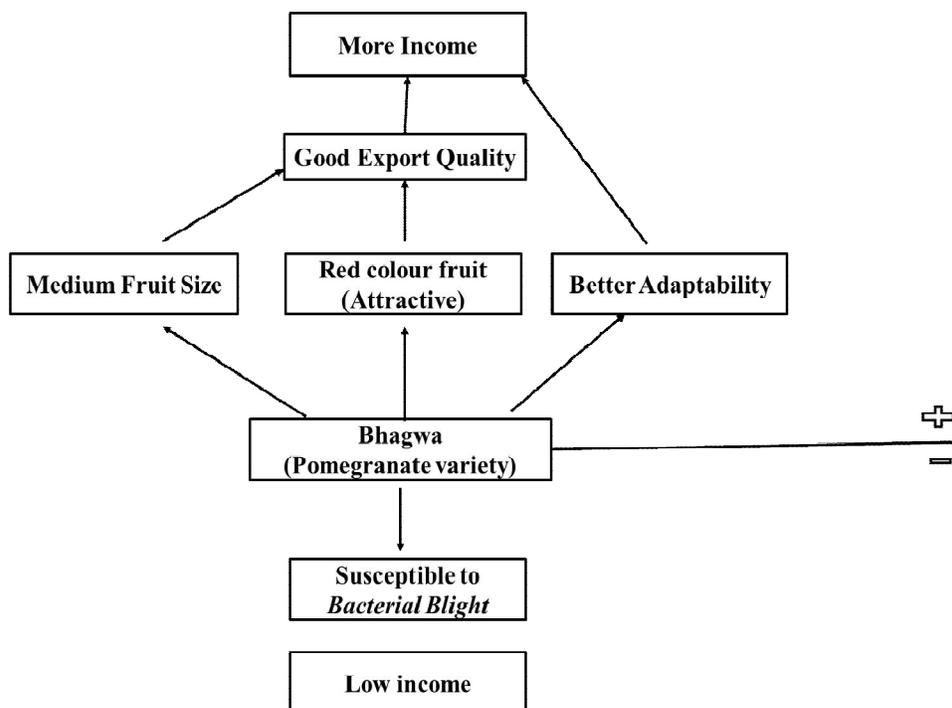


Fig 26: Consequence diagram for Bhagwa variety of pomegranate

The village has large area under pomegranate cultivation, most farmer are going for cultivation of BHAGWA variety, hence considering this consequence diagram is drawn for BHAGWA variety, key informants mentioned that the fruits of bhagwa variety is red attractive in color and medium size which mainly preferred for export in European countries also bhagwa showed better adaptability which gives good yield under available resources all together its gives good profit to farmers. Under negative points the susceptibility to bacterial blight is single main problem, which need more awareness to control using integrated diseases management.

3) Livestock

Key informants: Anil Kamble, Shivaji Gore, Tarun Lawate

In the Konheri village most farmers are going for Rearing crossbred HF/ Jersey cows. The milk production is much higher (Avg. 12 Lt/day) in comparison to Khillar cows (average 1 to 2 Lt/ day). Though the rearing cost is higher for the CB cows, the farmers are preferring them because of high milk yield and in turn higher return.

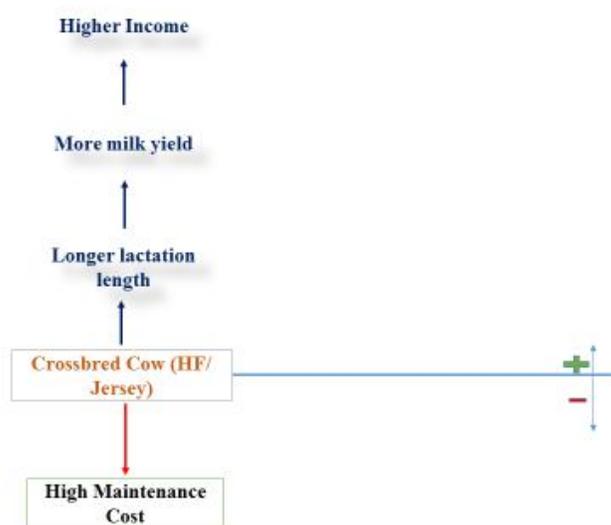


Fig 27: Consequence diagram for livestock in Konheri village

6.20 PROBLEM AND SOLUTION TREE

Different problems of Konheri farmers are identified with discussing thoroughly, some of the main problem related to different major crops and livestock are discusses here with possible solutions. The causes of problem and possible solutions are discusses with SMS of KVK (Mohol) and Agriculture department of Mohol tehsil.

1) Low yield of *rabi*Jowar

KI's: DatatrayJarag, Ravi Lawate, Rajendra Swami.

The most important problem in the farmers is Low yield of *Rabisorghm*, as most of the marginal and small farmers are depend on *rabisorghum* for food and fodder purpose. Solapurdistrict comes under the water scarcity zone, farmer depend on last rainfall of monsoon for growing the *rabi*Jowar crop hence there is severe water stress at grain filling stage which lends to significant reduction in yield, to avoid this the in-situ water conservation practices is the best solution which can reduce the water stress, also the farmers grow only local variety that is Maldandi, which has good grain and fodder quality but the yield of this variety is very low, MPKV Rahuri has developed series of *rabivarities* which gives more yield than Maldandi, the adoption of these improved varieties by efficient seed supply can reduce this problem. Moreover the seed treatment with insecticide and proper date of sowing can effetely control the major pest called shoot fly. The used of organic manure and balance fertilizer dose is needed to increase the overall yield.

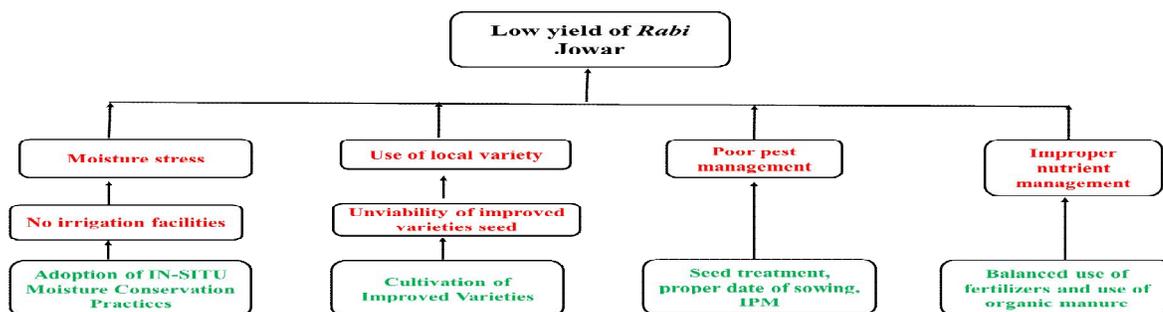


Fig 28: Problem-solution tree for low yield in sorghum in Konheri village

2) Low yield in pomegranate

KI's : Ganesh Shelke, ShiduLawate, DigambarDokne.

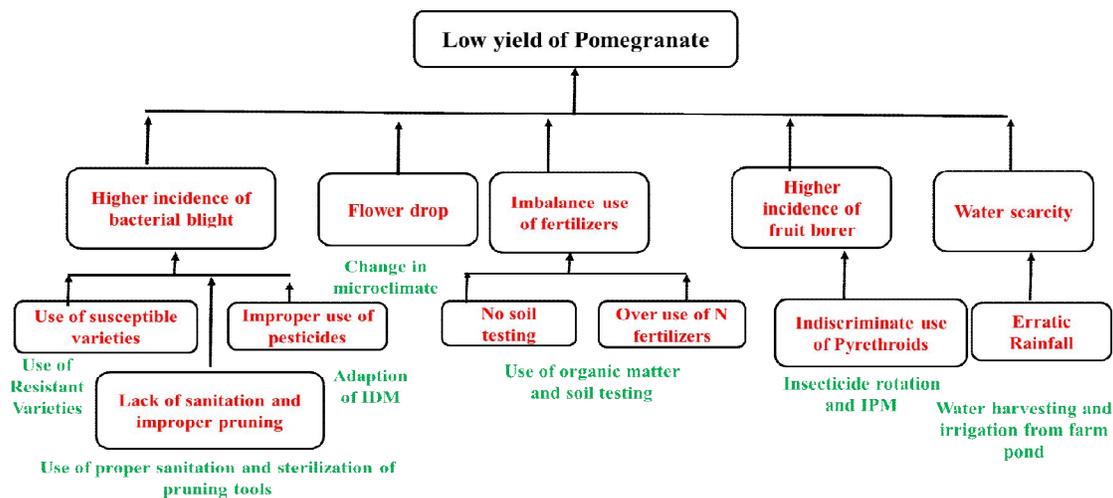


Fig 29: Problem-solution tree for low yield in pomegranate in Konheri village

Low yield of pomegranate is also a problem among pomegranate growing farmers, the main reason is higher incidence of bacterial blight which is due to use of susceptible varieties, lack sanitation and improper use of pesticides to control this disease proper sanitation and use of integrated disease management is very essential as only use of chemical pesticide increases the cost of cultivation and also develops resistance in pathogens. The flower drop in summer due very high temperature leads to low fruit seating for which maintaining cool microclimate using border crop is useful. The lack of micronutrient also result in low quality and yield of fruits for which soil testing based application of fertilizers is essential, fruit borer is also major pest for which farmers are using lot of chemical sprays, instead used of integrated pest management practices like collection of infected fruit and dispose or buried outside the field also smoking of orchard at evening hours will effectively controls the fruit borer and fruit sucking moth, many times farmers are facing water scarcity at bahar treatment for which protected irrigation using farm pond can avoid this problem.

3) Low yield in grapes

KI's: Parmeshwar Mane, Vijay Lawate, Vijay kumar, AbhimanShinde.

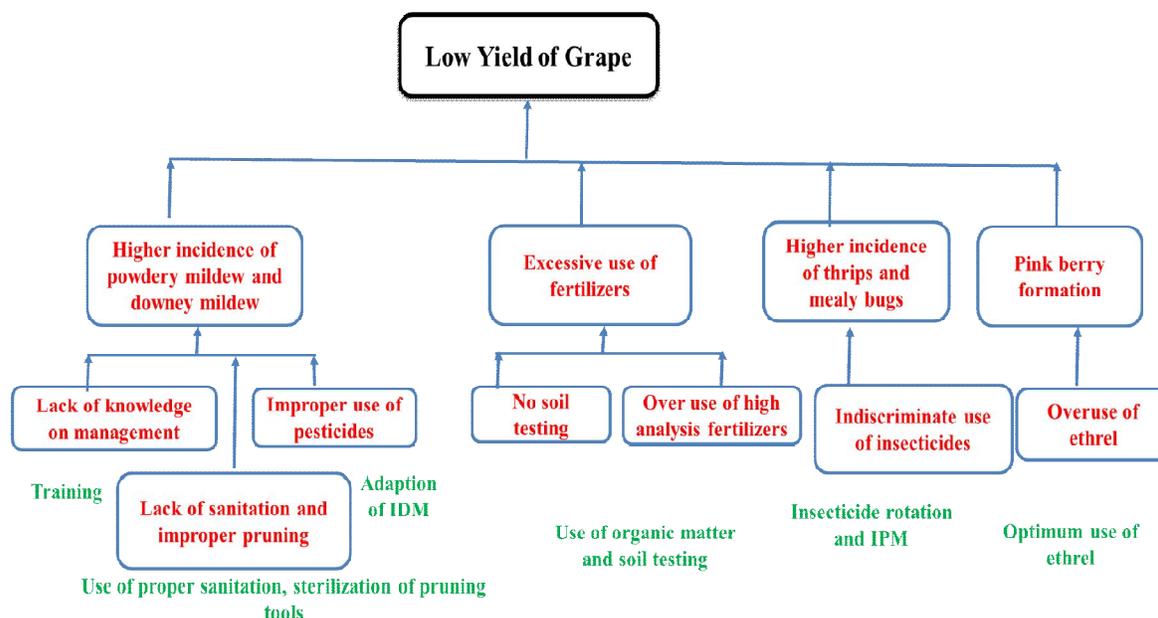


Fig 30: Problem-solution tree for low yield in grapes in Konheri village

Grape is most important cash crop in the village which has improved the economic status of farmers, the low yield in grape is also an important problem among the farmers, high incidence of powdery and downy mildew is main problem and farmers are using only chemical pesticides but the best way to control these diseases is proper sanitation and pruning of wines and use of integrated disease management is very effective to control this disease also without soil testing farmers are using many micronutrient sprays which increases the cost of cultivation, instead use of soil test based fertilizer and organic matter can reduces this excess cost, among insects thrips and mealy bug are big problem for which rotation of insecticide and integrated pest management is most preferred solution. The peculiar pattern of pink berry formation due to overused of ethrel can be reduces by optimizing ethrel dose.

Livestock is the second most important source of income of the Konheri village. As per discussion and our observations we found getting low price of milk, fodder shortage in lean season, repeat breeding in buffaloes and round the year incidence of mastitis are the major livestock related problems. Silage preparation with surplus Rabi fodder can be used in lean season. Group based preparation of value added milk products will increase the income

of dairy farmers. Awareness about proper timing of A.I., Hygienic maintenance of the animals will help to solve the problem of repeat breeding and mastitis respectively. Also proper vaccination and deworming of the animals is essential.

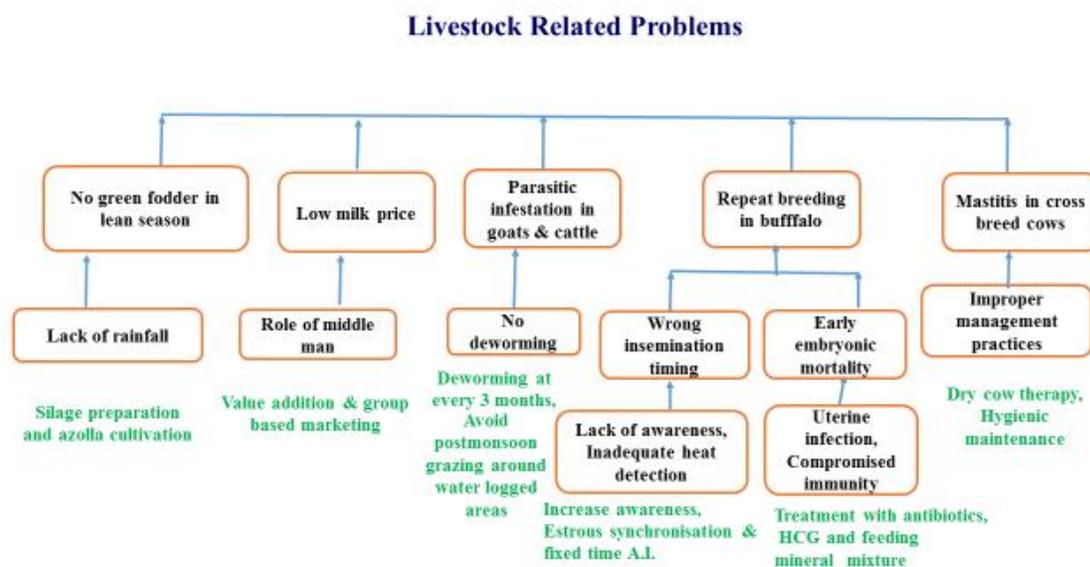


Fig 31: Problem-solution tree for livestock related problems in Konheri village

Perspectives of Problems

Problems identified were categorized as problems arising out of gaps in research in various agricultural disciplines and as problems arising out of gaps in extension activities. Main problems related to extension and research identified has been enumerated as follows:

Extension Gap:

- Awareness about improved varieties of *rabijowar*
- Awareness about judicious application of pesticides, fertilizers and growth regulators
- Awareness about cultural practices of bacterial blight management in pomegranate
- Lack of knowledge on tissue culture pomegranate plants
- Awareness about sanitation in the pomegranate field after pruning
- Knowledge about soil testing and micro nutrients status in soil
- Knowledge about consequences of monocropping
- Lack of knowledge on biocontrol agents of insect pests
- Awareness about organic manure production
- Lack of knowledge about silage making and benefits of azolla cultivation
- Awareness about the value addition in dairy
- Awareness about deworming of animals
- Awareness about the benefits of water harvesting structures

- Lack of knowledge in management of powdery mildew and downey mildew by IPM

Research Gap:

- Identification of bacterial blight resistant genes in germplasm of pomegranate
- Development of region specific weather forecasting crop models
- Identification of major pests and diseases of vegetables and development of IPM modules
- Identification and development of pheromone components of ber fruit borer

6. 21. ACTION PLAN

Table 27. Action plan for Agriculture and Horticulture related problems

What	Who	Where	How
Identification of bacterial blight resistant genes in germplasm of pomegranate	Plant breeder + Pathology	NRC, Pomegranate	<ul style="list-style-type: none"> - Phenotypic screening of bacterial blight resistant germplasms in screen house - Genotyping of germplasms using molecular markers - Identification of bacterial blight resistant genes
Development of region specific weather forecasting crop models	Agronomy + Agricultural meteorology + Agricultural physics	CRIDA	<ul style="list-style-type: none"> - Development of mechanistic and dynamic crop models - Prediction of suitable sowing dates
Identification of major pests and diseases of vegetables and development of IPM modules	Entomology + Pathology	MPKV, Rahuri & NCIPM, New Delhi	<ul style="list-style-type: none"> - Population dynamics of major insects pests of vegetables - Epidemiology of major diseases of vegetables - Development and validation of IPM modules
Identification and development of pheromone components of ber fruit borer	Entomology + Agricultural chemicals	NBAIR, Bangalore & IICT, Pune	<ul style="list-style-type: none"> - Identification of pheromone components - Designing pheromone traps - Field testing

Table 28. Action plan for livestock related problems

What	Who	Where	How	Outcome
Screening, proteomics of uterine fluid and micromineral status analysis of repeat breeding Murrah Buffaloes	Veterinary Microbiologist, Animal Physiologists and Animal Biotechnologist	NDRI, Karnal.	-Specific isolation of organisms from uterine fluid and Proteomic analysis - Bio-chemical analysis of serum samples	-Identification of specific causative agent - Development of area specific mineral mixure for treatment of repeat breeding buffaloes
Efficacy of peripartum feeding of polyherbal supplementation in preventing mastitis in crossbred cows	Animal Physiologists, Livestock production and management	Division of Physiology, ICAR-IVRI, Bareilly.	-Evaluation of serum biochemical and hormonal profile -Immunomodulatory, oxidative status and milk quality analysis	-Development of effective herbal drug against mastitis in crossbred cattle

Recommendations for fish culture in farm ponds: 0.1 ha size**Prestockingpreparation :**

Pond water should be free of insects and other parasites. It can be removed by simple netting
Optimum Water quality parameters to be checked before introduction fish seeds in to the pond

1. Water Quality Analysis :

- i) Dissolved oxygen: 4-6 mg/L
- ii) Temperature: 26-32 °C
- iii) PH : 7.5-8.5,
- iv) Total Alkalinity: 50-150mg/L CaCo₃,
- v) Hardness: 100-300 mg/L CaCo₃
- vi) Ammonia: NIL

2. Fertilization: Wet cow dung : 15 days before stocking 250 kg / dose (4 doses for crop) every

Species selection :

- 1. Catla (*Catlacatla*)
- 2. Rohu (*Labeorohita*)
- 3. Common Carp (*Cyprinus carpio*)

3. Selection of quality seed :

- i) Seeds should not have any parasite infection (*Argulus* and *Lernae* infection)
- ii) Fish seeds should be free of tail rot and fin rot diseases
- iii) Quality seed will move anti-clock wise direction when swing it
- iv) Take fish seeds in glass jar observe the seeds quality and give purchase order
- v. Fish seeds to be treated with 3-5 % of KMNO₄ solution before introducing in to the farm pond

4. Fertilization schedule

Wet cow dung: 15 days before stocking 250 kg / dose (4 doses for crop)

5. Stocking Density : 1 No/sq.m

Stocking density has to be followed strictly

6. Stocking size : 5-10 gram size of Advanced (ADF) fingerling**7. Initial Days** : 3-5% of the body weight**8. External Feeding:**

Rice bran: Ground Nut Oil Cake (2:1 ratio) dough

GNOC cake must be soaked in water before the night

Make a ball out of rice bran and GNOC

keep the ball in metallic/plastic tray place tray in corner of the fish pond and observe its feeding efficiency

If full feed was taken go for the same ration otherwise reduce ration

9. Sampling:

Every 1- 2 month to check growth gain of fish seed by hook and line fishing

10. Duration of culture : 9-12 months**Feeding ratio calculation:**

Feeding ratio: 2:1 (Rice bran: GNOC)

Initial Weight of a fish seed to be stocked: 10 g / each

1000 seeds stocked: $1000 \text{ nos} \times 10 \text{ g} = 10000 \text{ g}$; To convert in to KG = $10000/1000 = 10 \text{ KG}$ of fish; Initial days feeding rate = 3- 5%

For 10 kg fish (5% of body weight) = $5 / 100 \times 10 = 500 \text{ gm}$ feed to be given twice a day

Feeding time: Morning: 6.00 to 8.00 AM (350 g rice bran: 150 GNOC)

Evening: 4.00-6.00 PM (350 g rice bran: 150 g GNOC), feeding ration has to be calculated according to the body mass, it increases with increasing body mass

8. Village Seminar

We conducted village seminar on 19th August 2015 to discuss these major agricultural, livestock related problems and also suggested some possible measures. Around 100 farmers attended the seminar. We obtained feedback from the farmers and the KVK scientists, in the light of which the action plan was prepared. KVK FET coordinator Dr. D. Nandre, and Agriculture Assistant, Sarpanch, village progressive farmer and Farmers were present during the seminar. The response to village seminar was very positive since many villagers took active participation in the discussion.

The findings through PRA techniques were triangulated with the villagers and the necessary feedback and corrections were taken up.

The problems identified in the village are as follows

- Water scarcity
- Bacterial blight of pomegranate
- Lower yield of *Rabi* sorghum
- Higher incidence of powdery mildew and downey mildew in grapes
- Pink berry formation in grapes
- Flower drop and fruit borer in pomegranate
- No green fodder for livestock in lean season
- Repeat breeding in buffalo
- Low milk price
- Mastitis in crossbred cows
- Parasitic infestation in goats and cattle
- BQ, FMD in cattle and buffalo
- PPR in Goats

The top most researchable problem we identified by discussions and using the ranking technique were triangulated and almost all the villagers were in total agreement on that. The broad issues we took up in the village seminar were water scarcity, Bacterial blight of pomegranate, powdery mildew and downey mildew in grapes, Fodder shortage in lean season, Parasitic infestation in goat, cattle and mastitis in CB cows were also discussed.

The farmers of Konheri village perceived that water scarcity and pest and diseases in pomegranate, grape, low yield of *rabi* sorghum, Fodder shortage in lean season, Low milk price were the serious problem in their area. The FET group, KVK and line department officials were able to explain the villagers that how to handle those problems. Therefore,

there is a wide scope for adaptation of Integrated Pest Management, Integrated nutrient management and doing value addition in dairy practices can enhance the farmer's income and their living standards.

The village seminar was a grand success and the scientists were appreciated for their team work and coordination in organising the village seminar.

9. INSTITUTE SEMINAR

The institute seminar was held on 21st August, 2015 at KVK, DoE, MPKV, Rahuri, Dr. Kiran K. Kokate, Mohol. Dr. Dinesh Nandre Programme co-ordinator of KVK, technical staff of KVK and representative of other line department were present. During the institute seminar, we discussed the village transect, resource and social maps, daily activity profile of both men and women, time line, seasonal calendar, consequence and Venn diagrams, problem tree, solution tree and proposed research projects. The presentation by each FOCARS trainee apart from different PRA tools also included information acquired about the problems of farmers.

We presented the researchable issues on the means to overcome the various problems faced by farmers. We triangulated the details that were collected from the village with the Line Department officials. After the seminar, active discussion was held among scientists and feedbacks were received. The scientists gave valuable suggestions which helped in the preparation of final FET report.

The dignitaries were happy with the FET group presentation and the PRA work. It was also suggested that further "farmer based - need oriented" research programmes should be initiated to enhance the income and improve the livelihood of the farmer.

INDUSTRIAL VISIT TO LOKNETE BABURAO PATIL AGRO INDUSTRIES LIMITED

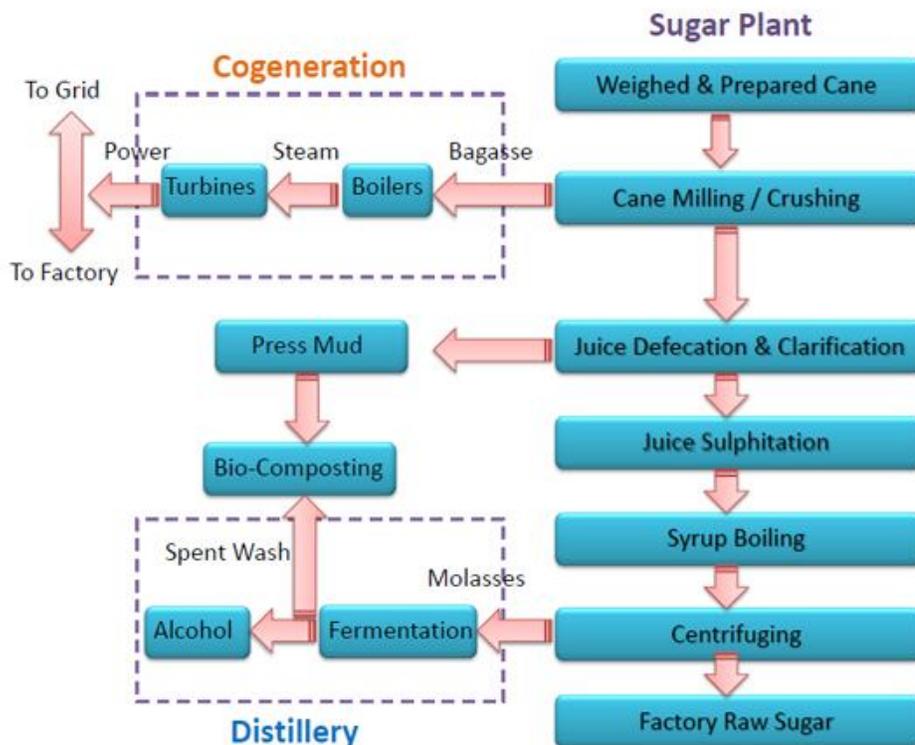
LokneteBaburaoPatil Agro Industries Limited is a Public Company incorporated on 17 January 2012. It is classified as Indian Non-Government Company and is registered at Registrar of Companies, Pune. Its authorized share capital is Rs. 105 crore and its paid up capital is Rs. 69,415,000. It is involved in Manufacture of other food products. LokneteBaburaoPatil Agro Industries Limited's Annual General Meeting (AGM) was last held on 27 September 2014 and as per records from Ministry of Corporate Affairs (MCA), its balance sheet was last filed on 31 March 2014.

Directors of LokneteBaburaoPatil Agro Industries Limited are Vikrant RajanPatil, RajashriRajanPatil, Vinita RajanPatil, HanumantHaridasPotare, ShaliniPawar, UttareshwarVithalPawar and RabbesalamSulemanShaikh. LokneteBaburaoPatil Agro Industries Limited's Corporate Identification Number is (CIN) U15400PN2012PLC141952 and its registration number is 141952. Its Email address is loknetesugar@gmail.com and its registered address is Laxminagar, Angar ,Taluka-Mohol, Solapur - 413214, Maharashtra INDIA.

Company Information

Corporate Identification Number	U15400PN2012PLC141952
Company Name	LOKNETE BABURAO PATIL AGRO INDUSTRIES LIMITED
RoC	RoC-Pune
Registration Number	141952
Activity	Manufacture of other food products
Company Category	Company limited by shares
Company Sub Category	Indian Non-Government Company
Class of Company	Public Company
Authorised Capital (in Rs.)	105,000,000
Paid up capital (in Rs.)	69,415,000
Established	2001
Date of Incorporation	17 January 2012
Email ID	loknetesugar@gmail.com
Address 1	Laxminagar, Angar, TalukaMohol, Solapur 413214

State	Maharashtra
Country	INDIA
Date of Last AGM	27 September 2014
Date of Balance sheet	31 March 2014
Company Status (for eFiling)	Active
Co-Gen facility	17 kW



Extraction of the juice, this involves washing shredding and extraction of the juice from sugar cane by milling. Next, step after the extraction of the juice the juice purification using the sulphitation process i.e. by using SO_2 , and the extractive juice is purified using lime and CO_2 for removing the non sugar substances from the juice. Then the next, step after the juice purification, the concentration of the juice by evaporation, The factory is having the number of multiple effective operator for evaporation of the purified juice, which we are getting that is around 15 percent. So, that it may be crystallized so, the after the concentration of the juice that is going to from the evaporation, it is going to crystallization.

Crystallization of the concentrated sugar solution to sugar crystal here that the crystallization part that is very important, because the growth of this crystal size, that is very important which is keeping. Centrifuges separates the crystallize sugar & molasses are left behind after the centrifuging, which is used for the production of the alcohol. So, the molasses which is that is one of the very important by product of the sugar manufacture.

Then the further refining of the raw sugar, the raw sugar is dissolved filtered and crystallized again to get high grade refined sugar.



Visit to ICAR Institute - National Research Centre on Pomegranate –Solapur

FET team of KVK Mohol visited the NRCP on 22.8.2015 with our FET monitor Dr. K.H.Rao and we met the Director Dr. R. K. Pal and he gave brief introduction about the institute and the current problems and thrust areas of research in pomegranate crop.

NRC on pomegranate is situated at Solapur district of Maharashtra. This institute was established on June 16 2005, comprising fourteen scientists of various disciplines.

The director has briefed about the importance of pomegranate. It is high value crop entire trees of pomegranate is of great economic importance apart from its demand for fresh fruits and juice the processed products like pomegranate wine, pomegranate tea and candy are also gaining importance in the world trade. All parts of pomegranate tree have great therapeutic value and have high potentiality for their use in leather and dyeing industry. Ideal crop for arid and semiarid agro climatic regions and profits can achieved up to 1.5 lakhs per annum.

The perspective plan of the institute emphasizes the methods of achieving the planned targets through scientific profitable ecofriendly and innovative technologies for cultivation both in traditional as well as non-traditional areas there by expanding pomegranate area and production post-harvest processing and value addition was given top priority expansion of export of fresh fruits and processed product will be achieved through organic farming and managing pesticide residues in fruits which have acceptance in international market.

Dr. Dinesh babu accompanied and explained about the different ongoing projects of the institute and we visited the various units of the institute like fermenter unit, cold storage, tissue culture, observatory, soil test unit, seed germination unit, microbiology unit, grafting unit *etc.*

The institute is maintaining 296 germplasm of pomegranate collected from different institutes and countries. The institute is working in collaboration with public as well as private sectors. The institute is mainly concentrating on production of pomegranate wine, seed oil, juice and rind powder for production of mouth wash.

The scientists are working on production of seedlings through hard wood and semi hard wood method over air layering and they developed protocol for production of seedlings. NRCP is the first government institute working on production of tissue culture seedlings.



Visit to Centre on Rabi Sorghum (ICAR-Indian Institutes of Millet Research)

Dr. Prabhakar Office in-charge of Solapur Sub Centre of IIMR, Hyderabad elaborated the different activity of the institute.

To focus special attention on *rabi* sorghum research ICAR established centre on *rabi* sorghum at Solapur Maharashtra in 1991. However the system became fully operational from 1997.

The mandate of the Centre is to develop suitable *rabi* sorghum varieties/hybrids for medium to shallow soils. The office and laboratories building were constructed during the year 2000. The research farm of the Centre is spread over a total area of 18 ha at two locations in Solapur.

Research highlights

CSV 26, a new *rabi* variety released for cultivation under shallow soil at national level. Improved breeding lines for shallow, medium and deep soil identified. Developed diversified parental lines for hybrid developments. Donors with tolerance to insect pest, diseases and drought identified. Standardized seed production techniques for production of new *rabi* sorghum cultivars evaluated new parental lines for seed setting traits.

Standardized improved package of practices for *rabi* sorghum cultivation and studied the response of sorghum cultivars to deep placement of fertilizers. Popularized improved *rabi* sorghum varieties through on farm and field demonstrations and enhanced adoption of new sorghum cultivars through seed village programme.



VISIT TO MAHATMA PHULE KRISHI VIDYAPEETH - RAHURI

FET team of KVK Mohol visited the MPKV Rahuri, University on 17.8.2015 and we met the Director of extension Dr. K. Kokate and he gave briefed how the integrated and multidisciplinary approach can solve the current problems in agriculture and allied sectors. He also explained importance of prioritization in research areas.

This university is pioneer in horticultural crop and pomegranate research and also released several varieties like Mrudula, Arakta, Ganesh, Bagwa, Phule super Bagawa

We visited various departments like Post Harvest Technology, Bio control laboratory, seed processing plant, Medicinal and Aromatic plants.

Post-Harvest Technology department developed various products like Jamun juice, Aonlajuice , candy ,mango pulp and tamarind pulp and have registered the products for selling. On part of technology transfer training on product development was given to self-help group members and also to the farmers. Many farmers becomes entrepreneur with the help of university training and government policies.

The bio Control laboratory has developed sustainable research on bio fertilizers like *Rhizobium*, *Azotobacter*, *Azospirillum*, BGA, VAM and phosphate and Potash solubilizing cultures, Also unit has developed many bio pesticide and bio fungicide which are populery used ny farmers. The unit has newly installed Electron microscope which is used to carried out virus related research.

University has very big seed processing plant along with State Seed Certification Agency office of state government. University has monopoly in quality Onion seed distribution. University has seed production farms at Rahuri, Dhule, Kolhapur and Pune, but the processing for all seed will be done at Rahuri seed processing plant, mainly Onion, Chickpea and Wheat seed processing is done at this plant. Foundation seed and truthful seed will be supplied to State Seed Corporation and certified seed will be supply to all seed sales counters distributed throughout the state. There are 13 seed sales counters and which supply 15000 quintal seed / annum. University is earning 1.5 crore / annum from Onion seed sale alone.

In Medicinal and Aromatic plants division they are maintaining 900 species of medicinal plants which includes perennial, annual and shrubs. They also have the small citronella oil extraction unit. This unit has developed propagation methods for many medicinal plants. The most promising species are Isabgul, asparagus, guggul, sena, davana, citronella, geranium, mint, sandal wood,Khus grass are being multiplied and tested under different agro ecological situations of state.

We also visited university dairy farm. They are maintaining 400 Nos of crossbred Jersey, crossbred HF and Gir cows. The university had developed a crossbred cow called PhuleTriveni (50% HF+25% Gir + 25 % Jersey). It's having high milk production trait of HF, local adaptability of Gir and good reproductive of quality of Jersey. The milk yield of the Phule Triveni is 3000-3500 lt/lactation with 3.6 to 4.2 % fat. The animal is having high disease resistance ability. They are also maintaining the progeny testing records. The university has developed popular forage crops varieties like Yashwant and Jaywantnapier grass and Sweta Chavali which are becoming popular among the dairy farmers.

We also visited the university goat farm where they are maintaining Osmanabadi and Sangamneri breeds of goats. They are breeding the goats and maintaining up to third generation of animals.



Discussion with head of Post-Harvest Technology Unit



Electron Microscope at Bio control Unit



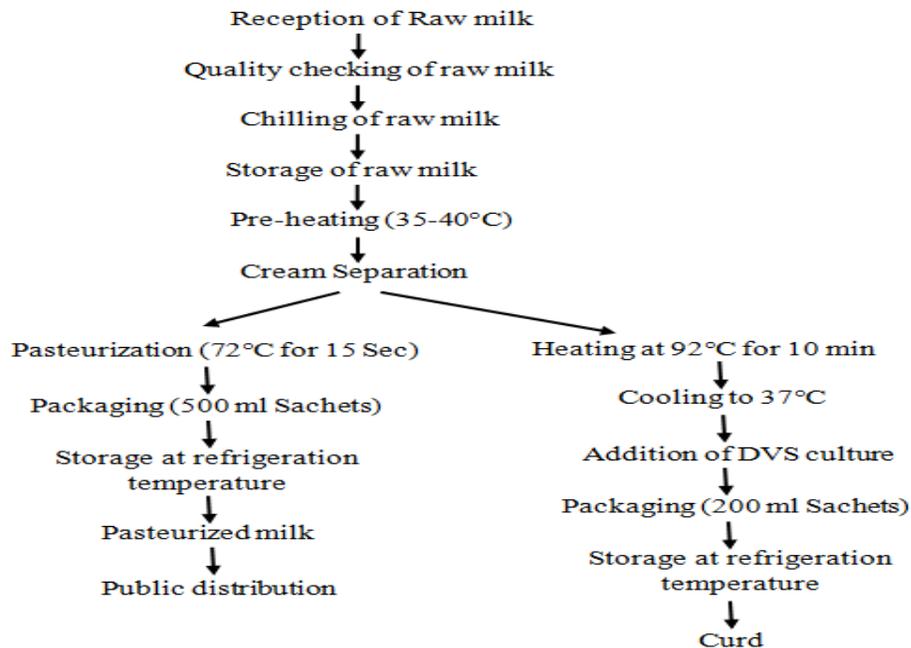
University Seed Processing Unit at Rahuri

VISIT TO SHIVAMRUT DAIRY

Shivamrut Dudh Utpadak sahakari sangh maryaditwas established on 27th January 1976 under the co-operative societies act. It offers a wide spectrum of milk products in Maharashtra, under the brand name of Shivamrut dairy. Mr. Deepak Relal is the managing director of Shivamrut dairy. Total 176 employees are currently working in the dairy and are working in two shifts daily. The plant is having ISO-9001 quality management system, HACCP (food safety audit) and ISO-14001(Environmental management system) certification.

Method of collection

Collection of the milk and payment is based on quality and quantity. Primary testing of milk for fat and water percentage is being done during village level milk collection. Immediately after receiving they check for any adulteration test and then go for organoleptic test. The daily average procurement of milk is 2 lakh 40,000 litres of milk per day. The milk is collected in cooling tanks. The sterilized chilled milk goes to separator for separation of cream. Separated milk is pasteurized. The final product is adjusted with requisite fat and SNF values and packaged with auto-packing machines. The pasteurisation, cream separation capacity is 20,000 Lt/hr.



Flow chart for the processing of various milk and milk products

The dairy plant is having a quality control lab where chemical and microbiological analysis of milk and milk products are done. They are maintaining BIS standard for all the

products. The spray dried milk powder facility is going to be established shortly.

Milk and milk products

The Shivamrut dairy produces various milk and milk products namely, cow (gold) milk, toned milk, double toned milk, full cream milk, lassi, peda, flavoured milk, export quality skim milk powder, gulabjamun, basundi, burfi, ghee, table butter, paneer, srikhand, amrakhand and curd. They are selling the surplus processed milk to AMUL and Mother Dairy. The marketing of processed milk and milk products is being done in 4 major cities Akola, Solapur, Nanded and Washim through distribution agencies. In addition to this they are also going for marketing milk with 3 layered packing for longer storage life.



Cream separator



UHT packaging unit



Milk chilling and packaging Unit



Trainees and KVK staff with unit manager

Visit to raisin processing plant at Bhojepati, Pandharpur

As a part of industrial visit, the FET team of Mohol KVK visited the raisin processing plant at Bhojepati situated at 45 km away from the FET center. The specialty of this unit it has been run by the SHG of farmers named as Vitthal Shetakari Bachat Gat. A group 54 grape growing farmers who decided to establish a grape raisin processing unit after a lot deliberations, discussions and back ground studies. The unit started on April 7th 2013 and it runs its business in the name of Bhoje Agro Industries Private Limited. The raisin processing plant has a capacity of 1000 tonnes of raisins. The raisin processing starts from the washing of the raisins procured from the farmers with water in a specially designed water tubs at a high pressure to remove dirt adhered to the raisins. After washing the raisins are dried in sunlight for 2-3 days and subject to fumigation with sulphur. Fumigated raisins were passed through scalper machine to remove the larger debris such as dried bunches. The raisins pass through another round of sorting to remove finer debris. The debris and raisins were separated at this stage. The raisins were sorted in to four different colour categories in a colour sorter and each colour grade raisins were then pass through the size sorter machines to obtain different size grade resins. The graded raisins were transported to automatic weighing machine through a conveyer belt. The 15 Kgs of raisins were packed in a cardboard boxes and it is sealed by using packing machine.

Some facts about SHG: Vitthal Shetakari Bachat Gat- Raisin Processing plant

Registration:- Agriculture Technology Management Agency (ATMA) Solapur.

Registration Number:-ATMA/12-13/672

Establishment Date:-01/08/2012

Number of Farmers:- Total=54 (Male = 34, Female = 20)

Saving per month: Rs.2000/per month per farmer that is Rs.108000/-month.

Assetes : Bachat gat has 1.5 acres own land.

Raisin Cleaning and Grading Machinerics

Raisin Processing-

After a long discussion and studies, the farmer of bachat gat decided to establish a raisin processing unit in the area. There is a need of the processing unit because the raisins prepared by the farmers are to be cleaned, sorted, graded manually. Now a days the availability of labours and their cost goes beyond the limits of farmers. So the raisin processing unit is the need of the day. Because in processing Cleaning, Sorting, Grading of raisins is done in low cost & in very less time. So V.S.B.G. established a 5000 sq.foot G.I.

shed and purchased a grading machines, color sorter, packing machine etc . (Figure A.) and provides services to the farmer.

Sl. No.	Item/ machine/ entity	Approx. Cost (in Lakhs)	Purchased from
1	G.I Shed	16.6	Mumbai
2	Building	15	Local constructor
3	Pneumatic Scalper	4.5	Digvijay Industries, Sangali
4	Pneumatic cleaner	2.5	Digvijay Industries, Sangali
5	Size grader	0.5	Digvijay Industries, Sangali
5	Colour grader	10	Amirtha industry, Andra pradesh
6	Air compressor	4.5	-
7	Washing machinery	0.5	Digvijay Industries, Sangali
8	Auto Weighing	16.5	Mumbai
9	Box packing	5	Mumbai

VSBG facilitated 15 kg raisin packaging till date which can be adjusted as per demand. The processing will add an additional processing cost approximately Rs. 100-110/box i.e. Rs. 7.5/kg raisin. This processing unit had processed around 1400 tons of raisin during the 2012-2013 season of 70 days. Bachat gat earned about Rs.38.00.000/-during the 1st season, Rs. 27,00,000 in 2nd& Rs. 17,00,000 in 3rd season.



Washer



Pneumatic Scalper



Pneumatic Cleaner



Sieve type size grader



Colour Grader



Auto weighing balance

10. CONCLUSIONS AND REMARKS

The Konheri village has exposed us to the ground level realities and typical problems on farmers' fields. There are many progressive farmers in the village who are innovative and technology receptive in nature. They tried many technologies on their field and spread it among the other farmer folk thus acting as local resource persons. They also refined the existing technologies to suit the local conditions. KVK (Mohol), Solapur is planning to adopt the village by seeing the villager's response. The linkages with the MPKV Rhourri and information from Agrowon newspaper also helped the farmers in acquiring latest agricultural information. The availability of private livestock supervisor in the village facilitated better health care for livestock in the village.

Even though the village is situated in complete dry land area the farmers of the village are reaping high yields in horticultural crops because of adoption of drip irrigation technology, the farming scenario in the village is having many common problems such as water scarcity, over usage of complex fertilizers and plant protection chemicals. The lack of soil testing facility nearby has led to improper micro nutrient application. The farmers of Konheri village are aware of most of the plant protection chemicals available in the market and reported that they had no problem in acquiring information on new technologies. However some of them used fertilizer application injudiciously. The action plan suggested throws light on water shed management, conserving soil moisture, managing pest and diseases of cultivated crops and improving the productivity of animals along with value addition in dairying which will supplement their livelihood.

Considering the increasing risk involved in agriculture, efforts should be made to diversify the farm enterprises of small and marginal farmers as these households are most vulnerable to income risk. It is necessary to create awareness among farmers of the long term effects of different cropping systems and how they should be more dynamic to keep pace with changes in the system. Creating awareness is also not an easy task and needs to be approached sensitively and sensibly with good planning. This FET and PRA exercise has made us more aware of the ground reality and has given us a better understanding of how to approach farmers and empower them to face the days ahead.

“Everything can wait but agriculture cannot”

Jawaharlal Nehru