

Study of socio-economic and bio-physical situation of Ulihatu village of Khuti District in Jharkhand (India) through PRA tools and techniques.

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“This work was carried out in collaboration between all authors. Author A (**Dr Ranjay Kumar Singhand Sneha Kumari**) havedesigned the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors B (**Mayur Gautam**) and C (**Shrestha Gautam**) managed the analyses of the study. Author D (**Dr R S Kureel**) managed the literature searches. All authors read and approved the final manuscript.”

ABSTRACT

To encourage the community to share their opinions ideas and experiences about the local problems, issues, and needs and facilitate information sharing, analysis, and action among stakeholders with a stipulated time from for preparations of an action plan for their development. In this context Directorate of extension, Education, Birsa Agriculture University, Ranchi use PRA tools and technique for study the biophysical and socio-economic situation of Ulihatu village of Khunti district in Jharkhand which helps for preparation of agricultural development plan, finding shows that majority of the farmers of the village belong from schedule tribes community having less than 1-acre of land, the productivity of field crops, vegetables is very less compare to state and country average, forest product is the main source of livelihood, 11 types of the micro-farming situation existing in the village irrigation is the major constraints for agriculture development, Indigenous breed of Cow, Goat, Pig, Poultry rear by farmers, there productivity is very less. The institution situated in the village requires more strengthen and makes sense for the help of villagers. The analysis showed that the majority of the villagers required need-based facilities and information on time for their development.

KEY WORDS: PRA, Agro Ecosystem Analysis, socio-demographic,

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I. INTRODUCTION

About a decade ago, it was realized that there exists an erratic distribution of productivity in the country across different ago-ecosystems and production systems. Low productivity over a large part of the country called for an alternative pathway for improving the situation, and thus elevating the economy of a large number of farm families, especially belonging to the socially and economically weaker section of the society. Birsa Agricultural University aimed mainly at bringing about needed reforms in technology generation and dissemination processes and reorienting the mindset of the scientists as well as extensions towards farmer participatory approaches, methods, and procedures.

To making shifts and departures in the technology management system, several intermediary functions were considered to be vital. Technology assessment and refinement were rated to be the most crucial functions among them, particularly to see the production problems and their solutions in terms of interactions of biophysical and socioeconomic factors in a broader framework of agricultural ecology. Keeping this fact under consideration for knowing the socio-economic and biophysical situation and production problems of the village, Directorate of Extension Education, Birsa Agricultural University conducted Agro Ecosystem Analysis through PRA Technique to known the biophysical and socio-economic situation of Ulihatu village of Kunti district of Jharkhand who helps for formation of the development plan of the village.

II. RESEARCH METHODOLOGY

There is no doubt that participatory methods are rapid and quick. This is especially true when trying to examine the changes. Scientific methods, even when they are very quickly executed, usually require that multiple measures be taken over time and controls are used. Participatory methods can be used to measure changes in a single site visit, without the use of controls. They are also very spartan in terms of the number of pieces of equipment required. Participatory methods solve the problem of deconceptualized data as well. The data gathered using participatory methods are inherently conceptualized. In this process people involved in measuring and interpreting the programs that affect them increase local understanding and involvement with program activities and ultimately help to empower them

For a general understanding of the village, several visits of the BAU Scientists along with progressive farmers were arranged for surveying purposively selected villages Ulihatu. of Khunti district of Jharkhand. Consisting of several hamlets with 107 farm families. agroecosystem analysis was conducted using various tools and techniques of Participatory Rural Appraisal (PRA). To develop a deep understanding of the existing farming systems farmer – scientist interface programmes were also organized. After fully understanding the production problems and related causes and constraints as well as delineation of production systems and micro-farming situations.

To prepare the report of Agro-ecosystem Diagnostic Analysis was done using various Participatory Rural Appraisal (PRA) tools and techniques. The following PRA tools were used for studying the agro-ecosystem patterns concerning space, time, flow, and decisions given in table-1.

Table-1: Agro eco system analysis tool which used under PRA exercise.

S.No	Type of Analysis	
1	Space Analysis)Social mapping	Resource mapping
		Transect mapping
		Use of TTK Spatially
2	Time Analysis)Time line/changing trends	Seasonalities
		Crop calendars
		Cropping sequenes
3	Flow Analysis)Livelihood analysis	Transformation of energy money material and information
		Venn diagram
		Wealth ranking
4	Gender Analysis)Activity analysis	Drudgery analysis
		Decision-making patter
5	Decision Analysis)Problems ranking	Decision matrices
		Decision tree
		Cause-effect relationship
		Focused group interview

Each analysis was followed up by triangulations.

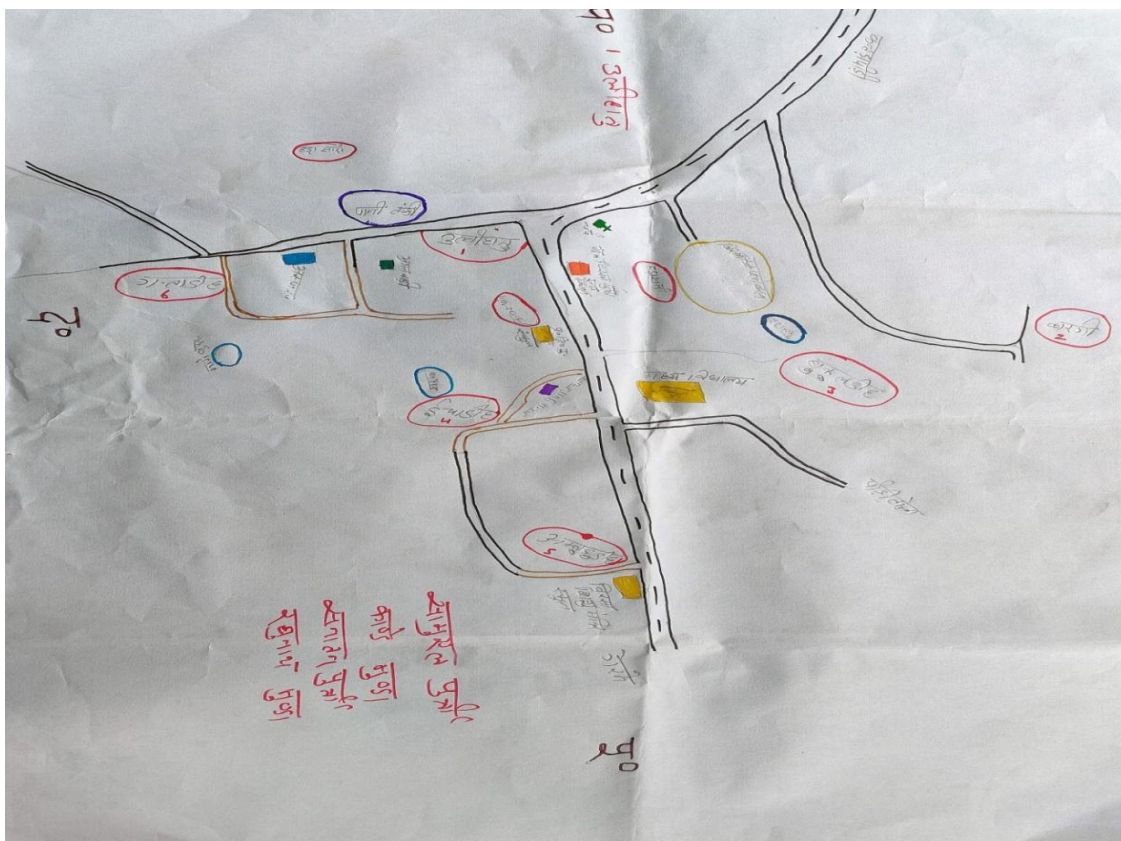
After collection of the information in quantities and qualitative form group, discussion will be also organized among scientist those who involved for conducting PRA Exercise with some progressive farmers. For batter interoperation of data qualitative data converted into quantities' data. mean, percentage, was used as a statistical tool for interoperation.

III. RESULTS AND DISCUSSION.

Space Analysis

For knowing and understanding the spatial distribution/arrangement of the village ecosystem, particularly socio-demographic profile and existing natural resources, participatory mapping exercises were got done by the villagers. Participatory mapping exercises included preparation of social maps, resource maps, and transect maps in respect of the village.

Social Mapping of the village



Resource Map of village ulihatu

Agro-economic Scenario of the village

It was observed through space analysis three important pillars of the economy of the rural people of this village i.e., agriculture, rural crafts, and forest-based activities. Agriculture in this region is practiced in almost rainfed conditions due to seasonal variations in rainfall, pre-dominance of uplands and undulating land structures, the extensive occurrence of poor sandy and sandy loam soils, rapid runoff, expansion of cultivated area on poor and marginal land affected by severe erosion, etc. Only 2.9 percent of the total geographical area and 8.5 percent of the total cropped area is under assured irrigation. This reduces to less than 5 percent during the rabi season. Agriculture in this region is characterized as complex, diverse, and risk-prone. Most of the cultivated area is mono cropped. The food grains occupy about 75 percent of the total cultivated area. Rice is the most important crop of the village. Other important crops of the village are maize, ragi, Kundli, and some other minor millets. Wheat is grown in the area having irrigation facilities. Pigeonpea is the dominant pulse crop followed by kulthi, urad, and gram. Among oilseeds, surguja and safflower have great potentials. The cropping intensity accounts for only 115 percent as only 3.2 percent of the cultivated area is cropped more than once. The level of productivity of different food grains is much lower than the state averages. The important fruits are jackfruit, guava, papaya, ber, Jamun, aonla, satalu, sharifa, etc. great potentials. Farmers nearby their wells use to grow vegetables and wheat. In some pockets, vegetable cultivation has become the source of farm families' income. Potato, cauliflower, brinjal, and tomato, are the main vegetables grown extensively in the village. Other vegetables are chilies, peas, capsicum radish, drumstick, etc. Farmers prefer to keep small animals like goat, pig, sheep, poultry, and duckery apart from small size local breeds of cattle, of which the production capacity is very low. On account of an inadequate level of nutrition, management practices and poor quality of breed, the productivity level of major livestock products is in the form of milk, meat, egg, and wool are lower than the state & country averages.

General agricultural problems of the Village

General agriculture problem will be ranked by farmers during PRA excessive. Ranking problem given in table-2

Table- 2: Identified general agriculture problem in the village.

Ranking	General agricultural problems of the Village
i.	Erratic rainfall, lack of irrigation facilities, poor water retention capacity and permeability of the soil.
i.	Soil erosion and acidity, moisture deficiency and low availability of nutrients, specially of phosphate are the important production constraints in uplands.
i.	Low lands (5% of the total cultivated area) remain monocropped (under rice) due to remaining wet upto January.
v.	Irrigated areas which are famous for vegetable production specially tomato in all seasons face the problem of fruit borer, which is the most important pest of tomato and brinjal.
v.	Mango shoot gall pest comes in way of successful mango cultivation.
i.	Poor use of improved implements and lack of storage facilities for perishable produce, etc.
i.	Poor socio-economic condition of the farmers.
i.	Remote areas do not get improved seeds in time.
k.	Stray cattle grazing.
k.	Weed problem is serious during kharif in direct seeded fields of Rice, Maize.
i.	Poor genetic stock of animal cow, buffalo
i.	Unbalanced feeding management in animal
i.	Seasonal disease problem in animal

Table 2 shows that erratic rainfall lack of irrigation facilities poor water retention capacity and permeability of the soil rated first agriculture problem in the village followed by Erratic rainfall, lack of irrigation facilities, poor water retention capacity and permeability of the soil., Soil erosion and acidity, moisture deficiency and low availability of nutrients, specially of phosphate are the important production constraints in uplands., Low lands (5% of the total cultivated area) remain monographed (under rice) due to remaining wet up to January., Irrigated areas which are famous for vegetable production specially tomato in all seasons face the problem of fruit border, which is the most important pest of tomato and brinjal., Mango shoot gall pest comes in way of successful mango cultivation., Poor use of improved implements and lack of storage facilities for perishable produce, etc., Poor socio-economic condition of the farmers., Remote areas do not get improved seeds in time., Stray cattle grazing., Weed problem is serious during Kharif in direct-seeded fields of Rice, Maize., Poor genetic stock of animal cow, buffalo, Unbalanced feeding management in animal, Seasonal disease problem in the animal.

Demography feature of the selected village.

During space analysis resource and social map will be drawn by the villagers with the help of scientist and details demography statistic was collected. It is given in table-3

Table-3 : Salient demographic features of selected villages

Sl. No.	Particulars	Ulihatu						Total
		Amrudih	Ichadiah	Bukludih	Gantadih	Bargi	Ilihatucase	
2	Scheduled Tribes	5	32	7	5	55	88	192
3.	Scheduled Castes	-	3	-	-	-		3
TOTAL								195

Table-3 shows that out of 105 farm families 192 come under scheduled tribes whereas only 3 farm families come under scheduled castes, No any other caste residing in the village.

Infrastructure facility available in the village.

Infrastructure facility available in the village was also study through resource map. Details resources available in the village is given in table-4

Table-4: Infrastructural Facilities Available In VillagesUlihatu

Sl. No.	Items	
1.	Type of link road	Pakka Road
2.	Post Office	1 km
3.	Telephone	Mobile phone
4.	market	Khunti
6.	Seed and fertilizer shop	Khunti
7.	Co-operative society	Not Available
8.	Schools	primary school & High school
9.	A.I. Centre	15 km khunti
10.	Veterinary Clinic	15 km khunti

11.	Primary Health Centre	Village
12.	Panchayat Bhavan	In Village
13.	Regional Research Station	No
15.	Agricultural University	60 km BAU, Ranchi
16.	Aanganbari Centre	Village
17.	Bank	Extension counter of central bank in village
18.	PDS	At village

Table-4 shows that village connected with the metal road from block or district headquarter, post office situated one KM away from the village, the mobile phone used by villagers for communication, farmers sell and purchase agriculture product and agriculture input from Khunti market i.e. 10km away from the village, only primary school and high school available at the village level, AI center and veterinary clinics situated 15km away from the village so that farmers face problems related to animal health, Primary health center, panchayat Bhawan, Angan Bari center, and PDS is also situated in the village. For agriculture technology backstopping, agriculture university situated about 60km away from the village whereas KVK situated 30km in another corner of the district.

Natural Resource Available In The Village.

During preparation of resource map and social map, discussion will be organized by the farmers and details natural resources available in the village will be study. Details available resources in the village given in the table-5

Table-5: Salient features pertaining to natural resources available in selected villages

Sl. No.	Items	Ulihatu
1.	Total geographical area (in ha)	2400
2.	Land use pattern	
	Homestead	120
	Cultivated	1400
	Forest	700
	Wasteland	110
	Orchard	70
	Waterbodies	18
3.	Land topography (in ha)	
	Upland	1800
	Medium land	400
	Low land	200
4.	Area under irrigation (in ha)	122
	Rainfed	2278
5.	Size of holding (no. of households)	
	Landless	12
	Marginal	60
	Small	25
	Medium	6
	Large	4
Source : PRA data		

Table-5 shows that total geographical areas of the village is 2400 ha out of that 102 ha Homestead, 1400 ha area come under cultivation, 700 ha is under forest, 110 ha wasteland and 70 ha are come under orchard. Only 18 ha area in village come under water bodies.

Productivity of important crop and livestock enterprises in the villages.

Group discussion and focus group interview will be organized with progressive farmers for knowing productivity of different crops and animals which available in the village. Details given in table-6

Table – 6: Productivity of important crop and livestock enterprises in selected villages

Sl. No.	Enterprises	Productivity (q/ha)
A.	Crop Enterprise	
1.	Upland rice	8
2.	Midland rice	14
3.	Lowland rice	20
5.	Wheat	13
6.	Maize (kharif)	14
7.	Pigeonpea	7
8.	Urdbean	5
9.	Mustard	4

10.	Niger	2.5
11.	Linseed	2.5
12.	Potato	160
13.	Tomato, Brinjal	160
B.	Livestock Enterprises	
1.	Cow	.75 lt./day
2.	Buffalo	1 lt./day
3.	Goat (matured body weight)	9 kg/goat (Adult 11 month)
4.	Pig (matured body weight)	25 kg/pig (Adult 11 month)
5.	Poultry	52 egg/annum/bird
Source : Data on PRA exercises		

Table-6 shows that 8q/ha rice yield was found in an upland situation whereas 14q/ha in medium land and 20q/ha in low land respectively whereas wheat (13q/ha), Maize (14q/ha), Pigeon pea (7q/ha), Uradbean (5q/ha), mustard (4q/ha), Niger (2.5q/ha), Linseed (2.5q/ha) and tomato and brinjal (160q/ha) respectively. Table 6 further shows that on an average cow given 0.75 lit milk/days which is very less compare to improved cow milk, yield. Body growth of goat is very slow (9kg/goat in 11 months) in the village due to poor feeding and management practices in the village few farmers are also rear indigenous breed of pig which acquire only 25kg body weight after 11 months of age, in the village poultry breed only provide 52egg annually, Similar finding was also reported by Samantaray et al (2018) found that poor development on various like of technological, economic income generation activities and marketing due to poor technological backstopping.

Transect Mapping

Transect maps of the study villages were prepared after participatory transect walks i.e. horizontal as well as vertical walks. After triangulation, a common transect map was prepared and soil, land used pattern, available water resources, existing corps, and vegetables, fruit trees, forest trees, livestock, problem, and opportunity, will be studied. of the selected village. The detailed information is given in table-7.

Table- 7: Transect Map of Villages- Ulihatu

Land	Forest land	Tarn	Don	Village
Soil	Gravelly coarse texture	Coarse sandy loam	Sandy loam	
Land use	Forestry	Field crops, veg. crops	Field crops fishery	Home stead, animal husbandry, field crops, veg. fruit plants
Water resources	River	Well, Ponds, River	Stream (nala)pound	Well, hand pump Water supply
Crops		Gora, Arhar, Maize, Kulthi, Urd, Niger	Rice, wheat, toria, maize, gram	
Vegetable		Cauliflower, Peas, Tomato, Potato, Brinjal, Bhindi	Cucurbits, Bhindi	
Fruit trees	Mahua mango	Guava, tamrin, jalkfruit, jamun, Awala		Papaya, Guava, Lime, Jackfruit
Forest trees	Sal, Palas, Gambhar, Bamboo, Karanj, Akasia	Guava, Tamarind, Jackfruit, Jamun, Bargad, Semal		Vegetable Fruits Maize
Livestock				Pig, Goat, Cattle, Poultry
Problem	<ul style="list-style-type: none"> ➤Defores-tation ➤underutiliza-tion of forest product 	<ul style="list-style-type: none"> ➤Drought ➤Mild fertility status of soil ➤Less moisture content due to low water holding capacity ➤Soil erosen ➤Disease & pest in field and vegetable crops ➤Lack of knowledge, skill of appropriate technologies ➤minimum irrigation facility ➤Lack of improved variety of seed ➤Use of traditional implements ➤Grazing 	<ul style="list-style-type: none"> ➤Low yield in field and vegetable crops due to lack of appropriate varieties and poor management practice. ➤disease and pest problem in crops ➤Fallow in summer ➤lack of knowledge, skill of high tech agricultural practices. ➤Unavailability of chemical fertilizers and Imported seeds ➤Lack of inputs, credit & marketing infrastructures ➤Lack of improved farm implements. 	<ul style="list-style-type: none"> ➤Low productivity in pig goat poultry, dairy enterprises. ➤Disease in animals ➤High mortality in animal. ➤Poor health and care mgt. in animals. ➤Drudgery of farm women in activities. ➤Unemployment and underemployment. ➤Low productivity in kitchen gardening. ➤Lack of knowledge regarding home based income generating activity.

			➤Grazing	
Opportunity	<ul style="list-style-type: none"> ➤Afforestation ➤Development of silvi horticulture pastoral system ➤Lac cultivation 	<ul style="list-style-type: none"> ➤Cultivation of quality upland rice, ragi and maize cultivation. ➤Improved cultivation of pulse and oil seed. ➤Cultivation of quality vegetable ➤Raising of dryland fruits. 	<ul style="list-style-type: none"> ➤Cultivation of quality rice, wheat and vegetable ➤Increasing cropping intensity inter cropping summer rice and Cropping system ➤Improving drainage system. 	<ul style="list-style-type: none"> ➤Rearing of improved breeds of pig, goat, dairy and poultry. ➤Introducing health and care mgt. of house hold animals. ➤Introducing small scale income generating activities. ➤Increasing cropping intensity of kitchen garden. ➤Beekeeping.

Flow Analysis

In order to know about the flow of resources like money, energy, etc. flow analysis was done in terms of livelihood analysis considering income and expenditure patterns in different well-being categories. For this at first the well-being ranking was done.

Well-being Ranking

For categorization of households in different well-being groups, well-being ranking was done following the card sorting method. The percentage distribution of households according to different wellbeing categories has been presented in table-8

Table-8: Percentage distribution of households according to different well-being categories (N=195)

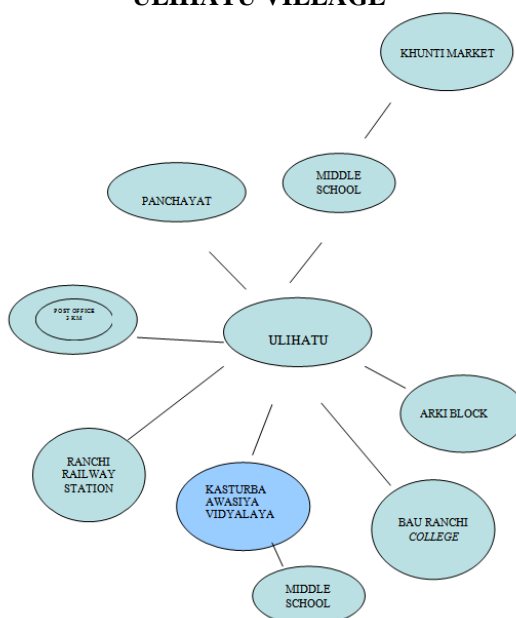
Sl. No.	Well-being category	Households
1.	Good well-being	8
2.	Moderate well-being	40
3.	Poor well-being	147

Table-8 shows that out of 195 farm families 8 families come under good well-being categories whereas 40, come under the moderate well-being majority of the farmers 147 farm families come under the poor well being categories because most of the farmers have landless or having 1-2 acre gravely and eroded undulating land where, there is no proper irrigation facility available in their land, only forest best product is the source of income of the families.

Venn Diagram

For knowing the accessibility and importance of different institution for the development of village will be study finding presentation in figure-1.

Figure-1: VENN DIAGRAM SHOWING INSTITUTIONAL SITUATIONS AND SUPPORT OF ULIHATU VILLAGE



The size of the chapati shows the importance of institution and distance of chapati shows there accessibility of the institution by the villagers. Figure-1 shows that Khunti market Kasturba Awasiya Vidyalaya, BAU Ranchi and railway station Ranchi are situated far away from the village but farmers of the village assess there a facility for development, Middle school, Panchyat Bhawan, Post office situated very near in the village but they are not contributing significantly for the development of the villagers, reported by farmers. Badaga et al (2018) reported that mobile exchange situated long distances to the mobile users but there are facilities assess by users and their services will influence the behavior pattern of farmers and this will facilitate the adoption of improved techniques leading to better yield.

Micro-farming Situations in the village

During transect walk, the existing Micro Farming situation of the village will be identified by the scientist with the help of farmers. The following micro-farming situations exist in the village is given table-9

Table-9: Existing Micro-farming Situations in the village.

S.No	Micro-farming Situations	% Share
1	Rainfed gravelly and eroded uplands-Tar	30
2	Rainfed light texture and uneroded uplands- Tar	18
3	Partially irrigated light textured uplands -Tar	5
4	Uplands with assured irrigation (well / pond) Don	5
5	Rainfed slightly eroded midlands Don	10
6	Rainfed medium lands Don	5
7	Partially irrigated medium lands Don	5
8	Medium lands with assured irrigation (well/ pond/ river) Don	5
9	Rainfed lowlands Don	7
10	Partially irrigated low lands Don	5
11	Irrigated lowlands (river) Don	5

Table -9 shows that 11 micro-farming situations available in the village i.e. rain-fed gravelly and eroded upland-Tar (30%), rain-fed light texture and uneroded uplands Tar (1840), Rainfed gravelly and eroded uplands-Tar, Rainfed light texture and uneroded uplands- Tar, Partially irrigated light textured uplands –Tar, Uplands with assured irrigation (well / pond) Don , Rainfed slightly eroded midlands Don, Rainfed medium lands Don, Partially irrigated medium lands Don, Medium lands with assured irrigation (well/ pond/ river) Don, Rainfed lowlands Don, Partially irrigated low lands Don, Irrigated lowlands (river) Don

A similar finding was also reported in Agro Ecosystem analysis reported of KVK Chatra in the year (2008) in report micro-farming situation of the village classified based on types of soil irrigation facility and topography of the soil.

Identification of Production Problems.

During the transect walk and several focused group discussions the production problems were identified. A list of commodity/enterprise-wise identified production problems is given table 10.

Table- 10: List of enterprise-wise identified important production problems

Sl. No.	Enterprise	Important problems
A. Field crops		
1.	Rice	(i) Low productivity in upland rice
		(ii) Instability in productivity of medium land rice
		(iii) Poor profitability in lowland rice
2.	Wheat	(i) Low productivity in normal sown wheat
		(ii) Poor productivity in late sown wheat
3.		(i)
4.	Maize	(i) Poor productivity in kharif maize
5.	Pulses	(i) Low productivity in pigeonpea
		(ii) Low yield in black gram
		(iii) Poor productivity of horse gram
6.	Oilseeds	(i) Poor yield in rapeseed-mustard
		(ii) Low yield in niger
		(iii) Low productivity in linseed
B. Horticultural crops		
1.	Vegetables & Fruits	(i) Low yield in Tomato
		(ii) Low productivity in vegetables like, brinjal, capsicum chillies& Cauliflower
		(iii) Poor yield in rainy season tomato

		(iv)	Poor productivity in rabi season potato
		(v)	Low yield in vegetable peas
		(vi)	Low productivity incolocacia
		(vii)	Low productivity in cabbage
		(iii)	Poor yield in jackfruit
		(iv)	Fruit drop in Jackfruit
		(v)	Low fruit yield in guava
		(vi)	Poor yield in papaya
		(vii)	Low yield in Mahua
		(viii)	Low productivity in mangoes
		(ix)	Low profitability in ber
C. Livestock			
		(i)	Low milk yield in indigenous cows
		(ii)	Poor milk yield in buffalo
		(iii)	Low profitability in goatry enterprises
		(iv)	Poor profitability in piggery enterprise
		(v)	Low profitability in backyard poultry/duckery
D. Home-based enterprise			
		(i)	Low productivity in kitchen gardens
		(ii)	Poor profitability in beekeeping
		(iii)	Low profitability in bamboo-based and other cottage industry
		(iv)	Low durability of preserved/processed food materials (fruits & vegetables)
E. Forest-based enterprises			
		(i)	Poor productivity in lac cultivation
		(ii)	Under utilized minor forest produce
		(iii)	Underutilized forest resources
F. Post-harvest operations			
		(i)	Poor profitability in stored grains
		(ii)	Low profitability in vegetables and fruits due to lack of processing/preservation
G. System-based			
		(i)	Low systems productivity
		(ii)	Instability in productivity of upland crops
		(iii)	Poor productivity in village ponds

IV. CONCLUSIONS

- 1.Participatory methods can be used to measure the change in a single site visit, without the use of controls.
2. It reduces cost, time, manpower, which involves for collection of information and preparation of action plan, target groups
- 3.Real priorities are identified and delegate responsibilities of the local people, motivate local development work, and
- 4.Bring desirable behavioral change among development workers and beneficiaries.
- 5.Findings prepared after PRA has to be consistent and must not contradict each other. Two opposite statements cannot be true at the same time. If the findings contradict the secondary sources or other sources one must be able to explain why. The finding has to be believable.

REFERENCE

- [1]. Badaga, A.K. Gathiye, G.S. Kirad, S.K., Chauhan, S.S. Rajpoot, J.S., and Barches wait (2018, Assessment pf Mobile advisory services for improving the agricultural livelihood of farmers in the tribal-dominated district of Madhya Pradesh, J. Krishi Vigyan 6(2) Pp. 1-6,
- [2]. Agro-ecosystem analysis report KVK Chatra (2008) unpublished.
- [3]. Samantaray, Santosh Kumar and Ananth, P.N (2018) Empowerment of Rural women through self-help groups: A Socio-Economic analysis, J.Krishi Vigyan 6(2) Pp. 84-87.
- [4]. Sharma, M., Kaur G, and Gill MS (2012) use of information and communication technology in agriculture by farmers of the district Kapurthala.

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