

ANALYSIS OF AGRO-ECOLOGICAL SITUATION FOR IDENTIFICATION OF PROBLEMS BY PRA TECHNIQUES IN ADAPTIVE VILLAGE OF KRISHI VIGYAN KENDRA UNDER NEW ALLUVIA ZONE OF MURSHIDABAD DISTRICT OF WEST BENGAL

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ABSTRACT : Agro Ecosystem analysis using the Participatory Rural Appraisal (PRA) techniques of an adaptive village (Jainpur) of New Alluvial Zone of Murshidabad-Jiaganj block in Murshidabad district, West Bengal revealed that the village basically has rice and jute based farming system. The cropping intensity of the village is 233%. Out of 363 household 80% is engaged in Agriculture, Animal Husbandry and other allied activities. The land availability per household is 0.40 ha. The villagers are mostly scheduled caste. By snow ball technique major problems were identified. On the basis of bio-physical and socio-economic problems, thrust area were selected. Area specific On Farm Trials (OFT) in farmers' were conducted on some researchable issues. Front Line Demonstration (FLD), training programme, health camp, awareness camp and other different extension activities were arranged to mitigate the problems.

Key words : Agro-ecosystem analysis, Problems identification by PRA techniques and some researchable issues in New Alluvial Zone of Murshidabad district, West Bengal

INTRODUCTION

PRA is the use of hands on methods such as participatory mapping and diagramming resources flows, which are through to over-come communication barriers that may exist between outside researchers and community members (Freudenberge, 1999). Krishi Vigyan Kendra is farm science center and entrusted with the responsibility of monitoring the mandated activities to facilitate the farming community by the multidisciplinary mode to reap a rich harvest of scientific agriculture and allied sectors.

METHODOLOGY:

Participatory Rural Appraisal (PRA) is a

methodology for interacting with the villagers, understanding them and learning from them. It involves a set principles a process of communication and a menu of methods for seeking villagers' participation.

VILLAGE TRANSECT WALK OR BIO-DIVERSITY STUDY:

Here transect walk was done from south to north direction in the village along with the Key Informants. The walk was started from the southern end of the village. This area contains most of the medium land agricultural fields including residential areas. The total village consists of 5 paras namely Upperpada, Middlepara, Nichupara, Goshpara and Narayanpur. Almost (70%) cattle population belong to gosh para, though population of goat and fowl is least here. Most of residential areas fall in Middlepara. The primary school, temple and shops are in Middlepara.

The majority portion of the village is dominated

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by agricultural land. Variety of orchards like mango, papaya and jackfruit are in Middlepara. Narayanpur is present adjacent to river channel namely Gobra bill. The end portion of village is covered by agricultural lands. The villagers mostly follow multiple cropping patterns.

AGROECOLOGICAL MAPPING:

Agro Ecosystem mapping indicates the macro and micro ecological (subsystem) features of a village and basic land use pattern such as agro forestry, social forestry cover and wasteland. This map also helps in preparing perspective planning for the village development. The distribution of high, medium and low land situation can be depicted from the land use map and hydrological map presents the status of water resources available in the form of surface and ground water.

Agro ecological System mainly helps to identify various agro-zones of the village, various system, sub-system and natural resources prevailing in the village. It indicates the macro and micro ecological (subsystem) features in a village. The meteorological parameters like rainfall, temperature, relative humidity of the village and basic land use pattern such as agro forestry, social forestry cover and wasteland is depicted from this analysis. The agro ecology map also helps in preparing perspective planning for the village development.

The climate of the area is hot and humid. Temperature varies from 10-35oC with 70-93% relative humidity and mean annual evaporation rate is 1320mm. The village has a big natural water preserver (Gobra bill), cannel linked with Bhagitathi river, 1 deep tube well, 143 shallow tube well. Out of 147 ha land, 135ha land is net cultivable. Most of the house of the village is mud house and few are brick house.

There is no distinct forest in the area. The village basically has rice and jute based farming system such as rice-rice-rice, jute-rice-wheat/ vegetables, rice-vegetable-mustard. Soil type is clay loam to sandy loam.

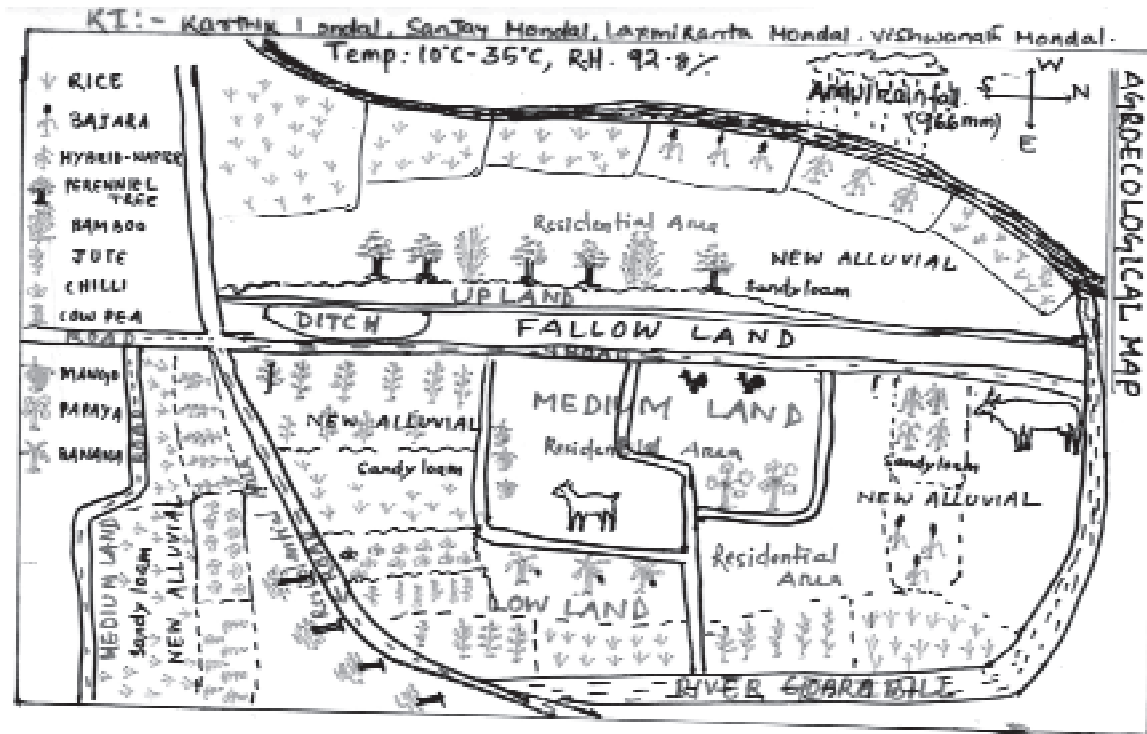
In upland situation maximum residential area and

livestock population are situated. Hand pumps and small size pond (water tank) are used for household purpose. Crops like rice, jute, wheat, rai, yellow serson and vegetables like tomato, brinjal, lady's finger, beans, cow pea Radish, Leafy vegetables (Spinach), Pudina, , potato; spices like ginger, garlic, chilly, onion, fodder like napier, sorgum, bajra. are grown in this village throughout the year. In the low land the soil type is clay loam, Jute and rice are commonly grown. Trees like mango, jackfruit, litchi were found in the area. Trees like palm, date palm and bamboo are common along the village road side.

The cropping intensity of the village is 233%. This can be achieved by the availability of irrigation water river lifting and ground water. Farmer prefer to cultivate boro rice, jute, wheat, mustard, sesame, brinjal, chilly and fodder crop throughout the year. They are suffering from a lot of problems such as the proper guidance about the insect, disease, weed control and shortage of labour. Such problems are root and foot rot infection in chilli, leaf curl disease in chilli, shoot and fruit borer infestation in brinjal, late blight disease in potato, leaf curl disease in tomato, fruit and stem rot in pointed gourd.

The profiles of these soil are immature, one or two sandy layers are found. The topography is in generally flat. The soils of the area are mostly neutral in reaction. The fertility status of soil is medium. Ground water potential is high. The organic matter content of the soil is medium to low.

Each farmer was contacted individually to rank at least ten most important problems, rank 1 being most important. Only researchable problems were recorded so that the scientific community can intervene directly in the problem solving area. On interaction with the farmers it was observed that problems faced by small farmers were somewhat different compared to the large or medium farmers. While problems faced by marginal farmers were more of policy related such as unemployment, low wages, migration, govt. schemes not reaching to them etc which required government initiatives. Therefore to have uniform representation, a sample



of 10 farmers was taken each from large (>10 bigha), medium (5-10 bigha), small (2-5 bigha) and marginal (<2 bigha) category.

Mobility Chart: Mobility map is a different kind of map, which tells us the movement of the village people to their surrounding places, the map tells us the limit of the villagers. The purpose and frequency of their movement of different place can be well understood from the map.

The mobility chart allows us to record, compare and analyze the mobility of different

groups of people in a community. Spatial mobility can be used as the indicator of freedom, wealth, empowerment, education or consciousness of a community.

The villagers of Jainpur frequently commutes to Jiaganj, located 3 km away for education, agricultural inputs, health services, veterinary hospital, post office, bank, selling agricultural produce, besides this other places to which villagers commute less frequently for selling agricultural produce are Lal bagh (10km towards south east),

Table :- Criteria for Wealth Ranking

Category	Size of the holding in bigha (33 decimal)	Monthly income (Rs)
Very poor	Less than 1	1500-2500
Poor	1-5	2500-4000
Medium	5-10	4000-5000
Rich	Greater than 10	5000-7500

Ajimganj (10km towards south), Kalikholi haat (2km towards west) for marketing of agricultural produce, for procuring fertilizers and pesticides; Berhampore (26 km towards south east), the district head quarter of Murshidabad is also an important destination for daily wage earning, purchasing agro-inputs. The villager's frequent mode of transport is by motorised rickshaw (van), cycle, rickshaw and bus.

Key Informants:

1. Srikant Mondal
2. Akshyaya Mondal

Matrix Ranking: Matrix ranking helps to understand local preferences to certain objectives (species of tree, crop variety, adoption of new technology etc) It helps to understand people's decision-making process according to their perceptions of usefulness and need. The reasons for local preferences for an item would be better understood using this tool. It is also known that the criteria may change from one group to another. It highlights the trends of technology behavior to be used for transfer of technology. The key informants

Features	Crops						
	Tomato	Brinjal	Bitter Gourd	Pointed gourd	Cabbage	Couflowe r	Green Chilli
1.Duration	8	8	9	9	9	8	7
2.Market Demand	8	9	7	8	8	8	9
3.Storage quality	7	8	6	7	7	8	8
4.Disease and pest incidents	8	7	9	8	8	9	7
5.Profit	8	9	7	9	8	7	9
6.Response to fertilizer	7	7	8	9	9	8	9
7.Labour requirement	8	8	7	7	7	8	7
8.Maintenance during seedling production	7	7	9	7	7	8	8
9.Yield	8	9	7	8	8	7	9
Ultimate preference	III	I	VII	IV	V	VI	II

Matrix ranking on livestock in broad sense.

	Hen	Cow	Duck	Goat
Life span	6	9	7	8
Meat production	8	2	7	6
Milk production	-	9	-	7
Egg production	8	-	7	-
Maintenance cost	8	7	8	7
Profit	5	9	4	6
Ultimate preference	III	I	IV	II

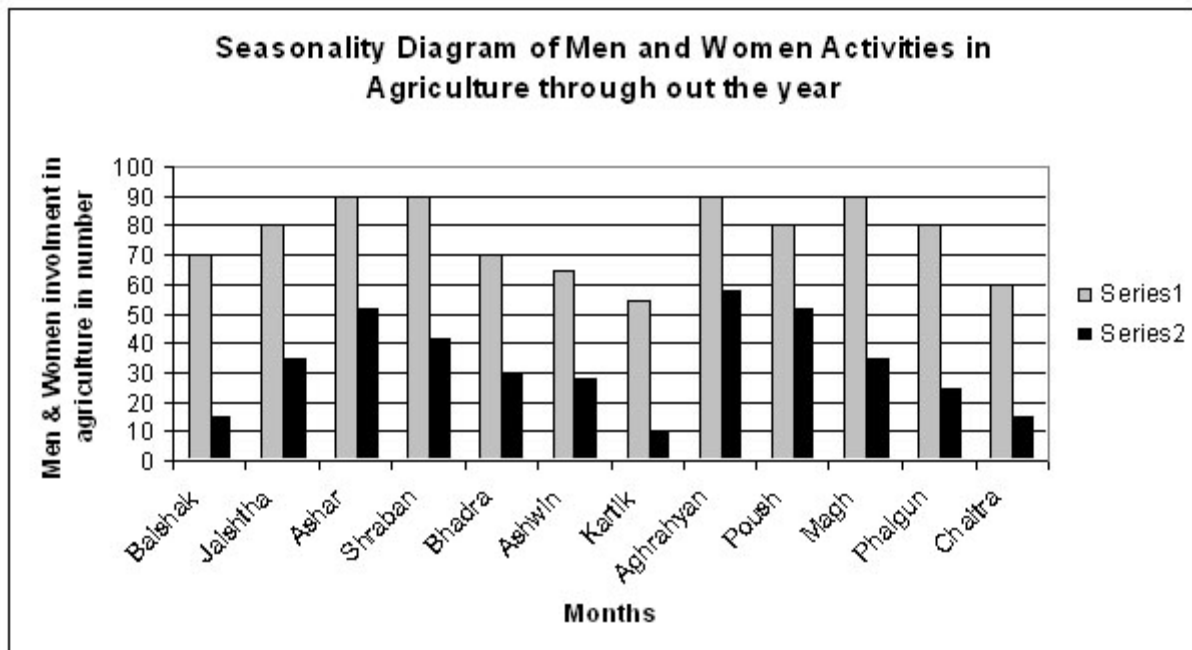
carried out matrix ranking for crops and animals based on different criteria fixed by them. Scores were given by the key informants based on their priority towards the technology

Conclusion: From the above matrix ranking on vegetables we may say that that the farmers very much prefer to cultivate brinjal and next prefer green chilly, tomato, pointed gourd, cabbage and cauliflower.

In case of animal husbandry the number of non-descriptive (deshi) cow, cross-bred cow, Black Bengal goat and poultry are 605,150, 1100 and 1000

opportunities prevail through out the year Variables related to the seasonality diagram: cropping sequences (land type wise).crop pest and diseases, men and women activities in horticulture, processing unit, availability of crop, variety in local market, price fluctuation of a particular crop. Features of the diagram: Operational activities according to crop stages-material and labour input, disease-pest management, cost-benefit analysis.

Interpretation: In the village Jainpur, women are generally not involved in agriculture field operation. But during crisis period they do that.



respectably. The villagers reported that their cattle generally suffer from Foot and Mouth Disease (FMD), Worm infestation, Hemorrhagic Septicemia (HS), Black Quarter (BQ), Repeated Breeding, Anestrus and Mastitis. Their goats suffer from Worm infestation, PPR and Goat Pox and their poultry suffers from Ranikhet Disease.

Seasonality Diagram: Seasonal variation has strong influence on the life style of villagers and it regulates their activities. This diagram depict the main activities, incidences, problems and

They mainly do post harvest jobs, catalyses men's work. They are involved in Animal Husbandry, particularly in goat and poultry rearing, where involvement of men are very rare. It is clear from the bar chat, activity of women in agricultural operation is maximum in the months of Ashar, Shraban, Aghrahyan and Poush and minimum during Kartik and Chaitra.

Daily activity profile-gender focused: Daily activity profile helps to understand season wise daily working schedule along with duration and place of

the work of the villagers according to different gender category and well being class. Through analysis their busy periods of different groups of people as well as free periods planning can be done for farmers training programme, education and other developmental programmes. Day profile also helps to estimate the workloads of a particular well being class gender wise.

Consequence diagram for adoption of Artificial Insemination (A.I.)

causes of the failure of A.I.
PROBLEMS IDENTIFIED THROUGH THE PRA TOOLS
A. Bio-physical:
 1. Low productivity of vegetables and other crops.
 i) Unavailability of suitable vegetable and other crop variety.
 ii) Improper agronomic management practices in crops and vegetables.

Anim als/ Technologies	Breed	A doption	Rejection	Reason
Buffalo	M urrah		✓	<ul style="list-style-type: none"> • Shortage of extra manpower • Dislike of buffalo milk
Goat farming		✓		<ul style="list-style-type: none"> • Easy availability of fodder • More return
Bengal goat		✓		<ul style="list-style-type: none"> • Milk consumption for domestic purpose • No extra input is required
Deshi cow	a) Layer or Broiler breed		✓	<ul style="list-style-type: none"> • Less scope of financial assistance in the form of loan
	b) Deshi or dual purpose breed	✓		<ul style="list-style-type: none"> • No extra input is required
Artificial insemination		Partially adopted		<ul style="list-style-type: none"> • Unavailability of veterinarians • More interested in natural services
V accination		Partially adopted		<ul style="list-style-type: none"> • Un availability of vaccine and manpower • Lack of awareness

Almost all villagers of Ghoshpara have adopted this technology, and some farmers of other four paras have adopted this technology. AI increased milk yield, reduces the risk of sexually transmitted diseases which is a great boon to farmers. Better utilization of germ plasm yields in better viable progeny that is beneficial to farmers. However, improper heat detection, improper cold chain maintenance and lack of skilled worker are the

Problem analysis: The problems in the system were identified, analyzed (as per Mettick, 1993) and ranked on the basis of various criteria identified by the farmers (as per Sabarathnam and Vennila,1996).

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| iii) Inadequate knowledge about the disease and insect management practices. | : | 4. More disease in animals due to lack of vaccination. |
| vi) Inadequate application of manure, bio-fertilizer and Vermicompost. | : | 5. Decreasing the coverage area and productivity of pulses. |
| v) Indiscriminate use of chemical fertilizer without soil test based fertilizer application. | : | B. Socio-economic: |
| vi) Unavailability of resistance variety of vegetable and other crop variety | : | 1. Inadequate knowledge about proper livestock management practices. |
| vii) Same type of cropping sequence year after year in same piece of land | : | 2. Lack of knowledge about maintaining sustainable soil health management. |
| 2. Infertility, disease and low milk production of crossbred and indigenous cow. | : | These problems helps to identify the research interventions steps needed to solve the problems. |
| 3. Low productivity of goat and poultry due to poor management. | : | TITLE OF ON-FARM TESTING (OFT): |
| | : | The On Farm Testing(OFT) of action plan have been prepared based on some researchable issues. |

THRUST AREAS IDENTIFIED

Technological Interventions as solution for sustainable livelihood security

A. Livestock production management

1. Health care management through prophylaction & vaccination
2. Strengthening of house hold goat rearing
2. Improvement of feed resources and nutrient utilization by strengthening existing feeding practices
3. Strategic supplementation of deficient nutrients and ameliorating the anti nutritional factors to improve fertility and milk production of crossbreed and indigenous cow
4. Intensification of Artificial Insemination in cattle for breed up-gradation
5. Supplementation of micronutrients
6. Improvement & utilization of local feed & green fodder
7. Promotion of scientific management in house dairy, goatery, piggery, poultry, duckery etc.in the backyard system of farming
8. Conservation & propagation of threatened indigenous breed like Black Bengal goat, Garole & Banpala sheep, Ghoongroo pig etc.
9. Popularization of Bio-gas production and use
10. To enhance farmer's income through productivity enhancement of livestock and fisheries

B. Fish production management

1. Introduction of high value item-freshwater prawn in carp farming system
2. Integrating fish culture with livestock farming/agriculture
3. Improved water management, stock management and health management programmes for better productivity
4. Conservation strategies for fresh water rare/ endangered fishes

C. Agriculture / Horticulture production management

1. Introduction of suitable variety and management strategies for different vegetable crops.
2. Soil health management using Integrated Plant Nutrient Management (IPNM) parameters.
3. Integrated pest management measures for plant protection measure.
4. Introduction of suitable variety and management strategies for different pulses.
5. Quality seed and planting materials production
6. Promotion of composite farming like banana/papaya-fish-duck/poultry etc

D. Women empowerment

1. Vermicompost production.
2. Mushroom cultivation & spawn production
3. Nursery management.
4. Bamboo based products

E. Small agri-enterprise

1. Production and marketing of vermicompost
2. Seedling production and marketing
3. Milk collection and marketing
4. Processing, grading & packaging units for agri- horticultural produce.

F. Value addition

1. Production of vermicompost
2. Value-added fishery products from low cost fish
3. Grading & pouching of local spices

G. Risk management.

1. Introduction of crop & livestock insurance

Formulation of some trial on farmers field on the bases of some location specific researchable issues identified by PRA Techniques.

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| <ol style="list-style-type: none"> 1. Evaluation of different low cost calf feed formulations over calf mortality under semi-intensive system of Murshidabad district. 2. Assessment of the performance of formulated supplemental feed by using few locally available feed ingredients over onset of estrous of post | <ol style="list-style-type: none"> partum anestrous cows of Murshidabad district. 3. Evaluation of the performance of Fish-Livestock-Horticulture based integrated farming system around the year with available aquatic niche of new alluvial zone of Murshidabad district 4. Evaluation of YVMV tolerant okra varieties |
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Front Line Demonstration(FLD) (Other than oilseed & pulses)

Title of Front Line Demonstration.	Crop/Enterprise
Introduction of Field pea under Irrigated Medium land	Garden pea: Variety Arkel
Production of cut flower of Marigold under Irrigated Medium land	Marigold: Variety- Siracole
Introduction of green manure crop.	Sesbania sp. (Dhaincha)
Preparation of Low cost vermicomposting Unit.	Worm
Production of green fodder for milch cow.	Green fodder (Hybrid napier, guinea grass, para grass)
Supplementation of mineral mixture for increasing milk production of cow.	Milch cow.
Prevention and control of diseases by vaccination.	Cattle, goat and poultry.

Thrust Area	Training title
Plant propagation Techniques	Vegetative propagation, grafting and budding. Phase I
	Vegetative propagation, grafting and budding. Phase-II
Vermiculture	Vermicomposting techniques.
Goat rearing	Follow up of the Vermicomposting training programme
	Training on scientific goat rearing at backyard system.

Thrust Area	Training Title
Integrated Crop management	Improved package of practices on Jute cultivation.
	Package of practices on potato cultivation .
	Package of practices on wheat cultivation .
	Improved package of practices of Oilseed cultivation.
Production and use of organic inputs	Soil health management techniques special reference to cultivation of pulses and green manure crops
Recourse conservation Technology	SRI(System of Rice Intensification) techniques for rice cultivation
Soil fertility management	Steps of soil sample collection and preparation for laboratory analysis.
Soil and water testing	Soil testing with the help of Kit.
Integrated nutrient management	Improved nutritional management of mustard cultivation.
Integrated pest management	Seed treatment – utility and procedure
Production of low volume and high volume crops	Advance technology for cultivation of chilli and Brinjal
	Techniques of cultivation of early cole crops.
	Production techniques of pea and beans
	Techniques of cultivation of early winter vegetables
	Techniques of cultivation of summer vegetables with special reference to cucurbits
	Production techniques of ginger, turmeric and elephant foot yam

Layout and management of orchard.	Management of orchard.
Nursery raising	Techniques of seed bed preparation and raising of healthy seedlings
Production technology of ornamental plants	Production technology of Marigold.
Cultivation of fruits	Advance technology of management of fruit crops with special reference to mango, litchi, coconut
Dairy management	Care and management of cross breed calf.
	Nutritional management and treatment of anestrous and repeat breeder cow.
	Importance of mineral mixture on milk production of cow.
	Care and management of pregnant cows
Feed management	Preparation of low cost feed by using locally available ingredients.
Feed management	Disease and feeding management of backyard poultry birds.
Disease management	Prevention and control measure against disease of cattle.
Disease management	Disease and nutritional management of goat.
Fodder production	Importance of green fodder for livestock.

during kharif season under irrigated medium land situation in the Murshidabad district.

5. Assessment of Elephant Foot Yam with intercrops during Spring Summer season under irrigated medium land situation in the New Alluvial Region of Murshidabad district.

6. Assessment the performance of sulphur application on mustard under irrigated medium land of new alluvial zone of Murshidabad

7. Assessment of yield performance of Aman Paddy through System of Rice Intensification (SRI) techniques under rainfed medium land of new alluvial zone of Murshidabad district.

CONTROL

The information collected in the village Jainpur through using the PRA tools is in agreement with various other studies conducted in the past, the study also provided issues of disagreement with earlier

studies. The PRA tools helped to make in depth participatory analysis for bringing out new emerging issues of conducting further investigation and make recommendation.

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