Case study of farmer's problems crop production, dairy and nutrition through Participatory Rural Appraisal (PRA)

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ABSTRACT : This research study was carried out from July 2016 to October 2019 in villege Salakhedi during our READY Programme. This study is part READY (Rural Entrepreneurship Awareness Development Yojana) that applied an integrated frame work for combined crop production, nutritional, food safety analysis in Ujjain Region. Here, The objective of the study was toanalyze the use of participatory rural appraisals (PRAs) with producers and consumers to investigate seasonality, constraints and opportunities in crop production, milk production.The PRAs allowed identifying seasonal crops and milk production and consumption.A wide range of production constraints were described by producers including insufficient technical knowledge, uncertainty in climatic conditions, poor package practices, poor quality breeds, cattle diseases, lack of capital, feed, water and reliable markets. While food and milk availability had a strong inûuenceon consumption. The main purpose are to get ourselves exposed in practicing the different PRA tools and to understand the scenario of the village and people's perception. Also, this research gives us hands-on experience of the Participatory Rural Appraisal activities.

KEY WORDS : PRA(Participatory rural appraisal), Crop production, Dairy, Nutrition, READY(Rural Entrepreneurship Awareness Development Yojana)

HOW TO CITE THIS PAPER : Gour, Shivam and Jatav, H.R. (2019). Case study of farmer's problems crop production, dairy and nutrition through Participatory Rural Appraisal (PRA). *Res. J. Animal Hus. & Dairy Sci.,* **10**(2) : 48-56 : **DOI: 10.15740/HAS/RJAHDS/10.2/48-56.** Copyright@ 2019: Hind Agri-Horticultural Society.

INTRODUCTION

Globalization and increasing population growth in low and middle-income families (LMIFs) increase pressure on Agriculture to supply food and nutrients for all. The livestock and fish sectors in LMIFs are rapidly growing thereby providing opportunities for poverty reduction and improvement of nutrition. The major problem for food security at the national level is that "the growth of food demand is greater than the growth of food supply"(BKP, 2006 and DKP, 2006).

PRA is a flexible, low cost and time saving set of approaches and methods used to enable workers to collect and analyze information in terms of past, present and future situations to understand the rural population and the condition that exists in rural areas which would provide a thorough and comprehensive idea regarding problems, potentials, resources and solutions to formulate realistic development practitioners to achieve the desired goals within specific time (Chambers, 1992).

The economy of the region is primarily dependent on agriculture. During the study, it was observed that over 90 per cent of the families had agriculture as their primary occupation. In spite of this heavy dependence

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on agriculture, the facility available for irrigation is a bare minimum and that too is limited to the low lying areas which can use water from streams for irrigation purposes. Hence, it would not be wrong to say that economy of the area is a gamble on monsoons. As rainfall in the area is non-reliable; thus, economy and food security in the area is also highly variable and depends on the timing and degree of the rain in the area.

The major crops in the area are Soybean, urd bean, Wheat, chickpea and vegetables like Brinjal, onion, garlic, peas etc. Most of this is grown as cash crop and sold in the Krishi Upaj Mandi which is the major market for the area. There is a noticeable shift in the cropping pattern in the area. Farmers have shifted from conventional or local low yielding crop varieties to newly released high yielding crop varieties which are availed by Krishi Vigyan Kendra Ujjian. An interesting fact which was observed in the study area was the use of traditional methodology for agriculture; and most of the farmer have not mechanical instruments like tractors, seedrill, threshers, cultivators etc. One major reason for this can be attributed to the fact the most of the farmers had small size of land holdings.

Another problem faced in the area was the rapid shift in the climatic pattern whichwas marked by longer and hotter summer. The villagers frequently raised the issue of rainfall getting delayed by a few weeks for the last few years. Also; due to the lack of irrigation facility in the area, the effects of delay of monsoons are felt even more. This not only leads to lower productivity of the crop but also delays the timing of sowing of the rainy season crops. During the study, one reason for the higher temperature in the area was credited to the increasing deforestation.

In general, the villagers did not have much problems related to food security in the region and enough food was available to all family members in all the families, however, problems existed regarding the nutritional value of the food little or no information existed about a balanced diet, its components and its necessity. Thus, no importance was given to the nutritional value of the food consumed and provision of information regarding the same to the villagers was of great importance to ensure a healthy future for the region.

MATERIAL AND METHODS

Study area:

For this study, PRAs were conducted in salakhedi village which is comes under the Ghatiya block (Ujjain). Ujjain comprises 6 Blocks namely Ujjian, Ghatiya, Tarana, Khachrod, Badnagar and Mahidpur. READY student's were alloted in Salakhedi village in Ghatiya block. Salakhedi is a adopted village of KVK, Ujjain. Thus the 90 households were selected for the study. The survey with the households was done based on non-probability or convenience sampling. These 90 households can be treated as the representative of the total sample. This is because atmost care has been taken to cover household of different income groups, located at distant places, belonging to different farmers community.

Moto of READY -Go to the people, Live among them, Learn from them, Love them. Start with what they know. Build on what they have.

So, in this study, PRA tools have been used and the primary data was collected through semi- structured interviews with farmers and their families, where interview was based on a check list and open ended questions. These interviews were guided informally like conversations, while staying focused on our discussion areas. The respondents were interviewed individually, at their own place. They were encouraged and probed to express their views at length. Also, we used critical incident study, where the respondents were asked to comment on real events/experience rather than giving generalized perceptive views. This helped us to know more about their beliefs and problems faced by them.

PRAs:

Participatory rural appraisal (PRA) or participatory learning and action (PLA) is the fieldworkers use of participatory approach. The PRA continues to evolve so fast that no definitions can be final and has to be updated several times. PRA is defined and updated several times by Prof. Robert Chambers. PRA has been described as

– A family of approaches, methods and behaviour to enable poor people to express and analyse the realities of their lives and condition, and themselves to plan, monitor and evaluate their actions (Chambers, 1992).

– A growing family of approaches, methods, attitudes and behaviours to enable and empower people to share, analyse and enhance their knowledge of life and conditions, and to plan, act, monitor, evaluate and reflect (Chambers, 2004).

PRA Tools:

Semi-structured interview (SSI):

Purpose : To gain information from an individual or small group on an issue.

Description : A semi-structured interview is a PRA method that engages villagers in a conversation through a series of guide questions (not structured questionnaire) relevant to the villagers. Important information is generated by talking with villagers about topics that interest them. SSI can be used with individuals, key informants, interest groups or other small groups of villagers (*i.e.* women's groups).

It is usually best to conduct such interviews in pairs with the person doing the interview and one taking detailed notes. The process of a semi-structured interview involves the interviewer presenting the context of the study and its objectives to the interviewee or interview group (such as a family or household).

Village profile:

Total Geography area	160 200 ha
Net cultivated area	120 170 ha
Residential area	10 10 ha
Forest area and barren area	30 30 ha
Tube well irrigation area	60 60 ha
Bore well irrigation area	48 48 ha
River irrigated area	12 12 ha

Demographic pattern:

Total population	700
Male	235
Female	219
Children	248
Family composition	
OBC	10
SC	108
Literacy	47.5%
Joint Families	6
Nuclear Families	120

Maps:

Participatory mapping is one of the most versatile tools and is powerful in generating pictures on any aspect of the physical reality. These maps cannot be compared with the geographical maps, exactly reduced representations of geophysical structures.

Maps can be produced for big regions , villages, farms or even of a single plot, depending on questions people are interested in.

Social mapping:

Social mapping is a PRA method that involves the sketching/drawing of houses and other social facilities and infrastructure (*i.e.* temple, stores, rice mills, school, pharmacy, trails and roads, water pumps, irrigation and recreation facilities) in a village.

Objectives:

– To learn about the social structures in the village and the differences among the households by ethnicity, religion and wealth. To learn about who is living where.

– To learn about the social institutions and the different views local people might have regarding those institutions.

How to facilitate:

Ask the participants to draw a map of the village, showing all households. Discuss whether the total number of households has increased or shrunk during recent years. If there were any changes ask why the number has changed and whether this has caused any problem for certain families or for the community at large.

Ask the group to also show institutions, buildings and places that offer some kind of social service or which are popular spots to meet and discuss. Example: schools, churches, health service, traditional healers, community administration, community leaders, local shop, kindergarten, places where people frequently meet, water point etc.

Encourage the group to discuss and show on the map which different ethnic groups are living in their village. Using a common symbol, mark those households in which

Fig. A : Social mapping of village Salakhedi

the minority ethnic groups live. Using a common symbol, mark those households in which the minority religious groups live.

Resource map:

The Village resource map is a tool that helps us to learn about a community and its resource base. The primary concern is not to develop an accurate map but to get useful information about local perceptions of resources. The participants should develop the content of the map according to what is important to them.

Objectives:

To learn the villagers' perception of what natural resources are found in the community and how they are used.

How to facilitate:

In our PRA, we made this map with separate groups of men and women in the village. This is because women and men may use different resources. The women will map the resources they think are important (like water sources, firewood sources, etc). The men will map the resources they think are important (like grazing land, infrastructure, etc). Maps may include: infrastructure (roads, houses, buildings, bridges, etc); water sites and sources; agricultural lands (crop varieties and locations); soils, slopes, elevations; forest lands; grazing areas; shops, markets; health clinics, schools, churches; special places (sacred sites, cemeteries, bus stops, shrines, etc.).
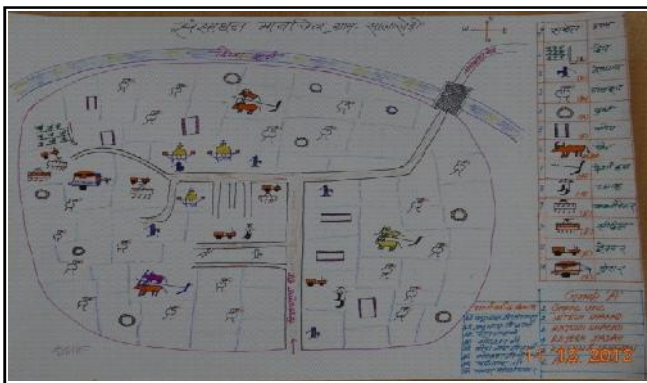

Fig. B : Resource map of village- Salakhedi

Time chart or seasonal calendar or crop calendar:

A seasonal calendar is a PRA method that determines patterns and trends throughout the year in a certain village. It can be used for purposes such as rainfall distribution, food availability, agricultural production, income and expenditures, health problems, and others. Villagers are encouraged to fill in the matrix of the chart/calendar by marking the grid or by placing stones or other objects on the matrix.

Objectives:

To learn about changes in livelihoods over the year and to show the seasonality of agricultural and non agricultural workload, food availability, human diseases, gender-specific income and expenditure, water, forage, credit and holidays.
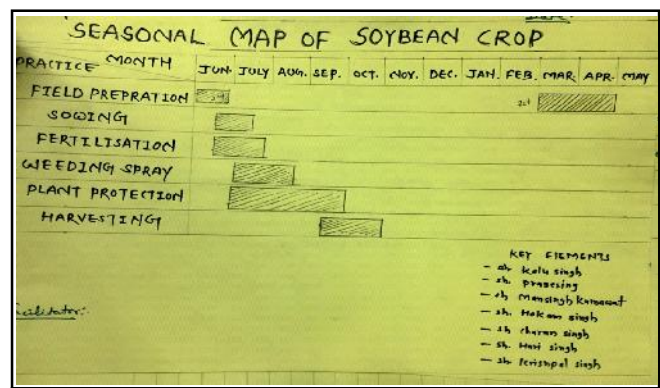

Fig. C : Seasonal map of soybean crop

Wealth ranking:

Wealth ranking is a PRA method that determines the economic attributes of households in a village. It shows information on the relative wealth and well-being of households in a village. It helps in determining the social and economic status of households in a village.

The information generated by the wealth ranking exercise helps in identifying the poor households in the village. Ranking is done by villagers themselves. It serves as baseline and as an opportunity to identify indicators for planning, implementation, monitoring and evaluation of village development activities (including selection of village organizing strategy).

Step 1: Be able to identify wealth indicators or the differences and features/ description of the households in each category or grouping.

Step 2: Categorize the households into rich, average, and poor (or into whatever categories that will emerge). The closeness of resulting average scores will determine the number of groupings which should however not exceed the number of piles given by the key informants.

Table A : Recurrent characteristics in levels of household wealth identified in participatory wealth ranking				
	Assets	Education	Nutrition	Other
Indicators of rich households (5%)	->8 ha. land ->10 Animals -Owns retail shop -Motor vehicle and tractor -Permanent house (cement walls)	All children in school	All members have balanced diet	-Employs others -Job with pension -Has good Business -early adopter (technology)
Indicators of moderately rich households (25%)	-Owns 5-8 ha of land -Semi permanent house (with iron sheet roof) -Motorcycle -3-5 cows -Multiple sets of clothes	-Children can attend private school	-Eat 3 meals per day	Owns a Business -mid adopter (technology)
Indicators of poor households (30%)	-Small plot of land -Mud house -One bed -Motor winding And carpentry	-Can only afford Government schools -Not all children attend -Children dropout after primary school	-Can only afford one meal or two meals per day	-Household head cultivates for someone else -Late adopter (technology)
Indicators of very poor households (40%)	-Household is landless -Does not own their home -Grass thatched roof - Roof in leaking -Clothes torn and dirty -No mattress -No bedding	-Children not in school -Cannot afford school fees	-Can only afford one meal per day	-Casual labour -No steady income -Cannot afford medications -Cannot afford medical care -conventional practices

Step 3: Take notes of the processes, particularly the difficulties encountered. Also note new learning taking place in conducting the wealth ranking exercise.

Transect walks:

Systematically walking with key informants through an area, observing, meeting people, asking, listening, discussing, identifying different zones, local technologies, introduced technologies, seeking problems, solutions, opportunities, and mapping and/or diagramming resources and findings. Transects can take many forms - vertical, loop, along a watercourse, combing, even (in the Philippines) the sea-bottom.

Objective:

– To find out the natural resources, present land use, vegetation, changes in the physical features and cropping systems, and so on in villages due to possible effects of climate change.

– Used as a method of triangulating data collected through other data sources especially where public resources, land use, social differentiation and mobility in

Table B : Wealth ranking				
Soil type	Light black soil	Medium Black Soil	Light Black Soil	Deep Black Soil
Land use	House hold and Livestock, Crop	House, Crop	Crop and Livestock	Crop
Agriculture crop	Soybean, Maize	Garlic, Onion, Potato, Wheat	Horticulture Crop ,Wheat	Gram, Soybean and Wheat
Vegetable	Potato, Garlic	Potato, Onion	Garlic ,Onion	Potato
Trees	*Neem*, Babool, Ber	Babool, Kabit, Mango	Kabit, and Babool	Mango
Fruit trees	Aonla, Guava	-	Aonla, Guava	Guava
Live stock	Buffaloes, Cow, Goat and Bull	Buffaloes and Cow	Buffaloes and Cow	Buffaloes
Problems	Poor yield of crop	Poor knowledge and low yield of soybean	Low yield of soybean	Low yield of Gram
Prospects	Dairy	Vegetable	Crop	Garlic,
	Kitchen		Production variety and	Soybean,
Opportunity	Garden		Seed	Potato, Wheat, Gram
	and Cultivation		Production	

communities are concerned.

Venn diagram:

The Venn Diagram on Institutions shows institutions, organizations, groups and important individuals found in the village, as well as the villagers view of their importance in the community. The Institutional Relationship Diagram also indicates how close the contact and cooperation between those organizations and groups.
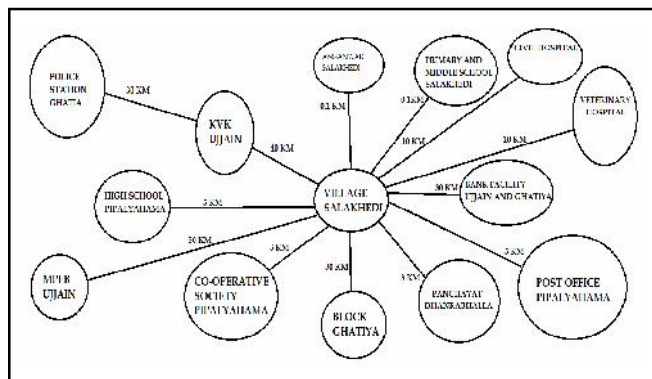
Fig. D : Venn Diagram of Village-Salakhedi

RESULTS AND DISCUSSION

The results of the present study as well as relevant discussions have been presented under following sub heads:

Low milk yield of cattle and buffalo:

Salakhedi has most of desi and nondescript breeds both cow and buffaloes. The majority of milk grower having buffaloes. The milk production in villages is very low. The productivity of dairy animals is very low especially in case of cows. Deshi cow produces 1 to 1/2 lit. of milk per day per animal. The productivity of cross breed cows is 6-7 lit. per day per animal.

Productivity of Deshi buffaloe is lower than murrah (4-5 Lit.) the productivity of murrah buffaloe is 7 lit. per animal per day.

The major cause of this problem as identified are low genetic potentiality of breed of cattle and buffalo imbalanced feeding, high disease prevalence and poor management practices followed by farmers efforts need to be made increase the number of cross bred in cattle and moorah breed in buffalo.

Availability of green fodder throughout the year and concentrate mixture along with mineral mixture need to be arranged specially to the poor farmers of small production system. The problem to low milk yield due to imbalance feeding while other cause could be considered the problems as such and would be dealt with their secondary causes-

Table 1 : Agriculture problems identified in Salakhedi

Problem	Action taken	Future plan
Increasing genetic vulnerability	Grow more than two varieties of crop	Conduction OFT and FLD
Continuously decreasing Productivity	Apply organic matter to maintain soil fertility	Conduction of Trainings and Extension activities at adopted villages
Low income for per unit of land	Adopt diversified farming adopt market oriented farming	Conduction of pulse FLDs
High incidence of wilt disease in dollar gram	Adopt diversified farming	Conduction OFT on 1GK-3 gram variety
Lack of new implements	Farmer should purchase implement through cooperation and subsidy	Conduction of OFT on TD planter and Redge bed furrow planter
Highly shattering in soybean	Harvest crop at physiological maturity	Conduction OFT and FLD
Decreasing water table	They should used	Aware for water conservation
Lack of germination in potato	Should break seed dormancy by the urea 1 % solution	Conduction seed treatment and also organised training
Low cattle population of lack manure	They should adopt animal husbandry of as alternate enterprise. They should make vermicompost NADEP pit on subsidy to produce.	Motivate to farmers regarding organic farming
Unawareness about the women friendly farm equipment and tools	Training programmes were conducted on drudgery reduction through women friendly farm equipments and also introduced farm tools to the farm women.	Increase involvement in agriculture through trainings and extension activities.
Malnutrition problem in village level	Improved seeds of vegetables were distributed and Nutritional Kitchen Garden were cultivated in backyard	Women andchild care programme conducted at adopted villages

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Table 2 : Problem – low yield of soybean

Problem	Action taken	Future plan
Socio economic factor		
Low purchasing power	Training on capacity building	Training s conduction on capacity building
Poor economic condition	Conduction training cum demonstration.	Conduction of trainings programme
Lack of knowledge / skill for quality seed production	To impart farmers for seed production	Conduction of Quality seed production at farmers field
Bio-physical factors		
Imbalance use of Fertilizers with non-availability of fertilises in time.	Training, OFT and FLD on IPNS.	Training programme on Integrated Plant Nutrient System
More attack of insects and pest- Soybean and injudicious use of Pesticides.	OFT/FLD on Insecticide scheduling and use of both biological and synthetic in Soybean.	Motivate to farmers regarding adoption of organic
Selection of verities unsuitable to moisture stress at latter stages — lack of awareness about new Verities	OFT/FLD on new varieties released for the Zone.	Suitable and Appropriate varieties demonstration under OFT and FLD
Heavy weed infestation — Lack of awareness about weedicides application	OFT/FLD based on weed population dynamics and rotation of herbicides.	Conduction of FLD on use of suitable weediside
Poor quality of seed with high seed rate-Farmers use own seed.	OFT/FLD on optimisation of seed ratio and spacing for Soybean verities.	Use of quality and certified seed of prominent varieties
Wilting due to soil and seed born pathogen-No seed and soil treatment.	Training and field campaign as well as Sangoshthi.	Conduction of trainings

– Lack of technology
– Low genetic potential of buffaloes
– Longer dry period
– Imbalance feed
– Attack of ecto-endo parasite and lack of vaccination.

Intervention points:
– Small production system
– Use of use molasses treated straw for increasing protein intake of lactating buffaloes/ cattle under limited resource conditions

– Green revolution production system
– Balanced feeding of lactating cow/ buffalos for increasing productivity.

Food consumption : Pattern and perception:
The food consumption pattern of the area is nearly consistent throughout the region. Food is cooked twise a day in nearly all the households in the village. This generally varies season to season, during the sowing season the food is generally cooked once and is taken to the fields for lunch as the women of the household are busy with the agricultural activities. *Chapati* and *Dal* is a staple

Table 3 : Mal-nourishment problem in village-Salakhedi

Problem	Action taken	Future plan
Lack of intake of Nutritious	Increased the knowledge regarding different nutrients and its functions. -Conducted the training programme for enhancing the knowledge regarding preservation and storage of grains	In future also the training programme, OFT and FLD as well as extension activities will be conducted
Unavailability of vegetables /fruit at village level		
Lack of knowledge regarding preservation		
Poor practices of grain storage		
Poor economic condition		
Unawareness about important of nutrients presents in vegetables/fruits	– Awareness was created for cultivating nutritional kitchen garden	Emphasis will be given attracting their attention for cultivating the nutritional kitchen garden and for preparing the food preservation activities
Lack of knowledge about nutrients and its importance	– Motivated the rural women for income generation activities by making SHG.	
Faulty method of cooking	– Awareness was created through the training programme regarding the right method of cooking and so on	
Unawareness about the right method of cooking		
Illiteracy		
Care less about own health	Create awareness regarding health status an its important	Motivation for formation of SHG at rural area
Due to rigid social		
Dual workload		
More energy expenditure		

diet in the region. Vegetables are cooked based on availability; seasonal vegetables like green vegetables, brinjal, sponge guard ,pumpkin etc. are cooked in the rainy season, when they are easily available from the fields in the village itself. Most of the families knew about the importance of vegetables as a part of food, however, it is not a regular part of their diet; this is because of the unavailability of these in the local market and high rates. The breakfast in the area is generally cooked early in the morning and mainly consists of *Chapatti* and *Dal* (*Sabji* depending on availability). The dinner again consists of *Chapatti* and *Dal*. When asked about nutritious food, the people had no or very little idea about the concept of balanced diet. Though, they talked about green vegetables, milk, salad, ghee etc. to be important for us having enough nutrition, nearly no one said that they took these things regularly. They said that all these things were subject to availability from the field or in the house. Very little or no purchase of milk was made even in the well-off families, when the cattle was not giving milk; whole families went without it for months. Due to change in the eating pattern and also the cultivation pattern of the area, many of the foods that were a part of the diet earlier have now become extinct or their usage has decreased significantly. Switching to cash crops in place of food crops has led to sharp decline in the production of finger millets, corn (makka); etc. and people get very little of these products to eat as a part of their daily diet. Thus, due to sale, villagers have much less to consume from their fields when compared to the earlier times. Since most of the agriculture in the region is rain fed, seasonal variations in the fortune of farmers is inevitable. When asked about the best and worst time of the year, the answers generally showed that rainy season was the best for all the farmers, the primary reason being availability of vegetables in the season, allowing the villagers to get to get good diet and also good income from the sale of these vegetables in the market.

To the nutritional angle:

Table 4 : Guideline daily amount values

Typical values	Women		Men		Children (5-10 years)	
	Recommended diet	Villager's diet	Recommended diet	Villager's diet	Recommended diet	Villager's diet
Calories	2000Kcal	1449Kcal	2,500 kcal	1600 Kcal	1,800 kcal	1300Kcal
Protein	45 g	22g	55 g	24g	24 g	11g
Carbohydrate	230g	180g	300g	195g	220 g	174g
Sugars	90 g	68g	120 g	70g	85 g	50g
Fat	70g	63g	95 g	74g	70 g	55g
Saturates	20g	11g	30 g	13g	20 g	9g
Fibre	24g	15g	24 g	15g	15 g	8g
Salt	6g	4g	6g	4g	4g	3g

Table 5 : Food sources

Food items	Amount	Healthy options	Occasional indulgences
Soup	50g	All fresh vegetable soups	Canned and cream soups
Cereal	30g	Whole Wheat *Rotis*/ Millet *Rotis*/ Brown and Red Rice/ Whole Grain Pasta/ Quinoa	White rice, Pooris, Paranthas
Protein	30g	Dais/ Paneer Besan/ Chicken 100g or Fish 120g, 80g Mutton	Organ meats, Pork
Vegetables	100g	All seasonal vegetables	Potato, Sweet potato, Yam, Lotus Stem, Tapioca
Dairy	100g	*Chaas, Rata, Dahi*. Skimmed milk puddings	*Ghee*, butter
Oil	5g	Peanut oil, Olive oil, Rice bran oil	
Calories	296		
Bedtime		Haldi milk, Almond milk	
Milk	200ml		
Calories	58		

Table 6 : The importance of various grains (in 100g)

Food grain	Carbohydrate (g)	Protein (g)	Fat (g)	Energy (Kcal)	Calcium (mg)	Iron (mg)
Sorghum	72.6	10.4	1.9	349	25	41
Bajra	67.5	11.6	5	361	42	8
Roger millet	72.0	73	1.3	328	344	3.9
Foxtail millet	60.9	12.3	43	331	31	2.8
Kodo millet	65.9	8.3	1.4	309	27	0.5
Proso millet	70.4	12.5	1.1	341	14	0.8
Barnyard millet	65.5	6.2	2.2	307	20	5
Little millet	67.0	7.7	4.7	341	17	9.3
Wheat (whole)	71.2	11.8	1.5	346	41	5.3
Rice (raw, milled)	78.2	6.8	0.5	345	10	0.7

Conclusion:

Krishi Vigyan Kendra, Ujjain giving recommendations of package and practices of different crops to farmers, it is very foremost to identify farmer's problems and available resources so that the solutions recommended will be accept by farmers as well as become successful at village level. This study has shown that in this era of ICT where information transfer is quick and digitalized, PRA still has crucial role to play. This study has showed that crop production,dairy and nutrition can be effectively identified through a systematic PRA and then sustainable solutions and researchable areas can be generated, after all the research it revealed that farmer must be adopt new agricultural interventions for their crop and dairy production and also be aware for daily nutritional diet which help to enhance their socio-economic standard.

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