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RESEARCH ARTICLE

RURAL LIVELIHOODS IN THE FARM ECOLOGY OF AN ECONOMICALLY BACKWARD DISTRICT
OF WEST BENGAL, INDIA

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ABSTRACT

Participatory Rural Livelihood Analysis paves a discernible way of socio-economic analysis for development planning. Purulia, by becoming a typical economically backward district and a complex-diverse-risk prone farm economy in India, is reeling under abject poverty and geospatial migration of farm labourers. This sector is now suffering from declining growth, uncertain market, low capital formation, and vagaries of nature. The sustainable livelihood has become the universal goals since millennium declaration by UNO. The present paper examines the achievability of sustainable livelihood in terms of selected variables prevalent in and integral to a farming system. The sustainable livelihood has become a complex disposition of some intrinsic factors viz. wage, calorie intake value, food intake value, level of drudgery, seasonality of wage, gender dimension of wages, security perception of livelihood, and its spatial distribution along the slope of economic affiliation. It has been found that some variables like size of holding, cropping intensity; irrigation status, migration, motivation, and education are being relegated to the issues of livelihood generation. The predominant factors like income, crop yield, technology adoption have some times been subsided by factors like wage pattern, family size, cropping intensity, intercropping space etc to live behind a basket of alternative thinking that only economic interventions or package of practices can't assure sustainable livelihood. We have to go beyond by refocusing our retention on some set of soft variables that are interactively characterizing the prospect of livelihood generation.

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INTRODUCTION

The participatory livelihood analysis has got off to a start in the decades of eighty's and has been socialized to empower rural folks, especially the marginalized section. Poverty in rural India is both systemic and universal. For the last sixty four years we have been in incessant fight against poverty, still 77 per cent of our population has to survive with rupees twenty per day per head (Arjun Sengupta Committee Report...). So, the scenario of poverty in rural India is not only bleak, it poses threat to the social equilibrium and economic growth. The process of livelihood generation in typically poor villages of India has got a unique social dynamics by having a social amnesia of power structures, institutionalization of unique leadership instilled deep into the power fabrics and the economic reconfiguration followed by land reform and implementation of *Panchyati Raj* at a unique pace and level as well (Debnath, and Dasgupta, 2006). The gradual impoverishment of purchasing capacity of rural masses appears to be a threat. Even suicidal cases among the farmers due to poverty and frustration are increasing (Bagchi, 2008). The development paradigm needs to have a shift from Rural Development Tourism (Chambers, 1995) to bottom-up participatory development. There are several factors, which

may be responsible for making the farmers resource poor, poverty driven and victim of malnutrition (Haug, 1999). Lack of education, lack of knowledge, insufficient extension coverage, weak market accessibility and several other factors may have contribution in this regard. At the same time the soil health and the ecological balance are deteriorating day by day due to excessive use of input like chemical fertilizers, chemical pesticides etc. in most of the areas (Sati, V.P. 2008). As a result of that crop productivity is also reducing simultaneously. Population growth, fragmentation of holding, shrinkage of agricultural lands is also creating obstacles to agricultural growth. Poverty has increased thrice in last three decades and right now around 350 million people are having a hard run below poverty line.

Pressures are mounting up with the emerging challenges for searching out more and more livelihood from less and less land and more and more income from more and more occupational stresses. The victim of increasing abject poverty is the populace from rural laborers, marginal farmers, dying rural artisans, the children and women and the traditional forest and coastal dwellers. The reality become harsher while the contribution of agriculture to the national GDP is slanting from 27% to 18% in recent times and the people dependent on agriculture is more than 64 per cent yet. The process of livelihood generation in typically poor villages of India has got a unique social dynamics by having a social amnesia of power

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structures, institutionalization of unique leadership instilled deep into the power fabrics and the economic reconfiguration followed by land reform and implementation of Panchyati Raj at a unique pace and level as well. Since 1990-91, due to the new Economic policies, the area under food grains and coarse grains have declined by -2 and -18 percent respectively while area under non-food cash crops such as cotton and sugar-cane have increased by 25 and 10 percent respectively. However, production of milk has increased from 84.4 m tonnes (2001-02) to 97.1 m tonnes (2005-06). Production of eggs has increased from 38729 million (2001-02) to 46231 million (2005) (Ghatak, 2007). The World Bank estimates that 456 million Indians (41.6 % of the total Indian population) now live under the global poverty line of \$1.25 per day (PPP). This means that a third of the global poor now reside in India. However, this also represents a significant decline in poverty from the 60 percent level in 1981 to 42 percent in 2005, although the rupee has decreased in value since then, while the official standard of 538/356 rupees per month has remained the same. Income inequality in India (Gini coefficient: 32.5 in year 1999- 2000)^[6] is increasing. On the other hand, the Planning Commission of India uses its own criteria and has estimated that 27.5% of the population was living below the poverty line in 2004–2005, down from 51.3% in 1977–1978, and 36% in 1993-1994. The source for this was the 61st round of the National Sample Survey (NSS) and the criterion used was monthly per capita consumption expenditure below Rs. 356.35 for rural areas and Rs. 538.60 for urban areas. 75% of the poor are in rural areas, most of them are daily wagers, self-employed householders and landless labourers.

Although the Indian economy has grown steadily over the last two decades, its growth has been uneven when comparing different social groups, economic groups, geographic regions, and rural and urban areas. Between 1999 and 2008, the annualized growth rates for Gujarat (8.8%), Haryana (8.7%), or Delhi (7.4%) were much higher than for Bihar (5.1%), Uttar Pradesh (4.4%), or Madhya Pradesh (3.5%). Poverty rates in rural Orissa (43%) and rural Bihar (41%) are among the world's most extreme. A study by the Oxford Poverty and Human Development Initiative using a Multi-dimensional Poverty Index (MPI) found that there were 421 million poor living under the MPI in Bihar, Chattisgarh, Jharkand, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh and West Bengal. This number is higher than the 410 million poor living in the 26 poorest African nations. Despite significant economic progress, one quarter of the nation's population earns less than the government-specified poverty threshold of 12 rupees per day (approximately USD \$0.25). Official figures estimate that 27.5% of Indians lived below the national poverty line in 2004-2005. A 2007 report by the state-run National Commission for Enterprises in the Unorganized Sector (NCEUS) found that 77% of Indians, or 836 million people, lived on less than 20 rupees (approximately USD \$0.50 nominal; \$2 PPP) per day. According to a recently released World Bank report, India is on track to meet its poverty reduction goals however, by 2015 an estimated 53 million people will still live in extreme poverty and 23.6% of the population will still live under \$1.25 per day. This number is expected to reduce to 20.3% or 268 million people by 2020. However, at the same time, the effects of the worldwide recession in 2009 have plunged 100 million more

Indians into poverty than there were in 2004 increasing the effective poverty rate from 27.5% to 37.2%. As per the 2001 census, 35.5% of Indian households availed of banking services, 35.1% owned a radio or transistor, 31.6% a television, 9.1% a phone, 43.7% a bicycle, 11.7% a scooter, motorcycle or a moped, and 2.5% a car, jeep or van; 34.5% of the households had none of these assets. According to Department of Telecommunications of India the phone density has reached 33.23% by Dec 2008 and has an annual growth of 40%. Majority of the India farmers derive their livelihoods from agriculture. During the Tenth Five Year Plan, gross domestic product (GDP) originating from agriculture and allied activities was 2.3 per cent compared to 8.0 percent in the industrial sector and 9.5 per cent services sector. During this plan period, the growth in the agriculture and allied activities averaged 2.3 per cent which is lower than that of 3.2 per cent during the 1990s and 4.4 per cent during the 1980s. Also, there is a shift from staple to cash crop which is the major reason for food insecurity. From 1960-61 to 1998-99 the area under grain crops has gone down from 45 million hectares to 29.5 million hectares, area under cotton has increased from 7.6 to 9.3 million hectares and area under sugarcane has increased from 2.4 to 4.1 million hectares.

The decline in per capita consumption of cereals, in particular coarse cereals, has worsened the nutritional status of the rural poor. In the case of the poor, total consumption of high value cereals like rice has declined by 10 percent due to rise in prices of cereals in real terms during the 1990s and dietary diversification towards non-food grains. Similarly, average daily intake of protein by the Indian population decreased from 60.2 grams to 57 grams in the rural area between 1993-94 and 2004-05 (Praduman Kumar, *et al.*, 2007). Recent studies indicate that household level food security for the poor households is changing for the worst. Household Level Food Security - Its Importance as Sainath (2007), puts it: "*Seldom has policy been as forcefully implemented as in the 1990s. For ten years, governments have assaulted the livelihoods and food security of the poor. That security does not lie in mountains of grain but in millions of jobs and workdays for people*". Food security at the national, state or district level does not automatically ensure food security at the house hold level. Today, commercial crops are being recommended by Agriculture Departments to improve the economic status of farmers without explicit consideration of their household level food security. What most small and marginal farmers often need is food crops such as short duration cereals, millets and fodder crops to meet their family's food and fodder needs.

Objectives

Estimation of the sustainable livelihood from a score of agro-economic and sociological variables Spatial analysis of seasonality and migration through Participatory Learning Action exercises and mapping Deriving strategic dimensions from such analysis as to go for certain effective intervention for sustainable rural livelihood.

METHODOLOGY

These are the methodological inputs followed for conducting the empirical study.

- Locale of study
- Pilot study
- Methods of sampling
- Variables and Measurements.
- Tools and techniques of data collection
- Statistical analysis and interpretation of data.
- PLA techniques for geo-spatial study

Keeping in view the paucity of time, resources and current socio-political situation, Purulia district was selected purposively for the study. The present investigation had been conducted in Joradi village in Purulia District, West Bengal. State Block and village was selected purposively due to unique nature of the locations in terms of subject area of study. A pilot study was conducted to understand the area, its people, institution, communication, extension system and attitude of people towards sustainable livelihood process. The 22 independent variables and 7 dependent variables were selected and measured with the help of exact scales developed by previous social science researcher or by modifying the developed scale by structured schedule for requirement of the investigation. Around 110 families live in Joradi village. An exhaustive list of respondents was prepared critically with the help of same villagers. From the list 50 respondents were randomly selected for the study. The final primary data were collected with the help of structured interview schedule by following the personal interview method after pre-testing of schedule. The Secondary data were collected from our library, Cab, internet etc, for establishing the conceptual frame work of the present study. Various dependent & independent variables are: Socio-personal variables Age (X_1); Education (X_2); Family size (X_3); Family member (adult (X_4); Functional Education Strata (FES) (X_5). Agro-economic variables are: Cropping Intensity (X_6); Irrigation status (X_7); Animal enterprise intensity (X_8); Nutrition (X_9); Holding size (X_{10}); Income (Rs.) per cotta (X_{11}); Seed type (X_{12}); Spacing (%) (X_{13}); Value of the source of material (X_{14}); Fertilizer application (X_{15}); Organic manure application (X_{16}); Irrigation status (X_{17}); Pesticide application (X_{18}); Fungicide application (X_{19}); Credit access (X_{20}); Yield level (X_{21}); Communication status (X_{22}) and Dependent variables are Wage (Y_1); Man days (Y_2); Level of decency (Y_3); Livelihood security (Y_4); Food intake value /g /day/head (Y_5); Health hazard (Y_6) and Sustainable Livelihood (Y_7).

RESULTS AND DISCUSSION

Estimation and analysis of sustainable rural livelihood from a score of agro-economic and sociological variables

The statistical tools like standard deviation, coefficient of variance, path analysis, factor analysis and canonical analysis.

1) Wage (Y_1)—Findings of related analysis

Coefficient of correlation- The seed type recorded a significant but negative correlation which implies that for the local seed management becomes less drudgery and hence, less of wages can be claimed by the wage earners.

For any hazardous agricultural operation like application of fungicide etc. wage has been negotiable and it has primarily been revealed by this correlation. Better yield performances create a steady demand for agricultural labour market goes buoyant. A buoyancy in agricultural labour marketing means higher rate of wages.

2) Man days (Y_2) - Findings of related analysis

Coefficient of correlation- Mandays have been a main source of income and wage support for the marginal farmers, contributing the highest number of respondents. In a typical rainfed agro-ecosystem, characteristically complex, diverse and risk prone, the number of mandays has naturally been predicted by the level of income. Sometimes it may happen that apparently “insignificant correlation” are retaining significant direct effect but has been negated by the summated indirect effect. The situation by default shall lead us to have an interactive analytical framework by resorting to path analysis, depicting the direct indirect and residual effect.

3) Level of decency (Y_3). Findings of related analysis

Coefficient of correlation- Decency is the level of perception on the amount of drudgery and its intensity which a respondent has to confront with while conducting agricultural operations. Here in this study the value of the inputs (source material) has recorded a negative correlation with the level of decency. It implies that when the cost of critical material has gone down the decency has increased. So the market price of different inputs has got a reciprocal impact on a perceived drudgery or decency of any kind of labour employed for sustaining agricultural management.

4) Livelihood security (Y_4). Findings of related analysis

Coefficient of correlation- It reveals that fertilizer application (X_{15}) has recorded a positive impact on livelihood security (Y_4). Fertilizer is the most important input which is deemed to have a decisive impact on livelihood securities. Modernization of agriculture hence has got some of its components at least yielding out livelihood security for the marginal farmers as well. Another variable yield has recorded a positive and significant bearing on livelihood security. An assured yield means a security in food supply and a food price which is expected to remain under control when food price remains under control; it offers higher accessibility to the marginal section of any farm economy.

5) Food intake value (Y_5) - Findings of related analysis

Coefficient of correlation- Nutrition is a congenital character which is biologically tuned with food intake value. So, in securing sustainable livelihood adequate food intake through securing desired nutritional level has become an essential pre-condition. All the inputs application viz. Fertilizer, organic manure, pesticide & fungicide have recorded significant & positive correlation with food intake volume. So, securing food intake rightly incorporate the need for modernization of farming system. Thus another important farm character yield

also has recorded as positive correlations with food intake volume.

6) Health status (y₆) - Findings of related analysis

Coefficient of correlation- Here has been found that yield has recorded a significant and positive correlation with health status. It implies that whenever yield is assured and it is a better yield of crop then even a poor family can enjoy some bit of surplus. So, a sustainable livelihood assured yield has got a binary impact. It fits the farm family and creates ground for demand for wage and better income. No other variable in this table has so far recorded significant correlation with health status for this we have to wait for path analysis for the decomposition of the total effect i.e. 'r' value i.e. direct, indirect and residual value.

7) Sustainable livelihood (y₇) - Findings of related analysis

These by becoming pertinent requirement the inputs like fertilizer (X₁₅), Organic Manure (X₁₆) pesticide (X₁₈), Fungicide (X₁₉) have stimulated the process of attaining sustainable livelihood. Other economic characters like holding size & value of resource material have also recorded strong bearing with the sustainable livelihood. This relation study hereby is generating a host of strategic implication of an initial modernization of this apparently stale and traditional farming system so that the people there in can thrive well and get the meaning of livelihood operationally and meaningfully through.

wage level. The respondents mainly comprising of small and marginal land category have recorded a bearing on wage fixation. Those having a bit higher size of land holding can also enjoy the ability to negotiate with the wage provider. Respondents having a poor or impoverished resource endowment are comparatively feeble in deciding on the wages render accessible to him. The seed type recorded a significant but negative correlation which implies that for the local seed management becomes less drudgery and hence, less of wages can be claimed by the wage earners. For any hazardous agricultural operation like application of fungicide etc. wage has been negotiable and it has primarily been revealed by this correlation. Better yield performances create a steady demand for agricultural labour market goes buoyant. Buoyancy in agricultural labour marketing means higher rate of wages. Since co-efficient of correlation depict only an associational relation among and between the predictor and predicted variable it won't be judicious to control anything beyond a mere prediction unless & until the efficacy of the relation has been supported by the path analysis by isolating the direct effect of an exogenous variable from the indirect & spurious (residual) effect. Man-days have been a main source of income and wage support for the marginal farmers, contributing the highest number of respondents. In a typical rainfed agro-ecosystem, characteristically complex, diverse and risk prone, the number of man-days has naturally been predicted by the level of income. None of the variables in this table has recorded a significant relationship to a "Statutory level; 1% or 5%". But in social sciences, it is better to go up to 10 or even

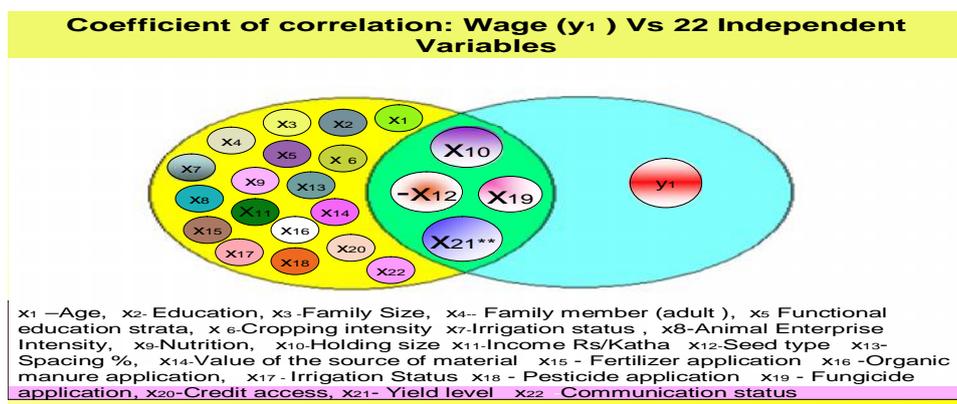


Figure 1. Interaction Model : Wage (Y₁) vs 22 Independent Variables

Factor analysis: Findings of related analysis

The Factor-1 has accommodated the following variables X₁₅(Fertilizer), (Organic manure) X₁₆, (Applied Pesticide) X₁₈, (Applied Fungicide) X₁₉, (yield) X₂₁, (Food intake Value /g/day/head) X₂₇ has been renamed as Input_factor. The factor has contributed 14.247 percent of variance. The Factor-2 has accommodated the following variables X₁ (Age), X₂ (Education), X₃(Family size), X₄ (Family Statement with adult person), X₁₀ (Holding size) has been renamed as Bio-Social Factor contributing variance percentage was 9.342. The Factor-3 has accommodated the following variables X₆ (Cropping Intensity), X₁₁ (Income), X₁₂ (Seed type), and has been renamed as Livelihood Status. The factor has contributed 8.141 percent of variance of the predictable character. For higher holding size from the respondent has gone attributive to higher

20% level of significance. Rather, it is more risky to draw an inference at a 1% level of significance stating that the relationship already analyzed has an applicability or truthfulness for the 95% or 99% of respondents. In the social sciences society has become the laboratory to the social scientists which itself is a very complex, less predictable and the variables are behaving in compliance with the heterophyle interaction not under stipulation of physical laboratories where in certain amount of inputs are experimented to generate certain amount of reciprocal output. In an experimental set up that is governed by institution framework and social norm evolved over a protractile period, it is ready and difficult task to steer and organized the relation study. Besides the value of co-efficient of correlation may be significant or less significant is retaining a huge implicate implication that needs to be disposed off through the decomposition of co-efficient of

correlation to extract the direct indirect & spurious effect. Sometimes it may happened that apparently “insignificant correlation” are retaining significant direct effect but has been negated by the summated indirect effect. The situation, by default, shall lead us to have an interactive analytical framework by resorting to path analysis, depicting the direct indirect and residual effect.

related to livelihood are Drinking Water, Job Crisis, Marketing, Transport, Financial and Communication process. So, to ensure sustainable livelihood the villagers should be assured of easy access to Credit, Proper Communication Facility and Safe Drinking water.

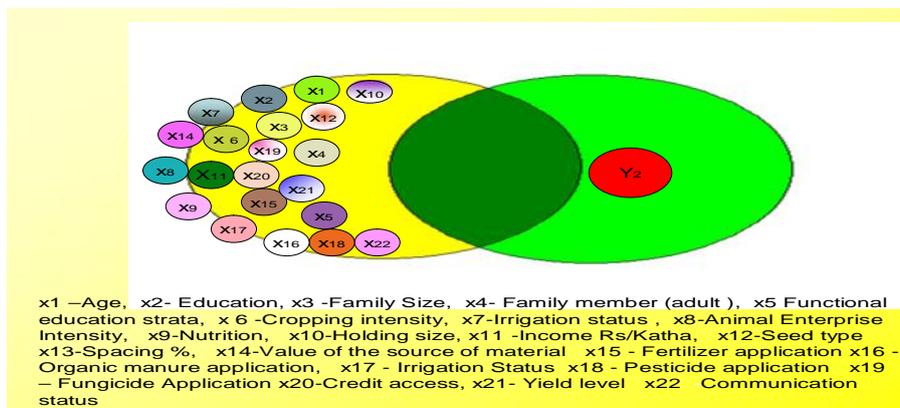


Figure 2 .Coefficient of correlation between man days (y₂) and 22 Independent variables

Exercises on participatory learning actions for depicting the spatial distribution of problem, choice and migration attuned to livelihood generation.

PRA-I Matrix Ranking: Perception of livelihood problem. Village of Joradi

Attribute	Crop related	Drinking water	Job crisis	Communication process	Marketing	Transport	Financial
Poor income	6	7	8	7	6	6	8
Seasonal labour	8	8	6	8	5	4	6
Gender	6	6	7	5	4	3	7
Drudgery	5	7	5	6	6	6	5
Technology	4	8	4	7	5	5	6
Norms	6	6	6	5	3	4	6
Irrigation	5	7	7	6	2	5	7
	40	49	43	44	31	33	45
Rank		(I)		(III)			(II)

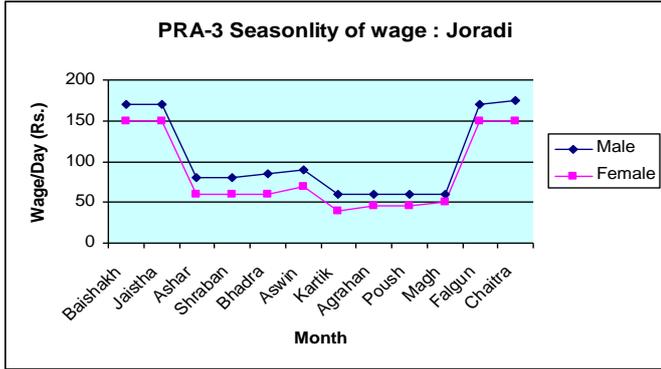
PRA-2 Intervention Matrix a multilayer: How to improve Livelihood

Stakeholder	Social Development	Economic Development	Enterprise Development	Management Intervention	Policy Intervention
Panchayat	6	5	5	5	6
Opinion leader ship	8	4	4	4	5
Gender	6	3	2	3	4
Farmers organization	7	4	6	5	6
NGO Performance	6	5	7	5	5
Role of BDO	8	4	4	4	3
Role of ADO	5	3	4	4	4
Total	46	28	32	28	33
Rank	(I)		(III)		(II)

The material PRA-I presents the ranking of the perception of the livelihood problem. The key informants in the PRA exercise were: Sri Ajit Murmu, Bikash Murmu, Bhim Murmu, Laksh Ram Murmu and Motilal Murmu. It was conducted on 28.07.10 for 45 minutes. The Vertical Attributes of Livelihood Problem, as identified by the key informant are: Poor income, Seasonal Labour, Gender, Drudgery, Technology, Norms, Irrigation and Horizontal Items are Problem Related to Crop, Drinking Water, job Crisis, Communication, Marketing, Transport, Financial. It has been found that the drinking water related problem occupied the highest rank position followed by financial problem, and the 2nd position has gone to communication process. So, three most striking problems

The PRA-2 presents the Participatory delineation of ranking on the perception of the livelihood Improvement. The key informants in the PRA exercise were: Sri Ajit Murmu, Bikash Murmu, Bhim Murmu, Laksh Ram Murmu and Motilal Murmu the PRA exercise was conducted on 28.07.10 for 65 minutes. The vertical attributes of livelihood Improvement, as identified by the village key informants, were Panchayat, Opinion leader ship, Gender, Farmers Organization, NGO Performance, Role of BDO, Role of ADO and the horizontal items are Social Development, Economic Development, Enterprise Development, Management Intervention, Policy Intervention. So, it is interesting to note that villagers, primarily the tribals of a typically backward district, have elicited the choice for

having social development. The reasons may be the people of that area have already been depleted by political unrest, cultural impoverishment and simmering social entropy. The violence has been inflicted by the extreme politics of imposition and hegemony. This social entropy has distorted the perennial nature of livelihood and serenity of pristine rural relationship. These have been followed by proper policy support as to ensure ethnic right on jungal-jal- jamin (Forest, water and land). And subsequently, the 3rd position has been occupied by enterprise development. A comprehensive drive and social development in these areas, suffering from uncertainty of livelihood, could ensure the proper and sustainable livelihood generation through peoples' participation.

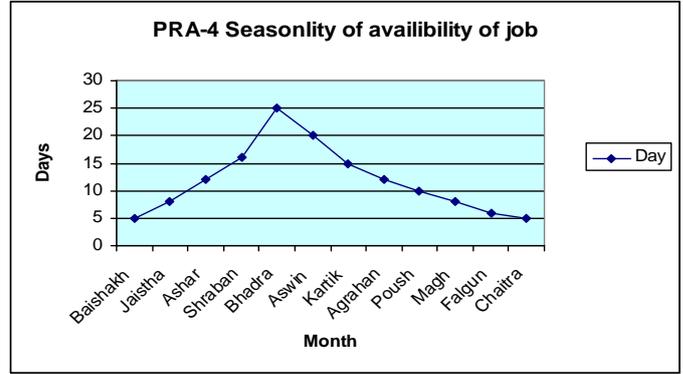


PRA-3: Seasonality Graph drawn by villagers on Wage

PRA-3 Present the seasonality of wage of both the male and female populace of the village Joradi. The participatory delineation depicts that there is no such difference in wage between male and female agricultural labourers. The wage is as high as Rs. 150 (female and 160(male in the month of Baishakh and Jaistha and as low as Rs. 50 (female) and Rs. 80 (male) in the month od Ashar to Aswin.

Revelation: The high rate of wage in of Baishakh and Jaistha is not due to demand from Agriculture from their own villages. It is due to migration that would help them eke out better in other district in the form of construction worker. There is no such migration of the village during the month of Aswin to Kartik, when the land demands tilling operation and sowing of mustard and wheat for generating a demand for labour there itself in the village.

PRA-4 seasonality of job availability in the village Joradi

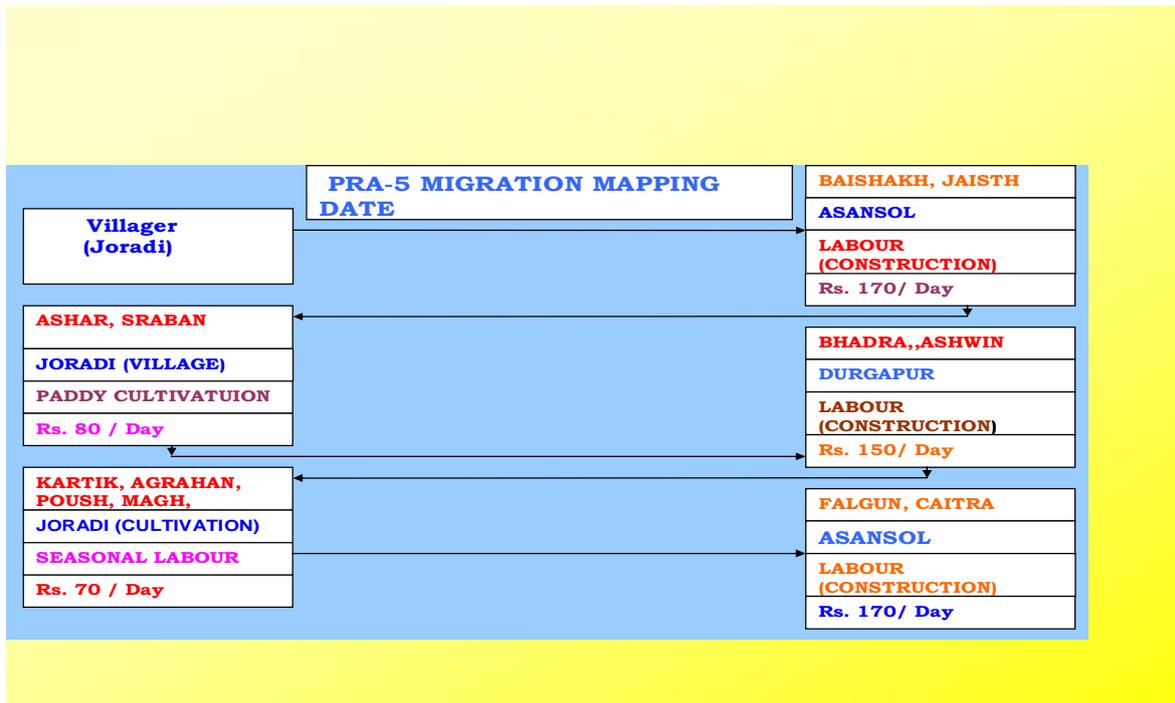


PRA-4 Present the seasonality of job availability of the Joradi villagers

It has been found that Baisakh is the month when rural people are getting almost month wise job and there after, it keeps slanting down Baisakh is the month worst for the availability of job. Agrahan poush Magh are the months when there is trend for declining demand for labour.

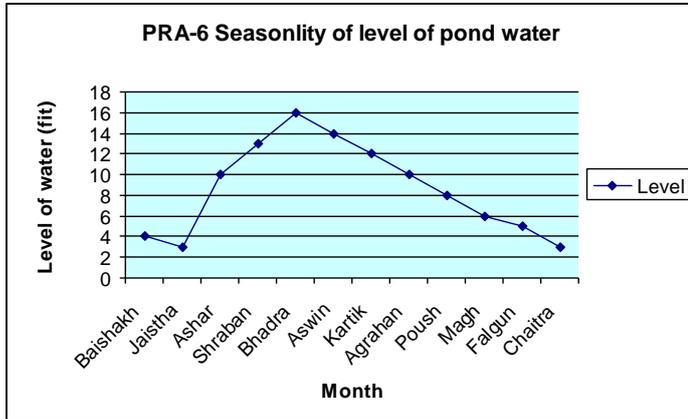
Revelation: The villagers are getting job for a span which is covering a few months only. And this has really conceded a barrier to change towards sustainable livelihood generation.

PRA- 5 Migration Mapping : Spatial Movement of Farm Labourer fro Joradi Village



PRA-5 Bhadra (Sept) is the month when the villagers are getting job almost throughout the month. This is not in their own village supported by their own performing farming system. This is due to a migration out of the village and in an ex-situ social system, may be in Asonsol and Durgapur or in neighbouring districts of Bardhaman. Migration invites a mix of occupation and culture, experience and learning beyond the depleting homophile monotony.

PRA-6 Seasonality of pond water



PRA-6 presents the seasonality of the level of pond water. The ponds of the village maintain a maximum of 16 fit width depths of water in the month of Bhadra (September) and Aswin. It is the minimum in the month of Chaitra, Baisakh and it plunges below 5 fit, to leave a water crisis, both for crop and livestock.

Revelation

Rain water harvesting and creation of seepage tank could go a long way in providing water during the stress period for crop, human being and livestock.

PRA-7 presents the seasonality of crop enterprise in medium land situation. These land situations are supportive to the following enterprises. The vegetable are grown during the month of Falgun to Baishakh; paddy grows between months of Ashar to Aswin wheat mustard (mixed cropping occupy the land from the end of Aswin to end of Magh. So, No. of crop over the season are not less but fluctuating nature of yield is really a problem and represents a true CDR (Complex, Diverse and Risk prone) farming system.

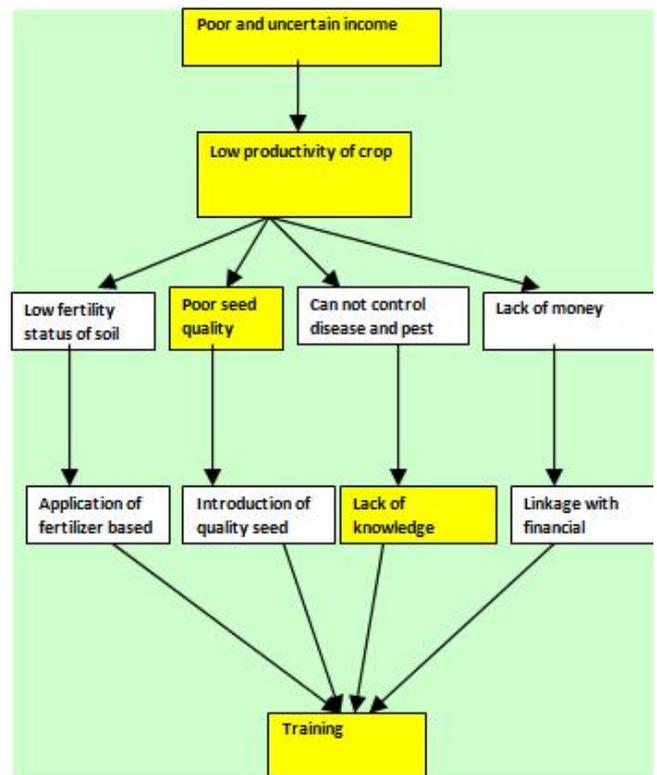
PRA-7 Seasonality diagram medium Land



PRA-8 Pie Chart on problem of paddy

PRA-8 Presents the problem of paddy cultivation standing as a barrier to achieve the higher yield as well as quality. Hundred of respondents that rank the problems are as follows : water problem (20 per cent) , Disease and pest (20 per cent) , soil fertility (20 per cent) , quality seed problem (10 per cent) , poor purchasing capacity of fertilizer (10 percent), technology (10 per cent) , transport (5 per cent) and lack of proper technology (5 per cent). So, it is elicited that the problem of soil, water and insect pest that are contributing a huge 60 per cent in this village. So better soil management, adequate water supply, training on crop protection, technology shall be the eminent interventions to readdress the problems and usher the sustainability of the farming system being operated by the villagers.

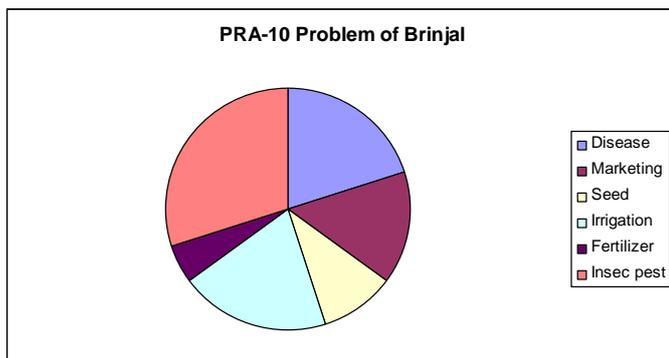
PRA-9 Causal diagram of problem: Low productivity of crop



PRA-9 Problem-cause Diagram : The Flow Analysis

The village Joradi has been reeling under the problem of low productivity of different crops. The secondary problem, as identified by the key informants, causing low productivity is: Low Fertility Status of the Soil, Poor seed Quality, Lack of Skill on Disease-pest Control and Lack of Money to render yeomen services. The secondary causes are generated from the primary causes, are: Lack of Soil Testing, Lack of Quality Seed, Lack of Knowledge and Poor Linkage with Financial Organization and impacting on the low productivity. The subsequent performance, has led to the final consequences is poor & uncertain income. Training has come out ultimately the most critical intervention towards mitigating the problem right at this moment.

PRA-10 Problem of Brinjal



The PRA- 10 Presents the problems of brinjal as perceived by the villagers of Joradi. The quality responses have been quantified and presented through a pie chart. The participating key informants of the deta generation process had been Sunil Murmu & Bhim Murmu. As usual of all the problems (30 per cent) are occurring in insect Pest form (20 per cent) are disease problem. So, (50 per cent) of all the problem are emanating in the form of plant protection problem. These problems of Brinjal have turned worst with the cognate problem, unavailability of ability of quality seed. So, problem of plant protection and associated problem of quality seed have amounted to (60 per cent) of all problems. Then, this problem has turned worst further with the problem of poor purchasing capability, especially for fertilizer and PPC. The other problems are marketing and lack of irrigation facility.

Revelation: So the following chains of problem have been logically levelt up by the key informant.

PRA-11 Time trend analysis on livelihood change

Year	Agriculture (%)	A.H. (%)	Fishery (%)	Poultry (%)	Piggry %
1960	85	12	1	1	1
1970	75=10	17	4	3	1
1980	70	20	3	5	2
1990	65	21	6	5	3
2000	60	20	10	5	5

Participant Date: 14.05.10

Agit Murmu, Sunil Murmu Duration: 50 Min

PRA -11 presents the time trend analysis on livelihood change over the decades. Now it has been found that given the total livelihood of a village amounts to (100 per cent), the following decadal changes are conspicuous. From 1960 to 2000, the livelihoods generated from agriculture have been reduced to from (85 per cent) to (60 per cent). The livelihoods generating from animal husbandry have increased in 1960 from (12 per cent) to (20 per cent) in 2000. The livelihood coming from fishery has substantially increased from a small (1 per cent) in 1960 to a sizable (10 per cent) in 2000. Both for poultry and piggery the changes are from (1 per cent) in 1960 to (5 per cent) in 2000.

Revelation: So, the trend is becoming more conspicuous, that is proportion from agriculture in livelihood generation is gradually reducing and that from animal husbandry and fishery are increasing. The two other enterprises, poultry and piggery are, going to occupy prominent position.

A- 12 Social Map village of Jordi



PRA-12 presents the social map of the village Bundla : The social map of Bundla is presenting the social- institutional and resource features of the villagers. The space analysis has been done to present the relative positions and access character of different resource and social privileges. The house are displayed in terms of social and economic categorization done by them. The communication network through village roads and connectivity present the pattern of humane interaction too.

Conclusion

The whole world is suffering from both the economic and food recession. The countries from Asian and African continents are the worst sufferers. The world agriculture shows a gradual decline in growth over the last decade. Every year, forty million people are joining the valley of hunger, poverty and silence. With hunger goes surging up, the problem of livelihood lays the foundation for such a blistering crisis. Livelihood must be sustainable, decent and secure. The predictor variables in this study have been: Age(X1), Education (X2), Family Size (X3), Family Member Adult (X4), Functional Educational Strata (X5), Cropping Intensity (X6), Irrigation Status (X7), Animal Enterprise Intensity (X8), Nutrition(X9), Holding Size (X10), Income (X11), Seed Type (X12), Spacing % (X13), Value of the source of material (X14), Fertilizer application (X15), Organic Manure Application (X16), Irrigation Status (X17), Pesticide

Application (X18), Fungicide Application (X19), Credit Access (X20), Yield Level (X21), Communication Status (X22) and the set of predicted variable here has been: Irrigation Status.(Y7), having the sub predicted variables Wage (Y1), Man days (Y2), Level of Decency (Y3), Livelihood Security(Y4), Food Intake Volume g/day/head (Y5) and Health Hazard (Y6). Coefficient of Correlation (r) study identified the following variables contributing significantly towards characterizing the sustainable livelihood: Holding Size (X10), Value of the source of material (X14), Fertilizer application (X15), Organic Manure Application (X16), Pesticide Application (X18), Fungicide Application (X19), Yield Level(X21). In any rural marginal economy as sustained by the poor farmers, family size has got stupendous impact on livelihood generation or livelihood consumption. The negative value of direct effect indicated that sustainable livelihood can well be estimated by the small sized family. When family size gone smaller, the stress and risk to reel under punitive poverty will be reduced. One of the reasons why sustainable livelihood could not be attained is that the soaring population contributed by high family size of the rural families has distorted the scope for assuring a better economy for them. Subsequent to it, holding size, has recorded the second highest direct effect on sustainable livelihood. Holding size is a resource parameter and possibly is the most important parameter to support any kind of livelihood. The holding size of a rural family is both the direct and indirect predictor of income, wage, owner of expected yield and a negotiator in the labour market too. Quite logically, it has recorded a substantive and direct impact on sustainable livelihood. The variable fungicide application has routed the highest indirect effect of as many as 8 variables to characterize the behaviour of the consequent variable sustainable livelihood. Sustainable livelihood is a composite disposition of livelihood, interactions and componential interdependency amongst and between different sub predictors. Livelihood is both the economic means and the social status. Livelihood combined production relation and social interaction.

These villages, Bundla, Joradi and the likes in Purulia are having some transformations in different agrarian enterprises towards generating, distributing, and accessing livelihoods. The PRA results have become a splendid example on how to estimate and rate the rural peoples attributes, choices, seasonality and migratory nature of livelihood based on their perceived realities. Future study should incorporate not only the sustainability aspects of livelihood, but also the changed dynamics of livelihood. The other dimensions of livelihood like gender, ethics, human rights, policies, migration, livelihood-forecasting in terms of demand and market, negotiation, spatiality etc. can be put under deeper insights through a comprehensive analysis, and there from, keeps characterizing the conventional framework of sustainable livelihood analysis.

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