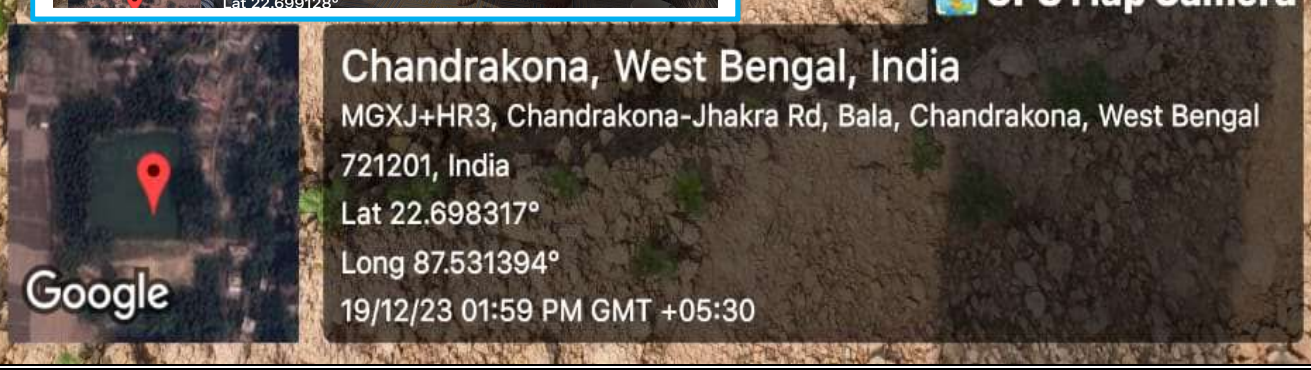
CHANDRAKONA VIDYASAGAR MAHAVIDYALAYA

A Project Report on

CROP SUITABILITY ANALYSIS AND IT'S SOCIO - ECONOMIC IMPACTS : A CASE STUDY OF KUAPUR GRAMPANCHYET OF CHANDRAKONA BLOCK II

Funded By College Authority (Chandrakona Vidyasagar Mahavidyalaya) Affiliated to Vidyasagar University



PREFACE

Since ancient time the main aim of Geography is to understand man – Environment relationship. But being an interdisciplinary nature of Geography. Now it related various field of applied science. Beside this if we look the evolution of the scope and contain of Geography, We show in 1960th decade Geography faced quantitative revolution and criticism against behavioural geography and humanistic geography were emerged. So, to know the socio – economic status of human society and its determinate is a major part of Geography study.

Field Survey is an important tool to know the actual condition of various aspect of an area. Because the surveyor involves collection of various Primary and secondary data about demography, relief, drainage, climate and other components of the area. After collection of these days data classification, tabulation, diagrammatic representation analysis and interpretation were done. So, field Survey a very necessary to the student of geography.

A field survey was conducted by the student of Geography Semester 5th (Hons.) in Kuapur Grampanchyet of Chandrakona Block - II to know the Crop suitability and it's Socio-Economic impacts.

The present study on crop suitability analysis is a prerequisite for achieving optimum utilization of the available land resources for sustainable agricultural production. To assess the suitability of crop type for a particular land area, at least five parameters are considered, i.e., physical properties of soil, chemical properties of soil, groundwater availability, irrigation status and climatic condition. The present study area is Kuapur Grampanchyet of Chandrakona Block II of Paschim Medinipur District in West Bengal. The lowland part of the study area and the river basin are most suitable for cultivation of paddy, vegetables, potato and some other crops. It was found that better land-use management could be applied in different land components as the conventional land assessment techniques agonize from the limitation of same cropping technique though it is suitable for different crops.

Acknowledgement

To conduct this project successfully, we are thankful to many of the concerned people. Among them, firstly we would like to express our sincere gratitude to the authority of this college for their support. We are grateful to all the faculty members of our department and college for the help rendered to us in the course of our project work. We give special thanks to the all of the students of 5th Semester (2023-2024) in the Department of Geography of our college for their active performance during fieldwork and post field works.

Official staff of the local authority along with local residents helped us by providing maps, relevant documents and information.

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CAPTER -1 (Introduction)

INTRODUCTION :-

One of the most important and urgent problems in India is to improve agricultural land management and cropping patterns to develop regional strategies and programs aimed at increasing agricultural production together with the efficient use of land resources. The information on the spatial distribution and suitability of various types of soils to various types of crops is crucial for planners and agricultural scientists to initiate and encourage farmers to practice cropping systems based on soil potentiality to its suitability based on soil characteristics, climate, topography, and water availability have been evaluated for the most important categories of information required for judging land suitability for production by using RS & GIS techniques on Kuapur Grampanchyet of Chandrakona –II block in Paschim Medinipur of West Bengal in India.

BACKGROUND OF THE STUDY AREA:-

In view of the day after day increasing rate of the population one effort to increase the agricultural population i.e. the important national task in order to feed the growing the population. So fulfilling the requirement planning is must be required based on various information related to agriculture.

Having seen the agriculture of the Kuapur Grampanchyet on Chandrakona Block - II it is found that the people of this area are depended mainly on agriculture. The economic condition is medium. The agricultural field of this area is used in Kharif & Rabi season for paddy, Sesame/Tils, vegetation wheat potato.

OBJECTIVES OF THE STUDY:-

1. In the present study, an attempt was made to investigate the relation between land use and socio-economic status.
2. It also focuses on the fact that traditional agriculture practice degrades the land capability and causes deforestation.

3. It also describes the problems and remedies while handling the multidisciplinary data covering a large area in a geo-spatial environment.
4. To propose a suitable area for a different crop.

METHODOLOGY OF THE PRESENT WORK:-

To achieve the above-mentioned objectives, the research works have been carried according to the following methods.

Pre Field Methods

This phase is characterized by collection of primary ideas about the study areas. Therefore, the data collected form

- Kuapur Gram Panchayet Map and Name of the Mouza falls under the Kuapur Gram Panchayet along with mouza map from Kuapur Gram Panchayet Office.
- Amount of Production of different crops for the last five production years from Krishi Bhavan, Districts Agricultural Head Office, Paschim Medinipur.
- Preparation of Questionnaire on the basis of object.
- Pilot survey was done in this stage.

Works in the Field for Primary Data Collection

This phase of the work consists of field observations and measurements. Following works were done in the field.

- Socio – economic and Demographic data were collected through random sampling.
- Collected Meteorological data for the year 2013 to 2023 from Rural Agricultural Development Office S.A.R.F, Khirpai, Paschim Medinipur.
- Through GPS receiver information of Latitude and longitude were collected from different point
- Also collected soil sample in different village from different part of agricultural field for measurement of Physical properties (Soil Structure and Soil texture) and Chemical properties (PH, Nitrogen etc.)
- Sketches were drawn in the field and photographs were taken.

Post Field Works for Analysis and Interpretation of Data

This phase of the work involves the analysis and interpretation of the collected data from the field and from the secondary sources.

LITERATURE REVIEW

- In the year 1998, from the United graduate school of agriculture science on 20th March F. Perveen, R. Nagasawa, MD. Uddin and K.M. Delowar analyses cropland suitability (Ref.1) in the following manner –one of the most important and urgent problems in Bangladesh is to improve agricultural and management and cropping pattern increase the agricultural production with efficient use of land resources. In Bangladesh, agriculture is the mainstay of the economy and rice is the major food but the production is very low. In particular, the rice production of Bangladesh does not meet the demands due to its rapidly growing population. The study was carried out in Haripur Upazila, Thakurgaon district of the north-west part of Bangladesh. Relevant biophysical variables of soil and topography were considered for suitability analysis. All data were stored in Arc GIS9.0 environment and the factors maps were generated. For Multi-Criteria Evaluation (MCE), pairwise comparison matrix known as Analytical Hierarchy Process (AHP) was applied and the suitable areas for rice crop were identified. This research provided information at the local level that could be used by farmers to select patterns and suitability.

- A.A.Mustafa, Man Sing, R.N.Sahoo, Nayan Ahmed, Manoj Khanna, A. Sarangi and A.K. Mishra assessing the land suitability analysis for different crops. A multi-criteria decision making Approach using Remote sensing and GIS (Ref2). Land evaluation procedures are given by FAO for soil site suitability for different crops and for generating cropping pattern for Kharif (summer) and Ravi(winter) season in Kheragarh tehsil of Agra. The database

on soil, clause & land cover was generated from data derived from IRS-P6 remote sensing satellite and soil survey to perform an integrated analysis in the geographic information system environment. agriculture and nonagriculture lands were delineated using the Decision Tree Classifier (DTC) and non-agriculture areas were masked for removal from future analysis. Different soil chemical parameter and physical parameter were evaluated for a different crop. Results indicated that about 55% is highly suitable for sugarcane and 60%, 54% and 48% of the area are moderately suitable for cultivation pearl millet, mustard, and rice respectively. 50% of the area is found to be marginally suitable for growing maize. It was also found that better land use option could be implemented in different land units as the conventional land evaluation methods suffer from the limitation of spatial analysis for the suitability of various crops.

- S. Rasheed and K. Venugopal assessing land suitability for selected crops in Vellore districts based on agro-ecological characterization in the year 13 April 2009 (Ref.3). Planning based on agroecological zoning aims at scientific management of regional resources to meet the food, fiber, fodder, and fuelwood requirements without adversely affecting the status of natural resources and Crop Suitability Analysis In Garbeta-I, II, & III Block, West Medinipur District Using Remote Sensing And GIS Technique 2019 16 environment. An attempt has been made to map the agro-ecological units for Vellore district of Tamil Nadu and derives the crop zone map for the four major crops namely. Paddy, sugarcane, groundnut, and millets. The agro-ecological unit map was generated by overlaying the agroedaphic and agro-climatic map layers in GIS. The agro-land suitability map was generated by matching the crop requirement details with the land qualities. The results of the suitability evaluation, when compared with the current land use statistics of these crops showed that area cultivated is less than the area suitable for these crops.

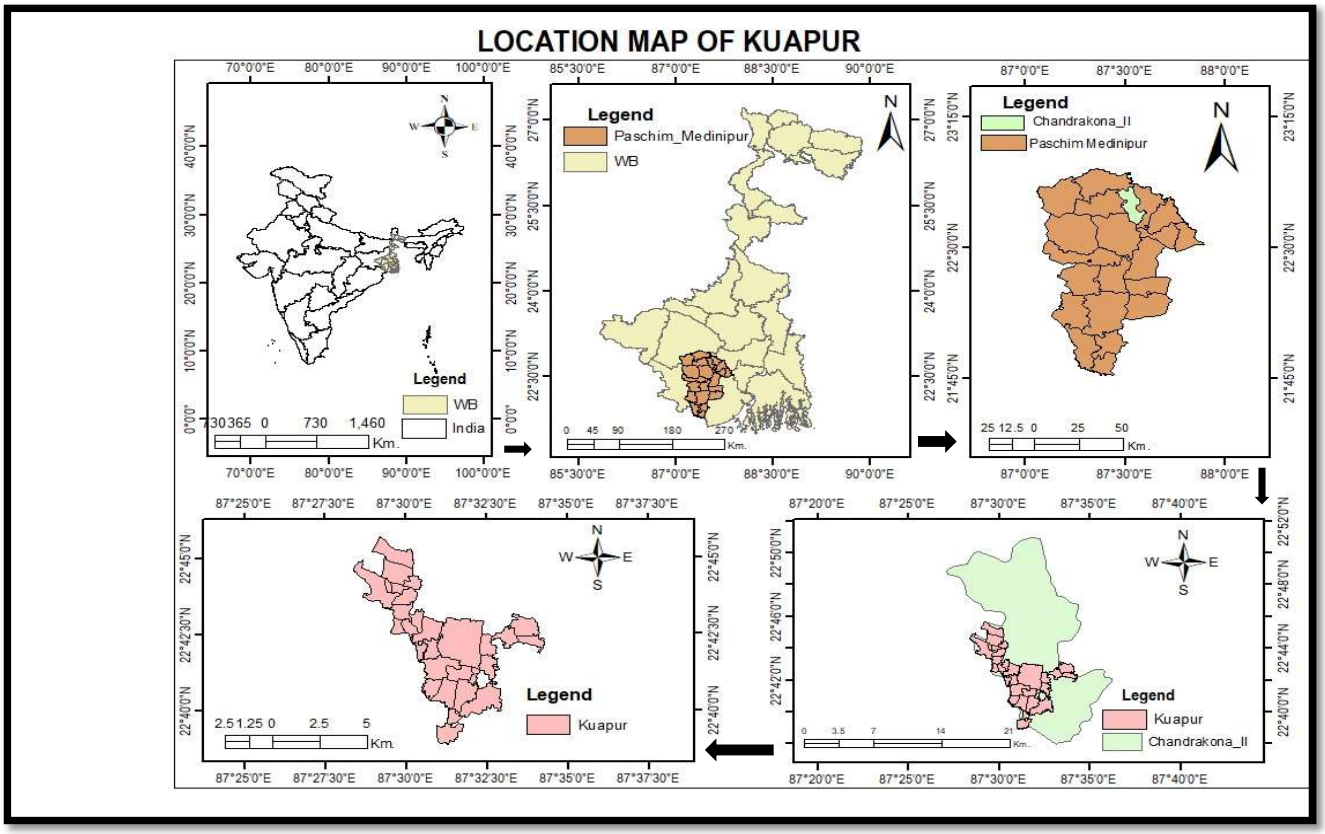
- On crop suitability a paper is published by jaded Chandra holder, Dept. of Geography, University of Calcutta, analysis cropland suitability in the following manner(Ref.4). The present study is a qualitative evaluation of land to determine land suitability in Ghatal block, Paschim Medinipur district, West Bengal for rice and wheat cultivation based on four pedological variables, like Nitrogen-potassium(NPK) status, soil reaction(PH), organic carbon(OC) and soil texture that area mandatory input factors for crop cultivation. All these factors have been rated based upon the proposed method of Sys et (1993). The qualitative approach given by FOA (1976) has also been used to classify the land on the basis of their suitability ranked classes. This study proposes an integrated methodology for analysis and mapping of land suitability using the remote sensing & GIS techniques. The result indicated that only 12.71% of agricultural land can be demarcated as highly suitable for rice cultivation whereas 7.78% of agricultural land as highly suitable for wheat cultivation in the study area.

- Samuel W. Kamau and David Kuria and M.K. Gachari analyzed the cropland suitability in Nayantara country, Kenya (Ref.5). the aim of this research was to identify and delineate the land that can support potatoes. Using GIS-based multicriteria evaluation technique and Remote Sensing. This was carried out in Nayantara country, Kenya. Agriculture is the mainstay of the local economy in the study area, but the production is very low because some of the crops being introduced are not doing well. There is a need therefore to delineate suitable areas for growing various crops to achieve maximum potential yield. An analytical hierarchical process (AHP) was used to determine the relative importance of criteria and the resulting weights were used to construct the suitability maps using GIS software. The results of this research revealed that in the study area, 37.6% of the agricultural land is highly suitable for potato cultivation, 51.5% is moderated suitable and 10.9% is marginally suitable. The results can be used by the country government to advise the local farmers on suitable areas for potato cultivation.

CHAPTER – 2 (Physical Condition of the study area)

LOCATION OF THE STUDY AREA:-

The Kuapur grampanchyet of Chandrakona - II block of Paschim Medinipur district of West Bengal state, India, lies between 87°28′19′′ to 87°34′15′′ east longitude & 22˚45′43′′ to 22˚38′53′′ north latitude on the globe. Kuapur Grampanchyet is surrounded by Chandrakona-1 block towards east, Keshpur block towards South, Garbeta – 3 block towards West, Salbani block towards west. Medinipur, Arambagh, Kharagpur, Tarakeswar are the nearby Cities to Kuapur Grampanchyet. This place is in the border of the Medinipur west district and Hooghly District. The study area mainly consisting mainly of one river i.e. Shilabati. The study area has a tropical monsoon climate. The mean annual rainfall ranges between 200 to 300 mm which is concentrated in the months of June-September. The mean annual temperature is about 29°c. The soil properties are mostly strongly to slightly acidic with pH from 5.13 to 7.66 with poor to imperfect drainage. The hydrology conditions are quite suitable for agricultural practice.



PHYSICAL CONDITION:-

The physical characteristics of the study area related to this component.

1. **Relief/topography:-**

   The three-block situated at the lower genetic plain. Here average elevation is 47 mt.

2. **Geology:-**

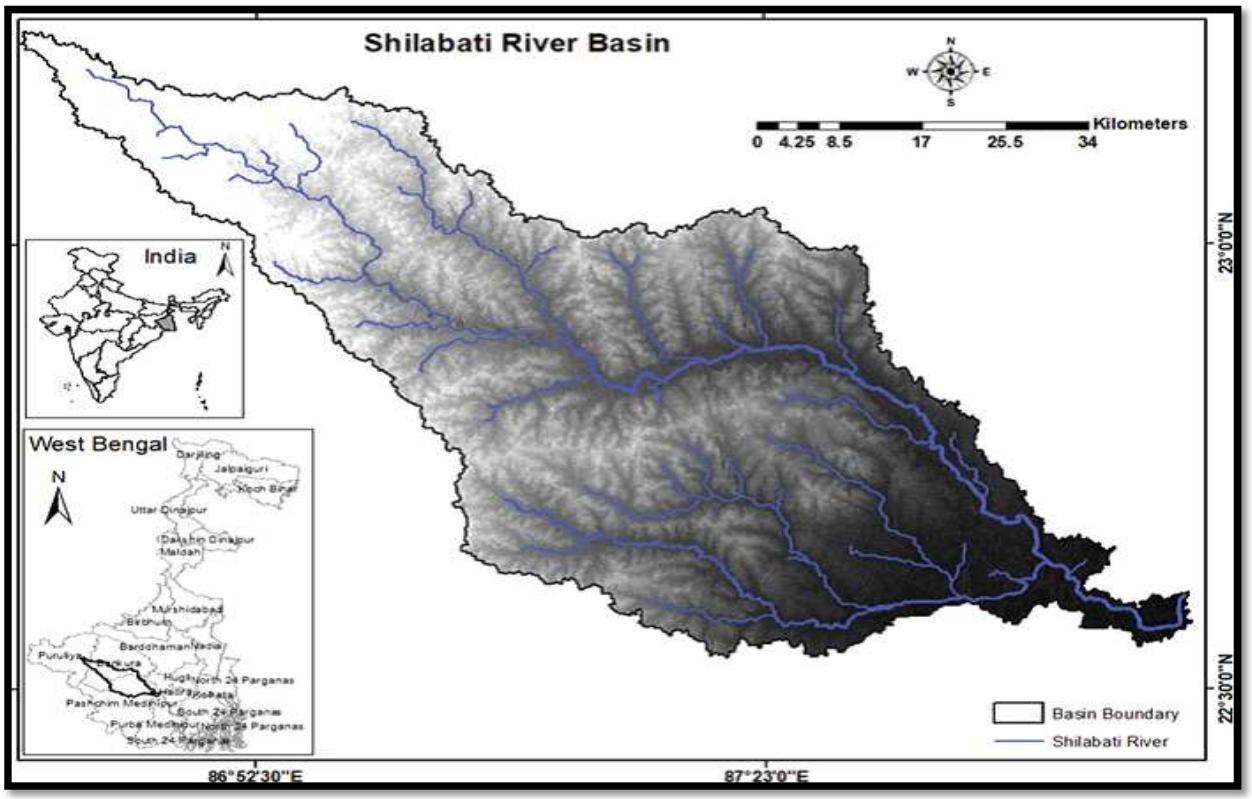
   Kuapur Grampanchyet have 27 Villages different geological soil status. 1. Course loamy typic hap-ustalfs 2. Fine loamy topic ustochrepts 3. Fine loamy ultic paleustalfs 4. Fine vertical ochraquqlfs.

3. **Ground Water:-**

   Groundwater is an important factor for crop suitability and productivity. The study area is a part of the Ganga plateau, water availability is high as surface runoff is low, so the infiltration rate is also very high. So groundwater potentiality is very high except in the dry season. In the study area, the pre-monsoon and post-monsoon averages of groundwater level are 4.89 and 12.32mt. Respectively. Groundwater potential zone (pre-monsoon) and groundwater potentiality map of the study area, respectively.

4. **Drainage of the study area:-**

   The study area has a good network of the drainage system, having a rather high drainage density. The drainage map of the study area is shown in (Fig.). The river of the study area is Shilabati Rivers is spread over the study area. There few of canals which are most important for agricultural purpose. But few mouza of the study area is using the river water for irrigation.



5. Climate of the study area:-

The study area has a tropical monsoon climate, hot summer, and well distributed normal rainfall. The year divided into four seasons. The cold seasons starts about the middle of December and continues till the end of February and summer and summer which extended up-to may. The south-west monsoon season continuous up-to the end of September. October & the first half of November is the post-monsoon season. The rainfall and temperature condition of the study area is shown in.

5.1 Temperature:-

The temperature rapidly rises about from early March. May is the hottest month with a mean daily Temperature of 31.6°C. The mean annual Temperature is about 25° C. The Temperature rapidly decreases appreciably January; the mean Temperature is about 16°C. January is the coldest month of the year.

5.2 Rainfall:-

The average annual rainfall 250 to 300 mm. Rainfall decreases hot and cold weather. A considerable amount of monsoon rainfall occurs in association with the movement of cyclonic depression from the Bay of Bengal. It rains heavily from June to September.

Distribution of Temperature and Rainfall

S.A.R.F Khirpai, Paschim Medinipur 2014 to 2023 (in cm)

2014					***2015***				
Sl. No	Name of Month	Maximum Temparature in °C	Minimum Temparature in °C	Rain Fall mm	Sl. No	Name of Month	Maximum Temparature in °C	Minimum Temparature in °C	Rain Fall mm
1	January	23.3	12.6	0	1	January	25.3	12.9	10.6
2	February	27.1	15.8	44.6	2	February	28.3	16.8	16
3	March	32.3	20.9	21.2	3	March	32.4	20.8	21.8
4	April	37.2	25.4	25	4	April	33.9	24.3	87.2
5	May	39	26.6	110.8	5	May	36.4	27.3	119.8
6	June	34.9	27.5	195.4	6	June	34.4	27	134
7	July	30.8	26.5	200.2	7	July	31.7	25.9	742.4
8	August	32.1	27.1	429.4	8	August	32.6	27.3	259.2
9	September	32.23	26.4	178.4	9	September	33.1	26.7	224.6
10	October	30.2	23.9	92	10	October	32.7	24.3	8.2
11	November	28.3	18.6	0	11	November	30.6	19.6	0
12	December	25.5	13.1	0	12	December	25.8	16.5	14.6

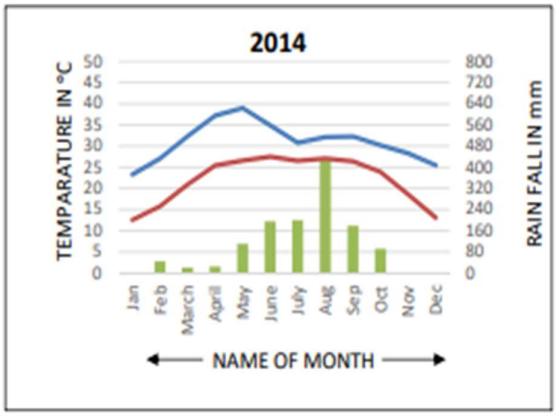
2016					***2017***				
Sl. No	Name of Month	Maximum Temparature in °C	Minimum Temparature in °C	Rain Fall mm	Sl. No	Name of Month	Maximum Temparature in °C	Minimum Temparature in °C	Rain Fall mm
1	Jan	25.5	13.8	54.4	1	Jan	25.3	12.02	0
2	Feb	29.4	19.7	26.2	2	Feb	29.3	16.4	0
3	March	33.1	23.4	97	3	March	32	20.8	38
4	April	38.2	26.8	0	4	April	35.7	26.3	38.6
5	May	36.7	25.7	122.8	5	May	36.7	25.3	141.2
6	June	34.3	26.9	128.6	6	June	35.5	26.9	162.8
7	July	31.8	26.9	266.4	7	July	31.7	24.4	702.6
8	Aug	32.3	27.2	439.8	8	Aug	31.3	26.9	340.4
9	Sep	32.2	26.8	237	9	Sep	31.5	27.3	126.6
10	Oct	31.6	24	40.6	10	Oct	31.5	24.9	160.6
11	Nov	29.6	18.1	0	11	Nov	30	18.2	23.2
12	Dec	26.4	14.3	0	12	Dec	28.4	13.3	14.4

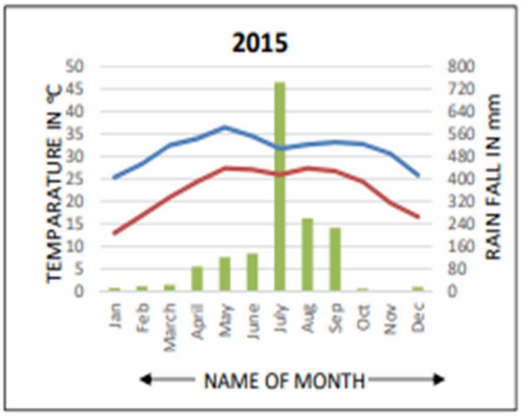
2018					2019				
Sl. No	Name of Month	Maximum Temparature in °C	Minimum Temparature in °C	Rain Fall mm	Sl. No	Name of Month	Maximum Temparature in °C	Minimum Temparature in °C	Rain Fall mm
1	Jan	23.4	10.8	0	1	Jan	24.05	13.3	0
2	Feb	28.8	16.5	0	2	Feb	28.7	15.4	60
3	March	34.8	22.7	0.6	3	March	33.1	21.3	38.2
4	April	39	26.7	81.4	4	April	33.92	23.92	65.4
5	May	34.4	26.3	102.4	5	May	36	26.2	111.6
6	June	35.6	27.3	184.2	6	June	33.9	26.4	129.6
7	July	32.8	26.9	247.8	7	July	32.8	26.8	151.8
8	Aug	32.8	27.1	156.6	8	Aug	31.7	26.5	274
9	Sep	32.4	26.6	123	9	Sep	31.3	25.9	271.4
10	Oct	31.3	24.5	30.6	10	Oct	33.1	23.9	152.6
11	Nov	32.4	20.4	1.6	11	Nov	30.2	19.2	43.6
12	Dec	25.1	13.4	26.4	12	Dec	25.8	13.6	9

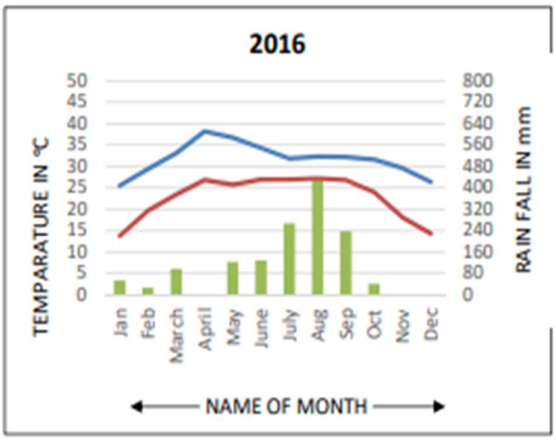
2020					2021				
Sl. No	Name of Month	Maximum Temparature in °C	Minimum Temparature in °C	Rain Fall mm	Sl. No	Name of Month	Maximum Temparature in °C	Minimum Temparature in °C	Rain Fall mm
1	Jan	23.3	13.9	28.2	1	Jan	23.81	12	0
2	Feb	28.7	15.6	7	2	Feb	26.9	15.5	0
3	March	34	21.3	29.6	3	March	34	20.5	0
4	April	35.4	40.1	69.8	4	April	35.9	24.1	0
5	May	37.4	26.3	255.2	5	May	35.9	26.8	317.6
6	June	37.6	28.3	311.4	6	June	33.8	27.6	372.4
7	July	33	26.9	176.4	7	July	32.8	27	532.8
8	Aug	32.8	26.6	258.4	8	Aug	32.3	26.9	170.6
9	Sep	32.8	26.6	57.4	9	Sep	33.3	26.8	517.6
10	Oct	31.2	22.9	79	10	Oct	30.4	24.6	189.8
11	Nov	28.4	15.1	5.2	11	Nov	29.1	17.8	31
12	Dec	25.2	13.7	0	12	Dec	26.7	14.6	121.6

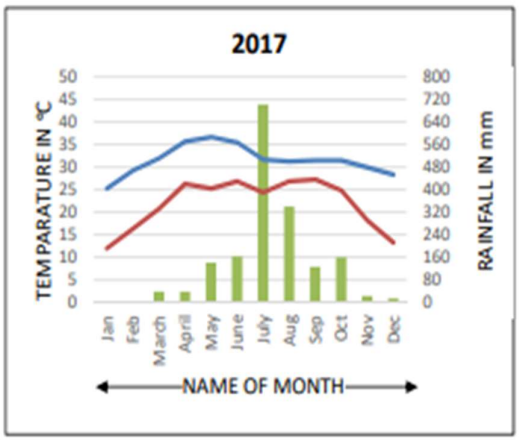
2022					2023				
Sl. No	Name of Month	Maximum Temparature in °C	Minimum Temparature in °C	Rain Fall mm	Sl. No	Name of Month	Maximum Temparature in °C	Minimum Temparature in °C	Rain Fall mm
1	Jan	25.2	11.6	29.4	1	Jan	28.1	13.4	0
2	Feb	28.5	14.1	47.8	2	Feb	35.2	14.9	0
3	March	34.1	18.6	0	3	March	34.5	18.5	43.2
4	April	38	22.9	0	4	April	38.1	23.1	23
5	May	37.5	24.1	165.8	5	May	39.4	24.7	142.6
6	June	35.1	25.1	108.6	6	June	31.8	26.4	82.6
7	July	32.8	24.6	153	7	July	28	26.5	254.4
8	Aug	32.2	24.6	505.2	8	Aug	32.9	28.8	358.3
9	Sep	32.4	24	175.4	9	Sep	32.9	24.1	228.2
10	Oct	31.9	21.9	71	10	Oct	33.3	22.8	159.2
11	Nov	29.6	17.1	0	11	Nov	31	18.9	18.8
12	Dec	26.1	12.5	0	12	Dec	26.6	13.5	40.4

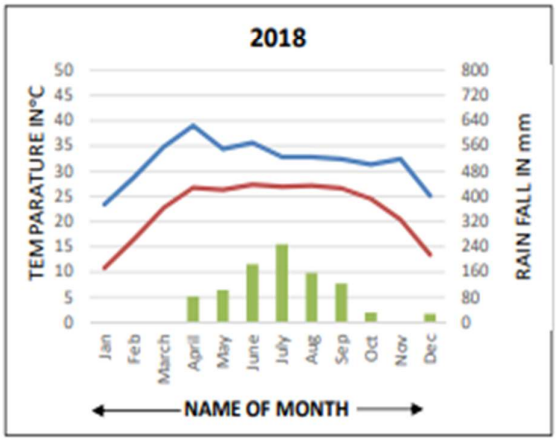
Distribution of Temperature and Rainfall S.A.R.F Khirpai, Paschim Medinipur (2014-2023)

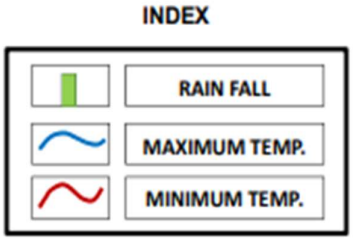






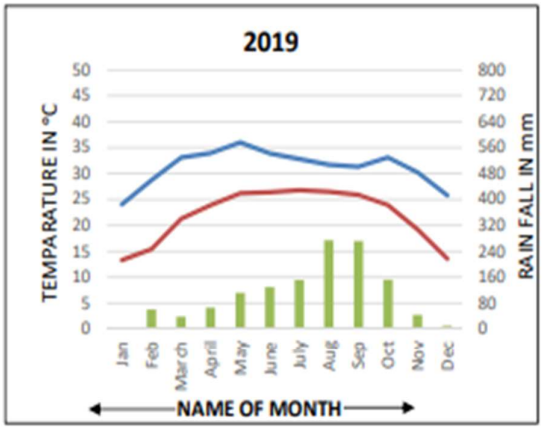


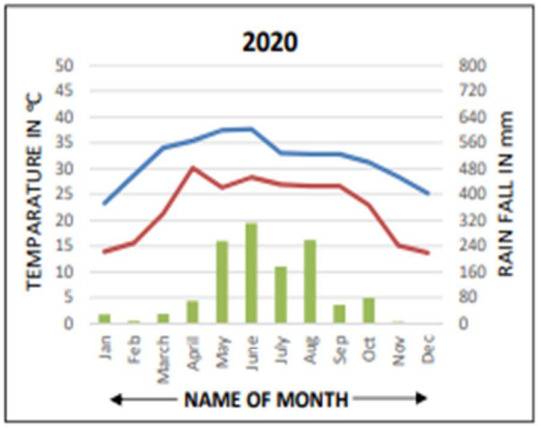


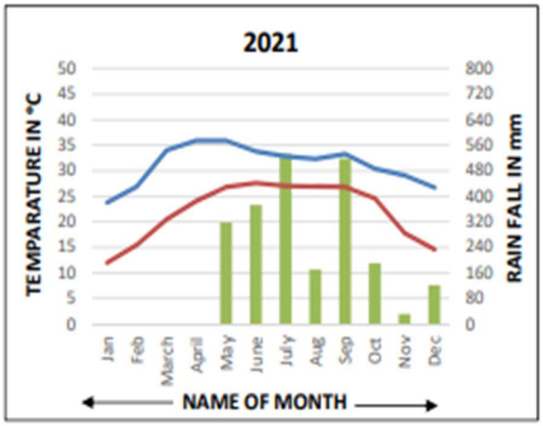


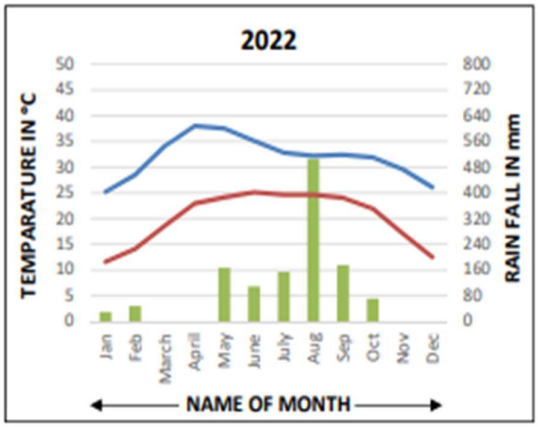
SCALE	HORIZONTAL : 1 cm to 10°C
	VERTICAL : 1cm to 160 mm

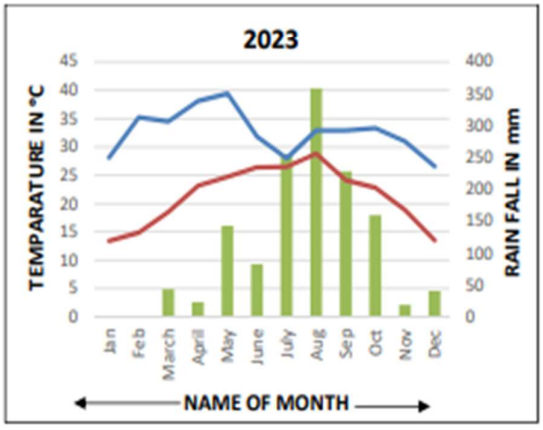
Distribution of Temperature and Rainfall S.A.R.F Khirpai, Paschim Medinipur (2014-2023)

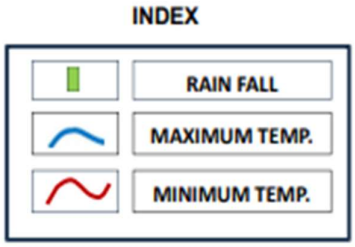








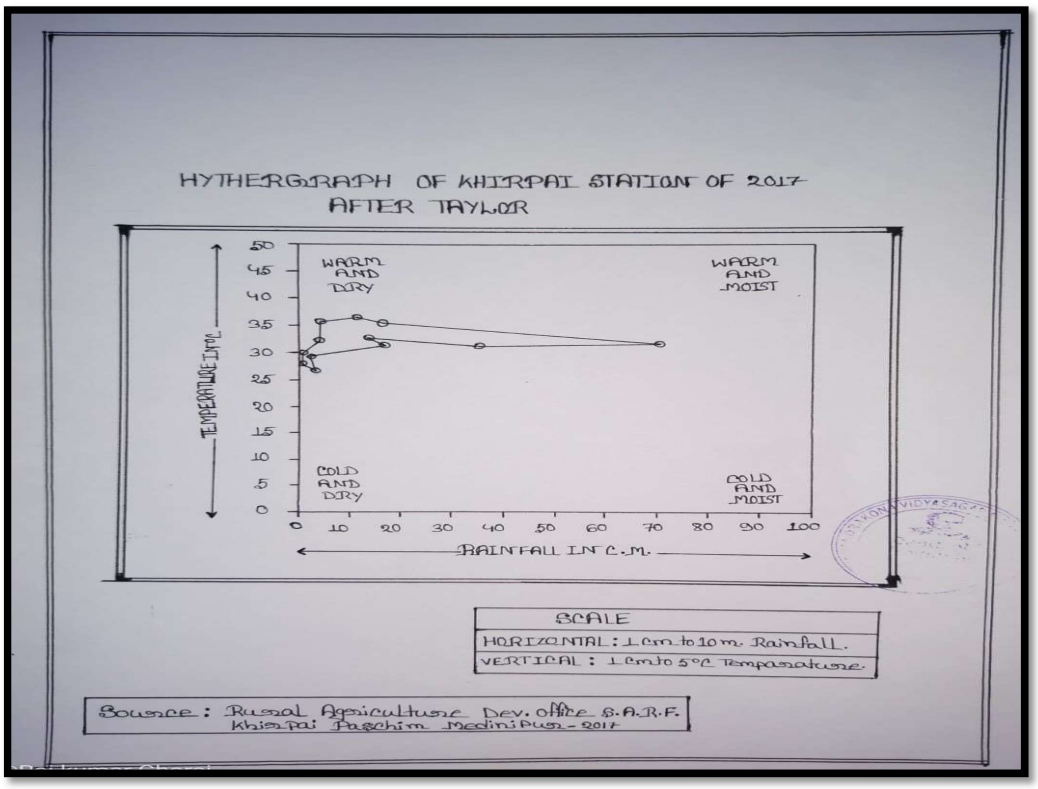




SCALE	HORIZONTAL : 1 cm to 10°C
	VERTICAL : 1cm to 160 mm

5.3 Hythergraph:-

A Hythergraph (Taylor type) has been drawn based on Temperature and Rainfall data of Khirpai station of 2017, which shows the minimum temperature at the month of January and December, and 83.89% of rainfall, occurs between June to September.



CHAPTER – 3 (land suitability cropping and soil status of study area)

Multiple Regression by Stepwise method for production of paddy with fertilizers

Variable	Mean	Std. Deviation	No. of Family (N)
Production_Paddy Quintal / Bigha	**8.4505**	**2.73475**	**64**
Urea Kg / Bigha	**35.9063**	**19.08021**	**64**
Phosphate Kg / Bigha	**18.8750**	**30.56946**	**64**
Potash Kg/ Bigha	**5.8438**	**10.40943**	**64**

Descriptive Statistics

Correlations

		Production Paddy quintal/Bigha	Urea Kg/Bigha	Phosphate Kg/Bigha	Potash Kg/Bigha
Pearson Correlation	Production_Paddy Quintal/Bigha	1.000	0.324	0.131	0.081
	Urea Kg/Bigha	0.324	1.000	- 0.239	- 0.490
	Phosphate Kg/Bigha	0.131	- 0.239	1.000	0.259
	Potash Kg/Bigha	0.081	- 0.490	0.259	1.000
Sig. (1-tailed)	Production_Paddy Quintal/Bigha	0.0	0.005	0.150	0.263
	Urea Kg/Bigha	0.005	0.0	0.028	0.000
	Phosphate Kg/Bigha	0.150	0.028	0.0	0.019
	Potash Kg/Bigha	0.263	0.000	0.019	0.0
N	Production Paddy Quintal/Bigha	64	64	64	64
	Urea Kg/Bigha	64	64	64	64
	Phosphate Kg/Bigha	64	64	64	64
	Potash Kg/Bigha	64	64	64	64

Explanation: weak positive correlation exist among production of paddy with fertilizers.

Variables Entered/Removed [a]

Model	Variables Entered	Variables Removed	Method
1	Urea Kg/Bigha	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	Potash Kg/Bigha	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: Production_Paddy Quintal / Bigha

Stepwise method excluded the variable phosphate fertilizer

Model Summary [c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	df2
1	0.324[a]	0.105	00.090	2.60816	0.105	7.264	1	62
2	0.425[b]	0.180	0.153	2.51621	0.075	5.614	1	61

a. Predictors: (Constant), Urea Kg / Bigha
b. Predictors: (Constant), Urea Kg / Bigha, Potash Kg / Bigha
c. Dependent Variable: Production Paddy Quintal / Bigha

Weak positive connection (R = 0.324) found between production of paddy with urea fertilizers. Capacity for urea fertilizers accounts for just 10% of the diversity in actual paddy production.

Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.784	0.699		9.704	0.000
	Urea Kg / Bigha	0.046	0.017	0.324	2.695	0.009
2	(Constant)	5.506	0.864		6.376	0.000
	Urea Kg / Bigha	0.069	0.019	0.478	3.596	0.001
	Potash Kg / Bigha	0.083	0.035	0.315	2.369	0.021

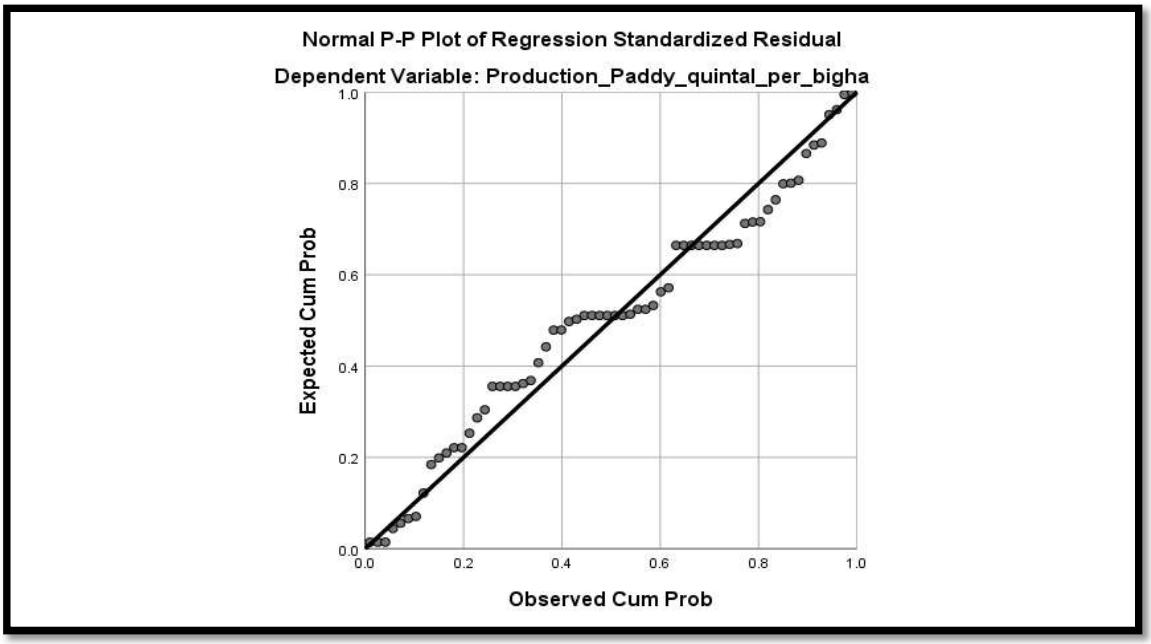
a. Dependent Variable: Production_Paddy Quintal / Bigha

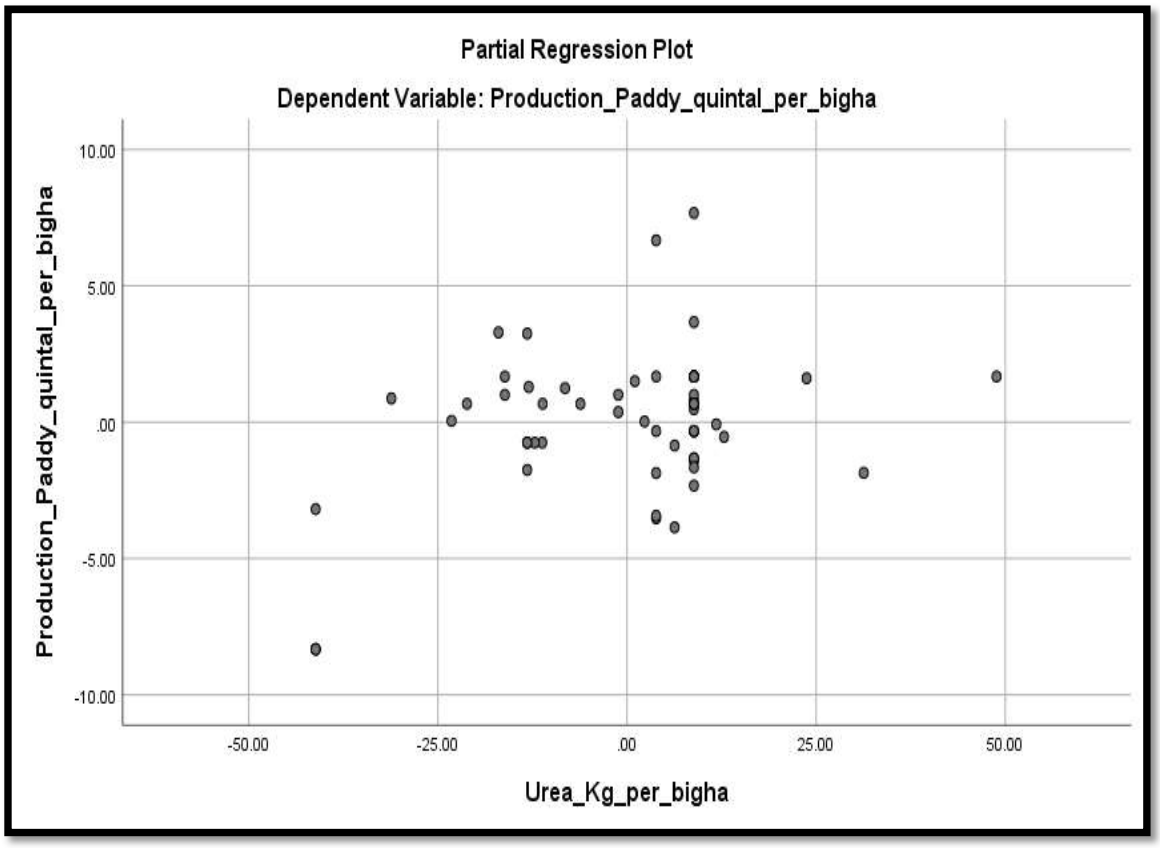
Equation for Multiple Regression $Y = \beta 0 + \beta 1\chi i1 + \beta 2\chi i2 + \beta 3\chi i3 + \ldots\ldots\ldots + \beta n\chi in + \varepsilon i \ldots\ldots (1)$

Here, Y= Villagewise Production of Paddy; β0 =intercept of the regression equation; β1, β2, β3……βn =regression co-efficient; and X1, X2,X3……Xn =independent variables; ε=the regression residual;i=1,2,3,.....n.

Y=5.5064+.069 utilization of Urea in kg per bigha +.083 utilization of Potash in kg per bigha

Therefore, utilization of Potash per bigha is significantly related to Villagewise Production of Paddy at Kuapur GP(Standardized Coefficients .478), followed by utilization of Urea per bigha Standardized Coefficients .315).




Partial Regression Plot
Dependent Variable: Production_Paddy_quintal_per_bigha
Production_Paddy_quintal_per_bigha
10.00
5.00
.00
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-10.00
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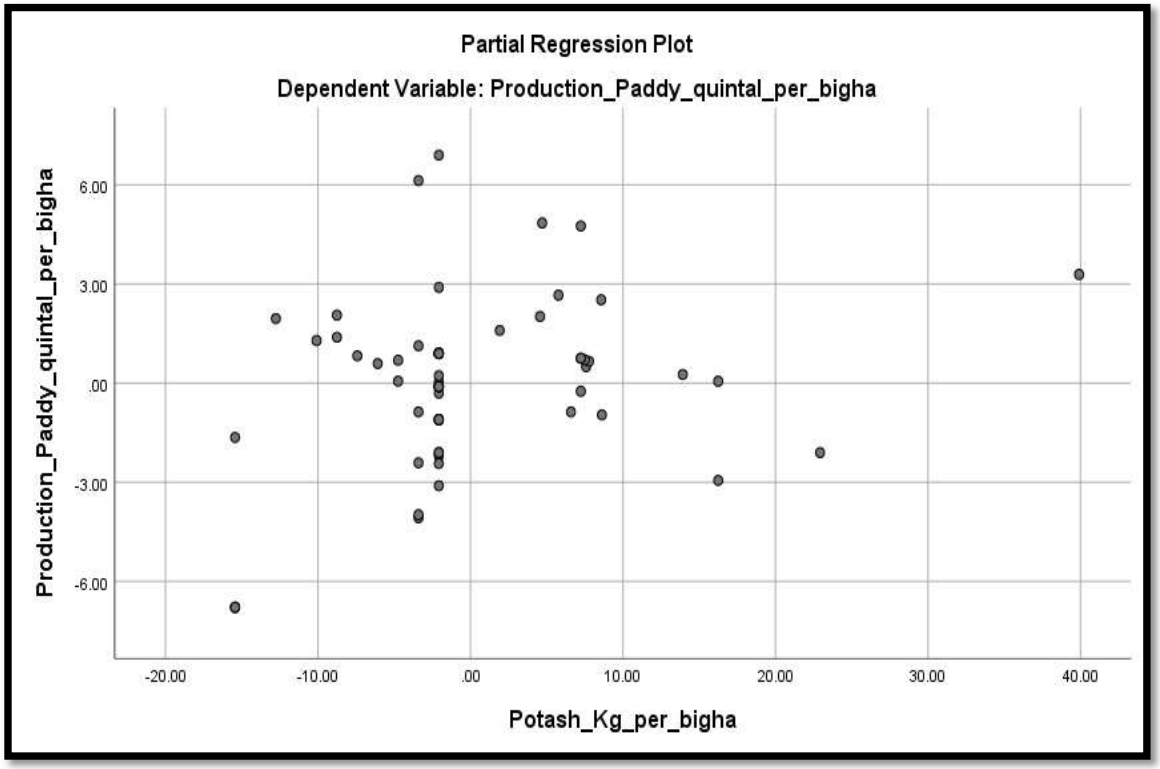
50.00
Urea_Kg_per_bigha


Partial Regression Plot
Dependent Variable: Production_Paddy_quintal_per_bigha
Production_Paddy_quintal_per_bigha
6.00
3.00
.00
-3.00
-6.00
-20.00
-10.00
.00
10.00
20.00
30.00
40.00
Potash_Kg_per_bigha

Multiple Regression by Stepwise method for production of Potato with fertilizers

Descriptive Statistics			
	Mean	Std. Deviation	N
Production_Potato Quintal / Bigha	37.3705	14.31892	64
Urea_Potato Kg / Bigha	97.2656	88.90395	64
Phosphate_Potato Kg / Bigha	97.2656	88.90395	64
Potash_Potato Kg / Bigha	32.2813	40.25296	64

Correlations					
		Production_Potato Quintal / Bigha	Urea_Potato Kg / Bigha	Phosphate_Potato Kg / Bigha	Potash_Potato Kg / Bigha
Pearson Correlation	Production_Potato Quintal / Bigha	1.000	0.299	0.299	-0.122
	Urea_Potato Kg / Bigha	0.299	1.000	1.000	0.232
	Phosphate_Potato Kg / Bigha	0.299	1.000	1.000	0.232
	Potash_Potato Kg / Bigha	-0.122	0.232	0.232	1.000
Sig. (1-tailed)	Production_Potato Quintal / Bigha	0.0	0.008	0.008	0.168
	Urea_Potato Kg / Bigha	0.008	0.0	0.000	0.033
	Phosphate_Potato Kg / Bigha	0.008	0.000	0.0	0.033
	Potash_Potato Kg / Bigha	0.168	0.033	0.033	0.0
N	Production_Potato Quintal / Bigha	64	64	64	64
	Urea_Potato Kg / Bigha	64	64	64	64
	Phosphate_Potato Kg / Bigha	64	64	64	64
	Potash_Potato Kg / Bigha	64	64	64	64

Explanation: weak positive correlation exist among production of Potato with fertilizers

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Urea_Potato Kg / Bigha	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: Production_Potato Quintal / Bigha

Stepwise method excluded the variable phosphate and Potash fertilizer

Model Summary[b]

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
				R Square Change	F Change	df1	df2
0.299[a]	0.090	0.075	13.77230	0.090	6.100	1	62

a. Predictors: (Constant), Urea_Potato_Kg_per_Bigha
b. Dependent Variable: Production_Potato_Quintal_per_Bigha

Weak positive connection (R=0.299) found between production of potato with urea fertilizers.). Capacity for urea fertilizers accounts for just. 9% of the diversity in actual Potato production.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	32.682	2.563		12.753	0.000
	Urea_Potato_Kg / Bigha	0.048	0.020	0.299	2.470	0.016

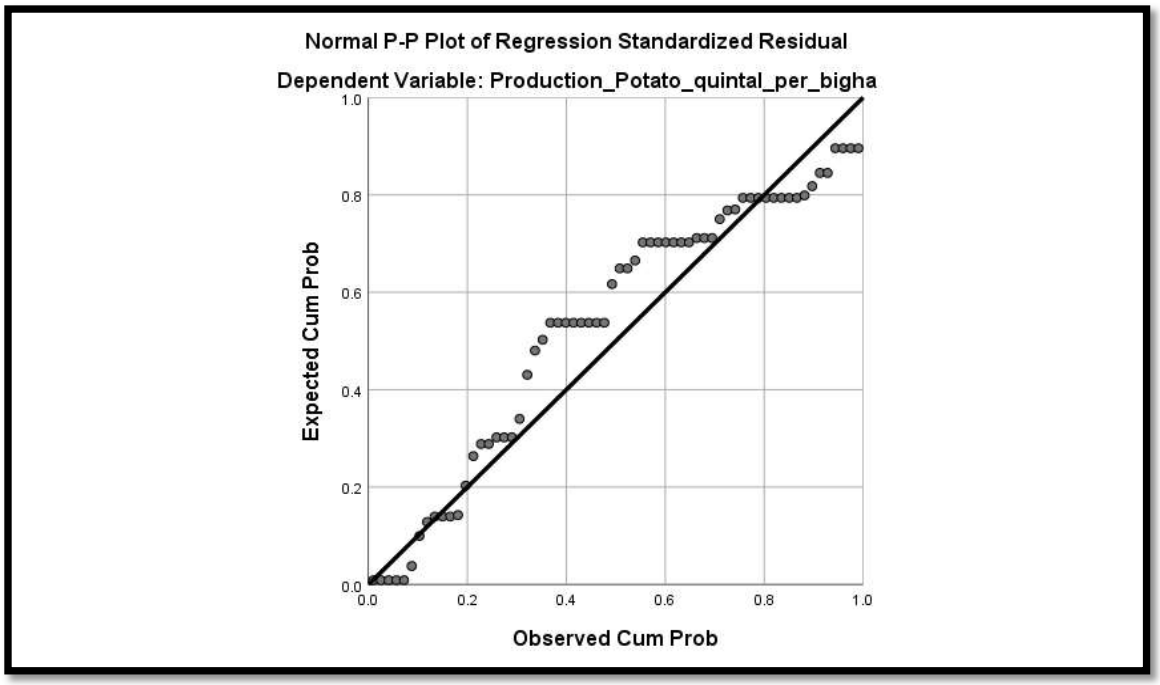
a. Dependent Variable: Production_Potato Quintal / Bigha

Equation for Multiple Regression $Y = \beta 0 + \beta 1\chi i1 + \beta 2\chi i2 + \beta 3\chi i3 + \ldots\ldots\ldots + \beta n\chi in + \varepsilon i\ldots\ldots(1)$

Here, Y= Village wise Production of Potato; β0 =intercept of the regression equation; β1, β2, β3……βn =regression co-efficient; and X1, X2,X3……Xn =independent variables; ε=the regression residual;i=1,2,3,.....n.

Y=32.682+.048 utilization of Urea in kg per bigha

Therefore, utilization of Urea per bigha is significantly related to Villagewise Production of Potato at Kuapur GP(Standardized Coefficients .299).



Apply Weaver method of crop combination for Kuapur GP

Weaver (1954) least square method of crop combination is the most useful method of crop combination among the various method of identification of crop combination region is least square method or minimum deviation the standard deviation method.

$$SD = \sqrt{\frac{\sum d^2}{n}}$$

Where, SD is standard deviation; d is Difference between hypothetical crop percentage and the observed percentage and n is the number of crops.

Minimum deviation the standard deviation method where Weaver square root is not considered or square root is ignoring. So, the actual formula use as follows

$$d = \sqrt{\frac{\sum D_p^2 - D_n^2}{N^2}}$$

At first, the percentage of each single crop area to the total cropped area of each blocks have been calculated. After the calculation the value of each crop has arranged in

descending order then deviation is calculated by using existing method by Weaver's. Then identify the suitable combination of crops in the study area.

Calculation Table for suitable crop combination of Kuapur GP

SL NO	Name of village	Plot No	Cultivated Area In Bigha	Major Crop in %			Standard Deviation			Suitable Crop Combination
				Paddy	Potato	Oil Seeds	Single Crop	Double Crop	Tripple Crop	
1	Gopinathpur	110	10.5	38.24	61.76	0	38.24	11.7	…….	Double Crop
2	Arajipirchak	111	4.5	42.11	42.11	15.78	57.89	7.89	12.41	Double Crop
3	Dhamkura	89	19.5	41.48	41.48	17.02	58.51	8.52	11.53	Double Crop
4	Ramgor	90	6.5	59.09	40.9	0	40.9	9.09	……	Double Crop
5	Lalgor	51	3.25	47.36	42.11	10.52	50	7.07	16.99	Double Crop
6	Chancharber	92	2.5	36.84	31.58	31.58	63.16	16	2.48	Triple Crop
7	Raniganja	93	5.5	36	32	32	64	16.12	1.89	Triple Crop
8	Dharampur	96	11.5	58.97	20.51	20.51	41.03	21.8	18.13	Triple Crop
9	Raila	246	11.5	33.33	33.33	33.33	66.67	16.67	0	Triple Crop
10	Tukuria	244	6	33.33	33.33	33.33	66.67	16.67	0	Triple Crop
11	Bala	239	2.5	38.46	38.46	23.08	61.54	11.54	7.25	Triple Crop
12	Manahorganj	239	6.5	40.63	29.69	29.69	59.37	15.81	5.16	Triple Crop
13	Dhunrabila	239	6	50	50	0	50	0	…..	Double Crop
14	Kuapur	242	2.75	13.64	50	36.36	50	9.64	14.99	Double Crop
15	Mohoboni	242	6.5	41.18	58.82	0	41.88	8.82	….	Double Crop
16	Badra	243	7	22.22	38.89	38.89	61.11	11.11	6.7	Triple Crop
17	Pardeshipara	239	8.5	41.67	36.11	22.22	58.33	11.45	8.18	Triple Crop
18	Dhanyajhati	239	21.5	33.33	33.33	33.33	66.67	0.67	0	Triple Crop
19	Padua	242	16	34.18	31.65	34.18	65.82	15.82	1.19	Triple Crop
20	Radhanagar	240	8.75	36.26	31.87	31.87	63.74	16.09	2.07	Triple Crop
21	Shyamganja	238	25	32	40	28	60	10.29	2.87	Triple Crop
22	Radhaballabhpur	99	9.75	36.11	36.11	27.78	63.89	13.89	3.9	Triple Crop
23	Bhilaibani	101	9	36	36	28	64	14	3.77	Triple Crop
24	Lalitaganja	97	2.5	33.33	33.33	33.33	66.67	2.88	0	Triple Crop
25	Madanmohanpur	237	8	36.26	31.87	31.87	63.74	16.09	2.07	Triple Crop
26	Pinglas	248	7.5	13.64	50	36.36	50	9.64	14.99	Double Crop
27	Khalakpur	247	10.5	38.24	61.76	0	38.24	11.7	…….	Double Crop

Crop combination region:-

Crop combination is an integral part of agricultural geography and it has a very important role in the demarcation of an agricultural region. In the study area, three crops were used on the basis of percentage of area and production of crops for the analysis of crop combination region. Study of crop combination is very helpful in different ways, firstly it provides an adequate information about the individual crop, and secondly, the combination is in itself an integrative reality

that demands definition and distribution analysis. Finally, crop combination regions are essential for the construction of more complex structure of vivid agriculture region (Weaver, 1954). One or mono-crop, two crop or double crop, three crop regions found in Kuapur Gram Panchyet of chandrakona block - II. (See table)

- **One crop/Mono-crop Region:--**

One crop region means, it is dominant in a region on the basis of percentage of area sharing under cultivation. The application of Weaver's crop combination method in the 2022-23 gives Mono or one crop dominant region in few village of Kuapur Gram. Potato is dominant crop in these Grampanchyet, i.e., 8500 hectares (about 91%) in Chandrakona block-II. Suitable irrigation facilities, the alluvial fertile soil of river bank, and HYV seeds are major factors for growing potato in this area and also fifteen number of cold storage with its huge storage capacity provide suitable facilities for potato and others vegetable preserve for a long time. Locations of cold storage also influence the cultivator for Potato farming.

- **Two crop region / Double crop:-**

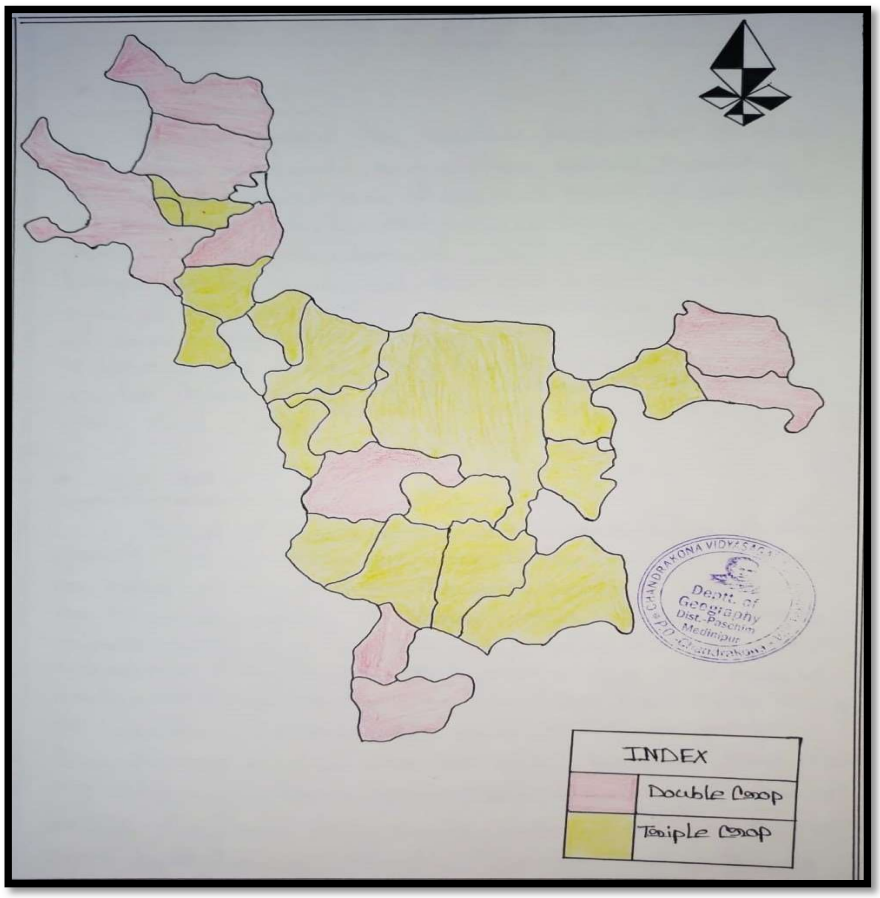
In Kuapur GP where two crop regions are found in surrounding area. Rice and Potato are leading crop in this region on the basis of the amount of production and also areal coverage under cultivation during this period. It is easy to understand rice is prime crop which shares above 50% area and potato share above 30% area of total cropped land. Highly fertile alluvial soil and high market demand its surrounding area (i.e. Gopinathpur, Arajipirchak, Dhamkura, Ramgor, Dhunrabila, Kuapur, Mohoboni Badra etc)

- **Three crop regions:-**

The results show that three crops region are maximum village in Kuapur GP in the reference year 2022-23. Hence, Rice, Potato, and, Oilseeds (Sesame and Mustard seed), have come in this combination. The Rice is dominant crop and potato is the second dominant crop according to the cropped area under cultivation. Fertile soil and well-connected market facilities are present in this block which is playing a very important role

in growing vegetable and others crops. (i.e. Chancharber, Raniganja, Dharampur, Raila, Tukuria, Bala, Manahorganj, Pardeshipara, Dhanyajhati etc).

CROP COMBINATION MAP OF KUAPUR GRAMPANCHAYAT



SOIL STATUS OF STUDY AREA

- **Soil texture:-**

Texture means the relative proportion of very fine, fine moderate, coarse, very coarse. According to the relative proportion of big and small-sized particles present in it, the soil may be termed as coarse or fine. If the number of quantity of big particles is large as in sandy soil, the soil is said to have a coarse texture. If, on the other hand, the number of small particles is large as in clay soil, it is said to have a fine texture. The fine texture is mainly found in the kuapur GP. The fine texture is suitable for any kind of crop.

- **Soil pH:-**

The pH of the soil is most important for plant growth. The pH value represents the amount of free or active acidity and not the total quantity of potential or combined acidity. In other words, it represents the intense acidity of a solution. Depending upon the preponderance of hydrogen or hydroxyl ions, soils may be acidic, alkaline or neutral in reaction. Those having pH less than 7.0 are acidic soils, and those greater than 7.0 are alkaline. For practical purpose, soils having pH ranging from 6.5 to 7.5 are considered neutral though they are very slightly acidic or alkaline as indicated by this range it is of no consequence as far as crop growth is concerned. Soils having pH between 6.0 and 5.0 are considered moderately acidic, those between 5.0 and 4.0 strongly acidic, while those having pH less than 4.0 are extremely acidic. Such soils are usually barren as no plant is able to tolerate Fig. such high acidity. In the soil report, it is shown that high pH area is the southern and eastern parts of the Kuapur GP.

Organic carbon The soil carbon improves the physical properties of soil. It increases the cation exchange capacity (CEC) and water holding capacity of sandy soil and it contributes to the structural stability of clay soils by helping the particles bind into aggregates. Soil organic matter, of which carbon is a major part, holds a great proportion of nutrients, cation and trace elements that are of importance to plant growth. It prevents nutrient leaching and is integral to the organic acids that make minerals available to plants (Soil and Environment news 2017). It also buffers soil from strong changes in ph. It is widely accepted that the carbon content of the soil is a major factor in its overall health. In the soil report, it is shown that the high organic carbon area is Kuapur GP where the value is 0.35% (Fig.). The high concentration of organic carbon is suitable for paddy and vegetable cultivation.

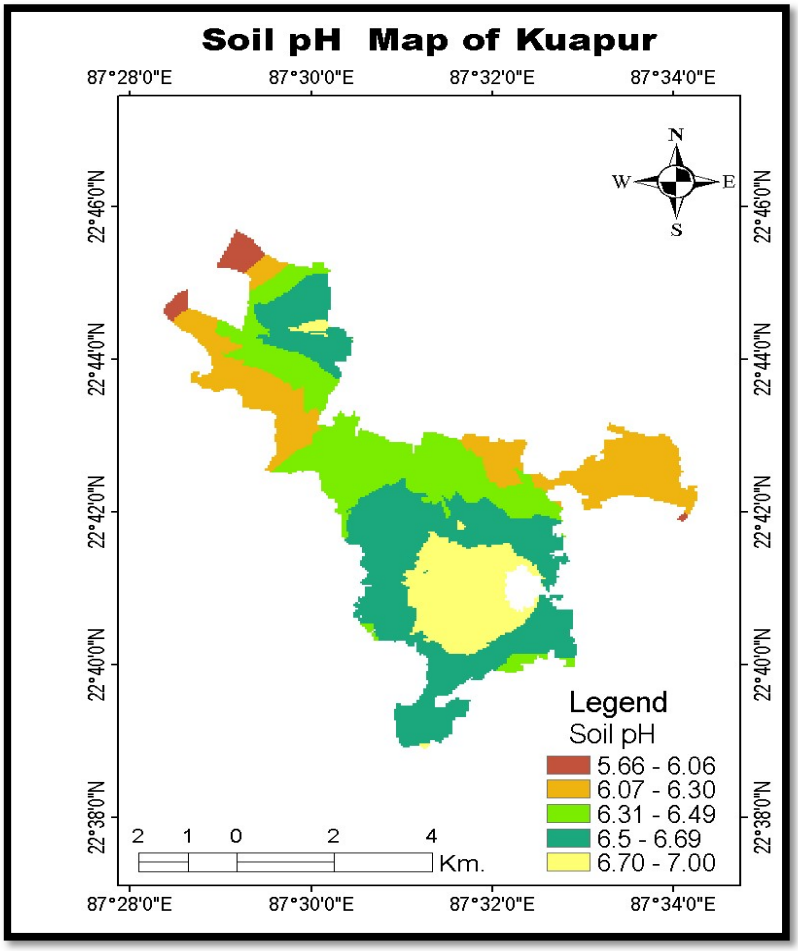
- **Nitrogen (N):-**

The availability of nitrogen is controlled mainly by microbial activity. One of the principal objectives for including a legume in the farming rotation is to improve the reserves of nitrogen (N) in the soil. Once soil N levels have been raised, the stored N can

be utilized by a period of cropping. In the soil report, it can be shown that the high-nitrogen area is the eastern part of Chandrakona-II and the upper part of Chandrakona-II Block, the value is 210 kg/ha. The high concentration of nitrogen is suitable for paddy, potato, and vegetable cultivation as this area has a high potential of groundwater.

- **Soil Phosphorus (P2O5):-**

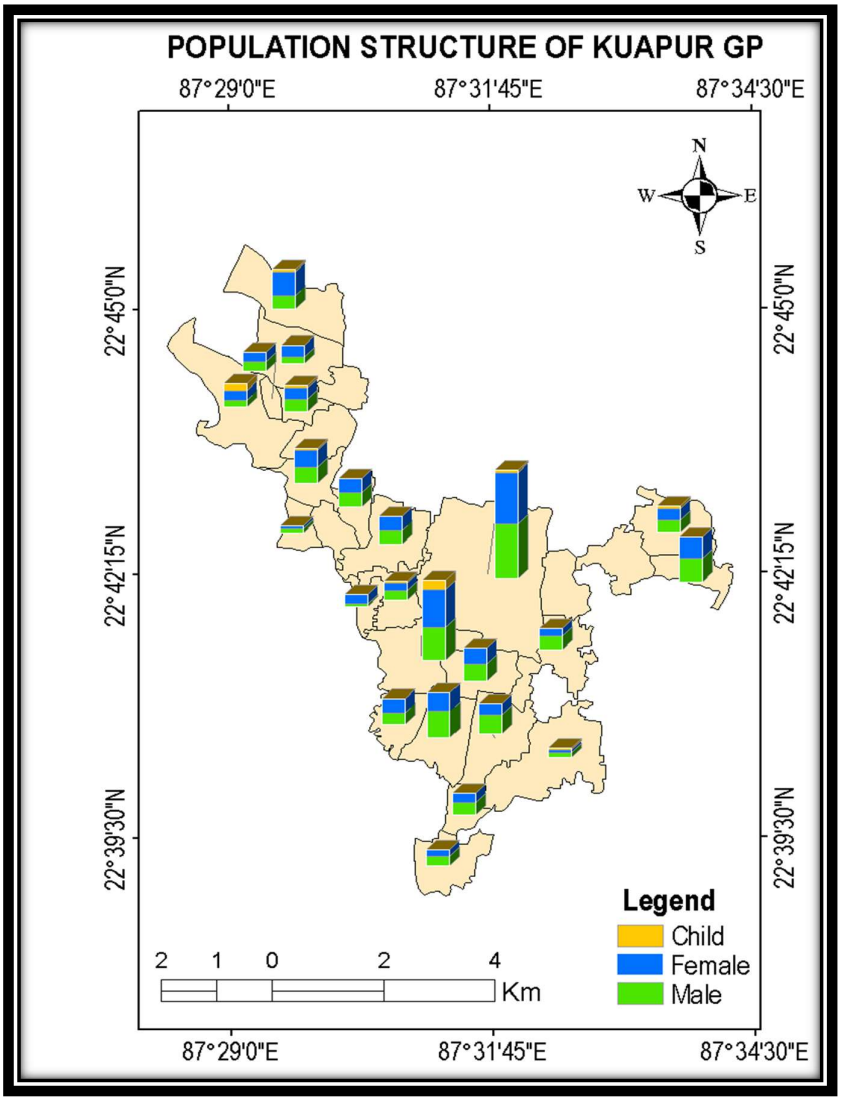
Phosphorus (P) is an essential element classified as a micronutrient because of the relativity large amounts of P required by plants (Busman et al. 2009). Phosphorus is one of the three nutrients generally added to fertilizers. One of the main roles of P in living organisms is the transfer of energy. Organic compounds having P content are used to transfer energy from one reaction to drive another reaction within cells. Adequate P availability for plants stimulates early plant growth and hastens maturity. Although P is essential for plant growth, mismanagement of soil P can pose a threat to water quality. The soil report shows that the high-phosphorus (> 80 kg/ha) area is the eastern part of Chandrakona II Block. Basically, this range (> 80 kg/ha) of phosphorus is suitable for groundnut cultivation.



CHAPTER – 4 (Socio – Economic condition of the study area)

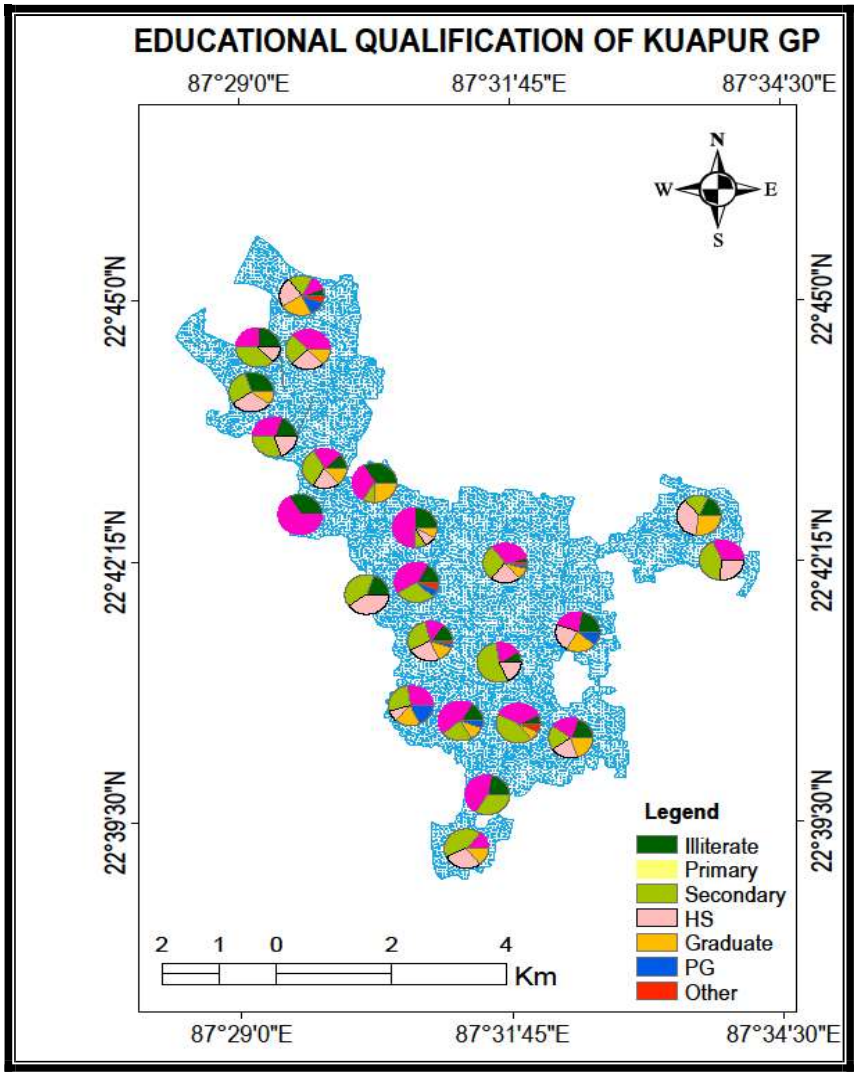
Population Structure:-

Population composition is the simplest method of measuring the male and female population structure. Population composition of the study area are represent the exceptional characteristics. We see the male and female population is 52.87% and 47.13%. Also sex-ratio is 891 female population per thousand male population. So, the study area belongs to the less developed area. Because their main problem is religious and other problem is superstitions. Their problem is barrier of social development, cultural development and economic development.



Educational Structure:-

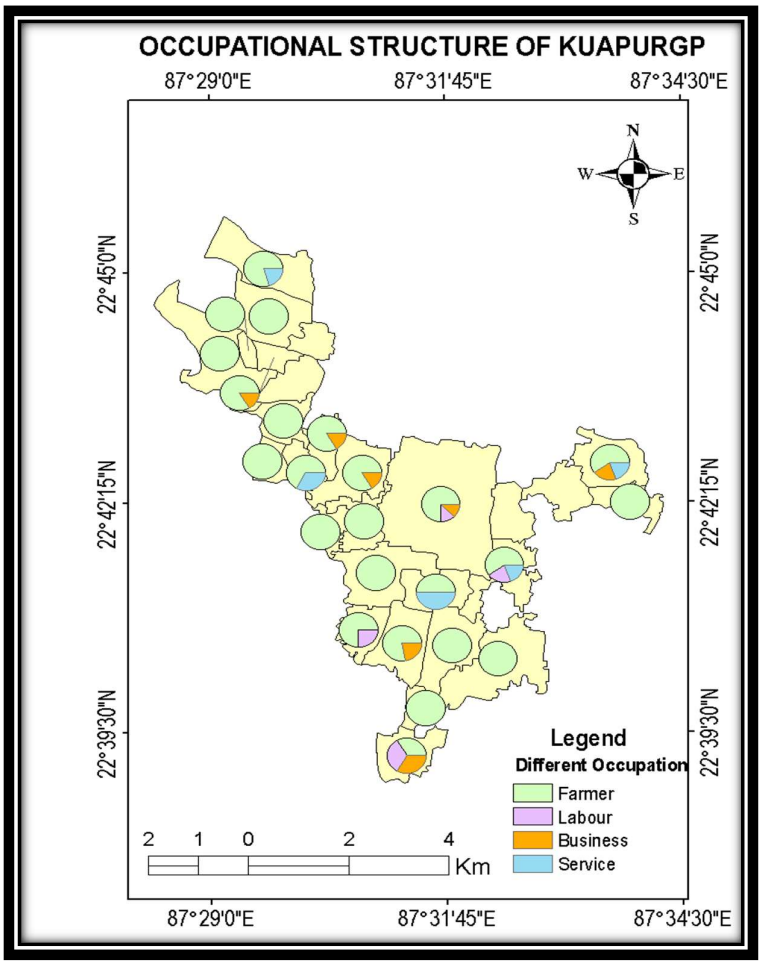
To analyses the spatial distribution of educational attainment status of this study area we trying to analyses the village wise distribution sample. Fig I have shown the village wise distribution of educational Qualification from data table it is clear that the highest illiteracy belongs in Kuapur village. Dhamkuria, Ramgarh, Lalgar, Chancharber, Radhaballabhpur, Radhanagar, Bala, Pardeshipara, Kuapur and Dhanyajhati are held illiteracy approx. 35% out of the total population of each village. Maximum population is Secondary and higher secondary of Bala village. Also Kuapur village are educated person 5 % and 7% population under graduate and Upper graduate respectively. Lack of social consciousness activity of child labour. Early marriage, religious men- tallit but poverty in responsible for high low rate of higher education.



Occupational Structure:-

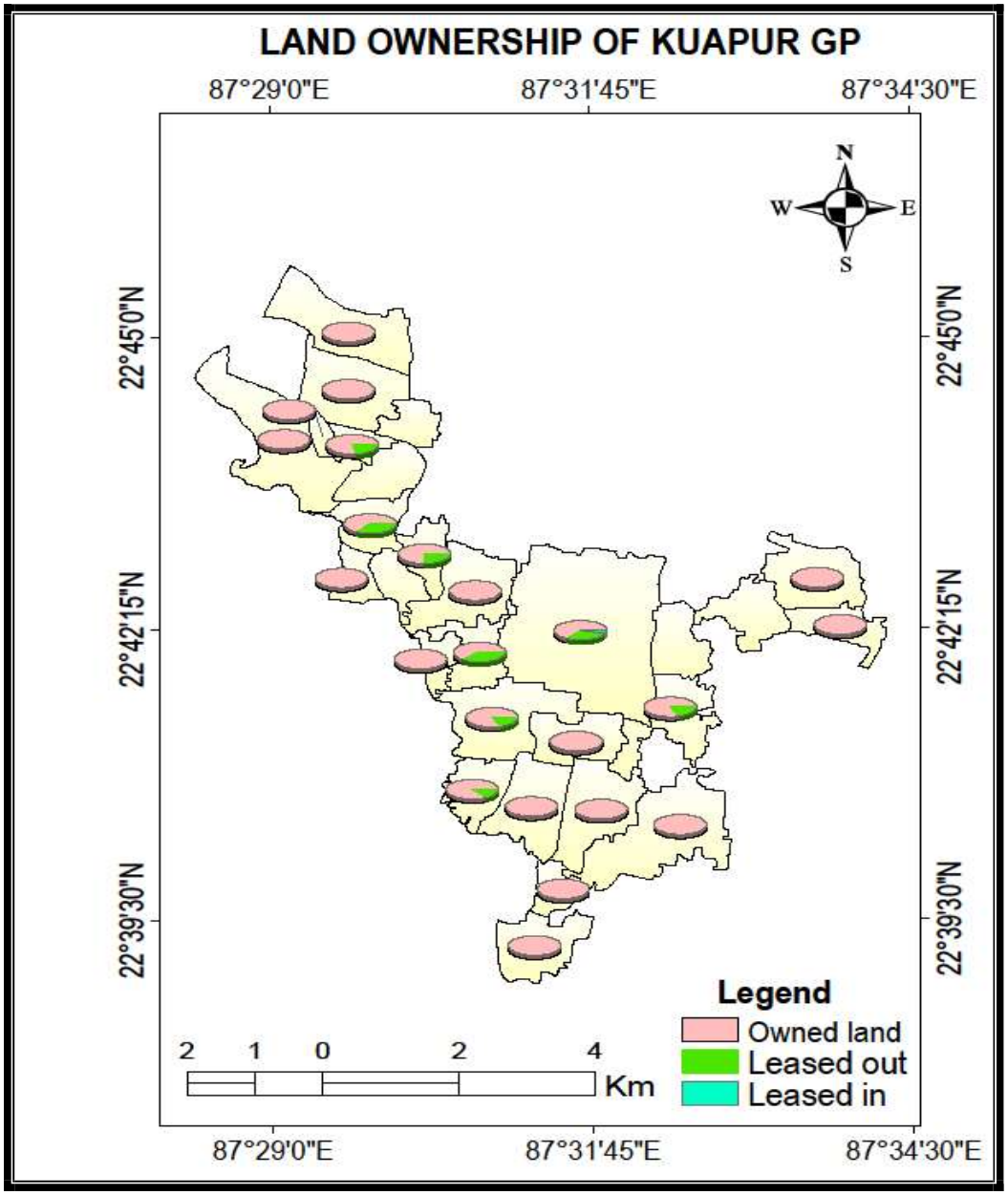
Economical activates is the important factor of the development of any region, so our study area of Kuapur Grampanchyet are economic activates. Agriculture is the most important occupation of the people of Paschim Medinipur district. The economy of the district is based on agriculture. The principal crop of the district is paddy though other crops like pulses, oilseeds, potatoes and sugarcane also grows in the district.

People in Kuapur GP are elated on different occupational pattern (Farmer, labour, Businessman, Service holders etc.). Among the maximum people of this study area are related of occupation is Farmer, approx. 64.29 % people the remaining people are engaged labour (23.33%), Businessman (4.76%) and minimum population are related on service holder (4.76%). Other population there economical activities is fishing, horticulture and livestock farming. Showing the occupational structure and other economic activities, given the below on table.



Land Ownership:-

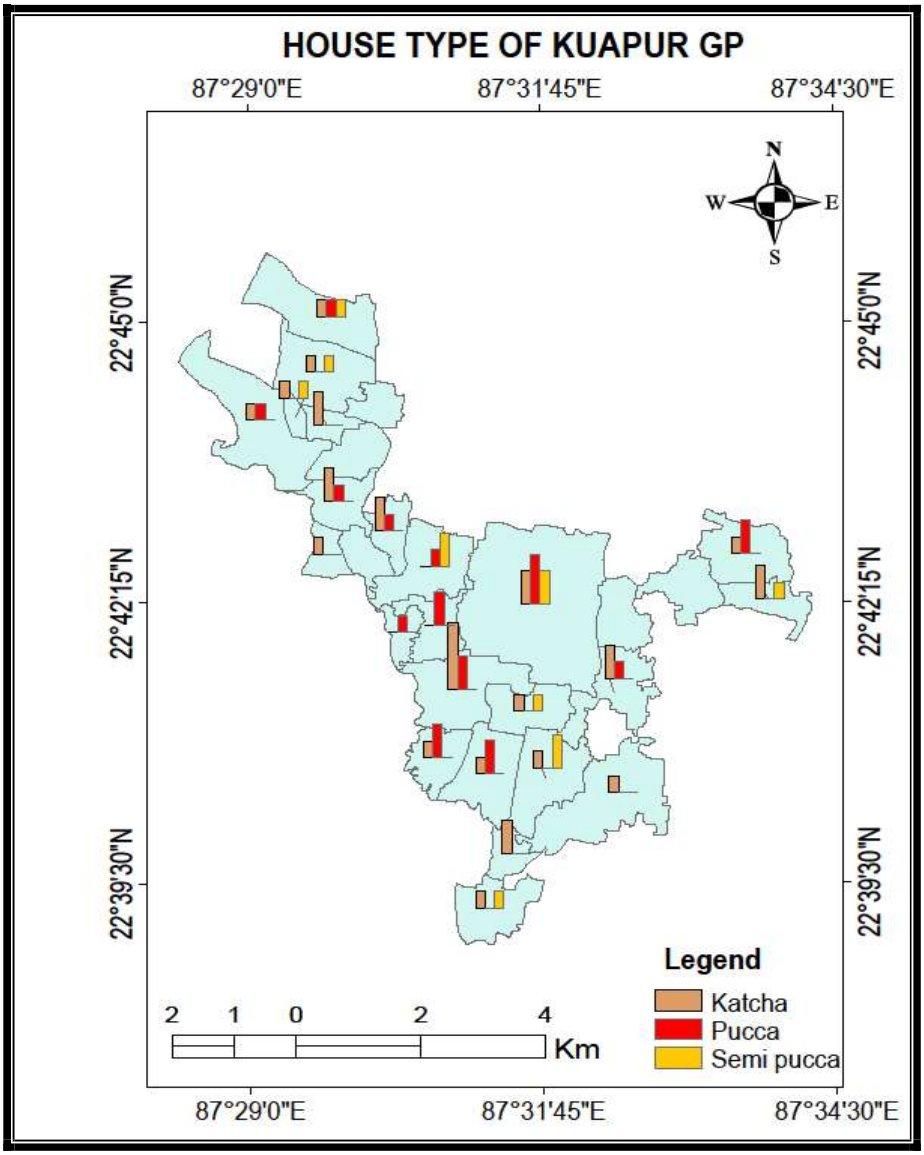
Though Kuapur grampanchyet belongs to Chandrakona block – II is maximum agriculture based but maximum people of this area have minimum agriculture land and approx. 25.33% family are not minimum land so, no land others family agriculture land is below 2 bigha (16.67%), 2 – 4 Bigha (18.67%), 4 – 6 Bigha (8%), 6 – 8 Bigha (20%), 8 – 10% Bigha (8%) and minimum family are agriculture land is 10%.



House type:-

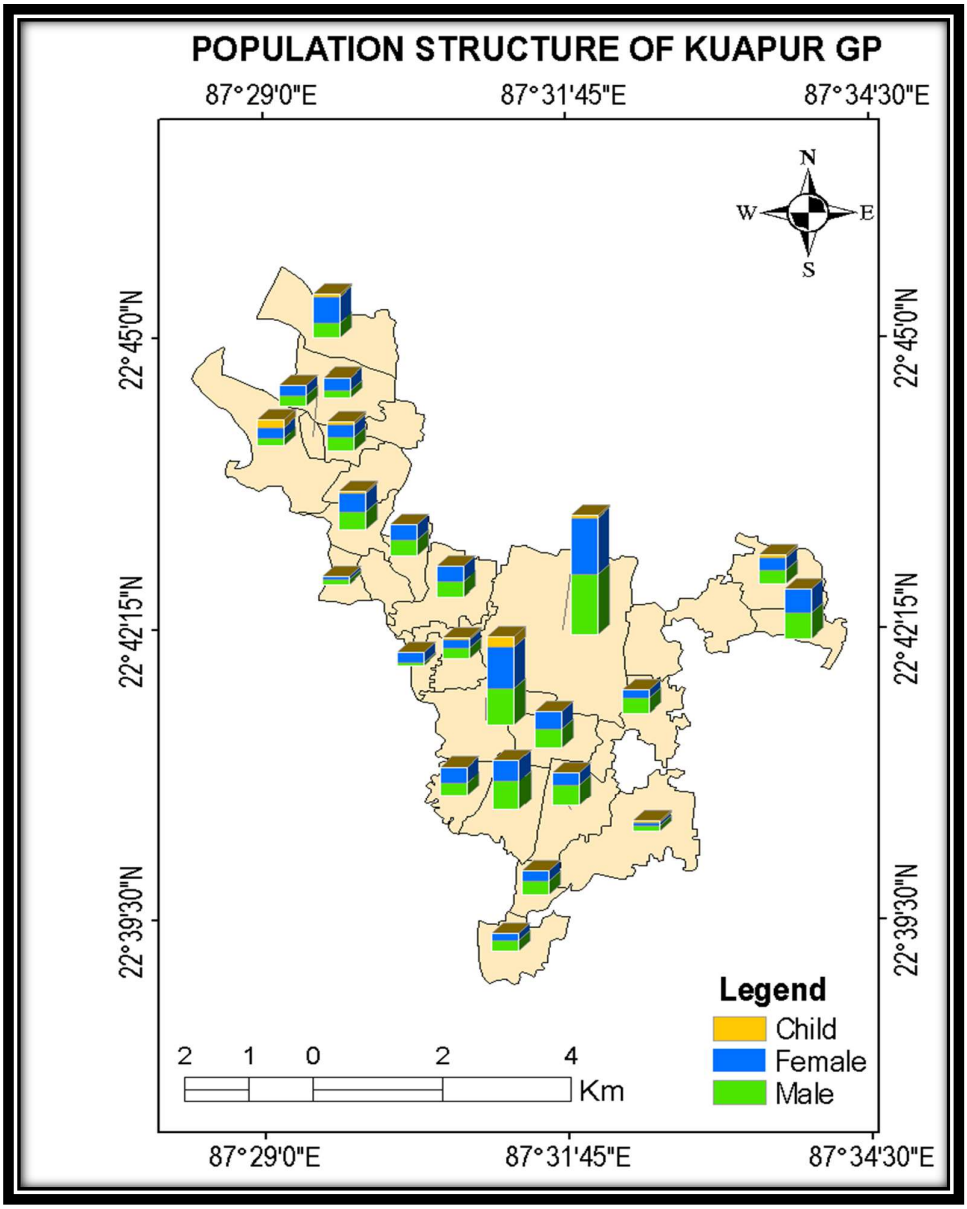
There number of household is 1988 in Kuapur Grampanchyet of Chandrakona block – II. 60% house are katcha. This main material is Bambo and Clay. 26% houses are Semi pacca and 14% house are Pacca. Though the study area is village so maximum house is katcha. It represent the low rate of economic development, Low rate of settlement, poor living status and different problem of the study area.

Their maximum house are kutcha and do not is very large house. Maximum houses are three to four room. Approx. 45% houses and 30% houses are below three room above two room. Above six room per houses is minimum or very few houses approx. 10% houses.



Population Structure:-

Population composition is the simplest method of measuring the male and female population structure. Population composition of the study area are represent the exceptional characteristics. We see the male and female population is 52.87% and 47.13%. Also sex-ratio is 891 female population per thousand male population. So, the study area belongs to the less developed area. Because their main problem is religious and other problem is superstitions. Their problem is barrier of social development, cultural development and economic development.



CHAPTER – 5 (Summary & Conclusion)

SUMMARY & CONCLUSION:-

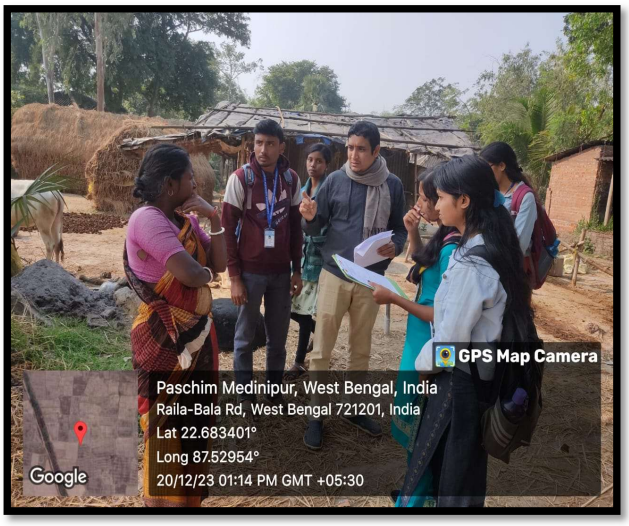
The present study reveals that the eastern and north-eastern parts of the study area are very much suitable for agricultural growth. The GIS-based geo-statistical and visualization analysis reveals that new crops such as potato and different kinds of vegetable under-diversification point towards the suitability of relatively large areas instead of traditional crops. Irrigation is important for agriculture and crop productivity depends on irrigation. Proper selection of suitable crop and its variety is essential for proper economic development. Though high alkalinity of the study area is a problem, proper use of fertilizer can reduce the alkalinity making the soil fit for agriculture. To sum up, it can be said that the use of fertilizer in the appropriate ratio is essential for better production. This study develops the different aspects of soil, climate, irrigation facilities and improvement of socio-economic status of the people of the area and also generates the soil database and land information system such as soil types, soil fertility, current land use status, climate variability, slope and vegetation cover to build the crop suitability model.

OUTCOME OF THE PROJECT:-

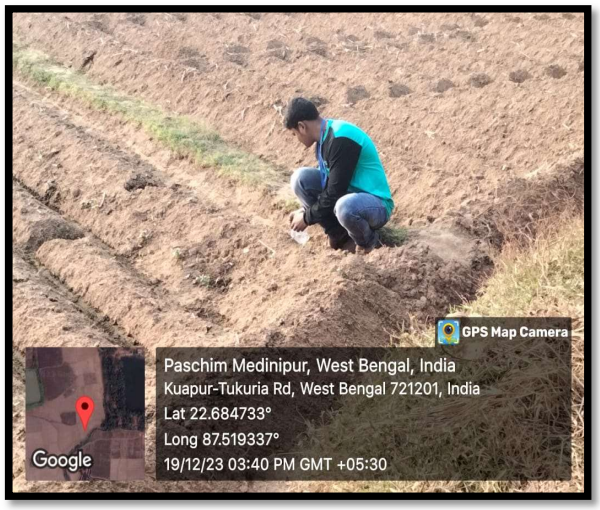
We have studied crop suitability, cropping pattern and socio economic impacts of agriculture of the study area with various criteria and also with multiple data source. In this study, we came to this conclusion that the existing agricultural system is suitable for this region but an upgrade or modification can prove to be more profitable to the farmers. Present cultivation situation is not sufficient for the development of the economic condition of the farmers due to extensive cultivation of potato. In our study area, there is a total of 192.19 hectares of agricultural land out of which 178.56 hectares is being used for cultivation of potato. So, the farmers are not getting the right price and facing loses. As a result, it is seen that most of the time farmers are committing suicide. So, my opinion is that instead of using Mono cropping technique and growing a single crop year after year

on the same land, the farmers can use crop rotation technique through other crops or growing multiple crops on the same land. It is also referred that in winter season instead of 192.19 hectares if the farmers use 178.26 hectares for potato and rest of them are being used for other grains or vegetable like mustard, cabbage, cauliflower and brinjal than the problem will be solved to an extent. So, it is proposed to the Govt. or the corresponding authority like; Agriculture Office, Block Development Office (with reference to my successful result) that if they can describe to the farmers about the benefits of crop rotation or disadvantage of mono cropping, farming a single crop year after year on the same land to the farmers and cultivate different types of crop according to this research, it can reduce the overall agriculture-related problem of the area.

HOUSEHOLD SURVEY PHOTO



SOIL SAMPLE COLLECTION



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ANNEXURES

Measurement of Soil pH by Colour Chart (Soil Testing Kit) of Kuapur GP

Sl no.	Name of Village	Mouza No	Latitude (N)	Longitude(E)	Measurement of PH	Remarks
1	Gopinath pur	110	22°42'53.658"	87°34'10.9524"	5.5	Medium acidic
2	Gopinath pur	110	22°42'54.1584"	87°33'53.6436"	7	Neutral
3	Gopinath pur	110	22°43'3.1224"	87°34'16.5144"	7.5	Slightly Alkaline
4	Arjipirchak	111	22°42'18.6912"	87°33'44.6544"	5.5	Medium acidic
5	Arjipirchak	111	22°42'36.3456"	87°32'49.7652"	5	Strongly Acidic
6	Arjipirchak	111	22°42'15.3684"	87°33'49.9932"	7	Neutral
7	Dhamkura	89	22°44'16.89"	87°29'54.7508"	4.5	Very Strongly Acidic
8	Dhamkura	89	22°44'4.5528"	87°30'42.7176"	5	Strongly Acidic
9	Dhamkura	89	22°45'9.522"	87°30'23.9688"	7	Neutral
10	Ramgar	90	22°44'18.402"	87°30'10.6092"	7.5	Slightly Alkaline
11	Ramgar	90	22°44'27.3264"	87°30'0.144"	7	Neutral
12	Lalgar	91	22°43'15.5424"	87°29'44.4912"	6	Slightly Acidic
13	Lalgar	91	22°43'50.1456"	87°30'2.8152"	5.5	Medium acidic
14	Charcharber	92	22°43'56.0712"	87°29'36.0924"	6	Slightly Acidic
15	Charcharber	92	22°44'3.0912"	87°29'37.8384"	6	Slightly Acidic
16	Raniganja	93	22°44'1.9068"	87°29'35.4984"	6	Slightly Acidic
17	Raniganja	93	22°43'57.81"	87°29'38.2992"	6	Slightly Acidic
18	Dharampur	96	22°43'49.6236"	87°29'29.4036"	6.5	Very Slightly Acidic
19	Dharampur	96	22°43'48.3312"	87°29'51.0216"	6	Slightly Acidic
20	Dharampur	96	22°43'46.7904"	87°29'45.276"	7	Neutral
21	Railya	246	22°40'36.534"	87°31'56.784"	6.5	Very Slightly Acidic
22	Railya	246	22°40'32.9592"	87°31'53.4468"	8	Medium Alkaline
23	Railya	246	22°40'41.3544"	87°31'36.8256"	7	Neutral
24	Tukuria	244	22°40'47.3808"	87°31'20.172"	6.5	Very Slightly Acidic
25	Tukuria	244	22°41'5.0388"	87°31'9.6132"	6.5	Very Slightly Acidic
26	Tukuria	244	22°40'55.3836"	87°30'51.804"	7	Neutral
27	Boro Bala	239	22°42'11.47"	87°31'55.2"	6.5	Very Slightly Acidic
28	Boro Bala	239	22°42'11.22"	87°32'0.33"	6.5	Very Slightly Acidic
29	Darabasti Bala	239	22°41'56.86"	87°31'37.01"	6.5	Very Slightly Acidic
30	Darabasti Bala	239	22°41'56.22"	87°31'45.56"	6.5	Very Slightly Acidic
31	Tatulia Bala	239	22°41'56.86"	87°31'37.01"	7	Neutral
32	Tatulia Bala	239	22°44'34.77"	87°31'35.14"	5.5	Medium acidic
33	Kuapur	242	22°41'28.33"	87°30'35.82"	6.5	Very Slightly Acidic
34	Kuapur	242	22°41'36.6"	87°30'35.28"	6	Slightly Acidic

35	Mohoboni	242	22°41'4.69"	87°30'43.7"	5.5	Medium acidic
36	Mohoboni	242	22°41'11.05"	87°30'41.52"	7	Neutral
37	Badra	243	22°40'50.02"	87°30'45.36"	5.5	Medium acidic
38	Badra	243	22°40'51.48"	87°30'48.15"	6	Slightly Acidic
39	Pankhua Bala	239	22°42'35.64"	87°31'41.9376"	6	Slightly Acidic
40	Pankhua Bala	239	22°42'40.4604"	87°31'20.9748"	6.5	Very Slightly Acidic
41	Pankhua Bala	239	22°42'36.0216"	87°31'38.4744"	7	Neutral
42	Chhoto Bala	239	22°42'35.7552"	87°31'29.568"	6	Slightly Acidic
43	Chhoto Bala	239	22°42'31.8816"	87°31'27.4188"	7	Neutral
44	Chhoto Bala	239	22°42'37.818"	87°31'29.1324"	7	Neutral
45	Kuapur	242	22°41'53.9412"	87°31'53.0184"	6.5	Very Slightly Acidic
46	Kuapur	242	22°41'53.9412"	87°31'53.0184"	6	Slightly Acidic
47	Kuapur	242	22°41'53.9412"	87°31'53.0184"	6.5	Very Slightly Acidic
48	Radhanagar	240	22°41'50.9496"	87°30'46.1376"	7	Neutral
49	Radhanagar	240	22°41'50.9928"	87°30'49.1688"	6.5	Very Slightly Acidic
50	Radhanagar	240	22°42'40.4604"	87°31'28.5348"	6.5	Very Slightly Acidic
51	Shyamganja	238	22°41'34.6416"	87°32'47.2704"	6.5	Very Slightly Acidic
52	Shyamganja	238	22°41'5.1468"	87°32'44.2032"	6	Slightly Acidic
53	Shyamganja	238	22°41'5.1468"	87°32'44.2032"	8	Medium Alkaline
54	Monoharganja	237	22°41'21.696"	87°32'40.416"	6.5	Very Slightly Acidic
55	Monoharganja	237	22°41'52.2492"	87°32'57.553"	6	Slightly Acidic
56	Radhaballabhpur	99	22°41'53.9412"	87°31'53.0184"	7	Neutral
57	Radhaballabhpur	99	22°42'49.2228"	87°30'47.7648"	7	Neutral
58	Radhaballabhpur	99	22°42'49.5504"	87°30''51.9912"	6.5	Very Slightly Acidic
59	Bhilaibani	101	22°43'9.3468"	87°30'30.204"	6	Slightly Acidic
60	Bhilaibani	101	22°43'90.444"	87°30'26.316"	6	Slightly Acidic
61	Bhilaibani	101	22°43'3.936"	87°30'30.8016"	6.5	Very Slightly Acidic
62	Lalitaganja	97	22°42'48.942"	87°29'47.94"	7	Neutral

Source of Primary data 19-12-23 to 20-12-23

Table – 1 for Population Structure :-

Sl No	Name	Male	Female	Child
1	Dhamkuria	35.29	58.82	5.88
2	Ramgarh	37.50	62.50	0
3	Lalgar	30.00	40.00	30.00
4	Chancharber	50.00	50.00	0
5	Madhabpur	0	0	0
6	Raniganj	45.45	45.45	9.09
7	Dhunrabila	0	0	0
8	Dharampur	46.67	46.67	9.09
9	Bhilaibani	50.00	50.00	0
10	Lalitaganj	66.67	33.33	0

11	Basantapur	0	0	0
12	Radhaballabhpur	50.00	50.00	0
13	Radhanagar	50.00	37.50	12.50
14	Bala	50	47.83	2.17
15	Pardeshipara	20.00	80.00	0
16	Kuapur	41.18	47.06	11.76
17	Dhanyajhati	50.00	50.00	0
18	Badra	45.45	54.55	0
19	Tukuria	57.89	42.10	0
20	Raila	61.54	38.46	0
21	Padua	50.00	25.00	25.00
22	Shyamganja	66.67	33.33	0
23	Manoharganj	0	0	0
24	Madanmohanpur	0	0	0
25	Gopinathpur	45.45	47.37	7.18
26	Arajipirchak	57.14	42.86	0
27	Pinglas	57.14	42.86	0
28	Khalakpur	55.56	44.44	0

Source of Primary data

Table – 2 for Educational Structure:-

Sl. No	Name	Illiterate (%)	Primary (%)	Secondary (%)	HS (%)	Graduate (%)	PG (%)	Other (%)
1	Dhamkuria	5.89	11.76	17.64	23.53	23.53	11.76	5.89
2	Ramgarh	0	37.50	25.00	25.00	12.50	0	0
3	Lalgar	30.00	0	30.00	30.00	10.00	0	0
4	Chancharber	25.00	25.00	37.50	12.50	0	0	0
5	Madhabpur	-	-	-	-	-	-	-
6	Raniganj	20.00	30.00	30.00	20.00	0	0	0
7	Dhunrabila	-	-	-	-	-	-	-
8	Dharampur	13.33	20.00	33.33	20.00	13.33	0	0
9	Bhilaibani	33.33	33.33	8.33	0	25.00	0	0
10	Lalitaganj	33.33	66.67	0	0	0	0	0
11	Basantapur	-	-	-	-	-	-	-
12	Radhaballabhpur	25.00	50.00	8.33	8.33	8.33	0	0
13	Radhanagar	17.65	41.18	29.41	0	0	5.88	5.88
14	Bala	4.44	31.11	28.89	22.22	8.89	2.22	2.22
15	Pardeshipara	20.00	0	40.00	40.00	0	0	0
16	Kuapur	15.79	13.16	28.98	23.68	13.16	2.63	2.36
17	Dhanyajhati	9.09	18.18	54.54	18.18	0	0	0
18	Badra	0	27.27	27.27	9.09	18.18	18.18	0
19	Tukuria	16.67	44.44	22.22	0	11.11	5.55	0
20	Raila	7.14	35.71	42.86	0	7.14	0	7.14
21	Padua	20.00	20.00	20.00	20.00	20.00	0	0
22	Shyamganja	22.22	22.22	0	22.22	22.22	11.11	0
23	Manoharganj	0	0	0	0	0	0	0
24	Madanmohanpur	0	0	0	0	0	0	0
25	Gopinathpur	18.18	0	18.18	36.36	27.27	0	0
26	Arajipirchak	0	31.58	42.10	26.31	0	0	0
27	Pinglas	0	17.28	42.86	28.57	17.28	0	0
28	Khalakpur	22.22	44.44	33.33	0	0	0	0

Source of Primary data

Table – 3 for Occupational Structure:-

Sl No	Village	Farmer (%)	Labour (%)	Business (%)	Service (%)
0	Gopinathpur	60	0	20	20
1	Arajipirchak	100	0	0	0
2	Dhamkura	80	0	0	20
3	Ramgor	100	0	0	0
4	Lalgar	100	0	0	0
5	Chancharber	100	0	0	0
6	Raniganja	83.333333	0	16.666667	0
7	Dharanpur	100	0	0	0
8	Raila	100	0	0	0
9	Tukuria	77.777778	0	22.222222	0
10	Bala	67.857143	10.71428571	10.714286	10.714286
11	Kuapur	85.714286	0	14.285714	0
12	Radhanagar	100	0	0	0
13	shyamganja	60	20	0	20
14	Radhaballabhpur	83.333333	0	16.666667	0
15	Bhilaibani	83.333333	0	16.666667	0
16	Lalitaganja	100	0	0	0

Source of Primary data

Table - 4 for Land Ownership:-

Sl no	Name	Owned land in (%)	Leased out in (%)	Leased in (%)
1	Dhamkuria	100.00	0	0
2	Ramgarh	100.00	0	0
3	Lalgar	100.00	0	0
4	Chancharber	100.00	0	0
5	Madhabpur	0	0	0
6	Raniganj	78.57	21.43	0
7	Dhunrabila	0	0	0
8	Dharampur	63.89	36.11	0
9	Bhilaibani	75.00	25.00	0
10	Lalitaganj	100.00	0	0
11	Basantapur	0	0	0
12	Radhaballabhpur	100.00	0	0
13	Radhanagar	60.87	39.13	0
14	Bala	63.97	32.30	1.5
15	Pardeshipara	100.00	0	0
16	Kuapur	83.05	16.95	0
17	Dhanyajhati	100.00	0	0
18	Badra	87.50	12.50	0
19	Tukuria	100.00	0	0
20	Raila	100.00	0	0

21	Padua	100.00	0	0
22	Shyamganja	83.33	16.67	0
23	Manoharganj	0	0	0
24	Madanmohanpur	0	0	0
25	Gopinathpur	100.00	0	0
26	Arajipirchak	100.00	0	0
27	Pinglas	100.00	0	0
28	Khalakpur	100.00	0	0

Source of Primary data

Table – 5 for House Typology:-

Sl No	Name of village	Katcha (%)	Pucca (%)	Semi pucca (%)
1	Dhamkuria	33.33	33.33	33.33
2	Ramgarh	50.00	0	50.00
3	Lalgar	50.00	50.00	0
4	Chancharber	50.00	0	50.00
5	Madhabpur	0	0	0
6	Raniganj	100.00	0	0
7	Dhunrabila	0	0	0
8	Dharampur	66.67	33.33	0
9	Bhilaibani	66.67	33.33	0
10	Lalitaganj	100.00	0	0
11	Basantapur	0	0	0
12	Radhaballabhpur	0	33.33	66.67
13	Radhanagar	0	100.00	0
14	Bala	28.57	42.86	28.57
15	Pardeshipara	0	100.00	0
16	Kuapur	66.67	33.33	0
17	Dhanyajhati	50.00	0	50.00
18	Badra	33.33	66.67	0
19	Tukuria	33.33	66.67	0
20	Raila	33.33	0	66.67
21	Padua	100.00	0	0
22	Shyamganja	66.67	33.33	0
23	Manoharganj	0	0	0
24	Madanmohanpur	0	0	0
25	Gopinathpur	33.33	66.67	0
26	Arajipirchak	66.67	0	33.33
27	Pinglas	50.00	0	50.00
28	Khalakpur	100.00	0	0

Source of Primary data

Table – 6 for Population Structure:-

Sl no	Name	Male (%)	Female (%)	Child (%)
1	Dhamkuria	35.29	58.82	5.89
2	Ramgarh	37.5	62.5	0
3	Lalgar	30.00	40.00	30.00
4	Chancharber	50.00	50.00	0
5	Madhabpur	0	0	0
6	Raniganj	45.45	45.45	9.10
7	Dhunrabila	0	0	0
8	Dharampur	46.67	46.67	6.66
9	Bhilaibani	50.00	50.00	0
10	Lalitaganj	66.67	33.33	0
11	Basantapur	0	0	0
12	Radhaballabhpur	50.00	50.00	0
13	Radhanagar	50.00	37.50	12.50
14	Bala	50.00	47.83	2.17
15	Pardeshipara	20.00	80.00	0
16	Kuapur	41.18	47.06	11.76
17	Dhanyajhati	50.00	50.00	0
18	Badra	45.45	54.55	0
19	Tukuria	57.90	42.11	0
20	Raila	61.54	38.46	0
21	Padua	50.00	25.00	25.00
22	Shyamganja	66.67	33.33	0
23	Manoharganj	0	0	0
24	Madanmohanpur	0	0	0
25	Gopinathpur	45.45	45.46	9.09
26	Arajipirchak	52.64	47.37	0
27	Pinglas	57.14	42.86	0
28	Khalakpur	55.56	44.44	0

Source of Primary data

QUESTIONNAIRE FOR CROP SUITABILITY ANALYSIS AND IT'S SOCIO-ECONOMIC IMPACTS: A CASE STUDY OF KUAPUR GRAMPANCHYET OF CHANDRAKONA BLOCK II

Department of Geography
Chandrakona Vidyasagar Mahavidyalaya
Chandrakona, Paschim Medinipur

1. Study area (village/urban): ……..

2. Locality: …….…….. 3. Block: ……..…….
4. District: …….. 5. Police Station: ……

6. GPS Location: Latitude …… Longitude ……

(A) SOCIO-ECONOMIC PROFILE:

1. Name of the Respondent: .....
2. Age: Please Specify (in years) .....
3. Gender: (a) Male (b) Female : ……
4. Caste Category: (GEN/SC/ST/OBC//OTHERS): ……...
5. Educational Qualification: (Illiterate / Under Matriculate / Under Graduate / Graduate any other): ……
6. Residential Background: (Rural / Urban) : …….
7. House Position: (Pucca / Katchha / Semi Pacca):…..……..
8. Annual Income (Including all sources): ……
   (Below Rs. <5000 / Rs.5000-10000 / Rs.10000-20000 / Above Rs.20000>)
9. Source of Income generation per year in Rs.
   i. Agriculture……
   ii. Labour……...
   iii. Business…….
   iv. Service……...
   v. Others……..
   Fishing…….. Horticulture…..…….……
   Forestry…….. Livestock farming……

10. Which colour (category) of ration card does your family have? …….
(Above Poverty Line / Below Poverty Line / Below Poverty Line Yojana / No response)
11. What is your occupation? ……
(Household work / Agricultural Labour / Service / Business / Others)

(B) DEMOGRAPHIC CHARACTERISTICS:

Sl No.	Name of Family members	Relation to the Respondent	Sex (M/F)	Age (Year)	Marital Status (M/Um/ W/D/S)	Age at the time of Marriage	Level of Education (IL/P/S/ HS/G/PG/ O)	Occupational Status (F/L/B/S/O/ HW)

Sex: M-Male, F-Female

Marital Status: M-Married, Um-Unmarried, W-Widow, D-Divorced, S-Separated

Level of Education: IL- Illiterate, P-Primary, S-Secondary, HS-Higher Secondary, G-Graduate, PG- Post Graduate, O-Others (ITI, Nursery etc)

Occupational Status: F-Farmer, L-Labour, B-Businessman, S-Service Holder, O-Others, HW-House Wife

(C) PERCEPTION STUDY OF AGRICULTURAL ACTIVITES:

1. Agricultural Land in Possession (Bighas)

OWNED		LEASED. OUT		LEASED.IN		TOTAL	
Irrigated	Unirrigated	Irrigated	Unirrigated	Irrigated	Unirrigated	Irrigated	Unirrigated

2. Area under Land type (Bighas)

Land owner Category	Single cropped	Double cropped	Tripple cropped
Owned			
Leased-Out			
Leased-In			
Mortgaged in			
Total			

3. Seasonal Agricultural Activity

Season	Major Crops	Cultivated area (Bigha)	Time of Sowing	Time of Harvesting	Irrigation Based (Y/N)	Yearly Production (Tone)	Use of fertilizer (O/I)
Kharif							
Rabi							

Irrigation Based: Y-Yes, N-No
Use of Fertilizer: O-Organic, I-Inorganic

4. What is general cropping pattern of this area?

Pattern	Crop Sequences
1	
2	
3	
4	
5	
6	

5. Do you think the water supplied by irrigation system is Sufficient and Timely?
Yes …….. No ……

Explain reasons in case 'No'
…….....

6. Sources of Irrigation and Area (Bigha)

Source	Kharif season (Monsoon season)	Rabi season (Winter season)
Rain-fed		
DTW		
LLP		
Pond		
River Pump		
Canal		
Manual/ Animal driven well		
Others		

7. What types of Fertilizer did you use in your crop land?

Name of crop	Types of fertilizers							
	Urea		Triple Super Phosphate		Muriate of Potash		Gypsum	
	Quantity	Area Covered	Quantity	Area Covered	Quantity	Area Covered	Quantity	Area Covered
HYV Paddy								
Local Paddy								
Wheat								
Potato								
Vegetables								
Oilseeds								
Others								

8. Do you think you are applying enough fertilizers and pesticides for your farms?
    a. Fertilizers: Yes ……. No ……
    b. Pesticides: Yes ……. No ……
9. How many times you generally use pesticides: ……
10. Which type of pesticides do you use?

Name of Crops	Name of Pesticides	Price
Paddy		
Potato		
Vegetables		
Others		

11. Do you think that over the past five year, the per bigha production of HYV is-
    Increasing…… Decreasing…… At the same level……
12. If Decreasing please explain Why?
    ……
    ……
13. Do you have any drainage or flooding problem? Yes……. No……
14. Do you face the drainage or flooding problem in every season? (Yes / No)
15. How can you rate the flood situation of your locality?
    a) Very poor b) average c) good d) very good
16. Did you have any training in crop production? Yes ……. No ……..

If Yes provide details

Training Types	Duration	Organizers

Date: Signature of surveyor: