

# Developmental perspectives in the remote villages characterized with rugged topography in Garhbeta – I block of Paschim Medinipur District of West Bengal

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## Abstract

**Objectives:** This work deals with some remote villages characterized with rugged topography in the Paschim Medinipur district of West Bengal, India. The main objectives are firstly to analyze the physical background of the study area in relation to agricultural practice; Next to make crop suitability analysis and fertilizer recommendation for the agricultural development of the rural villages and also major thrust is given on the agro marketing.

**Methods:** In the selected villages a study is made on the physical background in relation to agricultural practice. Then crop suitability analysis is also done. Based on this analysis, fertilizer recommendation is done by increasing and reducing the amount of  $P_2O_5$  and  $K_2O$  and soil pH. Important and rational transport routes are identified through which agricultural surplus production are transported. Finally some suggestions are given for the overall development of the area.

**Findings:** The economy of the study area completely depends on the agriculture and specially the surplus production of potato and vegetables. Infrastructural development to the rural markets is also necessary especially for the agro marketing. The study area is characterized by rugged topography and prone to excessive erosion. So attention should be given on the soil and water conservation by construction of bunch, field channel, and barren land may be developed by fodder cultivation. For enhancing the agricultural production it is very much essential to adjust the amount of  $K_2O$ ,  $P_2O_5$ , pH for the various crops. Cashew nut cultivation and sabai grass cultivations are also suggested as because these cultivations are needful for infertile and laterite track and also bring economic benefits. Construction, repairing and maintenance of the road both rural road and main also need more attention as these roads are the mode of connectivity for agro marketing.

**Application:** Research work related to surplus production of crops and agro marketing can be applied for the management and development of the rural villages where agriculture is the back bone of the economy. Besides crop suitability analysis and fertilizer recommendation can also be applied for increasing agricultural production.

**Keywords:** Agro marketing, Remote villages, Marketable surplus, Production, Fertilizer, Crop suitability.

## 1. Introduction

Development of an area can be ensured by the required distribution of resources over space through optimum spatial interaction along rationally developed transport network. In the postmodern era, the study of "space" [1] has spurred the study of geography and which is rightly termed as spatial concept. In the present study, some spatial analysis [2] is done for upliftment of the villages. Perspective of development is very much dependent on the physical as well as the socio economic condition of a particular area. More over site and situation is also treated as the very important factors for development. Sometime due to remote location some areas remain under developed. My present paper is dealt with some remote villages characterized with rugged topography in the Paschim Medinipur district of West Bengal. In Paschim Medinipur district especially in the western and north western part is characterised with rolling soil and dots of hills and mounds. The area are subjected to high surface and sub surface runoff over laterite track, rill and gully erosion and which ultimately results into undulating track.

In the district the western and north western part are most backward area compared to its eastern part. Proper development of these areas is really very difficult as these areas suffer from remoteness and also situated in rolling track. So here a study has been made on the remote and rugged villages of Garhbeta I block where the rural economy is depends on the marketable surplus of the agricultural products.

## 2. Methodology

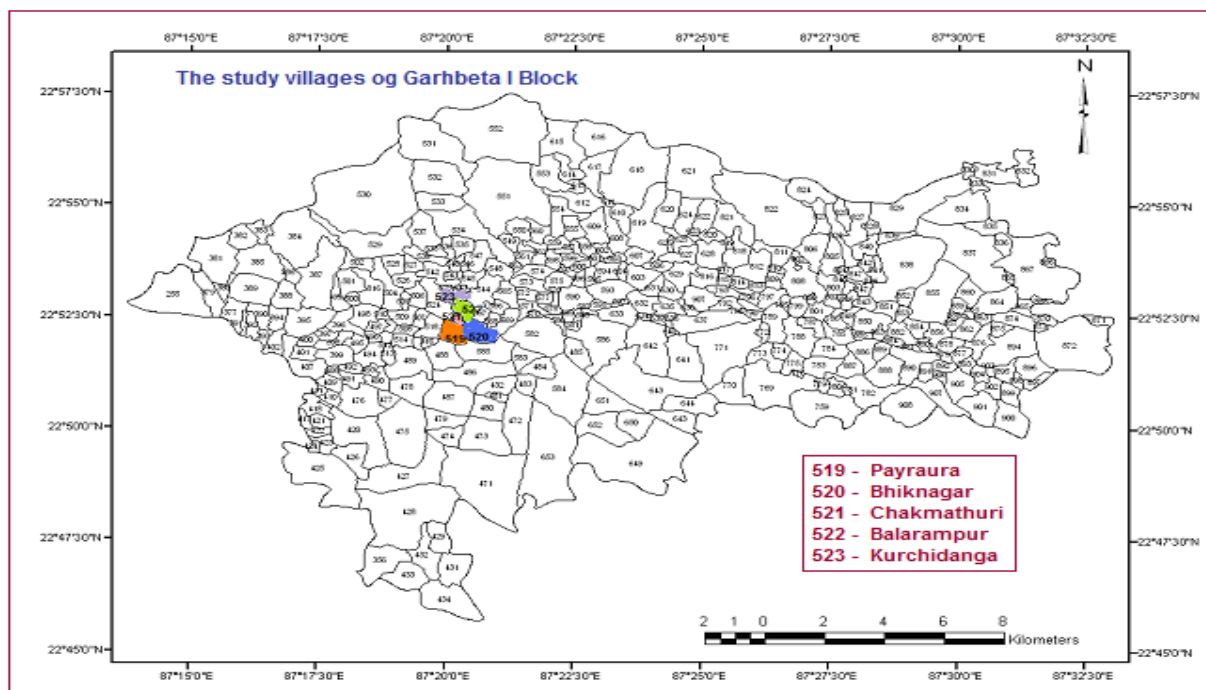
The subject of investigation for the study is to study the agricultural prospect in the remote villages characterized with rugged topography in the Garhbeta I block in Paschim Medinipur district. The methodology [3] followed for the study is as follows -

Firstly lots of study and literature survey is done related to the methods of agricultural analysis, crop suitability and agro marketing. In Garhbeta I block five mauzas are selected as the study areas. Then details study has been made about their physical and social back ground of the study area.

Then based on various primary and secondary information agricultural analysis are done especially on crop suitability and agro marketing and finally suggestions are given for the overall development of the study area. Data is collected from both primary and secondary sources.

Primary data are collected from the selected villages like door to door socio economic survey, collection of soil sample, ground water level etc and socio economic data are collected from D.L.L.R.O (District Land and Land Reform Office), A.D.O (Additional development Officer) of Garhbeta –I etc. Statistical data on soil characteristics (pH, soil P2O5, soil K2O), mauza wise cropping pattern, irrigation data etc also collected from secondary sources.

Figure 1. Location map of the study area



Source – Garhbeta I Panchayet Office

## 3. The study area

Garhbeta I block (Figure 1) of Paschim Medinipur is situated in the extreme north part of the District. It is bounded by Bankura and Hooghly in the north and the other side by Garhbeta II and III, Chandrakona I and II blocks. The study area covers the five villages of Garhbeta I block, which are Payraura (JL No 519), Bhiknagar (JL No 520), Chakmathuri (JL No 521), Balarampur (JL No 522), and Kurchidanga (JL No 523). Among these villages Payraura is situated under Amlagora Gram Panchayet and the others are situated on Agra Gram Panchayet.

### 3.1. Physical background of the study area

The study area is situated in the laterite track with little undulation. Average elevation of the study area is 60 m. In the Garhbeta I block mainly two types of geologic formation are found. One is older alluvial and the other is the younger alluvial. But the study area is under younger alluvial and which mainly spread along the river Silaboti and its tributaries. Older alluvial is spread over the other portion of the block. Sometimes the riverside area is characterized by the older alluvial and which is topped by laterite formation. Here in the study area Main River is Silaboti. The tributaries of the river Silaboti predominantly extends throughout the study area. In the Garhbeta I block 85% soil is laterite and 15% soil is under alluvial formation.

Table 1. Table is showing the ground water level of the selected mauzas in pre monsoon condition

Mauza no	Groundwater depth (mbgl)
519	4.5
520	4.9
521	4.4
522	6.2
523	6.5

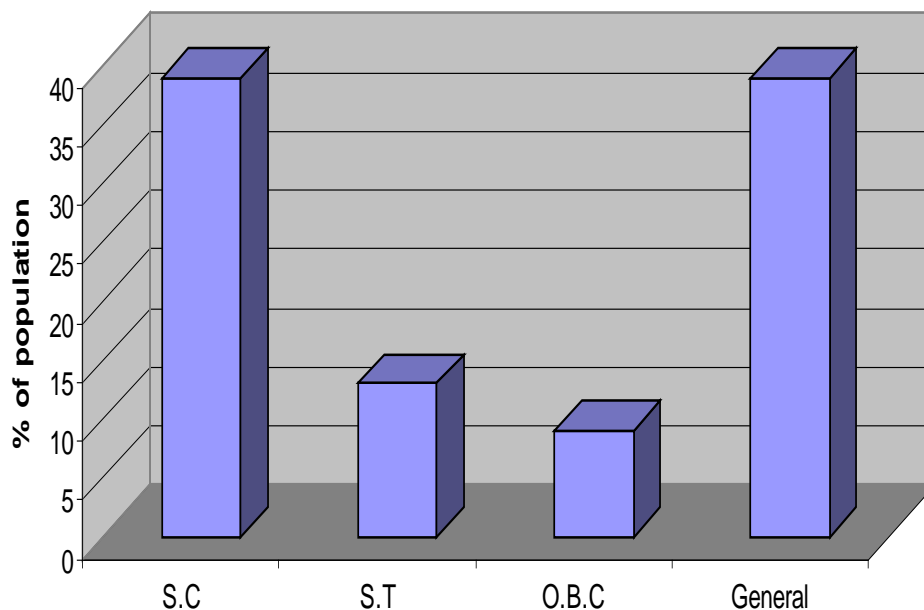
Source- primary data

In laterite soil iron and aluminum concentration is much higher. Generally laterite track is found in the elevated track of the area. In the study area mainly two types of alluvial formation are found, which are older and younger alluvial. The study area is mainly covered by two textural types such as sandy loam and laterite sandy loam. In sandy loam type of soil amount of sand is higher than the loam. In the study area maximum part of the selected five mauzas are covered by this type of soil. In laterite sandy loam type there is iron oxide concentration. It is also found in scattered condition in the study area. Average water depth below ground level of the block is 6.74 in pre monsoon and 1.97 in the post monsoon condition. Mauza wise data of ground water depth were collected during the field survey (Table 1).

### 3.2. Socio economic and demographic scenario of the study area

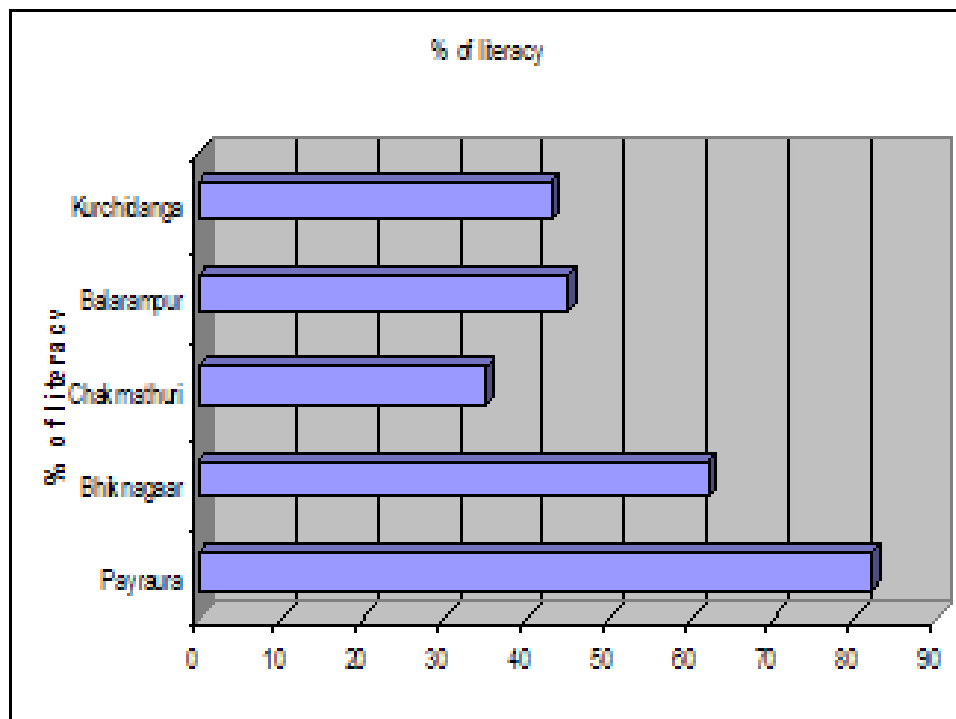
In the study area 300 households are surveyed selecting more than 50 households from each village. In Payraura, Bhiknagar, Chakmathuri, Balarampur and Kurchidanga villages 86,56,20,32 and 26 households are surveyed respectively. The Payraura and Bhiknagar registered higher population than the other mauzas. The caste structure of the study area shows a varied character.

Figure 2. Caste Structure of the Study Area



The area is covered by backward classes. S.C (Figure 2) population is higher in the study area. Percentage of general is almost equal with the S.C population. S.T and O.B.C has comparatively low percentage. From the Figure 3, it is clear that literacy rate is higher in Payraura mauza (more than 80%) and lowest in the Chakmathuri mauza (less than 35 %). In the other mauzas literacy rate is also very high. Level of education attend is also very low in the study villages. Secondary level shows the higher percentage. Whereas higher education is very low. This is mainly because of the low economic condition of the study area. Drop out level simply shows the percentage of student who have not completed their education. In the study area drop out level is much high. It is highest in the primary level. This is mainly because the people are not able to study up to higher class. Overall monthly income and expenditure is very low in the study villages. From the above discussion it is clear that the socio economic condition under developed.

Figure 3. Percentage of literacy



#### 4. Result and discussion

##### 1. Agricultural scenario of the study area

The district of Paschim Medinipur is mainly land of agriculture and more than 80% of the total population are residing in the villages and agriculture or agro based industries are the backbone of the rural economy of the district. The study area is situated by the side of the Silaboti River. Here in the river side area agricultural practice is done. Main agricultural products are paddy (aus, Amon, boro), potato, vegetables, tile etc. The study area is mainly surplus potato producing area. Vegetables also show surplus production. In the study areas expect the river side area maximum area covered by laterite soil which is most disadvantageous and this requires soil conservation measures. A major agricultural problem of the study area is poor market infrastructure [4] and also distance from the market.

Table 2. Mauza wise cropping pattern of the study area

Mauza No	Cropping pattern
519	Vegetables, Aus, Amon, Boro, Til, Potato
520	Vegetables, Aus, Amon, Potato, Til
521	Vegetables, Aus, Amon, Potato, Til
522	Vegetables, Aus, Amon, Boro, Til, Potato
523	Vegetables, Aus, Amon, Boro, Til, Potato

**2. Cropping pattern of the study area**

Table 2 shows the mauza wise cropping pattern of the study area. The main crops are paddy, potato, vegetables, till.

**3. Cultivated area of the study area**

In the study area among the various mauzas Kurchidanga has the highest cultivated area to total geographical area. Payraura, Chakmathuri, Balarampur also registered more than 68% area under cultivation (Figure 4). Bhiknagar registered comparatively low cultivated [5] area among the study mauzas.

Figure 4. Percentage cultivated area

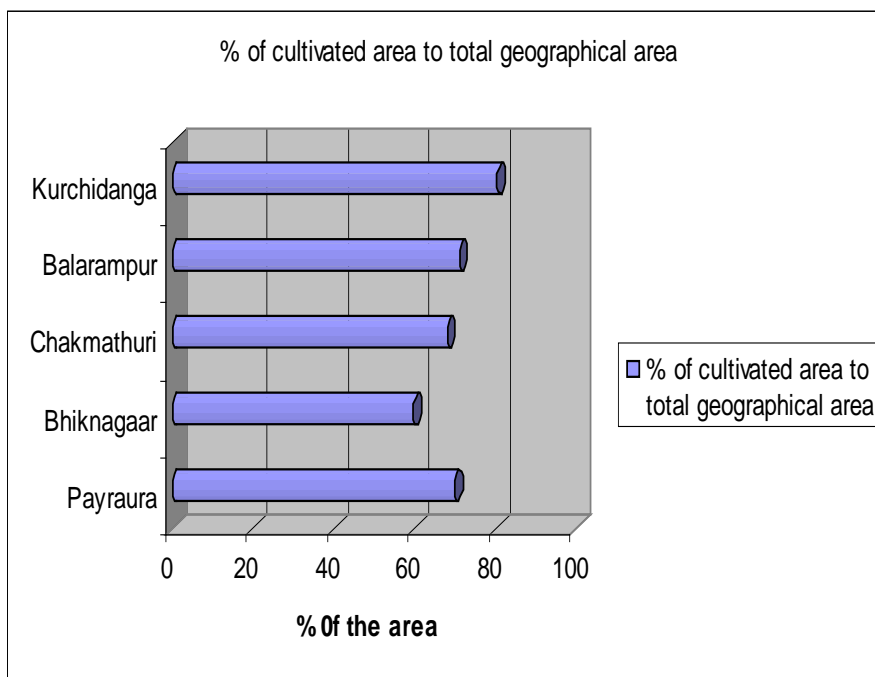
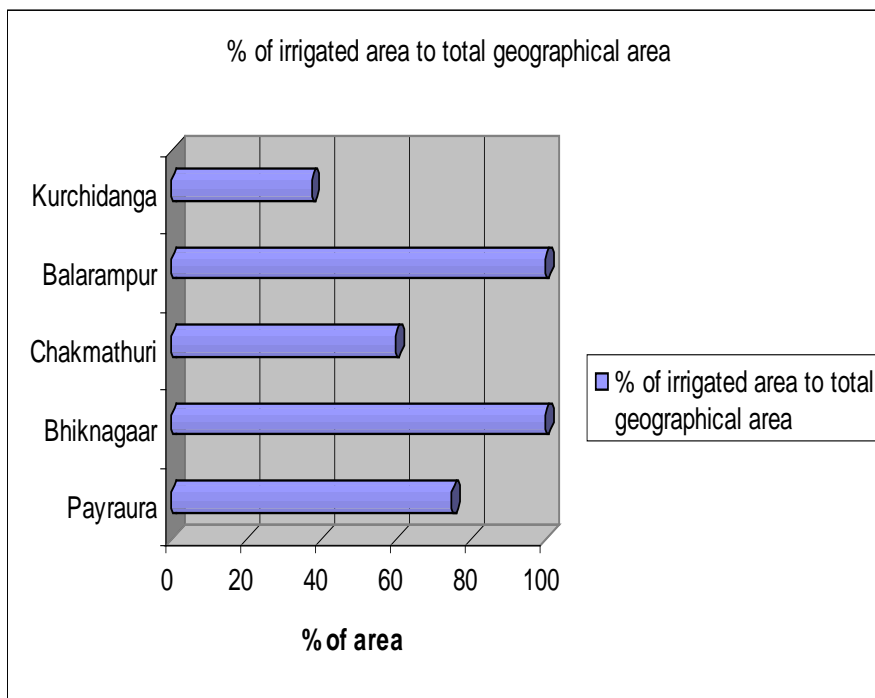


Figure 5. Percentage of irrigated area



#### 4. Irrigated area of the study area

In the study area agriculture is very much depends on irrigation. Here the various sources of irrigation are HDTW (High Capacity Deep Tube well), MDTW (Medium Capacity Deep Tube well), River lift irrigation, tank irrigation. In the study mauzas Bhiknagar and Balarampur have 100% area under irrigation. Chakmathuri and Payraura have 60 % and 75 % area under irrigation and Kurchidanga have 37.5% area under irrigation (Figure 5).

#### 5. Agricultural production and marketable surplus of the study area

Paddy, potato, vegetables, oilseed is the main agricultural products of the study area and some of them earned marketable surplus of this region. Here in the study area total production of potato is 257.85 Metric Ton. Out of this about 200.84 Metric ton recorded as marketable surplus in the study area. Domestic consumption is much less as the marketable surplus is much higher. Out of the five mauzas Kurchidanga shows maximum marketable surplus [6] for potato. The economy of the village is mainly based on the marketable surplus of the potato (Table 3). In case of vegetables including both Rabi and kharif vegetables the study area is also ranked as a higher productive area in respect to the whole Paschim Medinipur District. Total production of vegetables in the study area is 310.32 Metric ton. Out of which marketable surplus of the vegetables in the year of 2004-05 is 200.84 Metric ton (Table 4).

Table 3. Total production of potato in 2004-05

Mauza	Production (in m ton)	Retention as seed	For domestic consumption	For other purposes	Marketable Surplus
Payraura	59.66	4.17	7.15	1.78	46.27
Bhiknagaar	40.00	3.90	4.80	1.21	31.20
Chakmathuri	45.76	4.18	5.49	1.37	35.69
Balarampur	50.28	4.39	6.03	1.50	39.21
Kurchidanga	62.15	4.68	7.45	1.86	48.47

Table 4. Total production of vegetables in 2004-05

Mauza	Production	Retention as seed	For domestic consumption	For other purposes	Marketable Surplus
Payraura	65.00	0.32	14.95	3.57	46.15
Bhiknagaar	55.78	0.27	12.82	3.06	39.60
Chakmathuri	59.85	0.29	13.76	3.29	42.49
Balarampur	62.77	0.31	14.43	3.45	44.56
Kurchidanga	66.92	0.33	15.39	3.68	47.51

In case of vegetables domestic consumption is much higher than in case of potato. But it is also an important product for marketable surplus in the region. Paschim Medinipur district is surplus rice producing District. But in the study area surplus production of potato and vegetables are much higher than the paddy. In the study area total production of paddy in the year of 2004-05 is 588.70 Metric Ton. And the amount of total marketable surplus is 194.26 Metric ton (Table 5). In case of paddy production is much higher but the marketable surplus is much low as the amount for domestic consumption is much higher in case of paddy in the study area.

Table 5. Total production of paddy in 2004-05

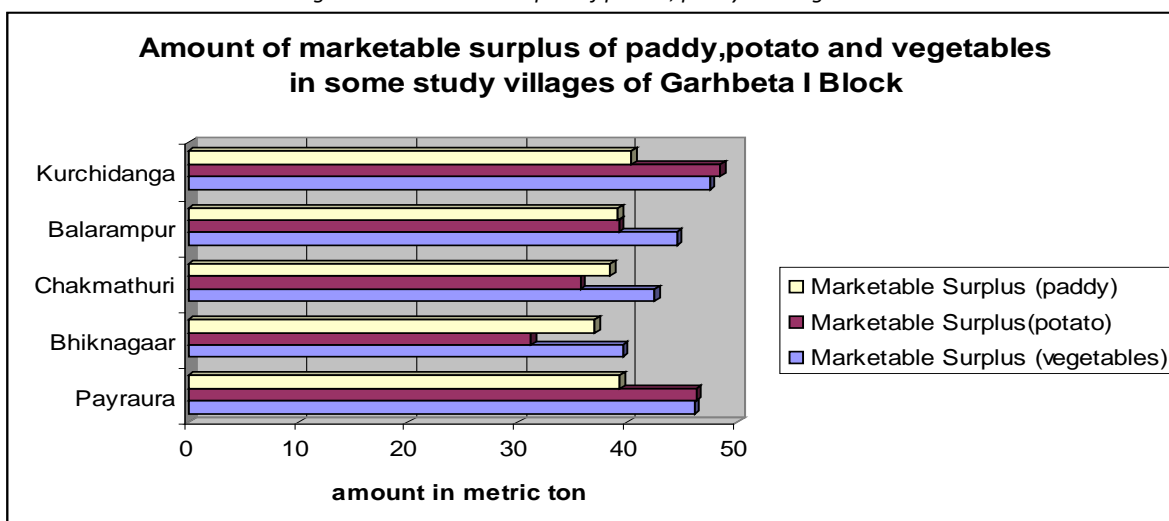
Mauza	Production	Retention as seed	For domestic consumption	For other purposes	Marketable Surplus
Payraura	119.16	4.76	73.88	1.19	39.32
Bhiknagaar	112.23	4.48	69.58	1.12	37.03
Chakmathuri	116.43	4.65	72.18	1.16	38.42
Balarampur	118.54	4.74	73.49	1.18	39.12
Kurchidanga	122.34	4.89	75.85	1.22	40.37

#### 6. Comparative analysis of marketable surplus

Figure 6 shows a comparative analysis of marketable surplus of paddy, potato and vegetables over the five study mauzas of Garhbeta I Block. Potato rank first in surplus production in the study area, then vegetables and then paddy.

Kurchadanga and Payraura scored highest in surplus production of potato and vegetables. Balarampur and Chakmathuri show more surplus production of vegetables. And Bhiknagar registered comparatively low surplus production for potato than paddy and vegetables out of the five mauzas.

Figure 6. Marketable surplus of potato, paddy and vegetables



### 7. Marketing system

The transport link can effectively clear the marketable surplus and ultimately help in reaching the market [7]. The major transport links are motorable vehicles and bullock carts in the study area for the nearest market centers. For the comparatively distant market centers road link and rail link between Khargapur and Garhbeta (54km) offer the means of connectivity. The nearest market centers are Amlagora, Garhbeta, Raskundu etc and other comparatively distant market centers are Chandrakona Road, Godapiasal and Medinipur Sadar (Table 6). In the study area the surplus products are mainly potato and vegetable and little amount of paddy.

Table 6. Important routes for the movements of marketable surplus

Name of road link	Distance	Imp market centers linked up	Agricultural products transported
Garhbeta - Amlasuli	20km	Garhbeta, Amlagora, Hoomgarh, Amlasuli	Potato, Vegetables
Garhbeta - Kharkusma	12 km	Garhbeta, Moyrakata, Kharkushma	Potato, Vegetables
Garhbeta - Medinipur	30km	Garhbeta, Chandrakona Road, Salboni, Godapiasal, Medinipur Sadar	Potato

### 8. Crop Suitability analysis

Crop suitability analysis [8], is also done for the five mauzas of the study area. The analysis is done by collecting the soil sample from the study area and then which is tested in the laboratory. Table 7 shows the test result.

Table 7. Crop suitability analysis

Mauza	P2O5 (Kg/hect)	K2O (Kg/hect)	Soil pH	Organic Matter Kg/hect
Payraura	18.5	44.63	5.7	0.370
Bhiknagaar	17.43	62.65	5.8	0.390
Chakmathuri	15.02	55.78	5.6	0.415
Balarampur	16.07	78.54	5.5	0.420
Kurchidanga	18.05	65.20	5.7	0,450

Source – Primary Data

**P<sub>2</sub>O<sub>5</sub>** – Amon and Aus paddy prefers 25 kg /hec P<sub>2</sub>O<sub>5</sub> during its maximum growth seasons. Boro crop however prefers a more 60 kg/hect. Potato on the other hand prefers 150 kg/hect at the initial stage of its growth. The amount varies 50 - 100 kg/hect for the vegetables. But in the study area amount of P<sub>2</sub>O<sub>5</sub> is very minimum in respect to the requirement.

**K<sub>2</sub>O** - Amon and Aus paddy prefers 25 kg /hec K<sub>2</sub>O during its maximum growth seasons. Boro crop prefers a more 60 kg/hect. Potato on the other hand prefers 150 kg/hect at the initial stage of its growth. The amount varies 50 - 100 kg/hect for the vegetables, sweet potato, oilseeds. But in the study area amount of K<sub>2</sub>O is much higher than its requirement.

*Table 8. Table providing fertilizer recommendation*

Crops	Soil pH	Soil K <sub>2</sub> O	Soil P <sub>2</sub> O <sub>5</sub>	Areas of cultivation	Suggestion
Aus paddy	5.0-6.7	25	25	All the mauzas	Reducing the amount of K <sub>2</sub> O
Amon paddy	5.0-6.7	25	25	All the mauzas	Reducing the amount of K <sub>2</sub> O
Vegetables	5.5 – 7.6	30-100	30-100	All the mauzas	By increasing P <sub>2</sub> O <sub>5</sub> .
Potato	5.0 – 5.6	150	150	All the mauzas	By increasing the amount of P <sub>2</sub> O <sub>5</sub> and reducing K <sub>2</sub> O

## 9. Other suggestions for areal development

1. The economy of the study area is completely depends on the agriculture and specially the surplus production of potato and vegetables. So attention should be given on the cultivation and more production of crops by supplying more minikits (HYV), supply of fertilizer kids, supply of agricultural equipments and training to the farmers from the Gram Panchayet.
2. The study area is characterized by rugged topography and prone to excessive erosion. So attention should be given on the soil and water conservation. This can be done here by construction of bundh, field channel; barren land may be developed by fodder cultivation [9].
3. Rain water harvesting is also suggested here especially in the dry season when the scope of river lift irrigation is limited.
4. As the villages are situated by the side of the Silaboti river pisciculture may be developed in the area in a larger form and it will become another source of income to the rural villagers. Various SHG may extend their hands for making fisherman community, awareness camp, fisherman shed, and assistance to the fisherman for pisciculture.
5. Infrastructural development to the rural markets is also necessary specialty for the agro marketing.
6. In the laterite prone dry areas main problem of agriculture is lack of irrigation. And agriculture is totally rain fed and depends on the rainfall in the rainy season. For this selection of long term paddy seed should not be preferred here. Generally drought resistance paddy variety should be preferred here like Kalyani 2, Hira, Khanika, Bandhan, Narendra dev Rabi etc.
7. In case river lift irrigation repairing of RLI pump is also required. Construction of embankment is also suggested for flood control.
8. Construction, repairing and maintenance of the road both rural road and main road (already mentioned earlier) also need more attention as this are the mode of connectivity for agro marketing. In this connection Garhbeta Medinipur, Garhbeta Medinipur and Gargbeta Kharkusma roads are in the priority list.
9. For enhancing the agricultural production it is very much essential to adjust the the amount of soil K<sub>2</sub>O, P<sub>2</sub>O<sub>5</sub>, pH for the various crops. And in this regard suggestions have already made on Table 8 for the various mauzas.
10. Cashew nut cultivation can be extended here in the laterite soil, which also proves very much economic. Already in the some parts of the Garhbeta I Block cashew nut cultivation is done. But for the proper scientific way should be followed. For this proper selection of cashew nut group is necessary like BL, A-39- 4, H 2/15, H 2/16 etc. And the land will be either with middle or high elevation with profuse amount of sunlight [10].



11. Proper selection of seed, proper application of fertilizer, and scientific way of agriculture can increase the production of cashew nut. Increased production of the cash crop like cashew nut can be sent to the various markets in and out of Bengal, which can bring money to rural people. This can be treated as a supplementary agriculture along with other cultivation in the study is and this is also economically fruitful.
12. Sabai grass (*Eulaliopsis binata*) cultivation is another alternative cultivation in the laterite prone areas and this can be implemented in the study areas also. Especially after the cultivation of paddy in the kharif monsoon, it is difficult to cultivate other crops as the soil nutrients completely exhausted. In this situation sabai grass cultivation really proves very fruitful. Sabai grass has multi purpose utilization. Various products like rope, bag, hat, furniture can be made from the sabai grass. Another thing like paper and paper pulp is also by product of this grass. Besides all these sabai grass cultivation restricts soil erosion and increase the fertility of the soil. Various research works regarding cultivation of sabai grass in proper scientific way is going on under Rural Development centre of IIT Kharagpur. So in the study area if this cultivation can be done specially in the wasteland areas, then it will be another source of income in the rural villages.

## 5. Conclusion

In the remote and rugged terrain of the study villages of Garhbeta I block, surplus agricultural production is the only source of income. Here the agro marketing of potato and vegetables is the main source of income. And the economic condition of the villages is also very poor. So in this situation more attention is needed for the increasing production and agro marketing. For increasing production, crop suitability analysis is done with suggestive fertilizer recommendation which enhance the production for marketing. The efficient marketing of surplus products can earn optimum profit for the agricultural communities which can ultimately be used for reinvestment and economic as well as social development.

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