

Impact of Natural Resource on Socio-economic Status of Sagar Island. West Bengal, India

¹ Manas mondal, ² Satyabrata Mandal

^{1,2} (Asst Teacher in Geography & Research Scholar)

Abstract

This paper deals with impact of natural resources on socio-economic status of Sagar Island, West Bengal, India. It conceived through the integration of various factors like available land & water resources, existing agricultural production, soil fertility & climatic factors influence socio-economic status of the inhabitants in our study area. Here we have tried to discuss major parameters, which directly or indirectly controlled socio-economic condition of this island. In rural area maximum no of peoples are depends on existing natural resources. This area is also dependent on natural resources. Agriculture, Soil & Water resources are the prime indicators of socio-economic condition of our study area. The growing population has been exerting tremendous pressure as well between 2002 to 2011, the land available for aman agriculture had sunk from 14700 to 14170 hectares with the rise in population settlements have also increased from 28398 to 42382 (Census of India 2001 & 2011). Therefore total population are also increasing in rapid way. In 2001 total population was 180408. It converted to 206801 in 2011. The average land holding is 0.82 hectare per family & about 0.084 hectare per capita. The national average of operational land holding is 1.33 hec per capita. Naturally agriculture is no longer a prefer livelihood option for the younger generation. The assets created by the father has little value for the son, who has to start his struggle all over again. For this he either has to migrate or get trained in a skill that will help him earn a livelihood. They have little freedom to choose from available career options. The range of soil PH belongs to 6.3 to 8.2 in normal temperature (22 °c). EC varies from 0.34 to 1.75 (dsm⁻¹). Therefore org.c (%) varies from 3 to 12.2. However soil fertility is also discussed here to understand the productivity of soil. In entire region range of clay belongs to 32.1 -48.3. N varies from 156 to 292 (Kg ha⁻¹). P2O5 varies from 22 to 79. k2o goes through 442 to 936. Available potassium (kg ha⁻¹) range is 8.5 to 32.2. Available sulphur (mg kg⁻¹) varies from 5.5 to 37.2. Available zinc (mg kg⁻¹) range is 2.5 to 10.2. Ponds & internal canals are only variable source of irrigation in this island, which cover 7.51% & 14.25% of total cultivable upland & midland respectively. Studies of quality of irrigation water indicate that saline irrigation water is the major problem in this study area. Lowest EC value (0.43-0.91 dsm⁻¹) is obtained for pond water followed by internal canal water (EC 12.24 to 19.36 dsm⁻¹) and river water (EC 16.09 to 21.96 dsm⁻¹). The higher EC value of river water might be due to its close connection with the sea. Low EC value of pond water (≤0.92 dsm⁻¹) indicates that it would not lead to soil salinization if used for irrigation purposes.

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I. Introduction:

Etymologically ‘resource’ refers to two separate words ‘re’ and ‘source’ that indicate any thing or substance that may occur unhindered many more times. The term ‘resource’ had no special significance till the early part of the twentieth century. After the use of various resources in various fields, it is very popular term in economic geography. Resource popularly signifies: a) A source or possibility of assistance b) An expedient c) Means of support d) Means to attain given end. e) Capacity to take advantage of opportunities.

Resource can be subjective as well as objective. Subjective resource denotes internal resource, objective resource is external resource. According to Prof Zimmermann: “The word resource does not refer to thing or a substance but to a function which a things or a substance may perform or to an operation in which it may take part namely the function or operation of attaining a given end such as satisfying a want”.

Sagar Island such an area which despite its tremendous economic potentiality is lagging behind in comparison with many other areas which are in geo-economic, geo-environmental and geo-hydrological in same region. This study is emphasize on finding out the utilization of natural resources & their impact on present people as well as upcoming people & the reasons behind the backwardness, identifying the areas of potentials and highlighting the prospects therein.

Study area:

Sagar Island lies on the continental shelf of Bay of Bengal having the island area of about 251.59 sq km with 43 villages and with population of over 180408 with population density of 717 / sq km (2001). The study area extended from 21° 37' N to 21°52' N and 88°02' E to 88°11'E. The Island has scattered Mangrove swamp, waterways and small rivers. Low laying rice production system is pre dominated. Tidal ingression, inundation of cropped land, cyclonic storm often hamper the kharif-rabi production system of Sagar Island, Severe meteorological drought and extreme rainfall event frequently disrupt the crop production. In the last 30 years population increased rapidly in this study area. Majority of them infiltrate from neighboring districts. In 1991 census the total population and the population density were 149222 and 593/Km², which increase to 180408 and 717/Km² respectively in 2001. In the 2011 census total population was 203074. Total area of the island is 251.59 Km² of which 116.83 Km² is not available for cultivation. 134.76 Km² has been considered as agricultural land of which 114.47 Km² areas is un-irrigated. Only 13.31% land is benefited by irrigation.

Objectives:

.The objectives for this thesis are drawn to address the study rationale listed below as:

1. To analyze the existing socio-economic and environmental status of Sagar island in order to identify environmental issues and problems.
2. To evaluate the existing schemes and their appropriateness with the utilization of present natural resources in the socio-economic settings.

Data Base & Research Methodology:

The present study is based upon primary field data which are mainly collected at the time of field survey. Here 10 % household data are collected in random sampling method to the total house hold. Soil sampling at one kilometer grid interval has been done for our study area. The analysis of macro & micro nutrients of this area has been completed. Therefore secondary data are also collected to fulfill this work. For effective discussion various government reports, national & international journals & books have been followed. Therefore we have also collected 321 GCP (Ground control point) by GPS.

Findings & Analysis:

Topographically this island has no significant variation. In socio economic status this study area has been considered as backward region. It has some major problems, which are adversely affecting the socio economic condition of the inhabited people. The present area of study is characterized by several physical and non-physical constrains which reduce the use of natural resource as well as economic status of the inhabitants. To build up a strategic framework of natural resource management some basic research questions are herein reported.

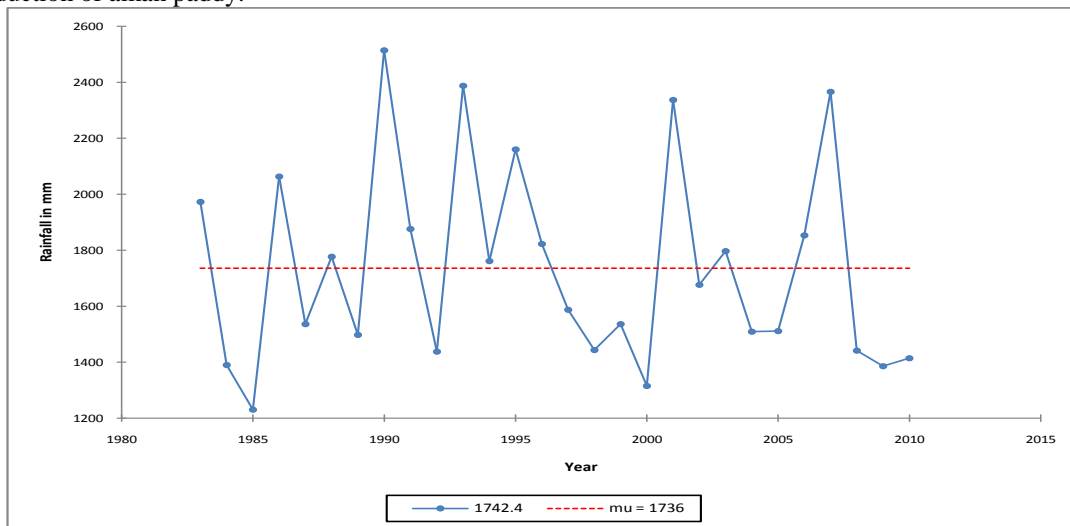
Agricultural Resources:

Agriculture is one of the most human activities. It is still one of the main sources of income. The traditional Agricultural system has been found in this study area. Most of the people (more than 70%) are Corley depend on agriculture. Maximum area is considered as monocarp. Rice- rice crop sequence is principally followed in the area with vegetables & oilseeds in some pockets of upland & medium land. Marginal farmers owned the major share of total cropped area in comparison to small farmers. For both the categories maximum yield was obtained from upland (2.90 – 10.65 tonha) while the minimum yield was recorded from lowland (1.82- 2.14 ton ha). Cropping intensity was maximum in midland area followed by upland & lowland areas. Upland & midland areas are considered as double crop in some pockets of this study area. Lowland areas are mostly monocrop except few patches remained fallow during the rabi season. *Aman* is cultivated in monsoon season. The total area is 12803 hectares covering for *Aman* cultivation. Total production is 24.302 thousand metric ton, and yield is 1898.12 Kg/hectars (District Statistical Handbook, 2008). *Boro* is mainly cultivated in post monsoon season. 73 hectares is covering for *Boro* cultivation. Total production is 0.250 thousand metric ton and yield is 3429.07 Kg/hectars (source- census of India 2001).The production of aman paddy is very low and fails to offer decent returns to the farmer 1.5 to 2 tones per hectare against a national average of 3.28 tones per hectare. The income is to the tune of Rs 6000 per acre against an investment of Rs 4000 per acre in monsoon season. There are three dominant reasons why agriculture will remain subsistence in this study area. Firstly the land holdings are small. There is also land loss to deal with. Finally there is a limited potential to develop irrigation facilities , which means multi-cropping cannot be practiced extensively. The growing population has been exerting tremendous pressure as well between 2002 to 2011, the land available for aman agriculture had sunk from 14700 to 14170 hectares with the rise in population settlements have also increased from 28398 to 42382 (Census of India 2001 & 2011).Therefore total population are also increasing in rapid way. In 2001 total population was

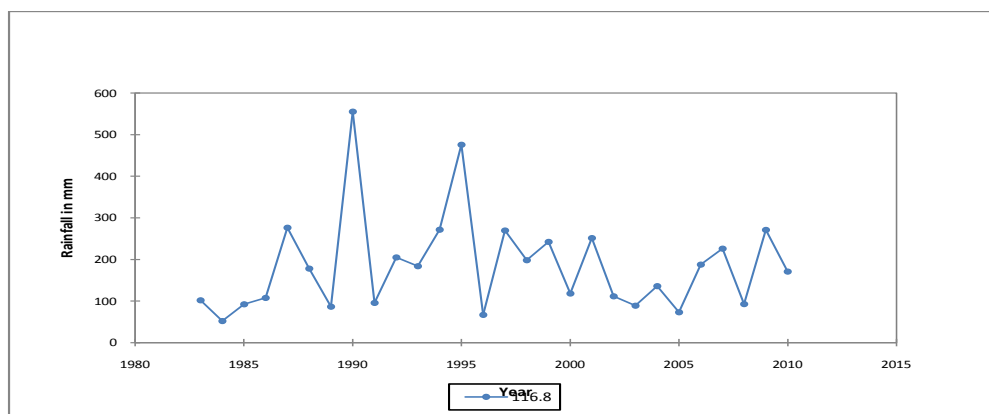
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180408. It converted to 206801 in 2011. The average land holding is 0.82 hectare per family & about 0.084 hectare per capita. The national average of operational land holding is 1.33 hectare per capita. Apart from all this there are governance deficits and institutional shortcomings that do not allow farmers of our study area to get a better price for whatever little they produce. Development of rural infrastructure with proper marketing and storage facilities are the necessary pre-requisite for successful rural agro based industries. Ease of transportation is an integral part of proper infrastructure. In the entire study area this infrastructure is minimal. This lack sometimes leads to huge losses for the cultivators. Sagar is famous for the production of watermelon. With no proper storage, transport, credit & marketing facilities their producers do not get any opportunity to sell these non-food grain crops in distant places at competitive prices. There is no cold storage in entire area. Naturally agriculture is no longer a preferred livelihood option for the younger generation. The asset created by the father has little value for the son, who has to start his struggle all over again. For this he either has to migrate or get trained in a skill that will help him earn a livelihood. They have little freedom to choose from available career options.

During hot summer season the average temperature is 35°C and 65% to 70% average humidity is the major problem for summer cultivation. In this study area agricultural system is totally dependent on monsoon rainfall. To analyze variability of monsoon 30 years rainfall data have been collected. Pre-monsoon & monsoon rainfall graph have been drawn to show actual variability of rainfall. Rainfall is primarily controller of production of aman paddy.



Annual distribution of monsoon rainfall



Annual distribution of pre-monsoon rainfall

Water Resources:

Irrigation system is very poor in this study area. Most of the canals and creeks are full of brackish or saline water. This type of water has no utility for irrigation. Ponds & internal canals are only variable source of irrigation in this island, which cover 7.51% & 14.25% of total cultivable upland & midland respectively. Studies of quality of irrigation water indicate that saline irrigation water is the major problem in this study area. Lowest EC value (0.43-0.91 $ds\ m^{-1}$) is obtained for pond water followed by internal canal water (EC 12.24 to 19.36 $ds\ m^{-1}$)

¹) and river water (EC 16.09 to 21.96 dsm^{-1}). The higher EC value of river water might be due to its close connection with the sea. Low EC value of pond water ($\leq 0.92 \text{ dsm}^{-1}$) indicates that it would not lead to soil salinization if used for irrigation purposes. Shallow pump system is totally absent in this area. P.H.E. pump stations are also situated for domestic purpose. But they do not supply adequate water. As a result especially summer agriculture system is hampered due to proper irrigation system. No ground water irrigation scheme yet been implemented for Rabi crop production.

The fresh drinking water is totally depends on ground water. The dipper aquifers are located in between 180 to 330 meters below ground level (Das, 91) and the fresh water tapped by means of small diameter tube well fitted with hand pump. Dug well produced saline water. Deep tube well set up is very costly. The existing numbers of tube wells are insufficient for the inhabitants. The scarcity between water demand and availability is one of the prime problems of the study area.

Soil Resources:

Soil sampling at one kilometer grid interval has been done for our study area. Here 296 soil samples have been collected. The analyses of macro & micro nutrients of this area have been completed. In this area physio-chemical property of soil has been analyzed. The range of soil PH belongs to 6.3 to 8.2 in normal temperature (22 °c). EC varies from 0.34 to 1.75 (dsm^{-1}). Therefore org.c (%) varies from 3 to 12.2. However soil fertility is also discussed here to understand the productivity of soil. In entire region range of clay belongs to 32.1 -48.3. N varies from 156 to 292 (Kg ha^{-1}). P₂O₅ varies from 22 to 79. k₂o goes through 442 to 936. Available potassium (kg ha^{-1}) range is 8.5 to 32.2. Available sulphur (mg kg^{-1}) varies from 5.5 to 37.2. Available zinc (mg kg^{-1}) range is 2.5 to 10.2. Basically physiochemical properties & fertility of soil are totally controlled the productivity of soil. Paddy is the principle crop of this entire area. Battle is cultivated for the economic supports of the inhabitants. Other vegetable crops are also cultivated to fulfill the local demand. In winter season Green chilly & Watermelon were the main commercial crops in few years ago. But now they are totally ignored for poor production. The study area is considered as a coastal zone. So the soil of that area is clayey in nature, enclosed with saline type sandy-clay soil that spread mostly in the inward side of the boundary walls. This belt of soil remains uncultivated throughout the year.

Present Socio-economic conditions:

In the last 30 years population increased rapidly in this study area. Maximum no. of peoples are infiltrate from neighboring districts. In 1991 census the total population and the population density were 149222 and 593/ Km^2 , which increase to 180408 and 717/ Km^2 respectively in 2001. In 2011 total population & population density are 206801 and 821.98/ km^2 . The total area of the island is 251.59 Km^2 of which 116.83 Km^2 is not available for cultivation. 134.76 Km^2 has been considered as agricultural land of which 114.47 Km^2 areas is un-irrigated. Only 13.31% land is benefited by irrigation. Thus a huge amount of lands are still un-irrigated. For a long time this area demands immediate implementation of sustainable irrigation system to fulfill the target production of crop.

Only 38% of the area covering a population of 40% of Sagar Island are developed indicating that more than 60% of the area and population are backward. In this backward area maximum no. of inhabitants belongs below poverty line. As a result multi-dimensional poverty is the major problem in this area. The poor suffer deprivation in multiple ways, low level of income, illiteracy, relatively high level of mortality, poor infrastructure, lack of voice, and poor access to resources such as credit, land, water and forests. The H.D.I. index of this study area is 0.55.

Poor health facilities have been found in this study area. Only one rural hospital is situated in this Island. Therefore 3 primary health centers and 1 Nursing home is available here. Only 87 beds are present for the patient. A huge number of patients do not get proper treatment. As a result mortality rate is also greater than other islands. Therefore poor people do not take sufficient nutrient. Immunity power is very poor. So they do not resist severe disease. A great number of peoples are suffering from various chronic diseases.

Transport system is still poor in the study area. Only a terminating bus route (30 Km North-South directions) is considered as the lifeline of the island. Recently few metalled roads also developed under Rajiv Gandhi Gram Sadak Yojana. 8 ferry services also available in this area. Un-metalled road is the main communication network for the villagers. There is no railway line in this area. Government of West Bengal is planning to connect Sagar Island with the main land with a 3.3 k. m bridge costing around R.S- 6000 million. West Bengal Government is also planning to build a deep sea port in the south western coast of the island.

Recommendations:

Sufficient natural resources are present in this island. But lacks of proper utilization knowledge, most of the resources are not in position for use. So proper planning & guideline is very necessary for actual utilization of resources.

- Agricultural activity is not satisfactory in summer & winter season in still now. Poor irrigation facility is the main problem for these seasons. So better irrigation facility should be arranged by government for more production.
- To mitigate the climatic change effects on agricultural production & productivity, a range of adaptive strategies need to be considered. Changing cropping calendars & pattern will be the immediate best available option with available crop varieties to mitigate the climate change impact.
- The role of P.H.E should be more active to serve fresh drinking water to all inhabitants of the island.
- More health stations should be build up to get adequate medical facility.
- 100 % electrification is very necessary for the socio-economic development of this island.
- At present natural beauty in the name of “Tourism industry” & tourists as people who “travel & stay in places outside their usual environment & enjoy your environment & pay for it”. This island has ample scope to attract people & earn money from her natural beauty of ocean. More hotels & resorts are to be set up for this ecotourism industry.

Conclusion:

Different researchers have been assessed the Natural Resources of Sagar Island. With all these previous studies carried out in the area natural resource potential questions still persists with the needed for the better description of different natural resources for the inhabitants of Sagar Island. As the inhabitants solely depend upon the available natural resources for their life subsistence the utilization and consumption pattern of natural resources and their impact on the island’s socio-economic environment has great importance for the analysis and assessment. Therefore this journal arise the core question – How natural resource can be properly utilized for the development of Socio-economic condition of this study area?

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