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Strategy for Intergrated Area Development: A Case Study of Nagaon District, Assam.

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Abstract:-Integrated Rural Development strategy formulated in the five-year plan of Economic development in India since the beginning of Fourth Five Year Plan where it is stated that the district continues to be fundamental unit of planning. Preparation of a resource inventory and identification of growth centres are considered essential in the preparation of area development plans. This study is an attempt to illustrate the approach to providing spatial dimension to planning at the district level using Nagaon District as a case study. Nagaon district is centrally located within the state covering an area of 3831.70 sq.kms. It has a population about 2,823,768(2011 census). In this study the physical resources and their areal variations have been evaluated in order to assess the development potentials and manner in which the economy of the district need to be spatially organized. The study will provide approach to the formulation of development strategy appropriate to the district.

Key Words*:* Integrated rural development, spatial organization, spatial dimension, development strategy.

Introduction

The idea of district planning emerged as a micro-level planning strategy for development from below and for the reduction of regional disparities. Thus, the spatial dimension of planning which was focused mainly on the national level and state levels was pushed down to the district level. The integrated area development strategy requires spatial integration, functional integration and planning for development. Thus, integrated area development seeks to achieve a sort of integration of spatial, functional and development activities. Spatial approach is implied in this concept which emphasis on physical planning of agricultural land use and human settlements as both these components is area of location specific. Preparation of resource inventory and identification of growth centres (nodes) are considered essential in the preparation of area development plan. The development process gets initiated by the formation of growth centres (nodes) which are the basis of spatial integration.

This study is an attempt to illustrate the approach to providing spatial dimension of planning at District level using Nagaon district, Assam as a case study. The district is centrally located within the state covering an area of 3973.00sq km with population of about 2823768(2011 census). There is sharp contrast within the district and spatial organization of economy bring out the inadequacies in the manner in which district and block level plans are formulated and implemented. The study area with its diversified resource base calls for an intensive survey using village level data for each development block in the context of innovative experiment in the decentralized planning. It is against these backgrounds and the historical and potential processes at work that the study will provide approach to the formulation of development strategy appropriate to the district.

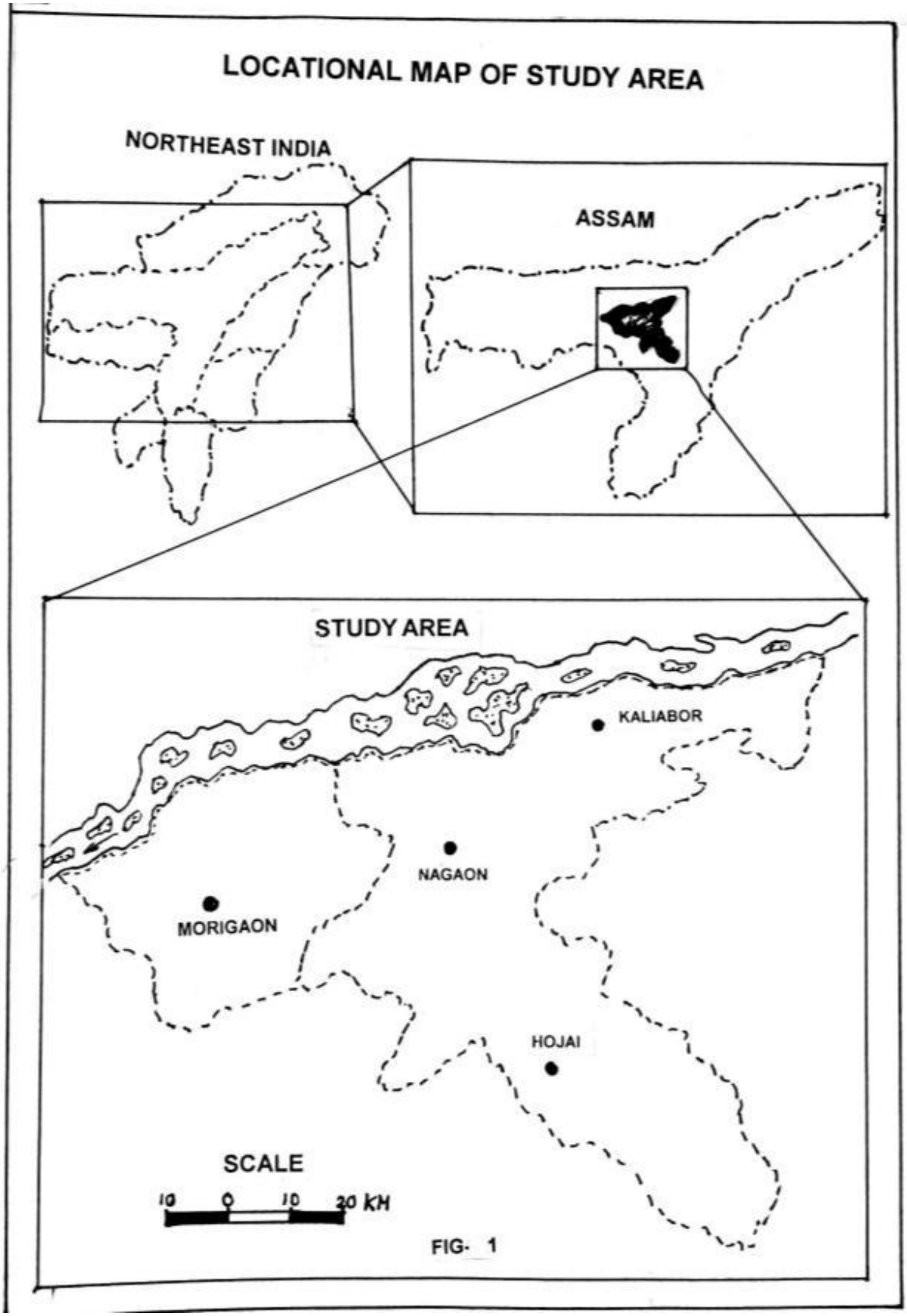


FIG- 1

The study Area: Nagaon district (Lat 25°45'N) and 26°38'N, long 91°58'E and 93°20'E) is centrally located within Assam. The district is bounded on the north by the Brahmaputra RiveR on the south

by Karbi Anglong district, on the east by Golaghat and Karbi Anglong district and on the west by Morigaon district. The district headquarter is at Nagaon Town. The district has three subdivisions namely Kaliabor, Nagaon Sadar and Hojai covering an area of 567.00 sq.km. 1834 sq.kms and 1686.90 sq.kms. respectively. The district has only 35.0 km^2 urban area consisting 8 towns. The district is a rural district consists of 1375 inhabitant villages. It can be thus being seen that the district has a highly imbalanced urban structure with a very weak pattern of nodality required for integrated development. The district has total 10 revenue circles, 19 development blocks and 3 sub divisional headquarters. The district has total 241 gaon panchayat, while 145 in the Sadar subdivision, 29 in the Kaliabor subdivision and 67 in the Hojai sub-division.

Objectives: The basic objectives of the study are summarized as follows:

I) To study geographical settings of the study area.
ii) To study resource base of the study area.
iii) To study the identification of growth centres in the study area.
iv) To study the strategy for integrated area development.

Methodology: To study existing hydro-geomorphological settings of the district, IRS Satellite imagery at 1:50,000 scale and survey of India topographical sheet has been studied. Generation of thematic layers on data interpreted and verified by field work. To study and evaluate the variations of demographic and socio-economic attributes of population a structural interview schedule and questionnaire were used. The data and information presented on diversified resource base are collected from various government records. The standard methodology of data classified, interpretation, integration and analysis has been adopted in different levels to identification of spatial organization of functional nodes/ growth centres.

Geographical settings of the study area:

Geomorphology: Major part of the district is under alluvial plains interrupted occasionally by scattered inselbergs. A significant portion of the district is covered by younger and older alluvium of Quaternary Period. Hills of Karbi Anglong and Meghalaya finger into the alluvial plains. All along the flood plains of Brahmaputra, Kopili, Kolong, Jamuna occurs loamy Newer Alluvium. Older alluvium exposes along the foothills in the Kopili Valley at Kathiatoli and in the southern part of the district. Paleochannels, old meanders, back swamps, ox-bow lakes, and water bodies are common features in the district. The altitudes of hillocks range from 272 m to 853 m above

ii) Drainage: The Brahmaputra River flows west and south-westerly course along the northern part of the district. The river Kopili, Jamuna, Kolong, Barpani and Killing are the important tributaries of the Brahmaputra within the district. The whole river system of the district forms a dendritic pattern. Most of the tributaries (river) of the Brahmaputra in the district flows towards north-west direction to meet the Brahmaputra River. The Kolong river (Suti) is a abandoned channel of the river Brahmaputra flows within the alluvial plain of Nagaon Valley. River migration and meandering formed numerous lakes, beels, swamps, paleochannels and abandoned channels.

iii) Climate: Nagaon district enjoys the typical sub-tropical monsoon climate having hot, humid and cool, dry characteristics during summer and winter respectively. March to May is the premonsoon period with rainfall about 20-30% of the total annual precipitation. June to August is the monsoon period with 60-70% annual rainfall, September to November is the post monsoon period and December to February is the winter season. The annual temperature varies from 34 degree Celsius (August) to 8 degrees Celsius (January). Rainfall is the dominant controlling factor of the climate. Annual rainfall varies from 1200mm to 2200mm.

Resource base of the Study Area:

The physical base of the study area provides insight into the nature of resources their spatial pattern of distribution and their spatial patterns and problems of development arising out of the characteristics and configuration of physical landscape. First of all, it is the limited extent of land available for cultivation and its spatial

arrangement that explains the variations in the overall density of population and the distribution of settlements. They are linear along the road network and river bank and girdling along the junction of the hills and alluvial plains in Nagaon District. There are isolated hamlets scattered in the forested hills and peripherals of wetlands.

Agricultural Land use:

Cultivated area of Nagaon district is mostly below 100-meter contour. It is contiguous and extensive in the plains of Nagaon and Kaliabor sub-division, while it is occurring in narrow belts the tributary valleys in the Hojai Subdivision. Net area under cultivation in the district is 3,64,518 hectares. While actual area of land under cultivation is 2,32,837 hectares and area of land under cultivation more than once is 1,31,681 hectares. The cultivated area in the district, there are distinct spatial variations reflecting the influence of topography. Area of land under different crops is shown in the Table -1 and Table 2.

Of all the total geographical area 3831.70 Km2 of Nagaon district, 47.88 percent area in the Nagaon subdivision, 20.93 percent in the Kaliabor subdivision and 31.19 percent area falls in Hojai subdivision. In each of these subdivisions problems and potentialities for upgrading the land quality and land use are different and require specific strategy. For example, in the southern riverine tract of the Brahmaputra River in the Nagaon and Kaliabor subdivisions, there is a problem of Bankline erosion and floods. Likewise, the plain regions of Kopili and Borpani and Jamuna River valley, there is the problem of chronic flood and water logging, needs integrated planning of flood management. Reserve forests situated close to this land are as such encroached resulting in degradation of the forest wealth. Another aspect related to integrated resource is in respect of the use of water resources of the district especially needs integrated planning of canal and well irrigation

Table-1 Area of Land under different crops in Nagaon District 2011

SI.No	CROPS	SUB-DIVISIONS			NAGAON DISTRICT
		Nagaon	Kaliabor	Hojai	
1	Paddy				
	a) Autumn Paddy	57710	21250	34917.5	113877.5
	b) Winter Paddy	167900	50250	103063.5	321213.5
	c) Summer Paddy	84595	18752.5	41875	145222.5
2	Wheat	6991	2904	3025	12920
3	Jute	18566	6939	2674	28179
4	Sugarcane	15192	226	8366	23784
5	Rape & Mustard	23755	12296	12000	48051
6	Potato	11702	3153	1093	15948
7	Arahar	668	2800	2998	6456
8	Gram	119	23	137	279
9	Other winter Pulse	16123	4469	3655	24247

Paddy is predominant in the cropping pattern and is grown mostly as a winter crop taking advantage of assured monsoon rainfall. (Table-1). Next in importance are the summer and autumn paddy are grown with the help of well irrigation. The winter paddy crop occupy only about 55.18% area whereas summer and autumn crop occupy 24.88% and 19.56% area respectively.

Table-2 Average production of different crops in Nagaon District 2011

(Units in Kg/per hectare)

SI.No	CROPS	SUB – DIVISION		S	NAGAON DISTRICT
		Nagaon	Kaliabor	Hojai	
1	Paddy				
	a) Autumn Paddy	2575	2719	3725	3006
	b) Winter Paddy	2904	4022	4659	3861
	c) Summer Paddy	5662	6429	5726	5939
2	Wheat	2131	3200	2035	2455
3	Jute	7360	8441	6952	7584
4	Sugarcane	81230	81350	84151	82243
5	Rape & Mustard	1060	1034	1419	1171
6	Potato	23023	24715	17393	21710
7	Arahar	1341	1334	1620	1431
8	Gram	1024	1032	1036	1030
9	Other winter Pulse	1053	1173	1140	1122

Other important crops grown in the district are wheat, jute, rape and mustard, sugarcane, potato, arahar, gram and winter pulses. These crops are not grown in as intensive cultivation (Table-1). Most of the foot hill area and upland of the district occupied by tea gardens of National Tea Company. Intra-regional variations of cropping area are however • quite revealing reflecting the impact of topography and soil condition.

The average production of different crops in Nagaon District (1 kg/per hectare) shown in the Table 2. From the table it is reveals that average per hectare production of summer paddy is 5939 kg followed by winter paddy 3861 kg and autumn paddy 3006 kg. Average high production of wheat in the Kaliabor sub-division (3200 kg), jute in Nagaon subdivision(7360kg), sugarcane in Hojai subdivision(82243kg), potato in Kaliabor subdivision (24715 kg). The average production of rape and mustard, arahar, gram and other winter pulses are moderate and marginal.

Forests

The major resources of this district are forest wealth with all topographic and climatic condition being favourable. The forest of the district contributes significantly towards its regional economy. The forest is classified into two categories, viz i) Reserve Forest and ii) Unclassified Forest. The reserve forest constitutes about 72% and the unclassified category constitutes 28% only. The reserve forests contain varieties of valuable timber species of which Sal, Teak, Makai, Bonsoom, mixed hardwood and bamboo, which have high economic importance. Besides, they provide a variety of medicinal herbs. Small scale industries of the district based on this material are an important part of the district's economy. The district has Laokhowa Wildlife Sanctuary in the northern part of the district.

Development of forest resources in the district needs spatial approach as the forest cover varies very closely with topographical conditions and the forest land use is closely linked with agriculture. Likewise, there is need to classify forest areas by type and levels of importance (local, regional and state and National level).

Minerals:

Nagaon district is poor in mineral resources. No valuable minerals can be found. Granite rocks are found in Kandali and Madhavpara hills in southern part of the district are quarried for use mainly building materials.

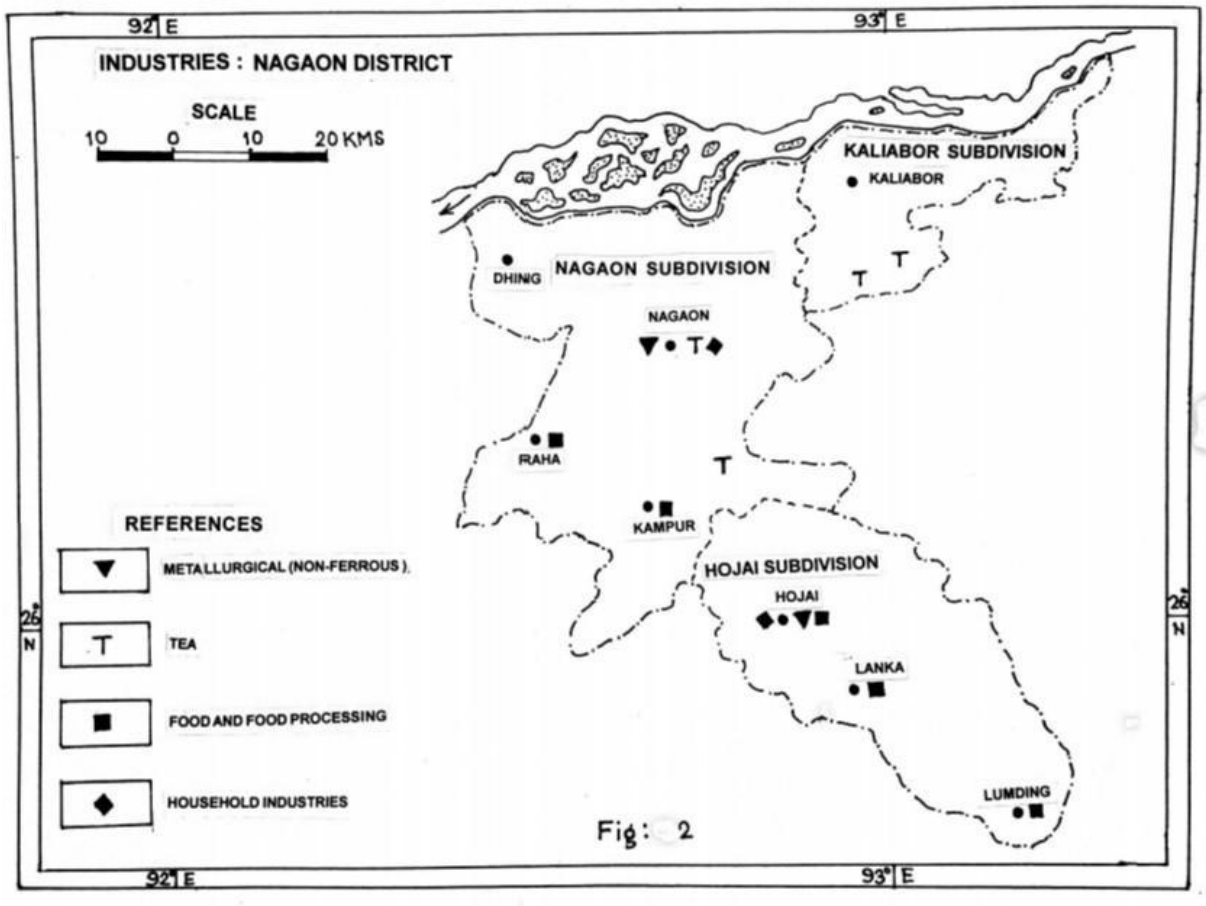


Fig: 2

Fishery

The inland water bodies' fishery is important in the development of the district awaiting large scale exploitation. The major fishery centres are Morikolong Beel. Samaguri Beel, Dighali Beel, Sapkati Beel, Haribhanga Beel, Patoi Beel.Though individual fishery also plays an important role in fish production. In the year 2011 the total fish production was61332 tones. Physical resource base analysed in the foregoing pages serves to bring out (the diversified nature of resources and potentials for their development.

Demographic characteristics of Nagaon 2111

Total Population	2,823,768
Male	1,439,112
Female	1,439,112
Population Growth	22.0%
Area sq.km	3,973
Density/sq.km	711
Proportion to Assam Population	9.05%
Sex Ratio (Per 1000)	962
Child Sex Ratio(0-6 Age)	964
Average Literacy	72.37
Male Literacy	76.51
Female Literacy	68.07%
Total Child Population (0-6 Age)	459,940
Male Population(0-6Age)	234,203
Female Population (0-6) Age	225,737
Literates	1,710,716
Male Literates	921,850
Female Literates	788,866
Child Proportion (0-6 Age)	16.29%
Boys Proportion(0-6Age)	16.27%
Girls Proportion(0-6Age)	16.30%

Identification of Growth Foci

In 2011-2012there were 220 permanent registered industrial units in the district, while 152 industrial units located at Nagaon subdivision, 14 units in Kaliabor subdivision and 54 units in Hojai subdivision. Most of these industrial units in Nagaon subdivision located in the nodal service centres, while in the Kaliabor and Hojai subdivision, these industrial units are very few and scattered. Also, the urban bias of these units is quite distinct, in that nearly(7l) percent of total number of units is concentrated only in six out of nine towns in the district in contrast to 29 percent in the rural areas where 87.98 percent of the total population lives in the 1375^illages. As overall obserservation from the distribution of industrial units indicates that no definite pattern of associations other than preferential location of towns, availability of raw materials and demand for the produce in urban centres seem to be main criteria. The district is a prominent tea producer in terms of total number of garden and production. The district has 22 large tea gardens own by different MNC and State undertaking. Out of total 22 tea garden, there are 10 gardens located in Nagaon subdivision and 12 garden in Kaliabor subdivision. The Hojai subdivision has no tea plantation area. Total area of the district occupied by tea garden is 12,883 hectares, while total number of wage earner of tea garden in the district is 86,271 persons.

The industrial entrepreneurship in the district has developed for its agro based economy. The most important agro based industry of the district is undoubtly tea as mentioned above, which has dominated the industrial sector of economy in the district. The district produces substantial amount of sugarcane, Jute and Bamboo. Nagaon is an important rice growing district. Rice mill industry has gradually grown up in the district. The district has forest-based industries which are mainly saw mill, timber treatment plant, paper and pulp industries and furniture making units.

The district has very few employment opportunities in terms of population distribution and growth. The total number of registered unemployed persons in the district is 40696 which in the Nagaon district is 30444, in Kaliabor

subdivision has 6123persons and the Hojai subdivision has 4129 persons. The number of life registered persons in the district is being increased very rapidly during last decade.

All the 46 settlement comprising towns and villages of over 1000 population selected for this study have been evaluated in the context of their present and future possibilities for being designated as centres for providing social facilities and amenities and non-agricultural economic activities to promote integrated development of settlements and resources of the area. The 40 composite score was four-tier hierarchy of service centres worked out on the basis of demographic attributes, non-agricultural occupation, infrastructure, facilities and amenities and industries. Appropriate weightage has been arrived at taking into account availability type and levels of such attributes in the settlement of over 1000 population. The weighted value assigned to them for computing centrality index is given below.

The total number of amenities multiplied by respective values give the centrality index of the centres. The total of 46 service centres has been identified. They vary in importance as their centrality index varies. Weightages (values) vary between 01 to 60. They have been categorized on the basis of the d on the basis of the deviation from the mean value calculating the Standard Deviation. The table 4.8 explains the ranking of service centres of Nagaon District. These identified growth foci of Nagaon District can help integrated rural development of the area. Growth foci of different tier are interlinked with one another. So development information can reach the remote rural villages through these centres.

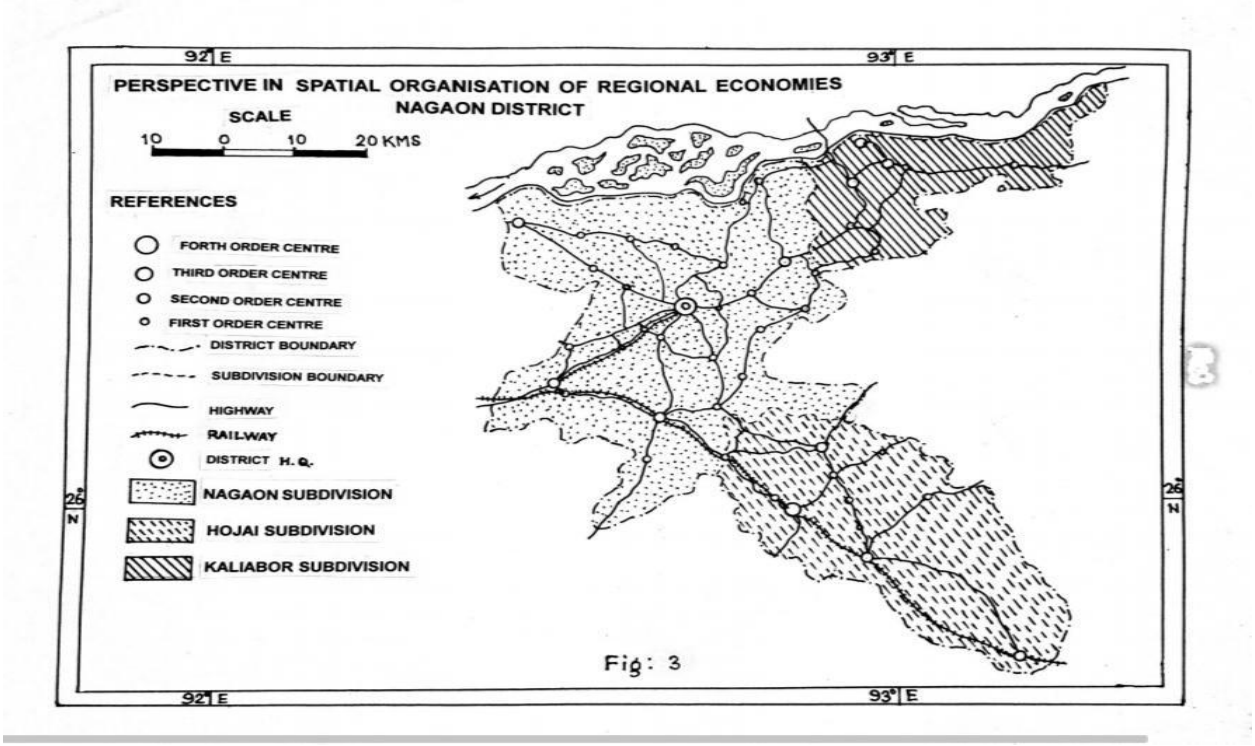
Table 3: Major Functions and Weightages

Functions (Amenities)	WEIGHTAGES ASSIGNED FOR CENTRALITY INDEX
Primary School	02
Middle School	05
High School	01
Post and Telegraph Office	03
Telephones	10
Hospitals	20
Health Sub Centres	05
Veterinary Hospitals	05
Electrified Villages	01
Metalled Roads (within 2 km)	05
Railway (within 4 km)	05
Industry	03
Shops if more than 5	02
Shops if more than 20	06
Banking Facility	10
Diversified index (0ver 3 functions)	20
Diversified index (0ver 5 functions)	40
Diversified index (0ver 7 functions)	60

Table 4: HIERARCHIAL SERVICE CENTRES OF NAGAON DISTRICT (2011)

INDEX VALUE	ORDER(LEVEL)	NO. OF SERVICE CENTRES	PERCENTAGE
M-I S.D = 3.87	1-15(I)	27	57.33
M+II S.D = 20	16-31(II)	09	19.75
M+II S.D = 40	31-45(III)	07	16.60
M+III S.D =60	45-60(IV)	03	06.31

Source: Calculated from census of Nagaon District 2011 and field work done by the authors. With the help of standard deviation fourtier of hierarchy are grouped i.e.,3: 7:9:27.



Spatial Integration of Development

Resource development in the district needs integration as between large scale and intensive cultivation of paddy-pulse-jute-sugarcane in the vast alluvial plains. This requires the preparation of a land classification map on the scale of 1:25,000 using topographical map survey of India and satellite imagery of the same scale. There is also problem of flood water logging and bank line erosion. Such area should be the basis for drainage and soil conservation measures by watershed management by integration District Rural Development Agency, District Agriculture, irrigation, water Resource, forest department and Panchayat. In Nagaon District, forest and water resource needs to be conserved and their use ought to complementary and not competitive both for the local use and for consumption outside the district. There is a need to prepare a spatial development strategy for flood prone area of Kopili and Brahmaputra flood plain as a whole in relation to the long-term strategy for the development of different sub-divisions of Nagaon District. From such strategy the priorities for development of resources of Nagaon District in relation to its local and regional priorities can be better evaluated (Fig - 5.1). Exploitation of river waters of Kopili, Borpani, Jamuna and Kalong River on an ad hoc basis with emphasis on state level priorities without evaluating its impact on the environment and the economy of people who inhabit the region has resulted in strong regional identity expressed through their mode of cultivation and socio-cultural ties within the region. This is a healthy trend and need to be strengthened rather than providing overtones which might give way to regionalism based on caste and communal conflict as are happening elsewhere. The resource base is diversified with distinct spatial affinity and land itself for the development of industries rooted to fishery, forest, plantation cultivation and vegetable production. In the Kandoli hill and Madhavpara hill area granites as building material await systematic quarrying and polishing. Cottage industries using cane and bamboo for export of their produce, through few, show potentiality for development of these small-scale industries in an organized manner. While demographic attributes of population are marked by high density migration and spatial contrast in their distribution, the literacy is moderate in spite of the disadvantages

of small and medium sized and scattered settlements seen in the floodplains and in the foothills area of the district. Creation of employment opportunities for the educated youths needs priority in the context of industrial development of the district. Light industries need to be renovated by proper assessment of the local resources. Establishment of growth centres as envisaged in the Five Year Plans has to be evaluated in the context of nodality as the basis of spatial organization of economic Growth centre strategy adopted in the context of initiating the trickling down process of benefits of economic planning has not produced desired result because the factors that contribute to growth and the channels through which they diffuse (usually a system of nodes and the communication lines that radiate from them) are not assessed a part of the development process taking place in the geographic space.

Spatial organization around nodes is the weaker link in the economy of the district. This is partly because of the geographical and terrain condition and some areas (nodes) were physically separated by unbridged river and wetland with surrounding service centres. Analysis of the settlement and their attributes social and economic revealed the gaps as between towns and rural settlement on the one hand and among rural settlements in the population ranges of 1000-3000 persons. It would appear that a twin strategy using nodality as well as pocket of flood plain in the southern bank of river Brahmaputra and Kopili river of small settlements as 'nodal regions' need While the terms of average area and population the district fulfils the conditions for being treated as a planning unit its spatial pattern and structure of small villages necessitate consideration of the flood plain and foot hills as distinct unit for spatial integration of development plans. Such a strategy would be more realistic than the use of development block and District as planning units. A series of micro water-shade would provide recurring patterns of development norms with water-shade management plans/micro irrigation project at the head water regions ensuring water to plain area so rich in forest and plantation agriculture with small and scattered settlements clinging to them and the transport routes passing through these valleys to the trading towns in the region to be adopted for spatial integration of development programmes.

Conclusion: In introducing the concept of Integrated Area Development the missing link in the present approach to planning at the block and district levels have been identified, n that ♦ the study area is essentially rural and the spatial dimension expresses itself in the configuration of the topographical features. The manner in which they have guided the spatial arrangement of human settlements both rural and urban, extent and types of land use and cropping pattern and in turn influenced the spatial organization.

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