CHAPTER 1
INTRODUCTION OF THE PROBLEM

1.1 STATEMENT OF THE PROBLEM

Resources of any kind or quality have their important bearing on both the sectoral and integrated development of a region—small or big. The earth has been endowed with natural things which may act as powerful resources. Until and unless things are used in favour of satisfying human wants and needs in the concerned areas, even the rich endowments of the earth are not called resources. According to Zimmermann’s (1933) ‘resources are not; they become’ and ‘neutral stuff’ acquires the status of a resource once it is recognized as having some functional value. McManus (2005) defined a resource as that which could build the source of human satisfaction, wealth or strength, labour, entrepreneurial skill, investment funds, fixed capital assets, technology, knowledge, social stability, and cultural as well as physical attributes. More precise is the definition and rational use of resources more will be the well-defined development in a region or an area. But while evolving a precise operational definition of resources for human development and societal as well as individual welfare, the quantity and quality, transformability of resources must be clearly understood and assess.

The concept, definition, and use of resources depend largely on the perception, interaction, etc., of the user groups of the area concerned. Resources have their own characteristic potentials. Such potentials also depend upon the perception, skill, and use of technology of the user groups. The spatial variations in productivity may result from differential geographies of innovation (Feldmann, 2000).

Resources in any country or a region have their locations relative to their users. Even though the resources have their own absolute characters, their relative characters arising out of the users’ perception, strength, need, and techniques have been playing important roles towards the standard of imposition of resource characteristics. Because of such a behaviour of the users of different kinds including the institutional ones, the development and its trend bear a unique position in the analysis of resource potentials and their impact on development. The role of users, therefore, can never be denied in
case of finding the ways and methods of resource investigation, evaluation and utilization.

Development is a highly contested term that, in its most general sense, means change (usually positive change) over time; it has often been used to describe processes of becoming modern or ideas of progress (Willis, 2007). Where the Economic Development is a process, it consists of progressively increasing the value of goods and services that a place is able to produce to enjoy or export (Bergman E. F. et al., 2008). The Udalguri district in the Brahmaputra Valley of Assam is not rich in mineral resources. Therefore, the base of the economic development in the region lies on the agriculture, small scale industries (based on agriculture, forest, etc), tourism, human resource, etc.

The role of resources is so much powerful in the planning and development of a region that all the areas / countries (developed / developing or even the underdeveloped one) have seriously been engaged in mapping and assessment of resources for the region’s development. The North-East India is endowed with rich natural resources, but it continues to remain backward economically in comparison to many other states in India (Chetry and Borah, 1999). The regional development implies both inter-regional and intra-regional development within the confines of national boundaries where the notion of regional development lies at the very hearth of the basic objectives of geographic studies (Sharma, 2007-08).

Being impressed by such a disciplinary development in research field, the researcher has undertaken to work on Assessment of resource potentials and impact on development in Udalguri district, BTAD, Assam.

1.2 THE STUDY AREA

The district of Udalguri (Fig. 1.1) in the north bank of the Brahmaputra in Assam, even though covers an area of 1851.16 km² has natural resources of importance of various kinds like land, water, forest, animals, etc. which have high potential for their mobilization towards desired levels of development. In spite such a stock of rich and potential the study area has yet to have desired level of development.

Again, the district has been mostly occupied diversely by ethnic tribes like the Bodos, Ravas, Hajongs, Garos, etc. along with the Adivasis, Nepalese, Muslim
Fig. 1.1
peasants of erstwhile East Pakistani origin in addition to the age-old indigenous people of caste Hindus of different cross-sections. The tribes using the local resources and applying their creativity on such resources produce cloths, crafts, etc. The Muslim peasants of immigrant origin immensely produce agricultural products out of the fertile alluvial land. The indigenous caste Hindus and the tribes as well are also engaged in tilling the land and producing agricultural crops. The district, in spite of being resourceful, is yet to develop at par with many districts of Assam, not to speak of India’s developed areas.

The present topic is therefore, undertaken to investigate the resource potentials in the district, and analyse their characteristics and impact on user groups towards development of the district.

1.3 OBJECTIVE OF THE WORK

The objectives of the study include-

i) To examine the present pattern of distribution of resources/resource indicators and their potentials, quantity and quality assessments.

ii) To classify the resources and to demarcate their existing roles on development and activities in the district.

iii) To examine the existing and future pattern of economic benefit derived by the people of the district.

iv) To correlate various aspects of resources/resource indicators in terms of their use and development.

v) To suggest for rational use of resources.

1.4 RESEARCH QUESTIONS

In order to execute the work, the following research questions are framed:

i) Is the district having widely distributed resources characterised by high grade potentialities for human interaction and socio-economic development, etc.?

ii) Are the resources fulfilling the needs and wants of the user groups of the district?
If so how? And if not so, what are the causes of less uses?

iii) How can the resource potentiality in terms of quality, quantity and usability be assessed and estimated?

iv) What suggestions may be adopted in favour of rational and optimum use of resources in the district?

1.5 DATA BASE AND METHODOLOGY

The study is based on an empirical and descriptive method of investigation. The methodology adopted by the researcher may be broadly divided into the following phases -

(i) Pre-field, (ii) Field and (iii) Post field phases. The post field phase is further categorized into stage – III and stage IV.

(i) Pre-field or stage – I: Problem formulation based on a-priori knowledge of the land, people and resources of the Udalguri district.

In this stage for the formulating the problem under study books, journals, monographs and published and unpublished theses are discussed. In this stage a number of materials is collected and rightly formulated the design of work and workability under title.

(ii) Field or stage – II: Collection of data (both primary and secondary) having relevance with the theme and objectives of the study.

In this stage both primary and secondary data and information are collected. The primary data and information are mainly collected from villages and some important points and places selected over the Udalguri district in its different parts. For the purpose as many as seven villages are selected based on the criteria such as (i) consideration of the distances from the district headquarters and (ii) tribal village and tribal - non tribal mixed villages. The randomly selected households of the villages are surveyed using schedule and questionnaire. The percentages of households from the selected villages are fixed at 15%.
The schedule and questionnaire used for the household survey has its two parts A and B, where part A is framed for having village information. The other part (part B) is framed for household information covering parameters like population, education, caste, occupation, landholding, landuse, etc.

The work uses mainly the data and information of secondary sources and therefore various published maps, data from satellite Images and other kinds of data series are consulted. For the generation of a quantum of topographic maps involving relief, slope and dissection Survey of India topographical sheets of 1:253,440 scale along with India and Pakistan map series U502 sheet NG 46-6 prepared by the US army are used widely. For preparation of other kinds of topographic maps like drainage networks, distribution of wetlands (natural and manmade) road network, etc. the Google earth is largely used. Land use land cover map data have been acquired from the images of IRS P6 LISS III satellite data available with the NRSC, Hyderabad, (2008). These data are used for preparing land use and land cover map of the district as supplements of resource and its location relationships.

The revenue circles of the Udalguri district are considered as the unit of study for finding spatial variation and making analysis. The data and information are fragmented in order to suit the work.

The secondary data and information are collected from the sources like –
→ the Survey of India (Toposheets No. 78 N & 83 B, of R.F. 1: 253,440 scale).
→ India and Pakistan map series U502 sheet NG 46-6 prepared by the US Army.
→ LULC map data acquired from the images of IRS P6 LISS III satellite data by the NRSC, Hyderabad, 2008.
→ Images capturing and digitizing from Google Earth (during 2011-13).
→ Statistical hand books, government of Assam, up to, 2012.
→ the government records, published reports, research papers, monographs, etc.

(iii) Post-field
(a) Stage – III: In the third stage all the data collected and generated are processed by using cartographic, simple statistical, GIS, Excel and SPSS techniques under relevant conditions. Indian topographical sheets and India and Pakistan map series are used through cartographic techniques along with GIS methods in case of preparation of relative relief and dissection index maps. The GIS techniques are used in the preparation of all the other maps incorporated in the thesis.

(b) Stage – IV: In the fourth stage of the works, processed data, maps, diagrams, etc. in the above stages and phases of work are analysed and discussed.

In the above stages only the outline of the data base and methodology for the work is given as because the methods are scatterly discussed relevantly while introducing the themes incorporated in different chapters.

The whole gamut of the work may, however be expressed and explained by the Fig. 1.2.
Source: Designed by the researcher

Fig. 1.2: Methodological approach flow chart for the work
1.6 SIGNIFICANCE OF THE STUDY

The identification, assessment and proper utilization of resources have been a must for long term planning as well as management for the all round socio-economic development of an administrative unit or the district. The study area i.e. Udalguri district is rich in natural resources and has potentiality to development. Even then the district has remained in a very poor quality of socio-economic developmental scenario. Therefore, an in depth study of existing resources, their assessment, proper representation on maps along with their analysis will definitely provide a good understanding on the one hand and bank of data information on the other towards taking long term strategies for development of the district. In that way, the study will bear a great significance.

1.7 REVIEW OF RELATED WORKS

The studies of resource, development and related issues are multidisciplinary in nature. The studies of these issues have been important parts of the positive changes that have occurred in many places, countries or regions of the world. The works in these fields have been carried out in different fields of study at different levels including the subject like geography. The works of geographers in this perspective can be drawing light from the general books and the research publications. The books that dealing with the resource and development of different country, regions and global level (e.g. Zimmerman, 1951; Van & Bengtson, 1960; Fryer, 1965; Hull, 1968; Hodder, 1968; Gillmor, 1974; Leong and Moergan, 1973; etc.) have been trying to represent the distribution and areal variation of resources, its uses, advantages and problems of these resources for the development etc.

The research works that deal with resources and development at different scales of area or region have been devoted to the studies in the area of land use and land cover (LULC) and their dynamic nature. In this context works of Turner et al., (1994), Krishna, (1996), Gautam et al., (2002), Lo and Yang, (2002), Nayak and Behera, (2008), Soleimani K., et al., (2008), Mohan et al., (2011), Santiago et al., (2013), can be cited. Identification of the suitability of land use (Joerin et al., 2001; Imtiaz and Abd Nasir, 2011; Gustavo et al., 2011; Khwanruthai and Yuji, 2012; Kumar and Biswas, 2013), geomorphic resource (Rivas et al. 1997; Prakasam and Biswas, 2011) are also
mentioned. Surface and ground water potentialities (Lakshmanan et al., Thakur and Raghuwanshi; Kumar et al., 2008), watershed management and development (Shanwad et al., 2008; Yadav, 2009, etc.), also deserve mentions. Studies on flood hazard or risk zone (NRSC, 2007; Rana and Tyagi, 2008, etc.), seismic zone (e.g. Geological Survey of India, Seismic Zone Map of India); soil resource (e.g. Velmurugan and Guillen, 2009); forest resources (e.g. Nualchawee and Barcareza, 1996); human resource (e.g. UNDP - Human Development Reports; Verma and Ali, 2007; Siddiqui, 2008); are also included here. Studies on the potentiality for eco-tourism (Boo, 1990; Eslami and Roshani, 2009, etc); valuation, management and conservation of resources (Ulibarri and Wellman, 1997; Rhodora, 2002; Michael and Peter, 2005; Wei Zhou et al., 2007; Kulkarni and Banerjee, 2011; Max and John, 2013; etc.); etc. are also found relevant here.

The common objectives of these investigations and studies are carried out to know the reality of existing resources, their advantages and potentialities. Some studies are also devoted to identify the possibilities of maximum use of the each unit of resources for their development for longest possible period of time. Also studies on resources have been related with resource politics in many respects. Resources have long been recognized as objects of geopolitical struggle and intrigue: control of water and oil, for example, are frequently tipped to be the battlegrounds of the twenty-first century (Klare, 2002). Another study mentioned is on economics related to resources. Such a study indicates that any meaningful measure of a resource’s availability must include its relation to capital, labour and socio-technical knowledge that can be expressed by reference to price (Barnett and Morse, 1963).

Along with the traditional tools and techniques, of studies, modern sophisticated tools and techniques of geoinformatics (RS, GIS and GPS) have also appeared with more and more effectiveness in studies in different fields of investigations including the subject geography. The quantification of the subject in the 1960s, followed by the addition of geoinformatics in the latter decades have been enhancing the capabilities to study and solving the more and more complicated spatial problems. The majority of works that have been carried out during the recent periods have partially or fully adopted the advantages of these modern tools and techniques.
The land use land cover in different continents of the world has been important theme during the last few decades, mainly after the adoption of geoinformatics in the subject of geography. According to Turner et al. (1994) the most spatially and/or economically important human uses of land on global scale includes cultivation in various forms, livestock grazing, settlement and construction, reserves and protected lands, and areas of timber extraction. These land uses have transformed land cover at a global scale. Their consequences have been significant not only in the aspects of land cover but also in the aspects of local, regional, and global environments. Climate, atmospheric composition, biodiversity, soil condition, and water and sediment flows have also been affected by such uses. Studies on that can provide the spatial and temporal resolution required to identify and account for major variations in cause-to-cover relationships.

The LULC have been changing over the time. While studying LULC changes in the Atlanta, Georgia Metropolitan area Lo and Yang (2002) have succeeded in simulating the land-use/land-cover changes from 1999 to 2050. The study indicated that such a scenario may not be realistic in the long range because of the change of economy. It is essential that changes in the physical environment be linked with policy and its implementation in order to ascertain which are the most promising avenues to conserving the natural resources and improve the rural livelihoods (Gautam et al., 2002). Spatial distribution of land use/land cover information and its changes is desirable for any planning, management and monitoring programmes at local, regional and national levels. This kind of information not only provides a better understanding of land utilization aspects but also plays a vital role in the formulation of policies and program required for developmental planning (Srivastava and Gupta, 2003).

The studies for the identification of the suitability of land use and the analysis to support interactive land use allocation have been carried out in many areas for the identification of comparative advancement of different plots of lands. Such works can help to optimum utilization of each unit of area.

Relevant works in the Indian context

In addition to the above mentioned international and the Indian researchers a large number of studies related with the resource and development have been carried
out by the Indian scholars in different regions of the country. A section of the researcher has been concentrating in the field of land use/land cover and their nature of changing. The other sections have been concerning with the selective resource e.g. soil, forest, ground water, human resource, etc. The objectives of these studies are basically to understanding the resources of respective regions and to help the users of these resources as well as to draw attention from the planner and decision makers. A few works in these fields in India are mention below.

The land quality assessment for coffee growing areas of Karnataka is carried out by Devi and Kumar (2008) based on parameters of climate, terrain and soil attributes using remote sensing and GIS. They demarcated the best, high and medium quality areas. Kumar et al. (2008) have carried out the delineation of potential sites for water harvesting structures using remote sensing and GIS and based on the findings they divided the Bakhar watershed of Mirzapur district, in Uttar Pradesh into four classes’ viz. excellent, good, moderate and poor areas of water harvesting. Mukherjee et al. (2009) have studied the effect of canal on land use/land cover using remote sensing and GIS in a part of Punjab covering the three districts of Gurdaspur, Hoshiarpur and Rupnagar. They asserted the increasing trend of waterlogged areas and assumed that if it continues it may result in change of groundwater, soil quality and cropping pattern of the region. Balak and Chauhan (2009) have studied the land use changes in Jhunjhunu district of arid part of Rajasthan and asserted that in order to save further degradation of precious natural resources and put them into sustainable uses the district requires a long term land use plans and management strategies along with effective agriculture extension systems and regular training programmes for farmers. On the basis of a study on renewable energy with maps of Maharashtra, India using GIS, Kulkarni and Banerjee (2011) have stressed on the importance to analyse the spatial variation of resources and their deployment.

Nayak and Narayankar, (2009) divided the levels of development in Bellary district, Karnataka, into the high, medium and low categories based on the 10 social and 13 economic indicators. Rukhsana (2009) has identified the regional imbalances in the dimensions of rural development in the 26 district of western Uttar Pradesh based on agriculture, industries and the infrastructural development. A study of level of rural development was carried out by Sharma and Sharma (2009) in Mohania block, Kamur
district of Bihar on the basis of 21 variables. They found out a large variation in the levels of rural development. Misra and Misra (2009) have stressed a watershed approach for sustainable agricultural production and improved economy for the people. Kumar and Sharma (2009) have attempted to evolve suitable production strategies to enhance income, employment and socio-economic well-being of the farmers of the Chuhar community in Himachal Pradesh and they designed a holistic agricultural plan for sustainable development of the remote area and suggested that it should be included in the distinct agricultural plan for the 11th plan period. Asif (2009) studied the Rohilkhand region of Uttar Pradesh with the objectives to find out the levels of agricultural and socio-economic development and attempted to examine the existing situation, future trend and the appropriate measures to be taken for improvement in agriculture. In this micro level analysis he has seen the caste as the determining factor for level of agricultural and socio-economic development.

Further it can be mentioned that during the last few decades the studies on resource, its development and related issues have been carried out in India almost in many disciplines including the subject geography.

In North East India studies on the resource, development and related issues have been getting due importance. Accordingly such studies are carried out by the some researchers in the region. But the Universities and research institutions in the region still have vast areas and issues which are yet to be getting proper studies.

In the work on ‘Economic Potentiality in Goalpara district’ Das (1972) has indicated the immense potentialities for future economic development of the district through the planning of the resource and man power. Barthakur (1984) had stressed on a fresh thought on the planning principle and policy for a steady and effective development of North East India. Das and Dutta (1986) studied the regional variation in land use and agriculture in North East India. In this work the authors have indicated the need of separate agricultural planning strategies for different areas on the basis of micro geomorphology and population structure. Bhagabati (1986) analysed the land and natural vegetation resources of North East India and indicated about the need of integrated planning for long term ecological security and supply of goods. Rinawma (1988) studied the influence of geomorphology on agricultural development in the Lunglei district of Mizoram. Goswami (1993) worked on the land resources of Assam based on remote
sensing. Kalita (1995) worked on the problems and prospects of socio-economic development of lower Kulsi basin in Assam. Saikia (1996) studied on the regional development of North East India and government policies. In his study on sustainable development in a highland-lowland interacting system Bora (1998) suggested an integrated land use model for the Dhaleswari basin; Kar (1998) worked on the population and problems of development in Assam; Taher and Ahmed (1998) published work on geography of North East India, where relief, landform, drainage, population, resources, development, etc are incorporated. Syiemlieh (1998) worked on the geomorphology and land use planning of Umran basin of Meghalaya. In their study on the resource base and development scenario in North East India Chetry and Borah (1999) indicated the threat to development of the region because of unscientific mining, improper land utilization and over exploitation of forest resources. Das (2000) worked on the agricultural land use and productivity pattern in the lower Brahmaputra valley. Bhattacharya (2001) studied on the status and potentiality of tourism in Assam. In the study on topography and landform of Assam, Barman (2005) indicated the diversely set landscape in the state of Assam and explained that almost all the landform has been actually unexplored which needs a comprehensive study to understand the region’s physical identity to formulate strategies for its development. Thapa (2005) worked on the land and resource evaluation for landuse planning in a block in the east Khasi hills of Meghalaya. Sarma (2010) worked on the forest resource utilization in Kamrup district of Assam. Das (2011) studied on potentiality of ecotourism. Nath (2012) studied on the assessment of irrigation requirement and potential for crop diversification in lower Kameng basin. These are few examples of studies in the region on resource, development and related issues.

**1.8 LOCAL TERMS AND TERMINOLOGIES USED**
- Dong: Small stream natural or man made
- Basti land: Residential yards surrounded by trees (mainly of fruit and nut trees of different kinds)
- Nadi: River
- Raja: King
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