

# Morphological and Functional Change of Rural Settlements in the High Himalayan Region

## A Case Study of Arakot, Uttarkashi

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### Abstract

In the past few years, many settlements in the high Himalayan region have witnessed morphological and functional change. These changes or transformations are a manifestation of livelihood diversification in these areas. The emerging (new) opportunities in remote rural areas have brought changes in the socioeconomic conditions of the people living therein. The new developments were accompanied by a functional change of isolated mountain settlements. As a result, these settlements have got transformed into multifunctional areas. All these changes are reflected in the spatial variations and accompanied changes in settlement characteristics.

The aim of this research is to identify the functional changes in remote mountain villages. The study area for this research is an isolated mountain valley in the high Himalayan region. It is a remote area of Uttarkashi, India. This area is regarded as a marginal region. The marginality of the area is the product of spatial isolation and remoteness. However, some of the settlements of this region have witnessed profound changes in the recent past. Different signs of change in settlement characteristics (morphological and functional change) have been observed in these mountain villages. There have been changes in the nature of agriculture in some of these settlements. These changes have been accompanied by a change in land use and the morphological elements of the villages. Changes in social infrastructure and standards of living are also important signs of change.

This research presents a study of changes in settlement characteristics (morphological and functional change) in one of the villages of this remote mountainous area. It can be interpreted as an illustration of the development of multifunctional rural settlements in a marginal area. There is a need to capture the current processes of transformation. It may offer an essential clue for rural revitalization in the high mountain areas.

**Key Words: Settlement Characteristics, Morphological Change, Functional Change, Himalayan Region, Uttarkashi**

### Introduction

Some rural areas around the world that have long been classified as problem/depopulated areas have emerged out and presented some evidence for socioeconomic revival (Dominik Sikorski, 2020). These areas or settlements are subject to intensive study.

The studies on rural and rurality frequently deal with the rural changes. It has different domains and each one is described by a different connotation. Obviously, there are different terms to denote (define) the rural changes. Among these words, rural change, rural transition, rural transformation, rural restructuring, rural regeneration and rural revitalization can be listed (Seda Kundak, 2011). The phenomena or the process of rural change (transformation) is a process of comprehensive socioeconomic change whereby rural societies diversify their economies and reduce their reliance on agriculture (Berdegue, 2014). The process of morphological and functional change in rural settlements is accompanied by these changes. It has emerged as a recent field of research (Fred Dahms and Janine McComb, 1999).

On the large landscape of the high Himalayas, there are many stagnant settlements and many others deserted (depopulated) settlements. Settlement abandonment has become a common phenomenon in other mountainous regions. Contrary to these settlements, there are few other fast-growing rural settlements in the high Himalayan region. These settlements are growing with the metamorphosis of their morphology and function. There has been a change in land use. These settlements have witnessed densification of settlement. These settlements have also witnessed marked economic development and comprehensive social transformations.

Berdegue has described the features of rural transformation as ‘household members attending school (to a higher degree), having access to some degree of health and other services, owning mobile phones, being in contact with the ‘outside world’ through different links and deriving an increasing part of the household income from nonfarm activities, etc’ (Berdegue et al, 2014). The similarity is presented by a few mountain settlements in the high Himalayan region.

The unique and evolving nature of change of these rural settlements is subject to geographical evaluation. This study would give a better insight into the process of rural revitalization in a peripheral mountainous area of the high Himalayas.

### **Literature Survey**

The process of rural depopulation and land abandonment is an important topic of rural research of mountainous areas. The change in land use/land cover and landscape change has also been a widely discussed topic within the studies of rural change (transformation). Along with this, the phenomenon of changes in settlement characteristics (morphological and functional change) in villages has gained importance in recent researches. The growing scientific literature describing the phenomena of changes in settlement characteristics (morphological and functional change) in rural areas also proves the increased importance of this subject.

The variety of research on change in settlement characteristics (morphological and functional change) is very broad. There are few other studies on multifunctional transition (Holmes, 2006, 2012). These studies range from the identification of the process, its causes and driving forces (Tamara Lukic, 2012, Niedzielski, 2015, Bayram Ebadi, 2015, 2016, Dominik Sikorski, 2020). The study of Debarshi Guin on transformation in Indian villages is also a notable reference to rural change (Guin, 2018).

The changes in function and their geographical consequences on the rural settlements were the themes of the study of many other geographers (Gudrun Hohl, 1960, Sebastian Goraj, 2014). But unfortunately, there is a dearth of deep study on changes in settlement characteristics (morphological and functional change) in mountain settlements.

### **Basic Assumptions of the Study**

The nature and magnitude of rural change/transformation are multidimensional. Even the phenomena or the process of rural change have different igniters, viz. Internal factors (e.g. Resources of a given rural region), external factors (e.g. Policy responses) or a combination of all these. Any change is basically the product of a combination of factors. Therefore, the factors responsible for rural change can be diverse and can have various impacts on rural areas (Seda Kundak, 2011).

It is not possible to explain the rural change only from social and economic perspectives. The spatial and functional indicators depict many facets of socioeconomic and spatial processes taking place in rural areas. The morphological and functional change of rural settlements gives a comprehensive picture of the changes taking place in these areas.

This study is based on certain premises;

- The diversification of the rural economy (and accompanied changes in employment) leads to change in mountain settlements.
- The functional change or change in the rural economy leads to a change in the morphology of the rural settlement.
- Change in land use, logically, gets reflected in a change in the morphological and functional change in the rural settlement.

### **Aim and Objective**

The villages located in the remote and marginal regions of the high Himalayas are undergoing a profound transition. There is growing diversification of the economy of these rural areas. This research evaluates the changing nature of rurality in remote mountainous areas and the factors responsible for the transition towards the multifunctionality of mountain settlements.

Arakot, a tiny little settlement in Uttarakhand Himalayas, has experienced rapid changes in settlement characteristics (morphological and functional change). The aim of this research is to capture the changes in settlement characteristics of the rural settlement of Arakot. It is an attempt to recognize the character and nature of spatial and functional transformations taking place in this mountain village.

### **Methodology**

The changes in settlement characteristics proposed in this research focus on morphological and functional change. The morphological change refers to changes in the shape and size of the settlement. It also refers to

morphological growth and densification of settlement. The functional change is defined as a change of function of settlement and a change in economic activities (and accompanied change in employment). Functional change is characterized by increased functionality of the settlement and increased employment in nonagricultural activities. The present research attempts to capture current (micro-scale) transformations in the rural settlement of Arakot.

This is descriptive-analytical research. The study is based on the analysis of diverse sources. The analysis of the functional transformation of rural settlements and current spatial development is based on field investigations and surveys. It also includes documents of different departments of the government of Uttarakhand.

#### Study area

The study area for this research constitutes the Mori subdivision of Uttarkashi. It is located in the western part of the Garhwal Himalayas. It is a high mountainous region. It has few dispersed human settlements. The people of this region have adopted subsistence agriculture (crop cultivation, horticulture and animal husbandry) which is characterized by substantial diversity. Therefore, they rely on diverse natural resources (especially forest, arable land and pasture) for their livelihoods.

#### Salient Characteristic of the Study Area

Spatial or Locational Characteristic – Located in the high Himalayan region;	<ul style="list-style-type: none"> <li>Remote Location; Natural Remoteness, not only due to inaccessibility but also due to geographical location (peripheral location),</li> </ul>
Physical or Environmental Characteristic – inherent diversity of the high Himalayan region;	<ul style="list-style-type: none"> <li>Biophysical Diversity; it has various types of landforms – upland and lowland. large variation in altitude and climate,</li> <li>Fragility; fragile mountainous region, high risk of natural hazards such as flash flood and landslides,</li> </ul>
Human Characteristics – few dispersed human settlements, an area of low population density, ethnolinguistically also it is a distinct region.	
Socio-Economic Characteristic – ‘Geographical Disadvantage’ of the extremely remote and isolated region,	<ul style="list-style-type: none"> <li>Marginality; a Least Developed Area, poor physical infrastructure, limited access to social services such as education, health and financial services, etc.</li> <li>Extreme Vulnerability; occupied by poorest of the poor, vulnerable to poverty,</li> </ul>

For a more intensive study of changes in settlement characteristics (morphological and functional change) in the region a case study of Arakot village has been taken up. In the recent past, the marginalized agriculture of this village has become the main occupation and a driving force of change in settlement characteristics.

The area yields further evidence on changes in settlement characteristics (morphological and functional change) in rural settlements. There have been changes in land use and agricultural activities. There are changes in spatial form, demography, economy, functional and social changes. There have been changes in rural amenities. These are obvious signs of rural revitalization. These phenomena or processes are influenced by various factors. Change in agriculture and change in agricultural land use is thought to be the most important factor of change. It is more expressed in the changes in the life and livelihood of the people.

#### Characteristics of the Village

Village - Arakot	A small village
Location	31.0127 N and 77.8413 E
	Western Highlands of Uttarkashi
Altitude - 1600 m	highland village
Area	220 hectares
Total Households	188 families
Population - 748 persons	small settlement
Economy	agricultural village
Settlement	dispersed settlement
Rural Amenities	school & health centre
Connectivity	improved road connectivity
Distance	55 km from subdivisional HQ
Characteristics of Rurality	small size, low density, remote and isolated
Signs of change	signs of Socioeconomic revitalization

# Based on PRA of the village

**The Land and Landscape**

Arakot is located in the lower reaches of the Pabbar valley. The exact coordinate location of the village is 31.0127 N and 77.8413 E. It is situated at a height of 1600 m. The total area of the village is 220 hectares. Arakot is a tiny mountain village. It is inhabited by about 188 families. It has a total population of 748 people. It has a low population density.

Arakot is surrounded by high mountains from all sides. The village is situated on a rugged terrace. The environmental surrounding the village has lush greenery. The natural vegetation contains dense forests. There are orchards of apples and other high-altitude fruit trees. The rurality is reflected in the abundance of farmland (orchards) and remoteness from urban areas.

**Morphology of the Settlement**

The settlement is located on the highland above the Pabbar river. Arakot is a typical mountain village. Here also the spatial pattern of settlement (distribution of houses and fields) presents a distinct form of a mountain village. The buildings are distributed according to the terrain. The general layout of the building is scattered. This kind of phenomenon is common in every mountain village. In these mountain villages, the morphology of the settlement is adapted to the livelihood opportunities. The land use and livelihood of the people are closely related to mountain agriculture.

There is great land use diversity in the village. Agriculture and forested land make up the largest land use and land cover of the landscapes. These are followed by settlements and pasture land.

**Village Economy**

The main occupation of the people of this village is agriculture (horticulture) and cattle rearing. Agriculture in this region is constrained by the limited agricultural land. Rice, wheat, potato, rajma (chami) are the main crops of the region. Potato and rajma are the cash crop. Traditional agriculture provides sustenance and food security to the rural people. Besides agriculture, animal husbandry and horticulture provide livelihood opportunities to rural people. Horticulture is the main component of the village economy.

**Recent Changes in Village Economy**

There are some visible signs of change in the form of spatial and functional, or social and economic changes. These changes are the key symptom of the functional metamorphosis of rural settlement.

The general observation of the area shows a decrease in area under grain cultivation and an increase in area under horticulture in several villages. Simultaneously there has been a decrease in the dominance of agricultural activities. It is expected to change further. The diversification of rural economy away from agriculture is the first sign of rural transformation. It is also a sign of urbanization in the rural region (Berdegue, 2014). The demographic and economic change in the rural settlements of remote areas of Mori are attributed to the development of horticulture in this part of the region.

**Functional Metamorphosis of Rural Settlement**

The rural transformation is been conceptualized as rural development, changes in economic structure and the occupational change in population from agricultural to the nonagricultural economy (Koustab Majumdar, 2020). In general, the economic change or the occupational change in population from agricultural to the nonagricultural economy indicates the demarginalization of the economy.

The change in the economy of the rural habitat is accompanied by changes in land use and changes in the social dimension of the settlement. The functional metamorphosis of the rural society is influenced by the position of the place or space and its interaction or communication with other settlements (Vahid Riahi, 2018).

The functional change of the peripheral mountainous village is always relatively slow as compared to the villages in plains. It is due to the impact of geographical remoteness, inaccessibility and other factors (Dominik Sikorski, 2020). However, few mountain settlements in remote regions of the high Himalayas are experiencing a subtle 'urbanization' and a notable decline in rurality. It is due to the improved accessibility and connectivity.

Arakot has also experienced a major economic change in the recent past. There has also been a change in employment and economic activity. The changes also get reflected in the rural amenities. Unlike other villages of the region, Arakot has better facilities. It is evident by the presence of schools, health centre, post office and bank. The village has redefined its role from a traditional mountain village (remote and isolated) to a more connected village. It has a daily bus service from Dehradun, the capital city of Uttarakhand.

Many small businesses related to rural service centres have centralized in this village. Few other new economic activities related to banking and finance, retail and wholesaling have also cropped up in Arakot. It all has contributed to the functional change in rural settlement.

**Demographic Change**

The mountain village recorded a population of about 427 inhabitants and around 132 residential buildings in 1971. It has increased to about 748 inhabitants and around 188 residential buildings in 2011.

**Table – 1 Arakot \_ Decadal Population Growth**

Year	1971	1981	1991	2001	2011	2021
Population	427	589	NA	688	748	1000 #

# estimated

The total population in the village is estimated to be even higher, as the census data do not include a large number of seasonal migrants with a second home in Arakot. The number of inhabitants increases significantly during the harvesting season due to a spike in labour demand in horticulture. Furthermore, the availability of improved services of regional importance attracts temporary and permanent migrants to this village besides the labour jobs in the infrastructure sectors.

The demographic change gets reflected in the landscape of the village. During recent years many new buildings (particularly public buildings) were added in the village. It has caused land use changes within and outside the village. It has also changed the physical landscape of the village. The increase in population has also led to the residential nucleation in the village.

#### **Change in Agriculture and Land Use**

The region has experienced a change in the area of land under cultivation of subsistence crops and a corresponding increase in area under horticulture. There has also been a change in traditional livestock production and a reduction in the number of livestock (sheep and goats). This change in land use and change in primary occupation also reflect a shift towards multifunctional rural areas.

#### **Change in Occupational Structure**

The changes or transformations in agriculture and agricultural land use are manifested in the occupational structure of rural settlements. There is a marked decline in traditional rural activities (sheep and goat rearing). There has also been a decrease in the share of employment in primary activities (agriculture and animal husbandry). Although small, there is a change in extreme rurality. There are substantial changes in the agricultural economy in terms of employment. There is an increase in the share of labour employment and service jobs due to emerging opportunities. Some people are working in the Govt. Departments and some are occupied in private jobs.

The functional change has a wide range of impacts, especially on employment. This assumption is supported by the observed increase in the number of employed in the service sector. New occupation includes transport business (transportation of goods and services). It has influenced the livelihoods of rural dwellers.

The livelihood diversification has brought in a socioeconomic change in the life of rural communities. There has been development or disappearance of certain phenomena. There is still a lack of accessibility to the amenities. Otherwise, change in income has brought a change in ownership of goods (motorcycle, car, cellular phone, access to internet). Change is observed in food and shopping habits. The life and livelihood of the people of Arakot are now virtually similar to a small town or urban centre. Simultaneously, the remote mountain settlements have also witnessed changes in household wellbeing.

#### **Social and Cultural Change**

All these changes are accompanied by social and cultural changes in the rural areas. The ‘commodification of rurality’ is another significant change in rural settlements of the high Himalayan region. Change is also observed in rurality (the social and cultural life). The social and cultural dimensions of changes include the rise of urban lifestyle. The lifestyles change has blurred the distinction between rural and urban. It is an impact of change on mountain society.

#### **Change in Rural Morphology**

The study of the morphology of settlement is one of the subdisciplines of geography which analyses the external and internal structure of the settlement (Tomasz Figlus, 2020). The morphological changes include changes in surface elements of the settlement, its shape and size (change in the built-up area) and the spatial transformation of land (remoteness and connectivity).

There has been a significant change in the spatial development of the village. Although the spatial transformation of the village is limited by topography and available geographical space but the changes in the economy of the village caused new opportunities for the spatial development of the village. There has been an expansion of residential and also service areas. The residential buildings in the village have increased from 132 houses in 1971 to 188 in 2021. It has led to spatial variations and changes in household characteristics. Most intense morphological changes have taken place on the periphery of the village.

The extent of morphological changes is governed by the housing needs of the village and the development of services in the village. The expansion of built-up areas has taken place to accommodate migrants and new inhabitants. New residential buildings have also cropped up in the recent past. Besides, there has been densification of built-up areas. The new changes primarily involve increasing the density of buildings and the partial appearance of the new residential areas. The densification of settled areas is a characteristic feature of changed rural settlements. Morphological changes are also visible in the physical and social environments.

The availability of educational facilities and healthcare facilities in Arakot has expanded over recent years. There has also been an expansion of administrative infrastructure. It has taken place onto the barren land and into agricultural land.

Arakot has also improved access to and from the nearby villages in the near past. It has also developed as a regional transportation hub. There are motorable roads from Arakot to Purola and Mori. Arakot is also a trading hub of mountain villages of Pabbar valley. Its bazaars offer a wide range of products and services which are unavailable in rural villages. The size of the bazaar has increased with the opening up of many shops. The strained historical function of the rural settlement is getting changed. Now it provides facilities, goods and services to their surrounding local areas. All these are accompanied by the spatial reconfiguration of the village market. The bazaar area of Arakot has the highest built-up density and it has become more concentrated. Now the differences in the built environment of the small town and the village are getting blurred and it is becoming 'more urban' in appearance.

#### **Need for Innovative or Creative Solutions**

Multifunctional development (multifunctional transition) (Holmes, 2006, 2012) is seen as a remedy against marginalization of monofunctional (agriculture-dependent) rural areas (Bogdanov and Vasiljevic, 2011). Invariably the social, cultural and economic conditions of mountain villagers remain poor (underdeveloped) owing to the geographical disadvantages of mountain villages. But the inclusion of mountain settlements to the larger (metropolitan) settlements brings in a change in morphology and functionality of the remote settlement. Mountain settlements require other innovative and inclusive solutions to deal with the disadvantages of remoteness.

#### **Conclusion**

This research was an attempt to identify functional changes in the mountain village of Arakot. There are some visible signs of social and economic change in the form of spatial, demographic, economic, functional or social changes.

There has been a decline in the agricultural function of the village. The development of horticulture has created new opportunities for the development of rural areas. This is especially pronounced in Arakot. Several business entities have cropped up in Arakot in recent years, especially transport businesses. The changing rural-urban connections are evident in the patterns of rural transformations. There has been a substantial change (qualitative and quantitative change) in the occupational structure of the rural population. There has also been improvement in necessary infrastructure. Several infrastructural facilities, schools, health centres and other institutions were built in the village. The village has experienced substantial improvement (renovation and redevelopment) in the recent past. It is also reflected in the living standard of the rural inhabitants. These changes are the key symptom of rural transformation. The growing service sector plays a vital role in functional changes in the village.

These changes are responsible for rural transformation (morphological and functional change of rural settlements).

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