

## RESOURCE MANAGEMENT: A GEOGRAPHICAL PERSPECTIVE

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### Abstract

*Nature provides resources to human beings for their survival. A resource manager requires understanding the definition of resource and its changing paradigm, dynamism and approaches in a specific social, cultural, and geographical ground. This article is an attempt to explore differences of traditional definition of 'natural resources' to more dynamic discourse of 'resources are not, but they become'. This essay is based on exploratory review of the available published materials. This paper contains introduction, conceptual ground, the shifting paradigm, dynamism in the resource definition, natural resource management vis-à-vis resource management, resources classification, the evolution of the field of resource management, and the approaches of the resource management. The body of the text is finally followed by the references cited.*

**Key words:** Geography, livelihood, environment, resource management, paradigm shift.

### Introduction

Human livelihood is determined by the availability of resources within the environment either natural or man-made. By applying human skill, mind and power, human beings are able to maintain survival through eking out the resources for their requirements. From where and how do the human beings get resources are the important research questions to understand whether they have regular flow or exhaustive in availability. Increasing demand, short supply in comparison to demand and its increasing scarcity in extraction and exploitation, we often faced, are the further issues which determine the availability and utilization of resources, standard of human life and also frequently give pressure in the surrounding environment. The other important facets of resource management studies are the level of skill and power with the people and stakeholders who directly involve in proper utilization and management. Therefore, the scope of the discipline has to carry these issues and challenges for the better understanding and sustainability of future survival of human beings, and also to keep intact the surrounding environment. There are two schools of thought. One is oriented towards the people (human) centric contextual ground of discourse of 'resource' with a view to combination of opportunities provided by the nature as a resource base and the human demand, mind, skill, knowledge, culture, society and rules and regulations; and the second is concentrated on natural resources as a free gifted stocks and its management for regular exploitation.

The aim of this paper is to deal with fundamental concepts and knowledge about resource

management. In the past, the resources were seen as natural gifts. This tradition is still remaining within the university curricula. University level resource management syllabus has been designed within the framework of natural resource management or the management of free gifted stock of resources. However, in practice, the philosophical thrust of resource management is more towards the blended of both. It is often mixed with the social and the natural contextual ground. The uni-directional natural resource management paradigm provides university graduates as well as resource managers no clear idea and they often are facing problems on identification of management issues, and challenges and are confusing to dig out the solutions. The philosophical dictum and notions of conventional natural resource management have been changed and the emphases have been given more on the human or people centric perspectives.

### Material and Methods

Review of widely published documents, reports, books, and website materials along with the empirical field studies and knowledge based on practical ground have been used to bring discourse in this form. This article has put forth the framework of people centric conceptual ground to understand the resource management with a geographical perspective or unify both nature and society. From this understanding resource manager will able to achieve the goal of sustainable development. Introduction, conceptual ground, shifting paradigm, dynamism in the resource definition, natural resource management vis-à-vis resource management, and resource classification, evolution

of the field of resource management, approaches and conclusion followed by references are the subheadings included in this article.

## Conceptual Ground

Natural resources are derived from the environment. Many of them are essential for our survival while the others are used for satisfying our wants and the rest left as it is. The material world is heavily dependent on different natural resources. The widely used common definition of natural resource takes place naturally within environment that exists relatively undisturbed by mankind or available in a natural form. A natural resource is often characterized by amounts of biodiversity and geo-diversity existent in various ecosystems. The variety and quantity of uses of natural resources have increased at present to such an extent that these were never found before in the history of mankind. New requirements for various resources in modern society have increased the demand for them a thousand fold and have woven them into combinations whose patterns are constantly changing (Malla and Shrestha, 1983:2).

Beyond the boundary of natural resource definition the dictionary meaning of resources is a concept employed to denote sources of human satisfaction and wealth or strength. Labor entrepreneurial skills, investment funds, fixed capital assets, technology and the cultural and physical attributes of an area may all be referred to as resources of a nation or region, company or household (Johnston et al., 1986). It would be worth to cite a paragraph written by David Cohen in NewScientist.com news service on 23 May 2007,

*"I get excited every time I see a street cleaner," says Hazel Prichard. It's what they collect in their sacks that gets her juices flowing, because the grime and litter they sweep up off the streets is laced with traces of platinum, one of the world's rarest and most expensive metals. The catalytic converters that keep exhaust pollutants from cars, trucks and buses down to an acceptable level all use platinum, and over the years it is slowly but steadily lost through these vehicles' exhaust pipes. Prichard, a geologist at the University of Cardiff in the UK, reckons that tonnes of the stuff are being sprayed out onto the world's streets and highways every year, and she is hunting for places where it is concentrated enough to be worth recovering. One of her prime targets is the waste containers in road-sweeping machines (Cohen, 2007).*

Berkes (2010) states that the conventional notions of 'natural resources' and 'management' are

problematic because of their history, and they need to be reconceptualised. He suggests, the term 'resource' carries a sense of 'free goods', human-centric use and co-modification of nature. It can be revised to include the protection of ecosystem services for human well-being. He further wrote that the conventional concepts of 'natural resources' and 'management' are problematic, if not obsolete, because of their history or the 'baggage' they carry. These two terms can be replaced or, perhaps more reasonably, be redefined in view of new perspectives and changing paradigms. Resilience thinking (resilience theory) provides an entry point into the process of change, and is a recurring theme in the discussion of shifting perspectives in resource management. Hence, resilience can be used as the conceptual basis of such a redefinition.

From these excerpts we could see the form of resources and the eyes to see where is the resource laying. Some thousands years ago human being could see resource just a few items given by the nature i.e. wild roots, fruits. Gradually, they found wild animal and fire. Then after, they came to know crops and cereals. With the pace of time they understood the value of soil and land resource and began farming. The Neolithic people used stone and wooden weapons that changed into metal weapons. To-day man is behind the chips and optical fiber from the metal and weapons and several industrial heavy equipments from the same. In the last several years of human history, gold was not a precious item like to-day and diamond might be just a shining stone. In the same way, some African communities feel proud to have a large herd of their animals to show their economic prosperity. Even in Nepali society, a number of Chiuri (*Diploknema butyraceae*) tree become an economic indicator among the Chepang community (Poudel, 2003). From these examples it is open to discourse on the topic of natural resource and resource. Nature is open to all natural things from its early existence but human kinds are not aware to use those substances available close to them. In fact, it requires understanding the differences of natural resources and resources. The discourse on natural resource management could lead towards the more eco-centric (focus to more natural aspects) and the resource management focuses on people centric thread of discussion. In these perspectives it requires to establish the approaches of understanding the subject.

## Shifting Paradigm

Since the dawn of human civilization, the resources were used to be viewed according to the broad spectrum of the man environmental interrelationship. In the early days of human history, man perceived nature to control human activities.

Human activities were just to use the responses whatever provided by the environment. Nature's control over human action was strongly accepted. In the same way, extraction and utilization of resources was determined according to the nature's limitation. Hunting, food gathering and early days farming were the major sources of resource to survive. That was also defined as 'deterministic' or 'determinism' relationship of man and environment. According to this dictum, the nature controls the human activities. This was the philosophical paradigm. Gradually, man got success over the nature's law and control. They became able to alter the determinants of the nature. Early days of industrial revolution have given more emphasis on high yield production system, large quantities of mineral exploration and extraction of resource in a scale of abundance. Man usually thought on control over nature. That period was perceived as 'possibilism' in the man-environment relationship. Gradually, several mines were exhausted and forests were destroyed. The renewable resources were no-more renewed over the time of extraction. People thought that the nature gives opportunity to human being but the nature's law to control the resources is still active. The concept of infinite sources of natural resources has been changed to perceive depletion. Several renewable resources require managing according to their replenish time duration. The harmony of man-environment interrelationship is accepted only after the proper management of resources provided by the nature. The interactive interrelationship between man and environment has been perceived for the sustainable future of human being.

In a more specific pragmatic ground, Zimmermann (1951) has defined the term 'resource' as 'resources are not they become'; they are not static but expand and contract in response to human wants and human action. A resource is not merely a tangible object but also a functional relationship that exists between people's wants, their capabilities and their attitudes towards the worth of an environment. Zimmermann has categorized the term '*man*' and '*MAN*'. To understand the resources one must understand the relationship that exists between *MAN* and nature. For that purpose it is necessary to conceive of the human beings as existing on two levels, the animal level and the supra-animal or human (social) level. The '*man*' on the animal level constitutes part of nature. *MAN* on the human level represents the counterpart of nature. Nature is non *MAN*.

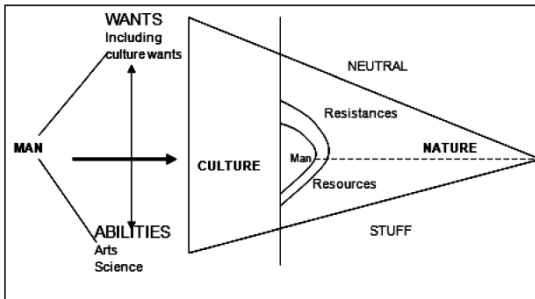
According to the philosophical dictum of Zimmermann the *MAN*'s resources, to an overwhelming extent, are not natural resources. It is true that nature provides the opportunity

for *MAN* to display his skill and apply his ever expanding knowledge. But nature offers freely only an infinitesimal fraction of her treasure; she not only withholds the rest, but seems to place innumerable and in many cases, well-nigh insurmountable obstacles in the way of resource-seeking and resource creating *MAN*. The bulk of *MAN*'s resources are the result of human ingenuity aided by slowly, patiently and painfully acquired knowledge. Knowledge is truly the mother of all other resources. The concept of resources is purely functional, inseparable from human wants and human capabilities.

Resource economist Judith Rees (1990) has clarified the term 'resources' on the philosophical footage provided by Zimmermann as 'an aid or means of support to the human species. They cannot be assessed other than through the meanings or values which people attribute them' (Rees, 1990:7). Resources are not static and expand and contract in response to human wants and action. She has further mentioned that the ideas on what constitutes resources have altered dramatically over time, response to increased knowledge, technical improvements and cultural developments which have changed perceived needs' (Rees, 1990:12). Omara-Ojunga (1992) has also given emphasis on changing nature of stuff to resources with respect to time and knowledge of the society. He has illustrated that a neutral stuff to one culture at one time may become a resource in the same culture at some other time (Omara-Ojunga, 1992:2). He has also mentioned that resource cannot be taken as tangible object but poses the functional relationship that exists between people's wants, action, knowledge, attitudes, values, aspirations towards the worth of an environment (Omara-Ojunga, 1992:1). Within this philosophical ground, resource and stuffs are two different conditions. Nature provides stuffs and the human action, knowledge, skill, attitudes; values change stuffs to make it useful to fulfill the human wants. Human wants or desires have dynamism. Resources are dynamic not only in response to increased knowledge, improved arts, expanding science, but also to response to changing individual wants and social objectives. Thus, resources are defined as means of attaining given ends, i.e. individual wants and social objectives. Means take their meaning from the ends which they serve. This philosophical thread can be linked with the human civilization and changing definition of resources. Hunting, gathering, agriculture and industry are gradually changing the stages of human civilization and the definition of resources also have been changing along the social and cultural standard of the time.

So long as the human race continues to climb upward to higher culture levels, culture is bound to become

increasingly important as the dynamic force in the creation of resources. Physical reality at all times is the basis on which human culture rests. The physical environment appraised both quantitatively and qualitatively and viewed as changing relationships of trends and forces rather than as static conditions. Therefore, at all times, the foundations of human productive efforts have been active and work for new innovations (Fig. 1).



**Figure 1:** Man, Culture and Nature (After Zimmermann 1951)

Nature sets the limits within which man can develop his arts to satisfy his wants. Within these limits he is free to select from the myriad possibilities offered by nature those which at a given time and place promise the best results in terms of want satisfaction in return for the human efforts applied there too.

Zimmermann (1951) discussed about the dynamics of culture. The dynamic force of culture is a penetrating one. The effects of cultural progress on nature come readily to mind. Not only wants and abilities of the individual man and group of men are affected by culture but education, training experience, sophistication, including the relationships between men, social organization, and societal institutions also come under its spell. Even the size of the human population is apt to be affected by cultural change.

More close to anthropocentric position and specified that often an object is first a neutral stuff and then when human value is attached to it, it becomes a resource (Mitchell, 1989). Rees has clearly mentioned that 'resources are defined by man, not nature' (Rees, 1990:12). Human beings are continually surveying the physical environment and assessing the value of particular organic and inorganic elements within it. Before any element can be classified as a resource, two basic preconditions must be satisfied: the knowledge and technical skills must be existed to allow its extraction and utilization, and there must be a demand for the materials or services produced. If either of these conditions is not satisfied, the physical substances remain 'neutral stuff'. It is

therefore, human ability and need which create resource value, not mere physical presence.

### Dynamism in the Resource Definition

Ideas on what constitutes resources have altered dramatically over time in response to increased knowledge, technical improvements and cultural developments which have changed perceived needs. Even though the total physical endowment of the earth is essentially fixed, resources are dynamic with no known or fixed limits. The history of resource use to date has been one of continuous discoveries, with an ever widening definition of the resource base.

- Paleolithic man – perceived few resources – naturally available plants, animals, water, wood and stone.
- The Neolithic man – primitive food gathering to primitive farming and subsequent introduction to some metal-based technologies.
- Modern man – has different forms of activities and resources.

The definition of resource may vary with time, and space. As repeating the above mentioned sentence written by Omara-Ojunga (1992) 'neutral stuff' to one culture at one time may become a resource in the same culture at some other time. Thus, resource has high dynamism and determined according to the knowledge and human needs of the society. Diamond became diamond only after the human knowledge otherwise that was a sparkling stone. In the same way, many present day neutral stuff of the earth might have a high economic value in future.

The development of spatially distinct cultural groups means that, even at any one period of time, there was no single definition of resource base; a substance with a high resource value in one society could be 'neutral stuff' in others (Rees, 1990:12). The diversity of resources in the present day world seems high in the developed world in comparison to developing countries.

Each stage in this process brought a new set of demands for goods, and services, which in turn stimulated technological innovation and led to a reappraisal of usefulness of components within the physical environment. These technical and economic changes then affected the structure of society and so the cycle continued.

Resources are therefore, subjective, functional and dynamic. The perceived resource set alters markedly over time and space to reflect variations in knowledge, technology, social structures, economic conditions and political systems (Johnston et al., 1986:409).

## Natural Resource Management vis-à-vis Resource Management

Natural Resource Management refers to the management of natural resources such as land, water, soil, plants and animals, with a particular focus on how management affects the quality of life for both present and future generations. Natural resource management is congruent with the concept of sustainable development, a scientific principle that forms a basis for sustainable global land management and environmental governance to conserve and preserve natural resources.

Natural resource management specifically focuses on a scientific and technical understanding of resources and ecology and the life-supporting capacity of those resources. Environmental management is also similar to natural resource. The natural resource management emphasis on sustainability can be traced back to early attempts to understand the ecological nature of American rangelands in the late 19th century, and the resource conservation movement of the same time. This type of analysis coalesced in the 20th century with recognition that preservationist conservation strategies had not been effective in halting the decline of natural resources. A more integrated approach was implemented recognizing the intertwined social, cultural, economic and political aspects of resource management. A more holistic, national and even global form evolved, culminating in the Brundtland Commission and the advocacy of sustainable development. The most active areas of natural resource management are Wildlife management often associated with Eco-tourism and Rangeland (pastures) management.

Resource management is concerned with allocation of resources and biophysical and socioeconomic milieu in which resources are or ought to be developed. Such resource allocation patterns do not result in unnecessary deleterious effects in the biophysical and socioeconomic systems. Resource allocation should therefore influence the production, consumption and distribution of resources in a direction consistent with the local, regional or national development objectives (Omara-Ojungu, 1992:3). It involves controls on the amount, quantity, timing, availability and the general direction of resource development. Resource management strategies are designed to promote exploitation, enhancement and restoration of resources.

According to O'Riordan (1971:19 cited in Omara-Ojungu, 1992:4) resource management 'may be defined as a process of decision-making whereby resources are allocated over space and time according to the needs, aspirations, and desires of man within the framework of his legal and administrative framework'.

Resources management examines strategies and technologies for resource development in order to sustain economic growth without hampering the environment. Mitchell (1989:4) writes 'resource development represents the actual exploitation or use of resource during the transformation of neutral stuff into a commodity or service to serve human needs and aspirations'.

The issues of management are closely related with the conservation of the existing resource available. However, Omara-Ojungu (1992:4) observes that resource conservation and resource management have substantial differences. The term conservation retains an implicit streak or undertone of 'no use' (preservation), thus causing the misunderstanding that conservation advocates no growth. In contrast, resource management is a more comprehensive and positive term. In the latest literature the term conservation is slightly using in liberal tone and is also deviated from the preservation in practice (Berket, 2010). The issues of management are closely related with the conservation of the existing resources available. Malla (1998) noted his views as: "it is to be reiterated that conservation means the utilization of resources in a way that guarantees their benefit ever. The purpose of conservation is to enable not only ourselves today, but also our grandsons and great-grandsons in future to utilize our resources. So we should know how much resource we have and keep them well protected and use them skillfully, judiciously and carefully. Human beings who are born to die after living a short while on this earth do not possess any right whatsoever to destroy ruthlessly the resources which are meant for human welfare forever."

In a resource management context, the term is reserved for substances, organisms and properties of the physical environment i.e. natural resources. Human beings evaluate natural systems, regarding as resources only those elements which they have the knowledge and technology to utilize and which provide desired goods and services. Natural attributes failing to meet these criteria remain unvalued, 'neutral stuff'.

Resource allocation is the spatial and temporal placing of resource uses in a pattern reflects the goals, priorities and aspirations of a community. In resource management it is intended that such resource allocation pattern does not result in unnecessary detrimental effects in the biophysical and socioeconomic systems. Further, it allows resource allocation to be regulated by combination of and compromising in social, cultural, economic, ecological and institutional processes (Omara-Ojungu, 1992). Change, complexity, uncertainty and conflict encountered in several steps of resource management (Mitchell, 1997).

An empirical example can be cited here from the people living in the hills and mountains where throughout the historical past managed their resources according to their own perceptive skills and knowledge. Terracing, making small irrigation courses, 'transhumance' or 'nomadism', use of fire and shifting cultivation techniques of Asian, African and South American highlands were common practices. At that time human numbers were relatively small and consumption patterns were less diverse and complex. Therefore, resource extraction and supply systems were in harmony. However, this trend has been disrupted by the economic growth after the industrial revolution. The demands for resources compelled to expand the limits of use. In the Western societies, George Perkins Marsh in Vermont, USA, has noticed this scenario as early as 1864. He has mentioned that "Man is everywhere a disturbing agent. Wherever he plants his foot, the harmonies of nature are turned to discords. Man has subverting the balance of nature" (Marsh 1864 reprinted 1964). However, in the developing countries, environmental deterioration because of ill management of resources has been realized after the late 1960s. Basically, this situation occurred due to post-colonial development in economic growth (Omara-Ojungu, 1992).

### Resources Classification

There are different basis of classification of resources. These bases are categorically given here.

On the basis of origin, resources may be divided into:

- **Biotic** – Biotic resources are obtained from the biosphere, such as plants and their products, animals, birds and their products, fish and other marine organisms. Mineral fuels such as coal and petroleum are also included in this category because they are formed from decayed organic matter.
- **Abiotic** – Abiotic resources include non-living things. Examples include land, water, air and minerals including ores such as gold, iron, copper, silver etc. Considering their stage of development, natural resources may be referred to in the following ways:
- **Potential Resources** – Potential resources are those that exist in a region and may be used in the future. For example, petroleum may exist in many parts of Nepal, having sedimentary rocks but until the time it is actually drilled out and put into use, it remains a potential resource.
- **Actual Resources** – Actual resources are those that have been surveyed, their quantity and quality determined and are being used in

present time. The development of an actual resource, such as wood processing depends upon the technology available and the cost involved.

- **Reserve Resources** – The part of an actual resource which can be developed profitably in the future is called a reserve resource.
- **Stock Resources** – Stock resources are those that have been surveyed but cannot be used by organisms due to lack of technology. Hydrogen is its example.
- With respect to renewability, natural resources can be categorized as follows:
- **Renewable resources** are ones that can be replenished or reproduced easily. Some of them, like sunlight, air, wind, etc., are continuously available and their quantity is not affected by human consumption. Many renewable resources can be depleted by human use, but may also be replenished, thus maintaining a flow. Some of these, like agricultural crops, take a short time for renewal; others, like water, take a comparatively longer time, while still others, like forests, take even longer.
- **Non-renewable resources** are formed over very long geological periods. Minerals and fossil fuels are included in this category. Since their rate of formation is extremely slow, they cannot be replenished once they get depleted. Of these, the metallic minerals can be re-used by recycling them. But coal and petroleum cannot be recycled.
- On the basis of availability, natural resources can be categorized as follows:
- **Inexhaustible natural resources**- Those resources which are present in unlimited quantity in nature and are not likely to be exhausted easily by human activity are inexhaustible natural resources (sunlight, air etc.)
- **Exhaustible natural resources**- The amount of these resources are limited. They can be exhausted by human activity in the long run (coal, petroleum, natural gas, etc.)
- On the basis of distribution, natural resources can be classified as follows:
- **Ubiquitous resources**- These are the resources found everywhere. Land and air are its examples.
- **Localized resources**- The resources found only at certain places are called localized resources. For example, minerals and fossil fuels.

On the basis of economic point of view, resources are commonly divided into two major types (Fig. 2):

- Stock or non-renewable, and
- Flow or renewable

The essential difference between them lies in the timescale over which they develop. Since all resources are products of natural cycles, all are, strictly speaking, renewable but very different rates.

Stock resources – all minerals and land – are substances which have taken millions of years to form and so from a human perspective are now fixed in supply. The technology exists to allow most metals to be re-used many times over with little loss of quality under the recyclable position.

Flow resources – are defined as those which are naturally renewed within a sufficiently short time span to be of relevancy of human being

| Stock              |                           |                   | Flow  |  |
|--------------------|---------------------------|-------------------|---|--|
| Consumed by use    | Theoretically recoverable | Recyclable        | Critical zone   | Non-critical zone                                      |
| Oil<br>Gas<br>Coal | All elemental minerals    | Metallic minerals | Fish<br>Forests<br>Animals<br>Soil<br>Water in aquifers | Solar energy<br>Tides<br>Wind<br>Waves<br>Water<br>Air |

Flow resources used to extinction      Critical zone resources become stock once regenerative capacity is exceeded

**Figure 2:** A classification of resource types (After Rees 1990:15)

The rate of replenishment for depleting resources is so low that it does not offer a potential for augmenting the stock in any reasonable time frame. The natural replenishment rate is quite faster with renewable resources. However, some of the flow resources like solar energy, air, and geothermal are perpetual. Hence, some of the renewable resources also exhaust under unsustainable utilization conditions and break the replenishment cycle. In the management perspective the challenge for depleting resources involves allocating dwindling stock among generations while meeting the ultimate transition to renewable resources. In contrast the challenge for managing renewable resources involves the maintenance of an efficient sustainable flow.

### Evolution of the Field of Resource Management

In both developed and developing countries the evolution of resource management as a distinct field of study has been late and slow. Prior to the 1960s, the aspects of resource management were studied in agriculture, forestry, and soil science and wildlife

conservation schools. In general, it was only in the mid-1960s when some universities in the developed countries established resource management as a full fledged course of study. By the 1970s, a few universities in developing countries followed this by conducting courses under such titles as land use and resource assessment, environmental science, resource development and conservation, environmental management or resource management. At these infancy stage, resource management courses had a poor conceptual structure with strong emphasis placed on the issues of the day (land use land cover, pollution, soil erosion, deforestation and so on. Little attempt was made to relate the issues to the principles and concepts in resources management.

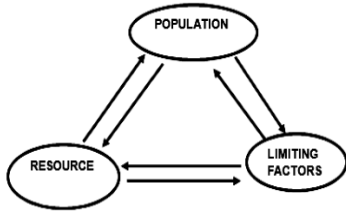
Several reasons account for the late arrival of the field despite the fact that human use and abuse of resources have been on the stage for millennium. One primary reason is that for a long time the nature of resource was ill-conceived. Resources were originally considered abundant and in single purpose terms, with no or few inter-linkages within and amongst them. Perhaps the worst drawback has been the prolonged association of resources with what was commonly known as 'natural resources'. The concept of natural resources precluded other non-tangible especially common property resources such as air, climate, sun light and historical monuments whose quantities and value could not be easily estimated using traditional economic framework. As a result, the change and damages to resource often passed without arousing public outcry. Resource management has evolved in response during the 1960s to shifts in the perceived values of land, labor, technology and capital. At various times, the resources have been conceived either as abundant or scare and management concern responded to emerging crises associated with subsequent use of resources. In the 1960s, however, fears of increasing resource scarcity, awareness of human ability to destroy, and inability to substitute for all resources prompted concerns from public and institutions associated with resource use. In the developing countries, the calls for resource management during the 1960s and 1970s were viewed as mixed up with concerns for environmental quality and limits on growth at a time when developing countries were hard pressed with needs for economic growth, provision of better facilities and conditions for education and health. As a result, the governments in developing countries usually paid only lip-services to calls for more effective resource management.

### Approaches

The models and approaches depend upon the contextual basis. At a broad level, resource

management studies take the physical environment as one basic departure point, the human attribute as the other and the controls on the interaction between the physical and human attributes. The physical attribute is discussed under the ecological approach, the controls under the economic and technological approach and the human attributes under the ethnological approach (Omara-Ojungu, 1992:18-65; Thakur, 2003; Mitchell, 2003:102-129).

With a view to resource utilization, management and the adaptive practices, management entertained through the understanding of population as a demand side, natural resources as a supply side and physical, bio-physical, social, economic, cultural, rules, regulation and other external influences under the limiting factors. All these factors have to be integrated and follow a holistic approach of resource management (Poudel, 2001, 2003). Following these basic premises the resource management can be framed in an interactive way (Fig. 3).



**Figure 3:** The Interactive Triangle for Resource Management (PORELI Triangle) after Poudel 2001, 2003).

## Conclusion

There are several empirical cases about understanding the resource for a long historical period even in the remote geographical terrain of Nepal. Construction of terraces for crop farming and locating human settlements over the hill slope are the two most common and visible illustrations of Nepal. Based on these prominent examples, it can be noticed how the local people perceive resources over time. The way and degree of understanding resources by the local people and availability of natural stuffs (stock) over the specific geographical territory are two different aspects to integrate by a resource manager. The responsibilities of a resource manager are to enhance the human skill, mind and knowledge of the people to understand diverse nature of stocks available on the space and to ensure livelihood of local people for their betterment in a sustainable future. A resource manager has to carry responsibilities of understanding people, resource and the limiting factors of space within an interactive framework.

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