



**MOUNTAIN FARMING SYSTEMS**

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## **A FRAMEWORK FOR INTEGRATED MOUNTAIN DEVELOPMENT**

**N. S. Jodha**

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## PREFACE

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ICIMOD's approach to problem oriented research involves both knowledge reviews and field studies. The focused reviews and field studies conducted by the Mountain Farming Systems Division cover various aspects of agricultural development. Since early 1988, a series of 'state of the art' reviews of agricultural policies and programmes were sponsored by ICIMOD in different countries of the HKH Region. The purpose of these studies and the subsequent National Workshops in different countries was to understand some of the constraints and prospects of Mountain area development. These exercises were also aimed at acquiring comparative perspectives of development approaches and strategies in different countries.

This paper forms an internal document of the MFS Division and explains the Divisions' approach to understanding the application of the mountain perspective as a step towards evolving a framework for integrated mountain development. This paper was presented to ICIMOD's Board of Directors at the meeting held in Bhutan, 1989.

## CONTENT

<b>Introduction</b>	<b>Page</b>
<b>Introduction</b>	1
<b>Mountain Specificities</b>	1
<b>Operational Implication</b>	4
<b>Development Imperatives of Mountain Specificities</b>	5
<b>Basis for a Resource-centred Integrated Development Approach</b>	7
<b>Some Relevant Features of the Conventional Development Approach</b>	9
<b>Operationalisation of the Approach</b>	11
<b>ANNEX</b>	14
<b>REFERENCES</b>	21



## Introduction

In conceiving conceptual or operational framework for the development of mountain areas, the key factors to be considered are those that separate "mountain" from other areas, for example, slope and altitude (Forman 1988). Compared to the two dimensional spatiality of the plains, mountain habitats are characterised by three dimensional spatiality. This additional dimension obstructs the applicability of developmental or other experiences of plains to the mountains. Because of slope and altitude, and associated conditions or characteristics (which in this paper we call mountain specificities), mountains, examined from the perspective of the plains, are often considered to be relatively difficult environments to live in and in which to replicate development experiences accumulated in the plains. Yet, plains' people have always treated and used these 'harsh habitats' as their 'hinterland' to be exploited for their development needs (timber, electricity, etc.), refuge (political, religious, etc.), and recreation (Eckholm 1975 and Groetzbach 1988). But despite the above approach, the fact remains that mountains have historically been the habitats of flourishing civilizations, with the clear-cut markings of mountain conditions on the complexes of production, consumption, and trading activities (Keay 1977). Furthermore, both societies and economies in mountain areas have never been static. A gradual transformation, involving a two way process of adapting sustenance strategies to mountain characteristics and vice versa, has been an integral part of the "living mountains" (Von Furer-Haimendorf 1981; Ellen 1981; and Brush 1988). A clear understanding of these phenomena is a crucial prerequisite for correcting the approach to mountain problems and for the initiation of relevant development interventions to handle them.

Admittedly, present day development interventions are a recent phenomenon in mountain areas. Generally, these interventions are inspired and conceived exogenously. Often, they involve pace, scale, priorities, and operating mechanisms not well known to mountain areas and people. Most importantly, the development interventions are based on approaches and models, which were not conceived and designed for mountain areas. Consequently, they have generally proved to be less relevant and quite ineffective to handle problems of mountain areas. This is revealed by poor economic performance, over-exploitation of mountain resources, disregard of equity issues, and extreme environmental perturbation (Rieger 1981; Forman 1988; and Sanwal 1989). Discontinuities between conventional development approaches and mountain conditions can be demonstrated at different levels of development interventions (Sanwal 1989). To illustrate this, it is essential to explain firstly, key mountain specificities and their implications and, secondly, the relevant dimensions of conventional development approaches and their inappropriateness for mountain areas.

After a brief introduction of six mountain specificities, the paper describes their operational implications, including the imperatives for development intervention. The features and orientation of the conventional development approach and an approach based on explicit consideration of mountain specificities are contrasted to indicate the lacunae in the present system of approach. Mountain specificities and their interrelationships constitute a compelling basis for a resource-centred and integrated approach to mountain development. The paper concludes with a comment on the operational effectiveness of the new approach.

## Mountain Specificities

The important conditions characterising mountain areas which, for operational purposes, separate mountain habitats from other areas are referred to here as 'mountain specificities'. The six

important mountain specificities, (some of which might be shared by other areas such as desert areas in the plains) are considered here. The first four, namely, inaccessibility, fragility, marginality, and diversity or heterogeneity, may be called first order specificities. Natural suitability, or 'niche' for some activities/products, for which mountains have comparative advantages over the plains and, 'human adaptation mechanisms' in mountain habitats are two second order specificities. The latter are different from the former in the sense that they are responses or adaptations to the first order specificities. But nevertheless, they are specific to mountains.

Before describing the major mountain 'specificities', it should be noted that, these characteristics are not only interrelated in several ways, but, within the mountains they show considerable variability. For instance, all locations in mountain areas are not equally inaccessible, fragile, or marginal. Neither do human adaptation mechanisms have uniform patterns throughout all mountain habitats. Recognising such realities, we may briefly introduce the mountain specificities.

#### *Inaccessibility*

Due to slope, altitude, overall terrain conditions, and periodical seasonal hazards (e.g. landslides, snow, storms etc.), inaccessibility is the most known feature of mountain areas (Price 1981; Allan 1986; and Hewitt 1988). Its concrete manifestations are isolation, distance, poor communication, and limited mobility. Besides the dominant physical dimension, it has socio-cultural and economic dimensions which are reflected by socioeconomic differentiation and inequity of access to resources, information, and opportunities. Inaccessibility, exaggerates other conditions such as marginality and diversity, as mentioned below.

#### *Fragility*

Mountain areas are known for their fragility. This fragility is due to altitude and steep slopes, in association with geologic, edaphic, and biotic factors, which limit the areas' capacity to withstand even a small degree of disturbance. Their vulnerability to irreversible damages, due to overuse or rapid changes, extends to physical land surface, vegetative resources, and even the delicate economic life-support systems of mountain communities. Consequently, when mountain resources and environment deteriorate due to any disturbance, they do so rapidly. In most cases, the damage is irreversible or reversible only over a long period (Eckholm 1975; MAB 1975; and Hewitt 1988). This factor is largely responsible for the vicious circle of 'poverty-resource degradation-poverty', in the fragile ecological zones of mountain regions (Forman 1988).

#### *Marginality*

'Marginal' entity (in any context) refers to that which counts the least in reference to the 'mainstream' situation. This may apply to physical and biological resources or conditions as well as to people and their systems of sustenance. The basic factors, contributing to such a status, in reference to any area or community, are remoteness and physical isolation, fragile and low - productivity resources, and several man-made handicaps which prevent participation in the 'mainstream' pattern of activities. The above basic factors also lead to secondary patterns of relationship between 'mainstream' and 'marginal' entities. They are reflected through neglect and exploitation of the latter by the former (Blaikie 1985). Mountain regions being marginal areas



rather than prime areas, in most cases, share the above attributes of marginal entities (Brush 1988; Forman 1988; and Ives 1988) and suffer the consequences of such a status in different ways.

### *Diversity or Heterogeneity*

In their natural state, some degree of heterogeneity is characteristic of all types of habitats. Soil-types change every 20 miles, as they say. However, in mountain areas, one finds immense variations among and within eco-zones, even within short distances. This extreme degree of heterogeneity is a function of the interactions of different factors such as elevation, altitude, geologic and edaphic conditions, steepness and orientation of slopes, wind and precipitation, mountain mass, and relief of terrain (Troll 1988). The biological adaptations (e.g. naturally suited plant types) and socioeconomic responses (e.g. cultural patterns, structure of economic activities, etc.), to the above diversities, also acquire a measure of heterogeneity of their own (Price 1981 and Jochim 1981). The 'diversity' or 'heterogeneity' phenomenon applies to all the mountain characteristics discussed here.

### *'Niche' or Comparative Advantage*

Owing to their specific environmental and resource-related features, mountains provide a 'niche' for specific activities or products. At the operational level, mountains may have comparative advantages over the plains for certain activities. Examples may include : a valley serving as a specific habitat for special medicinal plants, mountains as ideal places for certain economic activities (e.g. electronics factories) which require a relatively pollution free and cool environment, mountains as a source of unique products (e.g. some fruits, flowers, and minerals), and mountains serving as the best-known sources of hydro-power production. Thus, 'niche' has both physical and biological dimensions. Though not comparable to biophysical 'niches', it is not difficult to identify some specific socio-cultural characteristics of mountain communities (e.g. their social organisation, attitudes, etc.) which may impart some added advantage to them in activities such as, management of collective goods and community resources (Ellen 1981 and Jochim 1981). In practice, however, a 'niche' or comparative advantage may remain dormant unless circumstances are created to harness it. On the other hand, if certain developments lead to the elimination of the 'exclusiveness' characterising a situation or resource base, the comparative advantage may cease to exist. Production of special hill crops (e.g. flowers, mushrooms, and medicinal plants) in the plains, by creating artificial environments or through research, is one such example, where the comparative advantage of the mountains is lost. However, mountains, owing to their heterogeneity, have several, often narrow, but specific niches which are harnessed by local communities through their diversified activities (Whiteman 1988 and Brush 1988). The modern development programmes often lead to their elimination or over-exploitation.

### *Human Adaptation - Mechanisms*

Mountains, through their heterogeneity and diversity, even at micro-level, offer a complex of constraints and opportunities. Mountain communities, through trial and error, have evolved their own adaptation mechanisms over the generations (Pant 1935; Guillet 1983; and Jochim 1981). Accordingly, either the mountain characteristics are modified (e.g. through terracing and irrigation) to suit their needs, or activities are designed to adjust the requirements to mountain conditions (e.g. by zone-specific combinations of activities, crops etc.). Adaptation mechanisms or experiences are reflected through formal and informal arrangements for management of resources, diversified and interlinked activities to harness micro-niches of specific eco-zones, and



effective use of upland-lowland linkages (Allan 1986; Forman 1988; Brush 1988; and Whiteman 1988).

It should be emphasised that harnessing of 'niches' or 'comparative advantages', too, could be treated as a part of human adaptations to mountain conditions acting as opportunities. Viewed this way, the two second order mountain specificities (i.e. 'niche' and 'adaptation mechanism') have human effort as a crucial common factor. This differentiates them from the other mountain characteristics discussed above. While inaccessibility, fragility, marginality, and heterogeneity, represent structural features of mountains, human adaptations and (to a greater extent) 'niche' represent operational consequences of the former. However, since the 'operational consequences' considered, are also unique and unmistakable features of mountain realities, we have treated them as mountain specificities.

With changed circumstances, such as increased population pressure, increased role of market forces, and side effects of public policies and programmes, a number of adaptation mechanisms are losing their feasibility and efficacy. However, understanding of their rationale can help in evolving new institutional and technological options that are more relevant to mountain realities (Thompson et al. 1986; Forman 1988; and Sanwal 1989).

### **Operational Implication**

There is a rich body of literature in which students of mountain ecology, mountain ethnoscience, and mountain geography, in particular, have described the above features for different mountain systems (Price 1981; Singh 1986; Ives and Messerli 1989; and Allan et al. 1988). However, to enhance their direct usability in the current development efforts in mountain areas, one needs to see them from an integrated perspective. More importantly, clear identification of their operational implications is essential to influence the decision processes affecting mountains. Operational implications of the above mountain characteristics can be placed under three categories: (i) objective circumstances, (ii) dependent patterns-traditional activities, and (iii) dependent patterns-development interventions. Table 1 (Annex) presents a summary of these implications, along with the mountain characteristics causing them.

#### *Objective Circumstances*

By objective circumstances, we mean the set of constraints and potentialities which influence the choice and pattern of activities in the mountains. Distance, physical isolation, high transport cost, limited mobility, difficulties of logistics and infrastructure, vulnerability to risks due to human action and natural hazards, limited production opportunities, limited exposure to, and limited replicability of experiences from the plains, are some of the important elements of objective circumstances. Mountain features such as inaccessibility, fragility, marginality, and heterogeneity contribute to them in different ways (Annex, Table 1).

#### *Dependent Pattern - Traditional Activities*

'Dependent patterns' imply a broad complex of activities, particularly their orientations as permitted and encouraged by the above objective circumstances. The type of production, consumption, exchange activities, and their associated practices, including interactions with non-mountain areas, are included here. For example, the dominance of local resource-centred

production and demand patterns that are spatially and sectorally diversified, interlinked activities in the field of production and trade, slow pace of change, unavoidable dependence on highland - lowland linkages, general neglect, and 'selective over-exploitation' by the 'mainstream' systems are some of the components of dependent activity patterns. In a way, they represent traditionally evolved forms of human adaptation to mountain circumstances. These traditional "dependent activity patterns", as against the deliberate development interventions, are a part of the gradual transformation processes characterising mountain areas.

#### *Dependent Patterns - Development Interventions*

Deliberate development activities, too, could be considered to be a part of 'dependent activity patterns' to the extent that they are conceived with reference to the objective circumstances and experiences of transformation processes in mountains. However, if development interventions are undertaken without conscious and explicit consideration of mountain characteristics, they will probably be treated as 'independent patterns'. They would be 'independent' of any sensitivity and relevance to the objective circumstances of the mountains. Several development initiatives, which are designed with little sensitivity to mountain conditions, and which often lead to extreme environmental perturbation and resource degradation, would fall into this category (Sanwal 1989). The following discussion relating to development interventions and the potential role of mountain specificities will throw more light on this.

#### **Development Imperatives of Mountain Specificities**

It may be reiterated that consideration of a complex of varying degree of the above mountain characteristics, their multiple dimensionality, and their interrelationships, would give a contextual perspective to decisions and actions in mountain areas. A sensitivity to such a mountain perspective would determine the relevance and effectiveness of any development activity in mountain areas. This is elaborated below by highlighting the development imperatives of the major attributes of mountain specificities.

#### *Multi-dimensionality*

As stated earlier, most of the mountain specificities have biophysical, socioeconomic, and cultural dimensions. For instance, diversity is found in the physical and biological features of mountains as well as in the socioeconomic and cultural life of mountain people. The same may apply to the characteristics of fragility and marginality. Incidentally, production and productivity-wise, marginal and fragile areas often coincide with the habitats of marginal plants and marginal people. Inaccessibility, too, has physical and socioeconomic (as reflected by inequalities) dimensions. 'Niche', that imparts comparative advantage to mountains, primarily relates to the physical and biological resource base but in some senses it may relate to special skills, attitudes, and approaches of mountain communities.

The complex of mountain specificities and their multiple dimensions help in presenting an array of positive and negative attributes of mountain situations. The focus of development interventions should be on protection and enhancement of positive attributes and maximisation of their role in development interventions. The opposite could be said about the negative attributes. An understanding of these attributes can greatly help in determining development goals and priorities and in designing of operational programmes. Table 2 (Annex) illustrates the situation



by indicating a few possible approaches for treating positive and negative attributes of mountain conditions. For instance, while it suggests a reduction in physical fragility by conservation and stabilisation support, it emphasises the protection of botanical fragility (represented by potentially disappearing, delicate plants) as a source of biological diversity. Similarly, while it suggests the maintenance of physical and biological diversity, it calls for a reduction in economic diversities (e.g. inequalities) and encouragement of social integration with protection of diverse values. The Table suggests the need for reducing marginality of all types. More examples can be seen from the Table. Most of the suggestions may sound 'normative' (i.e. based on norms emerging from one's value judgements and biases). However, our purpose, instead of sermonising, is to put together a range of possibilities which should find a place in public interventions addressed to the sustainable development of mountain areas. These possibilities highlight the need for widening the focus (objectives and approaches) of development interventions.

### *Interlinked Mountain Specificities*

Yet another important feature of mountain specificities is that most of them are interlinked in two ways: (a) commonality of causative factors and (b) shared consequences of disturbance to each other.

Common Causes. As indicated by Table 3 (Annex), most of the mountain conditions (specificities) share common causative factors. If the relevant factors are grouped under (a) habitat and (b) society (Price 1981 and Whiteman 1988) and related to mountain specificities, the point becomes quite clear. The degrees of diversity, fragility, marginality, human adaptations, and inaccessibility are, in different measures, directly linked to factors such as elevation, slope angle, slope orientation, and exposure. Similarly, climatic factors, such as precipitation and micro-climate, also contribute to the degree of diversity fragility, marginality, and human adaptations. The role of socioeconomic factors, such as ethnicity, type of economic activity, and resource management patterns in determining the degree of diversity, marginality, etc. of mountain communities, is quite clear from Table 3 (Annex). More examples can be gleaned from the Table. Owing to the above relationships, any intervention disturbing the underlying common factor will affect other related specificities.

Shared Consequences or 'Externalities'. Partly, because of the commonality of causative factors and partly, because of their crucial interdependence at usage-level, a number of mountain characteristics are invariably influenced by any disturbance or treatment extended to each other. The consequent impacts could be negative or positive. For instance, when an inaccessibility problem is handled by the construction of a road in mountain terrain, the fragility due to steep slopes and associated vegetation is negatively affected.

Similarly, in the marginal and fragile areas, the improved accessibility may encourage a rate of resource extraction higher than the rate of regeneration of the same resource. Improved accessibility may also shatter the traditional occupational patterns and survival strategies of certain mountain communities. Thus marginal areas and people may be further marginalised (Bjonness 1983). However, improved accessibility could also integrate the hitherto remote and marginal areas (their people and activities) with mainstream situations and reduce their marginality. Such negative or positive impacts, going beyond the intended purpose, are termed negative or positive 'externalities' by economists.

Table 4 (Annex) presents the possibilities of these externalities of development interventions addressed to specific mountain characteristics. The positive and negative externalities are indicated by (+) and (-) signs respectively. Accordingly, intervention directed to inaccessibility can have both negative and positive side effects on marginality, diversity, niche, and adaptation

mechanisms. Any treatment of fragility may reduce the degree of marginality and create new 'niches'. But this intervention may have some negative side effects on the degree of diversity and specific adaptation mechanisms associated with fragility.

Any efforts, directed to reduce marginality of all types, will generally have positive side effects on other specificities apart from people's adaptation mechanisms that evolved over time to cope with marginal situations. Efforts to reduce diversity/heterogeneity may adversely affect fragile and marginal situations and specific niches (Bjonness 1983). Steps to protect and maintain diversity would have effects almost opposite to the above. Depending on how 'niches' are harnessed (i.e. conserved and used or simply extracted), these steps will influence other mountain characteristics positively or negatively. Finally, any effort to use people's adaptation mechanisms (i.e. their rationale if not the contents) may make development initiatives more sensitive to the rest of the mountain specificities and would ensure positive side effects on them. This is because people's adaptation mechanisms have evolved over time because of close association with mountain conditions. The details presented in Table 4 (Annex) are more for illustrative purposes. More cases with reference to specific interventions can be worked out.

### *Features Constraining Development Norms*

Even if they ignore the finer attributes and interrelationships of mountain characteristics, development experts readily perceive the broad features of mountain situations, which we have described as 'objective circumstances'. Infrastructure, communication, and mobility are three interrelated basic facilities with which pace of development is closely associated. The physical, climatic, biological, and even socioeconomic (e.g. scattered settlement patterns) factors, contributing to the 'inaccessibility' phenomenon, act as major constraints to the development of the above facilities.

Any attempt to overcome these constraints leads to a second set of constraints. The latter, expressed in the language of development economics, include high over-head costs, long gestation periods (i.e. time span between initiation and completion of a project), poor pay-off to investment (due to low absorption capacity of mountains for 'productive' investment), uncertain economies of scale (e.g. gains positively associated with scale of operations), and limited replicability of development experiences generated in the plains. Undoubtedly, other conditions such as fragility, marginality, etc. also contribute to the above constraints faced by development planners.

Finally, mountain specificities and their interrelationships throw up several basic issues which are difficult to approach through narrowly conceived development norms and yardsticks. Among them are : sustained bio-diversity as a part of human heritage; ecological equilibrium and environmental stability; less visible, 'immediately hydrological and related consequences of development interventions; a variety of upland-lowland linkages; and equity issues in sharing invisible costs and gains of mountain development. The conventional cost-benefit calculus finds it difficult to capture most of them adequately (Paranjpye 1988). Responses of development planners to them will be mentioned later.

### **Basis for a Resource-centred Integrated Development Approach**

The comprehension of the above attributes of mountain specificities reveal several implications and imperatives for approaches and strategies in mountain development. Though casually mentioned in the preceding discussion, they are systematically recapitulated here.



### *Multi-dimensionality of Development Goals*

The multi-dimensionality of mountain features calls for basic changes in development goals. This is implied by the need for appropriate treatment of positive and negative attributes of mountain characteristics for sustainable development of mountain areas. Development goals and needs should be described and defined in broader terms with an explicit focus on issues such as equity, environmental stability, and, of course, economic betterment. In view of the inter-generational equity issues and inseparability of the long-term health of natural resources and their current use-pattern, sustainability should be the explicit component of development objectives.

### *Resource-centred Strategies*

Development strategies for mountain areas have to be resource-centred. The resource characteristics (fragility, heterogeneity, niche, etc.) determine the choice and pattern of resource use, and this in turn should be directed not only to current productivity but to sustained use of the resource base.

Again, due to inseparability of sustainability of resource base, its use pattern, and its productivity, 'the sustainability goal' itself calls for a resource-centred approach to mountain development. It may be added that by sustainability we do not mean a self-sustaining system that is independent of external links. Conservation and harnessing of mountain potentialities, directly or indirectly through equitable exchange, are among the essential ingredients of an approach to sustainability.

### *Compelling Basis for Integrated Approach*

Since most mountain characteristics - acting as constraints or indicators of resource base potentials - are interlinked due to their broadly common causes and externalities when used, none of them can be treated appropriately or harnessed in isolation. This forms a compelling basis for an integrated approach to development interventions. Accordingly, while considering any development option, its backward and forward linkages, activities, or side effects also need full consideration and incorporation into the policy and programme designs.

### *Planning from Below and Participatory Development*

The earlier mentioned, "dependent patterns of activities", represent people's adaptation mechanisms to mountain habitats. They are, in a way, repositories of traditional wisdom and experiences of mountain communities in managing and harnessing mountain constraints and resources. To benefit from this, and also to make development interventions relevant to the heterogeneous conditions of mountain habitats, it is essential that "planning from below" becomes an integral part of the development approach in the mountains. This by implication necessitates a greater role for people's participation and decentralisation at different stages of development planning and implementation.

### *Required Broadening of Norms and Procedures*

Owing to the already mentioned factors such as: (i) 'objective circumstances' of mountain habitats, (ii) their inadequate understanding and projection (by development planners) as merely

"constraints to development", (iii) inadequacies of conventional cost-benefit norms to account for negative and positive externalities associated with development interventions, and (iv) limited replicability of plains' development experiences in the mountains, the conventional development models and approaches need significant changes to become relevant to mountain areas. This becomes all the more clear if one contrasts the major features and orientations of conventional development approaches with those approach conceived with sufficient recognition of the mountain perspective (Annex, Table 5). In the following discussion, broad orientations and features of conventional development approaches are highlighted to facilitate the comparison.

### **Some Relevant Features of the Conventional Development Approach**

Development or rather economic development, as a practical phenomenon generated through conscious and deliberate efforts, as understood and attempted in most of the developing countries today, has a rather short history that began after the end of the Second World War, when the 'decolonisation' process started in what is known today as the third world. Yet, both theoretical and empirical literature on the subject has grown several times faster than the rate of economic growth achieved by any country in the world. Space will not permit even a casual comment on the totality of the phenomenon. Hence, we will confine our discussion to only those aspects that are of direct relevance to the mountain issues discussed above.

In this connection, it may be repeated that there are no specific development theories or approaches designed for mountain areas. Mostly, approaches are extensions of those evolved for 'mainstream' (i.e. plain) situations, with occasional modifications imposed by circumstances.

Development experts and scholars differentiate conceptually between economic development and economic growth (Todaro 1983). The latter refers to rise in real per capita income over time. The former is a more comprehensive phenomenon that includes material well-being along with reduced inequalities, unemployment, etc. However, in practice, most of the developing countries have ended up achieving some measure of economic growth (Singer 1979 and Lipton 1987). However, economic development itself is considered to be a fairly restrictive category (Korten and Klauss 1984). It is not sensitive enough to issues relating to environment and ecology, stability and sustainability, varied forms of poverty and inequity, and gender perspectives and participatory development. As indicated earlier this is more so in the case of mountains, where the neglected issues are more central to the stability and sustainability of mountain habitats and communities.

Even the more recent initiatives with fairly catchy titles (e.g. 'Integrated rural development', 'integrated watershed development' etc.) extended to mountain areas, too, do not seem to make much difference (Bhati and Swarup 1985). The reasons are clear.

The methods of conceiving problems and designing solutions; procedures used for project prioritisation and resource allocation; choice of operational mechanisms including preferred technologies and institutional means, including free play of market forces or centralised bureaucratic systems, have not changed (Sanwal 1989).

With the above general comments on the conventional development paradigm, now we can briefly examine the place and treatment of basic issues emerging from our past discussion on the implications of mountain specificities for development interventions.



### *Development Goals*

In the light of the previous discussion (relating to concentration on narrowly conceived goals of economic development and the inability), in practice, to address to other basic issues, it hardly needs mentioning that multidimensionality of development goals (required by multidimensional attributes of mountain specificities) seems to be a far cry from the conventional development approaches.

### *Resource Focus*

The resource focus of conventional development interventions in the mountains also violates the requirements of the mountain situation. Firstly, the 'product or service generating approaches' tend to be quite indifferent to resource bases. The negative side effects of tourism is one case in point (Singh and Kaur 1985). The resource base is treated more as a normal production input - like capital equipment - to be exhausted in the process of production. This ignores the fact that in the mountains (and elsewhere) sustainability of the resource base is as important as sustainability of production streams.

Secondly, wherever development interventions are explicitly 'resource-centred', as in the case of mining activities, timber harvesting, and the harnessing of energy potential, they rarely have an integrated view of mountain specificities and their interrelationships. Resource extraction is the focal point of such efforts. The side effects of such ventures, such as environmental degradation, backlash on the diversified sustenance systems of mountain people, and a disproportionately low revenue transfer from these activities back to hill areas, are rarely emphasised (Paranjpye 1988; Repetto 1988; and Bandyopadhyay and Shiva 1985).

Other types of resource-centred development initiatives are largely sectoral in their approach (e.g. forest development projects). They treat resources as homogeneous units in complete isolation from other resources and related activities. Hence, diversity and linkages (Mahat 1987), which should form integral parts of resource-use policies and planning, do not get attention (Repetto 1988). Even in the highly publicised 'watershed development schemes' in the hills, the forest component receives disproportionate attention. Moreover, in sectoral initiatives the level of specialisation (e.g. horticultural specialisation in Himachal Pradesh, India), often dictated by market indicators, is carried to the extreme. This has its own implications in term of risk and long-term unsustainability.

### *'Integrated' Approach?*

The 'Integrated approach' would emerge as a compelling necessity for development interventions, if the latter were designed taking mountain conditions into full consideration. Moreover, as most of the problems in the hills (poverty, unemployment, environmental degradation, etc.) are closely integrated, their solution, too, needs an integrated approach (Champers 1983). Development planners have also picked up this term, both because of its publicity value and marketability in terms of procuring foreign aid. Accordingly, "integration", which has become an important term in development vocabulary, is also used as an adjective in several development interventions in mountain areas. In practice, it barely serves as a prefix to the titles of development projects. A deeper investigation will show that, while mountain conditions tend to make 'integration' a compelling precondition for relevant development strategies, the conventional development approaches use it in quite different ways. Consequently, as observed in the field, the term integration is often used in the following contexts.

In most cases it stands for a spatial scale of operation e.g. a scheme covering a whole ecological zone, a total river basin, or a small watershed without keeping the linkages of different components of the project as focal points. In other cases, integration implies initiation of several activities simultaneously, but keeping their sectoral approach intact (Bhati and Swarup 1985). Another important approach to integration is centralisation of the administration of varied activities in a given sector or zone and this goes very much against the spirit of the integration implied by mountain specificities. To sum up, mountain characteristics and their implications seldom form the basis of an integrated approach.

### *Planning from Below*

Despite its utility and need for improving the relevance and effectiveness of development initiatives, "planning from below" and the participatory approach to development continue to be the most neglected aspects of the present day development culture. Despite pronouncements in planning documents for it (GOI 1982), in practice, bureaucratic centralisation and imposition of ideas and schemes from the above continue to be the rule (Gadgil 1985 and Sanwal 1989).

### *On Procedures and Norms*

The objective circumstances and consequent constraints on the application of conventional development norms and yardsticks, pose a difficult challenge to development planners. The multiplicity of externalities in mountain development greatly complicates investment decisions. Rather than revising development norms to accommodate requirements of mountain areas, decisions are made favouring activities or projects which have the following attributes : high economic pay-offs (rather than other unquantifiable gains); greater contribution to the national economy (rather than well-being of mountain communities; sectoral focus (disregarding the interlinkages); and high potential for fiscal distortions. The last one is reflected by a variety of subsidies which, besides creating dependency among the people, tend to project the mountains as permanent liabilities for the mainstream economies. The above tendencies will persist unless development initiatives are sensitised to the mountain perspective. This alone can help to project mountain realities not as constraints but as objective circumstances requiring specific treatment (Sanwal 1989).

### **Operationalisation of the Approach**

The key message of the present paper is that, to make development approaches relevant and effective in mountain areas, the latter's specific characteristics should be made a key consideration, while designing the development interventions. Understanding of mountain specificities and their interrelationships, and their incorporation in development designs can form a functional and objective basis for an integrated approach to mountain development. Acceptance of this approach may lead to several basic changes in development strategies in the mountains.

Once integration based on mountain characteristics, both at the conceptual and operational level, is achieved, other requirements such as resource-centred development, multiple goals of development, and even participatory development etc., will also be satisfied. It may be pointed out that integrated development, as per the above approach, does not necessarily mean simultaneous adoption of multiple activities. This sort of 'integration', involving simultaneous



coverage of all activities, seldom proceeds beyond a computer terminal. The essence of 'integrated development' emerging from an understanding of mountain characteristics, involves the following.

- o It involves a two way adaptation process; therein (i) the specificities are adapted or modified to suit productive activities and (ii) activities are chosen and designed in such a manner that they fit well with the constraints and potentialities reflected by resource specificities. Terracing on mountain slopes and choice of shallow-rooted crops on mountain slopes with thin top soil are two respective examples of the above.
- o Development interventions, broadly speaking, are often of the above two types. Either they are focused on harnessing the resource or they involve promotion of activities possible in that resource context. However, the two are ultimately interrelated. But the most important point (which is the essence of integrated development) is that : (i) while choosing a treatment (or use-pattern) for a given resource characteristic, its impacts on other mountain characteristics (e.g. impact of road construction, to resolve inaccessibility, on physical or biological fragility, on the adaptation strategies of the people etc.) are fully spelled out. Similarly, the implications of an activity chosen with reference to one mountain specificity, for the other related specificities also need clear exposition (e.g. choice of irrigation dam to harness 'niche' characteristics of the mountains and its effects on neighbouring marginal areas, vegetation, and hydrology of the mountains etc.). Another way to look at the integrated approach is to spell out the potential key attributes of a projected activity in terms of its impacts on different mountain characteristics and activities based on them. These impacts could be negative or positive. Preparation of their detailed inventory can give an idea of trade-offs in order to facilitate a final decision on development interventions. The following Tables 6 and 7 sketch the essence of the above idea with the help of examples.

Table 6 (Annex) indicates the adaptation process wherein, one specificity, i.e. physical inaccessibility, is chosen for illustration. We have such examples worked out for all specificities but space does not permit their inclusion. Table 6 (Annex) shows an approach to handling physical inaccessibility that is different from the conventional approach. In case inaccessibility is not treated, the Table indicates the relevant attributes of dependent (adapted) activities which should be promoted by different means.

Table 7 (Annex) illustrates the idea of an integrated approach where a single activity is focussed upon. In our case, it is a prospective new crop variety for mountain agriculture. Accordingly, the concerned activity is only one, but its choice is based on an integrated view of mountain conditions. In other words, its potential attributes, as required by mountain specificities, are indicated. Here again, we have nearly a dozen examples of development activities, ranging from credit schemes for the mountains to the structure of marketing system for mountain villages, which for want of space are not included here. It may be added that most of the ideas presented in this paper formed the basis of studies on the sustainable development of mountain agriculture coordinated by the author at ICIMOD (Jodha 1989). The most important procedural lesson offered by the above work, accomplished so far, is that a strong data base, differentiated by mountain specificities, is a key step in making the new approach operational.

To sum up, the present paper tries to communicate the following :

- o The conventional approach to the development of mountain areas is ineffective and less relevant because it is not sensitive to mountain conditions.
- o An alternative conceptual framework is outlined, where mountain specificities (characteristics), such as inaccessibility, fragility, marginality, diversity, 'niche' or comparative advantages of mountains, and human adaptation mechanisms and their interrelationships, are central. They constitute a compelling basis for a resource based integrated approach to mountain development.

# ANNEX

**Table 1: Operational Implications of Mountain Specificities**

Implications	Mountain Characteristics					
	Inaccessi- bility	Fragi- lity	Margi- nality	Diver- sity	Niche	Adapt. mechanism
<b>A. <u>Objective Circumstances</u></b>						
Remoteness/isolation	x		x			
Higher transport cost	x					
Poor mobility	x		x			
Limited production possibilities	x	x	x		x	
Vulnerability to natural hazard	x	x	x		x	
<b>B. <u>Dependent Patterns (1)</u>*</b>						
Local resource-centred production and demand	x			x		x
Diversified interlinked activities	x			x	x	x
Neglect by mainstream	x	x	x		x	
External dependence & overexploitation by mainstream			x		x	x
Low level of development	x	x	x	x		
<b>C. <u>Dependent Patterns (2)</u>*</b>						
Inapplicability of conventional dev. norms/procedures	x	x	x	x		
Limited replicability of dev. experience of plains	x	x		x		
High overhead costs	x	x		x		
Need integrated approach due to externalities	x	x	x	x	x	x

\* Dependent patterns' category (1) relates to traditional patterns of activities, while category (2) relates to development interventions in mountain habitats.



Table 2 : Mountain Specificities and Their Development Implications

Dimensions and Major Imperatives for Development Interventions				
Mountain specificities	Physical (Climatic, Edaphic)	Biological	Social/ Cultural	Economic
Inaccessibility	Reduce through multiple options such as roads, ropeway, waterways tele. com. etc.	Explore and develop as new available resources, (e.g. unexplored, unexploited genetic resources)	Reduce through education, participation, and support systems	Reduce disparities  Improve accessibility-special programmes for target groups
Fragility	Reduce by stabilization, conservation measures  Restricted use and other conservation measures	Conserve by R & D and other support systems (e.g. Endangered genetic resources/species)	Protect value systems/institutions endangered by development	Strengthen sustenance capabilities through dependable options
Marginality	Reduce and prevent by physical and biological measures  Regulated use intensity	Conserve and reduce by R & D support  Integrate with farming systems development	Reduce by institutional reforms and support systems  Prevent by controlling negative side effects of development interventions	Reduce by special support programmes; opportunities  Prevent by safe-against backlash of development
Diversity	Diversified/decentralized approach to use & development options  Homogenize some resource categories by irrigation land-shaping etc.	Harness, enhance through support systems, infrastructure R & D use	Protect and orient to integration	Reduce inequalities  Strengthen diverse options/flexibilities
Niche/ Comparative Advantage	Prevent over-exploitation and its negative side effects	Harness by support systems, infrastructure prevent over exploitation	Encourage traditional skills and crafts	Harness with better terms of trade
Adaptation Experiences	Incorporate ethno-engineering knowledge in development interventions	Incorporate folk knowledge of resource utilization/conservation in development options	Incorporate rationale of traditional practices in development activities	Complement new interventions with traditional economic activities

**Table 3 : Basic Factors Underlying Mountain Specificities**

	Mountain Conditions					
	Diversity	Fragility	Margina- lity	Inaccessi- bility	Niche	Adaptation Mechanism
<b>A - Habitat</b>						
Elevation	x	x	x	x	x	x
Slope angle	x	x	x	x	x	x
Slope orientation	x	x	x			
Geology/soil type	x	x	x		x	x
Precipitation	x	x	x		x	x
Water flows	x	x		x	x	x
Wind	x	x				
Radiation	x				x	x
Temperature	x			x	x	x
Seasonality	x		x	x	x	x
Micro climate	x	x	x		x	
Plant/animal resources	x	x	x		x	x
<b>B - Society</b>						
Ethnicity	x		x			x
Social organisation	x		x	x	x	x
Mainstream links	x		x	x	x	x
Economic activity	x					x
Resource management	x	x				x
Adjustment processes	x				x	x

**Table 4: Externalities of Development Interventions Directed to Different Mountain Specificities**

Mt. Characteristics Focussed by Intervention	Impacts on Other Mt. Characteristics and Related Activities					
	Inaccessi- bility	Fragi- lity	Margi- nality	Diver- sity	Niche	Adapt. mechanism
Inaccessibility		(-) <sup>a</sup>	(-) (+)	(-) (+)	(-) (+)	(-) (+)
Fragility	(+)		(+)	(-)	(-) (+)	(-)
Marginality	(+)	(+)		(+)	(+)	(-)
Diversity		(-) (+)	(-) (+)		(-)	(-)
Niche			(-)	(-) (+)		(-) (+)
Adaptation mechanism		(+)	(+)	(+)	(+)	

a (-) and (+) indicate positive and negative impacts respectively. In some cases, depending on the circumstances, the impact could be both negative or positive. The Table illustrates the point. A more detailed inventory of externalities (impacts), within their short or long-term context, can be made with reference to specific activities. (See Table 6 for an illustration)



**Table 5: Contrasting Features of the Conventional Development Approach and the Approach Based on the Mountain Perspective**

**Broad Features of :**

Conventional Approach	Alternative Approach with Mountain Perspective
(a) <u>Goals &amp; priorities</u>	
Narrowly focussed - production, productivity, income growth, etc; "extraction-oriented"; decided exogenously.	Broadly focussed - economic gains, equity, and long term issues e.g. environmental stability, sustainability etc; dictated by Mt. specificities.
(b) <u>Resource focus</u>	
Missing, in product and service-oriented interventions; Present, in some but oriented to "extraction only"; or highly sectoral.	Resource-centred and integrated as dictated by : Mountain specificities; inseparability of sustainability of resource base, its use-pattern, and productivity.
(c) <u>Forms of integration</u>	
Activity covering "full area" (a valley, village watershed); administrative centralisation of diverse activities without linkages; simultaneous start of several activities without discarding sectoral focus; linkages with mainstream with dependency potential.	Integration at levels of conception, goal setting, planning, and implementation, as guided by Mt. specificities and their linkages, interdependence, externalities, etc.
(d) <u>Norms and procedures</u>	
Investment norms, decision - procedures, technologies, and institutions insensitive to externalities, long-term issues	Sensitive to externalities and long term sustainability issues; determined by Mt. specificities and their linkages; people's participation.
(e) <u>Consequence</u>	
Dominant scenario : Performance lagging behind effort; emerging indicators of unsustainability; backlash of interventions.	Arrest and reversal of unsustainability trends; strengthening of resilience to withstand crises.

**Table 6: Conceptual Framework for Dealing with Physical Inaccessibility Through Development Interventions**

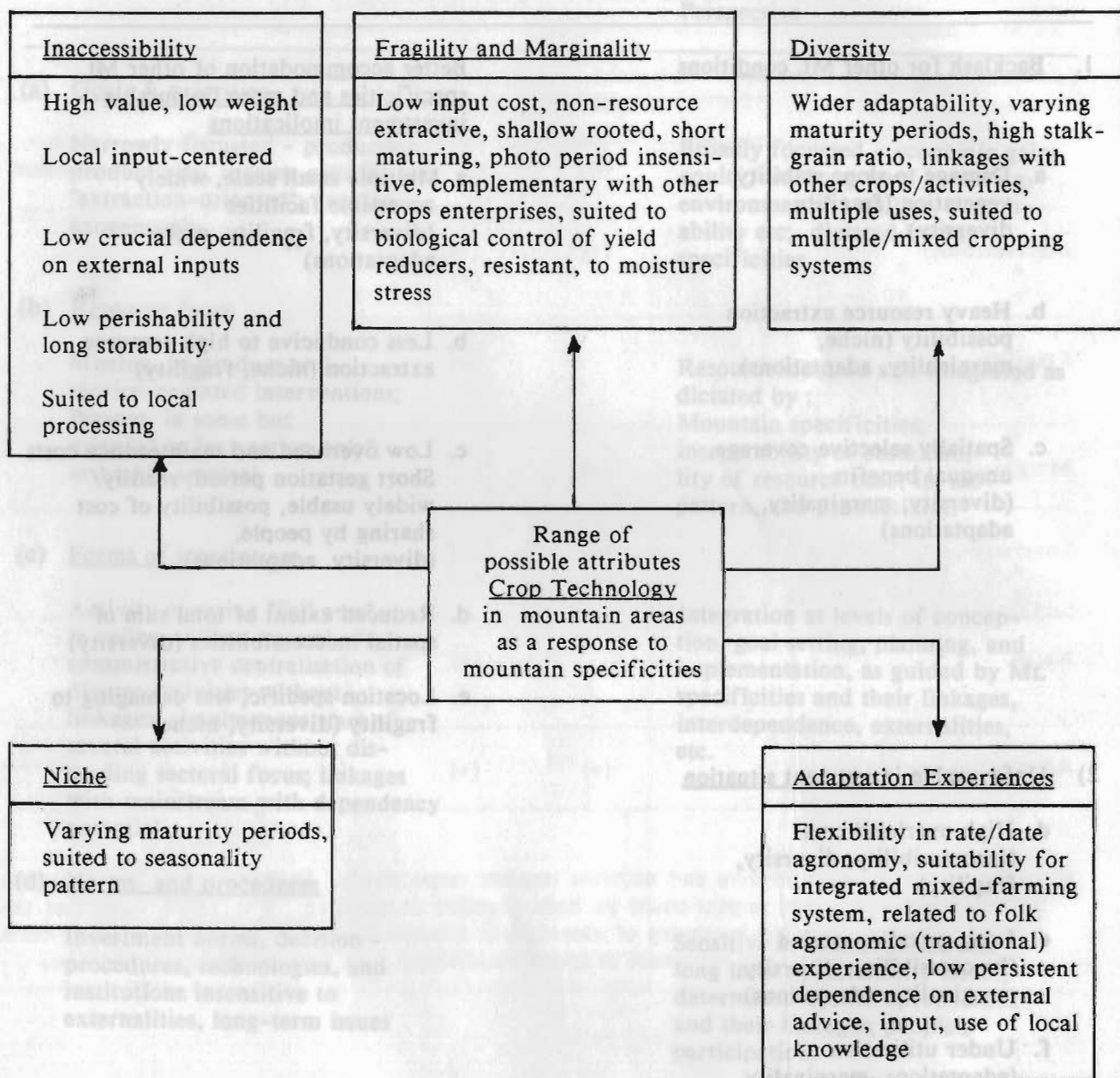
Reduction in Inaccessibility\* Using :

Conventional Approach (e.g. large-scale road network)	Approach with Mt. Perspective (e.g. multi-option integrated approach involving road, track, rope/water ways)
1. <u>Backlash for other Mt. conditions</u>	<u>Better accommodation of other Mt. specificities and more favourable investment implications</u>
a. Damage to slope stability, vegetation** (fragility, diversity)	a. Multiple small scale, widely accessible facilities (diversity, fragility, niche adaptations)
b. Heavy resource extraction possibility (niche, marginality, adaptations)	b. Less conducive to high resource extraction (niche, fragility)
c. Spatially selective coverage, unequal benefits (diversity, marginality, adaptations)	c. Low overhead and maintenance costs Short gestation period, readily/widely usable, possibility of cost sharing by people. (diversity, adaptations)
	d. Reduced extent of total sum of spatial inaccessibilities (diversity)
	e. Location specific, less damaging to fragility (diversity, niche)
2) <u>Unfavorable investment situation</u>	
d. High overhead cost (inaccessibility, diversity, fragility)	
e. Long gestation period (Inaccessibility, diversity, marginality, adaptations)	
f. Under utilisation (adaptations, marginality, fragility, diversity)	

\* Another options to handling the inaccessibility problem is to live with it and concentrate on adaptable activities. Example : emphasis on products with low perishability, low weight, high value, low seasonality, and low crucial dependence on external inputs; diversification and decentralisation of operations in the field of production, marketing, and support services so that negative impacts on inaccessibility can be minimised.

\*\* The Mt. characteristics to be affected by intervention are indicated in parentheses.

**Table 7 : Approach to Identify Attributes of Prospective Crop Technology  
Appropriate to Mountain Specificities**





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