Institutions Dealing with Agricultural Research and Development: How They Look and How They Perform

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As a contribution to efforts to facilitate the strengthening of capabilities and change the orientation of agricultural R & D institutions, to enable them to meet new challenges in respect to sustainable development of hill/mountain agriculture effectively, ICIMOD sponsored studies in the HKH countries to assess the state-of-the-art situation. The reports of these studies (through quick reviews) were intended to raise several issues for further discussion and analysis which, in turn, would help design appropriate action programmes. This note contains a critical summary of the key issues emerging from the country reports. Issues pertaining to each country are first discussed separately, followed by an overall appraisal of their positive features and the existing lacunae.

Within a policy environment that lays stress on sustainable resource management in the mountains, it is imperative that key issues in research and extension are also focussed on resource management. Enhancing the productivity of different resources and ensuring their sustainability can be best achieved by taking a holistic view of production systems.

Following the aforesaid approach, **Bhutan** is currently reorganising its R and D institutions under what is now called RNR (Renewable Natural Resources) Strategy. Under this system, R and D institutions have been categorised into six groups to fit into the prevalent production systems, viz., dryland plantation and orchards, wetlands, livestock, forests, and *Tsheri* land. This type of categorisation indicates a mixture of the commodity approach and the production systems' approach. Another important feature of the RNR strategy seems to be the creation of an institutional mechanism at district level for implementation of R & D programmes and to give feedback for planning and identification/ revision of priorities. A mechanism has been provided in the institutional structure and mandate for a participatory approach and for a role for farmers in deciding priorities.

The fact that, in **China** (Ningnan county), agricultural extension work is effectively managed at county level is a unique example of decentralised systems. The County Management Committee selects the research priorities and invites national and provincial research institutions to work on research projects that the county is interested in. Scientific teams have to prove the value of their recommendations on-farm before the contractual obligations of the county are fulfilled. Programmes and funding can also flow from national and provincial development institutions. When the county engages national and provincial research institutes to carry out research work on a programme basis, it avoids the necessity of creating its own infrastructure. Farmers contribute financially to county management and also to particular research programmes. The R & D system is designed to reflect the priorities of the farmer in its agenda. In keeping with the above R & D orientation, the provincial and national governments create research stations to address research aspects of regional interest. The Chinese system of R & D, seen in Ningnan county, is a model of a bottom-up R & D approach which is very sensitive to local circumstances.

The R & D system used by the State of Himachal Pradesh in **India** is commendable for

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its performance in terms of facilitating the commercialisation of hill agriculture (through horticulture). The system is conventional in its structure and mandate. For instance, it is very centralised and follows a top-down approach with little leeway for using people's knowledge. The strong point in favour of the R & D system is that it has received political patronage from the State, ensuring adequate funding for manpower, infrastructure, and research activities. Moreover, different farming communities working as pressure groups (representing different interests) have played important roles (through political channels) and influenced the choice of research programmes.

Himachal has also experimented in combining education, research, and training and extension activities under the university system and technology transfer under development departments. The fact that this system has demonstrated an ability to facilitate improvements in farming in Himachal Pradesh does not mean that it is valuable for all types of production systems and farming classes.

The R & D system in Himachal is still way behind in terms of building capabilities to meet the new challenges of environmentally-sound agricultural systems.

The structure of agricultural and forestry research and development institutions in the mountain areas of **Pakistan** is not too different from that of India. Like India, since only part of its area is mountainous, most of the R & D systems reflect a plains' orientation. However, one can find regional research stations established in specific mountain areas, and they work under the CAREPLAN (coordinated agricultural research planning system). Provincial development departments act as organs both for Technology Generation (TG) and for the Transfer of Technology (TOT).

Institutionalised R & D in **Nepal** is still in the process of evolution. Structurally, it has been designed to meet the great diversity of mountain areas, but its problems lie in meagre resource allocation and lack of manpower and infrastructure.

A good example of a successful R & D institutional system is represented by the Lumle and Pakhribas regional agricultural research centres. These two institutions work on a fully internalised participatory approach, effective on-farm demonstrations, and designing research programmes on the basis of the needs and resources of regional farming systems. However, questions have been raised about the heavy budgets of these centres compared to other R&D institutions in Nepal.

Research and development in **Bangladesh** and **Myanmar** are based on conventional structures and mandates. Problems facing these areas call for efforts to strengthen their mandates and structures to meet new challenges. Resource constraints and manpower limitations are critical factors curtailing their growth and achievements.

There is a noticeable lack of effective linkages among the different organs of research systems and the farmer. There is a visible absence of both the mechanisms and mandates for a participatory approach. This makes the farmers passive partners, receiving ideas and technologies imposed from outside.

Issues Emerging from the Reviews

An overview of the institutional systems dealing with agricultural R & D in the HKH countries reveals that the performance in some areas is visibly quite effective, whereas in others it is yet to have an impact. Also, most of these institutional systems are either simple extensions of plains' based research institutions or are greatly influenced by them. Thus, the question arises as to how far these R & D systems are responsive to the conditions of mountain habitats and to mountain agriculture?

The practical realities of hill and mountain areas impose certain imperatives in the form of potentials and limitations, which demand a specific orientation and structure of R & D institutions to suit mountain areas. Table 1 lists these field realities (i.e., mountain conditions/specificities) and their imperatives for an effective R & D system.

Table 1: How Far are R & D Systems Tied to Sustainable Mountain Development? (AGRIC)

Sr. No.	Ground Realities (mountain specificities/conditions)	Imperatives for R & D institutional structure and mandate	Present status of R & D institutions in the HKH countries						
			Bangladesh	Bhutan	China	India	Myanmar	Nepal	Pakistan
1.	Diversity of resource base due to physical, biological, and man-made factors; production opportunities and constraints (Diversity)	Decentralised, diversified, local resource-focussed R & D facilities with resource management and utilisation mandates (not focussing only on a few commodities) (Broader mandate and non-compartmentalised resource managing, research-focussed R & D system)	4	3	2	2	4	4	3
2.	Unique opportunities relating to special products, resource facilities, location, etc with comparative advantage to mountain hills (Niche)	R & D facilities and mandate for harnessing niche, enhancing regional comparative advantages	4	3	2	2	4	4	3
3.	Fragile and marginal (inferior) resource base, vulnerability to degradation, limitations in carrying capacity (fragility/marginality)	Area and resource-centred structure and mandate of R & D institutions/facility Incorporation of RPK, farmers' need-based research, prerequisites Resource management and total production system focus essential	4	2	3	3	2	4	3
4.	Transport and communication hazards of various nature, distance, isolation, low mobility, conservative societies	- R & D facilities for ensuring self-sustaining systems, food security, and low-volume, high-value, non-perishable products for exchange - Broad integrated mandate, structure, and manpower	4	3	2	2	4	4	3

Note:

1. Excellent R & D institutional system
2. R & D facility exists with desired structure and mechanism
3. Partial accomplishments in terms of R & D structure and mechanism
4. R & D systems under transition/developing

An understanding of mountain specificities makes one realise that R and D institutions for mountain agricultural development need to have broader and diversified mandates, strong inter-sectoral and inter-disciplinary linkages, and mechanisms for multi-disciplinary teams of scientists to work on the problems with regular feedback from the farmer. The outcome of research has to be relevant to the local farming community.

A glance at the existing systems in the HKH Region reveals that most of them broadly fit into this mountain-oriented framework. However, in terms of concrete steps/items one can grade them into different stages for different reasons. **The key issue is, will it be necessary to reorient the existing R & D institutional structures and mandates? If yes, then how can it be done? and who will be the key actors in the process of change?**

Almost all country reports have commented on the current mandates of R & D and their focus on commodity-centred research. In some areas, such as Ningnan and Himachal, agricultural research has visibly succeeded in making significant impacts. One key factor behind their success is their ability to match their activities with the niche and agroclimatic conditions of the mountains. In other countries, such as Nepal, the focus so far has been on cereal crops (maize, wheat, rice) which has only benefitted a few better off, farming communities with relatively fertile lands. There has been no impact on other crops/products. The experiences of all countries indicate that there is a strong need for an alternative approach to R & D. Several examples have been quoted to emphasise this point.

The marginal farmer with less than 0.25 hectares of land constitutes the majority in the mountains/hills throughout the countries of this region. His survival, based only on agricultural land (by crop farming), cannot be ensured. It is vital for him to make a living from diversified activities, e.g., by integrating cropping, livestock, pastureland, supportland, forests, and off-farm vocations. Also, his marginal and fragile lands are showing indications of rapid decline in soil fertility and productivity. He finds it difficult to arrest and reverse these trends because of lack of access to external resources and paucity of cheaper, local resource-based options. Commodity-based technological options have not proven effective, because they need a very different resource base and R&D support systems. Thus, the need for product-cum-resource based thrusts, e.g., as manifested by SALT, etc, cannot be overemphasised. The reports also bring out these facts clearly. **In light of the above, is it not time to make an assessment of current R & D mandates which place a heavy emphasis on commodity production and associated technological options? is it not time to reorient R & D institutions towards a resource management approach? How and who will do it? are the other questions that have to be dealt with.**

Motivated, well-educated, and properly-trained manpower is an equally important prerequisite in order for R&D institutions to make impressive achievements. Concerns have been voiced in India and Pakistan about inbred, poorly-motivated scientific manpower. Solutions, such as reorienting educational materials by incorporating the mountain perspective and linking educational institutions to western universities to maintain contact with and ensure exposure to external scientific work, have been suggested by some reports. This is a positive sign of introspection.

A few things become clear at this stage. Firstly, educational facilities for producing manpower, which is especially trained for mountain agriculture, do not exist at present. Secondly, the existing professional manpower has been working in compartmentalised systems with little interdisciplinary interaction, which probably was favoured by the commodity approach. Emphasis on the development of environmentally-friendly agricultural systems calls for manpower with broader training and good interdisciplinary knowledge. **Should it be necessary to broaden the R&D mandates for mountain agriculture to accommodate resource management concerns, it will call for reorientation or retraining of most of the scientific manpower. How and who can**

be the partners to do it, is a point for discussion.

Traditional art and science of resource management and production was evolved and inherited by rural communities through centuries of informal experimentation. One finds that despite their greater suitability and relevance, modern R & D institutions working for the development of mountain agriculture have given very low priority to institutional mechanisms than can retrieve the rural people's knowledge (RPK) from the farmers. Although this neglect is part of the modern R & D culture worldwide, the intensity of the disregard for RPK in mountain areas is perhaps greater. Whatever the factors for neglect, the rationale, if not the form, of traditional technologies is very relevant today for they can constitute the most useful input for R & D in mountain agriculture. The institutional dimension of this blending of RPK with modern R & D, however, poses several questions involving collaboration of R & D scientists and farmers in interdisciplinary problem-focussed, location-specific work.

Yet, another issue, of no less importance, is how much resource allocation is necessary to make institutions effective in development and delivery relevant technologies? Existing experiences show that institutions, such as Lumle and Pakhribas, that are operating on very high budgets (by Nepalese standards) are very effective in performance and impact. The budget of these two foreign-supported institutions in comparison to locally-supported R & D systems is very high, and the government R & D institutions are also working on very low budgets. Reports from most other countries speak of poor resource allocation, particularly to research programmes and extension activities. In India, Himachal Pradesh reports higher resource allocations and better manpower facilities compared to the U.P. Hills (3.5:1), and it is argued that it achieves better performance in and impact on agricultural development because of better resource allocation.

It is true that many of our R & D institutions are under-funded but how much more is needed? what should be the optimum scale of investment? and can these countries afford the Lumle/Pakhribas types of model?

An equally important question for national R & D planners and donors is that, in view of the diversity, location specificity, high cost of logistics, etc should there not be different norms and yardsticks for research resource allocations in mountain areas? **Questions that R & D scientists should look into are how much extra it will cost to reorient their work to involve the farmers' perspective, introduce diversification, and integrate resource-regenerative components in their technology? what do they think of low-cost technologies? how far can they follow the Ningnan (China) model where agricultural R & D is a local, community-funded activity?**

Most of these issues are of concern to the respective countries, but there are areas in which the role of ICIMOD can be envisioned as a catalytic institution; e.g. in facilitating the reformulation of R & D mandates, taking up the responsibility for giving orientation - training to existing manpower, generating and disseminating information/literature, and cooperating with national institutions to strengthen their capabilities where they feel it is possible. These are, however, very broad bases for cooperation between ICIMOD and the national institutions and their specifics would vary from country to country.