

## **ADAPTED LAND USE AND OVEREXPLOITATION OF NATURAL RESOURCES IN GORKHA**

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There are, no doubt, definite signs of the overexploitation of the natural environment and the thus resulting damage to the landscape in the Himalayas of Nepal. However, it is not the destruction which is the dominant aspect, but a type of mountain agriculture, based on a long tradition of farming experience, optimally adapted to geological Factors (Fig. land 2). Some examples are regular crop rotation, the practice of a fallow-season as an integral part of a crop rotation plan, fertilization, the spreading of mulch to provide the soil with supplementary organic matter and elaborate techniques of artificial irrigation (see Gorkha-Sirdi Khola: Land use Map).

Instructive and, from an ecological point of view, particularly problematic examples of overexploitation are: the building of roads on deeply weathered rock which is prone to erosion; the extension of settlements onto slopes threatened by landslides (Fig.3) the excessive increase in demand for drinking water in Gorkha; the abandonment of a fallow-season in favour of type of intensively dunged, all-year-round cultivation and the degradation of vegetation and soil in areas of common land caused by a particularly large range of various kinds of overexploitation (cattle grazing, the removal of tree fodder and firewood).

There is, no doubt, that the traditional agricultural techniques and cultivation and pasture farming systems are suited to the natural potential. However, that does not mean that adaptation is the equivalent of environmental and ecological stability or even of an ecological balance between natural environmental potential and the demands made of this environment by the people who settle and farm there. Gradual but continual forest and soil degradation have proved to be unavoidable and are by no means recent developments even in the old agricultural areas. Although there have been references to the overexploitation of the natural environment in Nepal for about 2-3 centuries now. Although the Nepalese have often been accused to gross misunderstanding and the wrong attitude towards their mountain environment, it must be said that this recent development has a number of causes, which should be seen in connection with the rapid takeover of new technology (e.g. in road and house building, mechanization and

modernization of agriculture). The most important maxim is no longer adaptation to a natural, ecological environment. Actions are nowadays governed by economic pressures and by the influence on non-Asian patterns of behaviour and thus nature is exploited for purely economic reasons. Unlike in the traditional farming society, the limits of environmental potential are nowadays no longer realized, but are also being thoughtlessly transgressed more and more. Overexploitation in the form of a type of rubber-farming and irreversible damage to the landscape is then the regular consequences. As the topography of the land does not permit an extension of the arable area in the Gorkha region, there is only one solution to the dilemma of the population explosion of the last two decades. This is to increase area productivity not only in arable farming, but also in areas which have so far been used extensively (pasture, degraded forests, wasteland).

There are, however, difficulties involved in the form of the restricted limits set to such a development by both economic and ecological potential. For example, the cultivation of grain in winter depends on the restricted amount of irrigation water available during the dry season. Furthermore, the fact that the land is no longer allowed to lie fallow to renew its fertility means that it is necessary to employ expensive, imported mineral fertilizers. These are only two of the problems. Increased production of rice, maize, animal products and wood for building purposes or firewood is of the utmost importance for a population which is already being forced to live, economically speaking, from hand to mouth, even if it will not satisfy more than a basic demand for the main necessities of life. On the other hand, recognition of the fact that the same priority must be given, in the long run, to the protection of the ecological foundation is prevailing more and more. The following are some of the methods which can be employed for the conservation of soil and to increase fertility in the long-term:

- Upland terraces (bari) must be secured by extending the (already existing) practice of cultivating fodder trees along the edges of the terraces, around farmhouses, along roadsides and paths, small brooks and mountain streams.
- Cultivation of intercrops (finger-millet and pulses) in the maize fields where the soil is particularly exposed and thus in danger of erosion.
- Improved provision of the soil with humus by means of mulch spreading or covering the ground with left-over plant material.

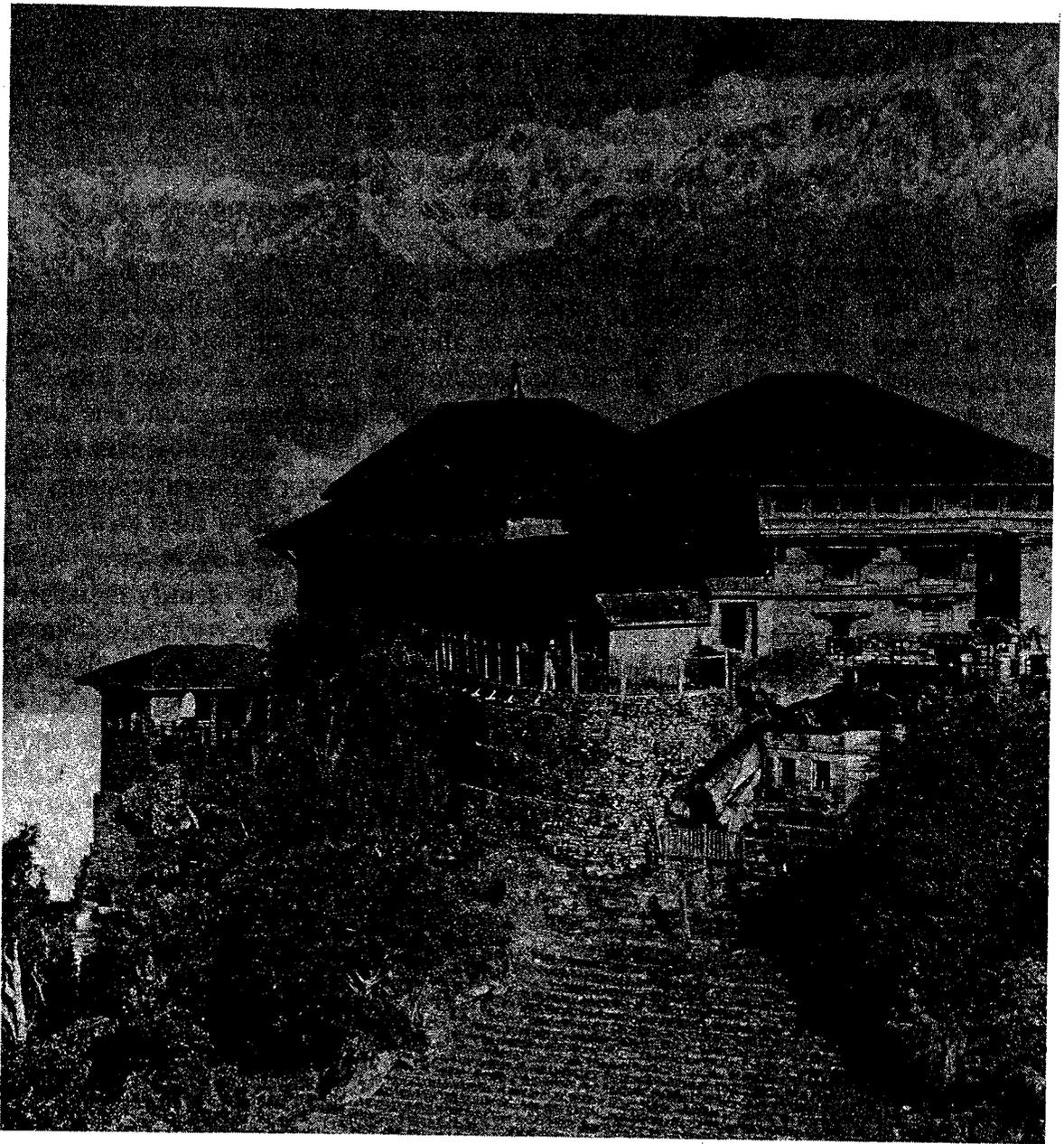
Finally, I would like to point out one method of soil preservation, as yet unknown in the Gorkha region. This is the cultivation of soil-conserving fodder plants (e.g. legumes), which could also help at the same time to somewhat reduce the chronic lack of fodder, available for livestock. The propagation of husbandry may be regarded, to a large extent, as being on a level with an improvement of basic fodder, e.g. by means of:

- the above-mentioned introduction of controlled cultivation of field fodder plants,
- the encouragement of fodder tree cultivation,
- the introduction of a rotating grazing system for overused pastures,
- the release of certain forest and shrub areas for pruning to produce fodder and temporary, strictly controlled grazing,
- the keeping of fewer, but more productive animals,
- the encouragement of stabling so as to produce more dung.

However, exploitation of the "village forests" which are being called for within the framework of a social forestry plan for Nepal, and utilization of their products (wood, leaf fodder, fruit), must not be allowed to be the only to be dominant aspects, as has been the case so far. The demand for the creation of "village forests" is also a demand for orderly measures for their protection and conservation. The aim of "social forestry" is to make the local, native inhabitants of Nepalese mountain villages responsible forest owners with the rights of usage necessary for the local economy, but with duty to ensure afforestation and to protect the forest and to take measures to regenerate already devastated areas. I believe that this is one way of bringing the inhabitants of a village, for example in the Gorkha area, to really identify themselves with the forest, in spite of its being a public or common property. Only then the Nepalese mountain farmer, who up till now has also ways been labelled as a destroyer of forests, will be prepared to employ all those techniques of tree and soil conservation which he has mastered for centuries, but has only yet put into practice on private land.

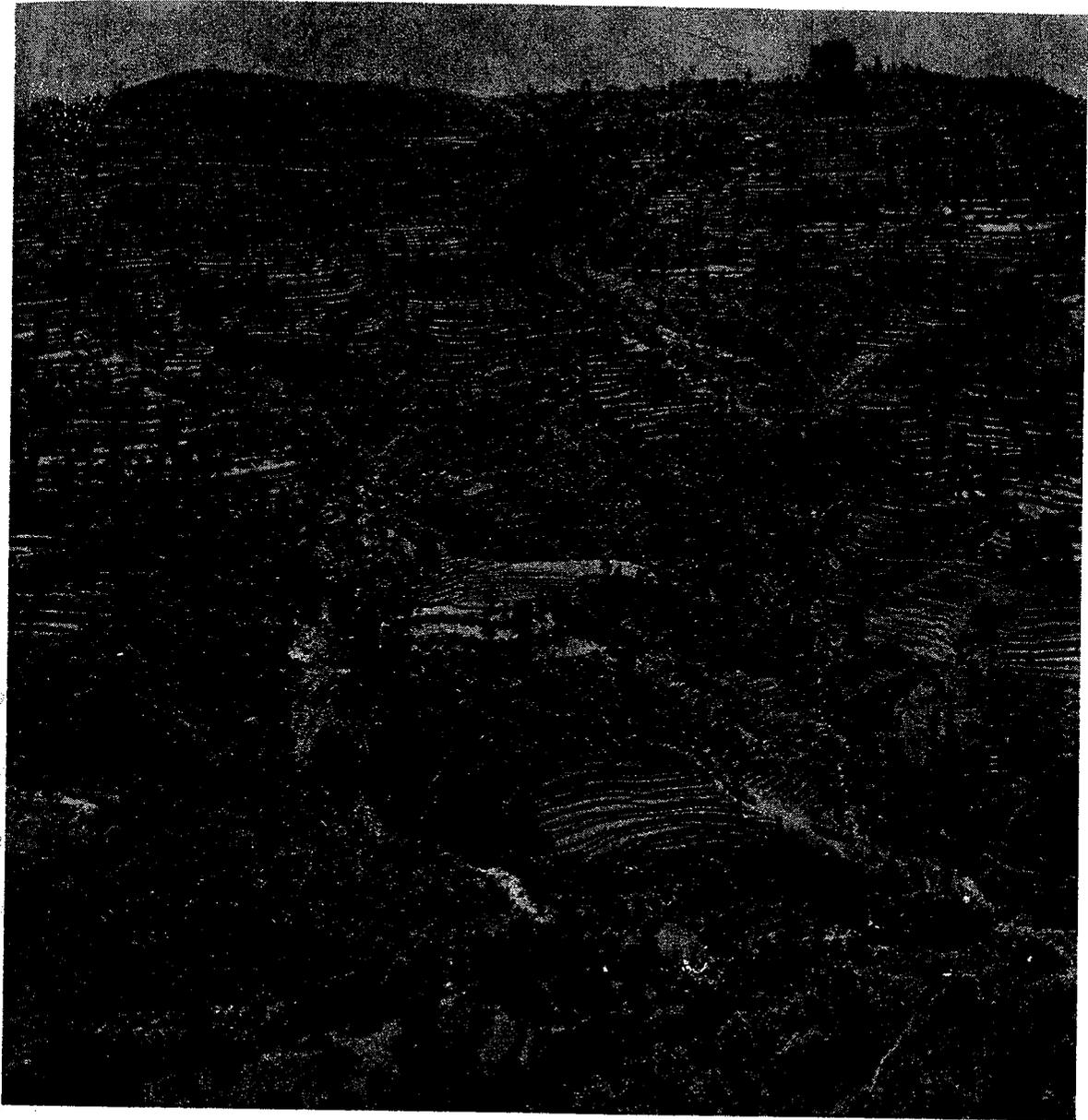
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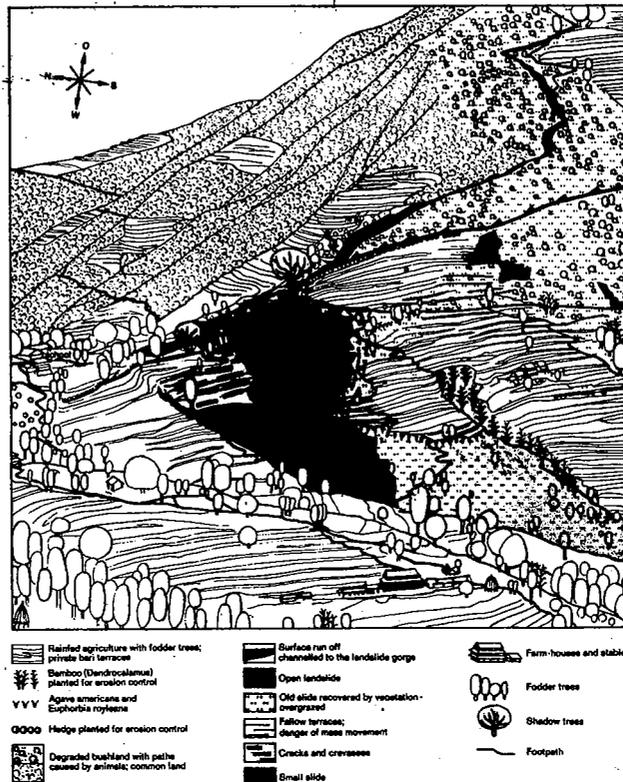


**Fig.1: Gorkha-Darbar located on a mountain ridge with open view to the main Himalayan range.**

**The problem of land slides and soil erosion is perfectly mastered by the construction of terrace like steps and by the plantation of trees and bushes.**



**Fig. 2: Traditional agro-forestry on the steep and intensively cultivated mountain slope near Sirdigau. The problem of soil erosion and mass movement is perfectly mastered by terracing and the plantation of fodder-and fruit tree.**



**Fig. 3:** indicates the complicated factorial complex leading to serious erosion damages accelerated by man:

- heavy regressive river erosion in deeply weathered bedrock and colluvial deposits;
- permanent channelling of surplus water from a neighbouring village uphill to the landslide gorge;
- young cracks and crevices indicate the next step of slope-sliding. Even the school is endangered and again valuable arable land will be lost.

The sketch-map exemplifies at the same time:

- well maintained private barri terraces (rainfed agriculture) with fodder trees;
- active biological erosion control inside a fossil erosion-gully by bamboo-plantation;
- degraded bushland on common land;

There exists, of course, a serious conflict between the upper village and the local people living around the dangerous gorge how to solve the serious slide problem. But in the meantime the erosion process is much advanced and an easy and quick solution seems no more possible. The local villagers are obviously overcharged by the actual situation.

# GORKHĀ - SIRDĪ KHOLĀ

## Land Use Map

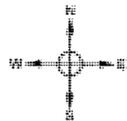


Survey Map of the Region

1 :



-  Evergreen mountain forest (Castanopsis/Que
  -  Evergreen mountain forest (Castanopsis/Quer Rhododendron)
  -  Degraded mountain forest (brushwood)
  -  Pine - afforestation
  -  Palm - tree
  -  Bamboo
  -  Fruit - tree
  -  Grassland - Pasture
  -  Dry inclined terraces (bāri)  
Main crops : maize, millet
  -  Irrigated levelled terraces (khet)  
Main crop : rice
- Irrigated crops in March / April :**
- R Rice (asāre dhān)
  - M Maize
  - W Wheat
  - P Potatoes
  - N Peanuts
  - V Vegetables
  - Ra Radish
  - O Onions
-  Uncultivated fields
  -  Rocks and thatching grass
  -  Rockfall sediments
  -  Wasteland
  -  Gravel
  -  Quarry
  -  Slide
  -  Settlement area



-  road - path
-  shadow line
-  stream (kholā)
-  spring (dhārū)

0 100 200 300 400 500m

Topographic base: H. Koehn, E. Schneider, U. Müller-Böcker  
 Field survey and draft: W. Haffner, P. Pohl, March, April 1988  
 Cartography: H. Remmers  
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