

# Development Trends in Dolakha and Sindhupalchok, Nepal (1975 – 1995)



Development Status Report 1995: Synthesis

Prepared by INFRAS for Swiss Development Cooperation (SDC)  
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Cover page: Changes in Jiri Valley between 1968 (above) and 1994 (below). Two changes are striking: after 1980 an immense construction boom took place in Jiri (end of the road) which has continued until 1989. The forest area and density on the slopes has substantially increased during the past 25 years.

**This is a consultant report and expresses the findings and opinions of the authors. They do not necessarily coincide in all respects with the opinions of SDC or other institutions.**

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# Development Trends in Dolakha and Sindhupalchok, Nepal (1975 - 1995)

Final report on monitoring development trends in the former area of the Integrated Hill Development Project (IHDP) and the Lamosangu-Jiri Road Project (LJRP) in Nepal.

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*What we observe is not the nature in itself, but nature which is exposed to our way of questioning.*

*W. HEISENBERG, 1973*

## Table of Contents

Abbreviations .....	ii
Glossary .....	iii
Map of Nepal and the Core Project Area .....	iv
Foreword.....	v
1. Background.....	1
2. Methodology.....	5
3. Development Trends at Regional Level .....	8
3.1. Natural Resources and Primary Production.....	8
3.2. Human Resources and Social Development Trends.....	15
3.3. Regional Economy .....	20
4. Conclusions.....	29
4.1. Sustainability of Development Trends and Project Interventions .....	29
4.2. Initial Expectations and Impacts Revisited .....	32
Annex.....	37
Photo Point Monitoring .....	37
Initial Key Questions .....	61
Figures and Tables.....	62
References .....	70

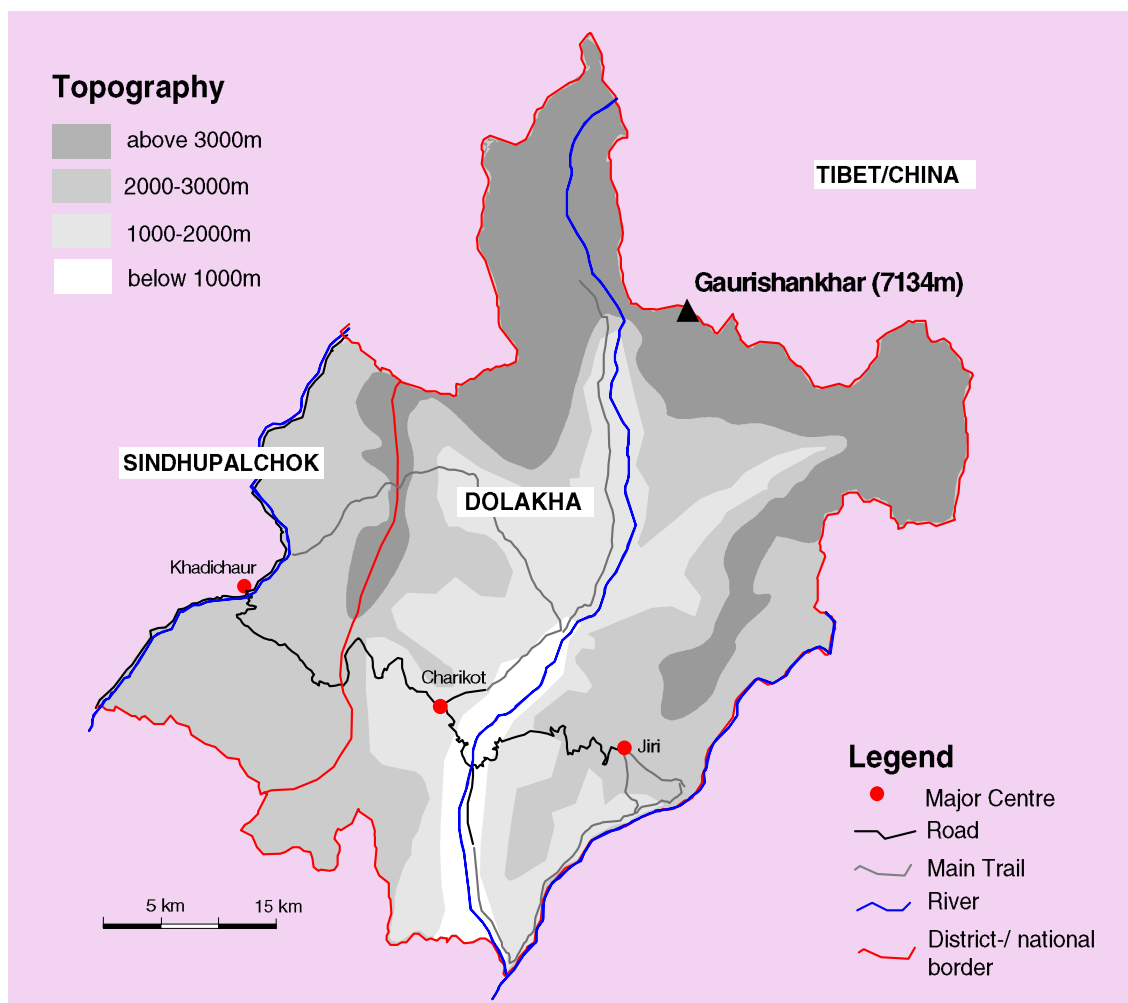
## **Abbreviations**

CBS	Central Bureau of Statistics
CEDA	Centre for Economic Development and Administration
CGI	Corrugated Iron Sheet
DSR	Development Status Report
FY	Fiscal Year (July 15. - July 14.)
HMG	His Majesty's Government of Nepal
HYV	High Yielding Varieties
IHDP	Integrated Hill Development Project
IMP	Impact Monitoring Project
ISR	Impact Status Report, prepared in 1987 and 1990 (INFRAS 1988 and 1991)
LJRP	Lamosangu-Jiri Road Project
LRMP	Land Resource Mapping Project (HMG-Canada). Aerial photo survey on land use in Nepal in 1978/79, published in 1986
OPS	Opinion and Perception Survey
Rs.	Rupees (37 Rs. = SFr. 1 in Dec. 1994)
SFr.	Swiss Franc
SDC	Swiss Development Cooperation
SMA	Special Monitoring Area
STOL	Short Take-Off and Landing
TWP/PDP	Tinau Watershed Project (1979-1988), Palpa Development Programme (1988-1995) were supported by Helvetas and GTZ
UGS	User Group Support: SDC supported NGO project in the former project area of IHDP and LJRP (since 1991)
VDC	Village Development Committee

## Glossary

Confounding factors	External variables resulting in outcome effects that mask or exaggerate true effects of an intervention (e.g. project). They comprise endogenous trends, secular transformations (e.g. due to mass media influence), self-selection and interfering events (e.g. floods, earthquakes etc.).
Core project area	The core project area of LJRP and IHDP consisted in Dolakha District and parts of Sindhupalchok District East of Sun Kosi (IHDP expanded to whole Sindhupalchok District after 1985).
Development trend	Overall change in socio-economic, environmental and political aspects.
Effectiveness	Expresses the degree to which a project or programme achieved its intended objective.
Efficiency	Expresses the relationship between project inputs (financial, material, personnel, know-how) and outputs.
Evaluation	Comparison of planned and achieved results. Valuation of changes, processes or outputs on the basis of an explicit or implicit set of values and standards.
Hypotheses	Postulated cause-effect relationship (e.g. if activities - then results)
Impact	Direct or indirect effect or outcome related to an earlier intervention, whether intended or not. Gross-impact is the overall change observed (→ development trend). The net-impact is the change which can be attributed to project interventions and apart from confounding factors.
Indicator	A parameter or phenomenon used for measuring effects or conditions for which time series information is available.
Monitoring	Continuous collection of information/data (with indicators) in order to assess conformity between objectives and outcomes.
Relevance	The degree to which an impact induces transformation processes in the region, spill-over effects in other regions or adjustments at the policy level.
Sustainability	In the context of this study sustainability has two dimensions: <ul style="list-style-type: none"><li>• The degree to which project-induced objectives or practices are continued or adapted by the local population.</li><li>• The degree to which development meets the needs of the present generation without compromising the ability of future generations to meet their own needs.</li></ul>

## Map of Nepal and the Core Project Area



## Foreword

This **Development Status Report** is the third and last report in a series of studies designed to monitor development trends in the Central hills of Nepal. Several joint Nepalese-Swiss development efforts have been undertaken over more than four decades: out of these projects the Jiri-Multipurpose Development Project (JMDP 1964-1971), the Lamosangu-Jiri Road Project (LJRP, 1974-1985) and the Integrated Hill Development Project (IHDP, 1975-1990) were the most important regional development efforts. LJRP and IHDP were designed in the early 1970s as an integrated strategy towards rural development with explicit consideration of ecological, economic, and socio-cultural aspects. It was the era when the concepts of integrated rural development projects started to evolve in Nepal and elsewhere.

This monitoring process is different from a traditional project evaluation. Rather, it has made efforts to record and observe changes taking place over two decades. It tries to grasp the fabric of ecological and socio-economic processes and forces at work behind it. Two impact monitoring reports were published in 1988 and 1991. However, due to confounding factors, such as the political change to a multi-party democracy in 1990 and economic liberalisation in Nepal, the cumulative impact of many small social processes dilute the cause-effect relationships between project interventions and observed changes. The aim of this process was to provide a more coherent and general analysis of the overall and long-term efforts to promote development in the hills of Nepal. The series of monitoring documents attempts to provide an account of the evolving longer term causal chains of socio-economic and environmental changes in the former LJRP/IHDP-area (Eastern part of Sindhupalchok and Dolakha District). This report compiles the presently available information from recent surveys (1994/95) and secondary sources of information.

The team of authors has found that monitoring impacts and development trends is a challenging and difficult task for which no clear cut guidelines are available. The attempts to systematically marshal and analyse evidence against or in support of hypotheses deducted ex-ante from development plans are constrained by time, the need for pragmatic "least-cost" methodology and the lack of a sound system of baseline information. With the joint interdisciplinary efforts undertaken by the authors, it is hoped that the most relevant trends and their driving forces have been identified and interpreted.

The team of authors would like to acknowledge the crucial and constructive contribution received from SDC, especially from Mr. P. Spycher, Mr. H. P. Maag, Mr. M. Greco and Mr. R. Wieser. Without the free and warm sharing of information and experience by many of the local farmers, businessmen, politicians and government staff, this report would not have been possible. The authors thank them very sincerely.

Samuel P. Mauch, INFRAS, May 1995



# 1. Background

## Area of Reference

During previous centuries Dolakha played an important role as trading centre between India and Tibet. This trade was stopped in the middle of this century when the borders to Tibet were closed. Before the Arniko Highway was constructed in 1968, Jiri could either be reached by foot (approximately 7 days from Kathmandu) or by STOL-planes. During the early 1970s the project area was described as a severe food deficit area<sup>1</sup> and malnutrition among children was prevalent. Low level of confidence in political institutions at community level and the lack of institutional capabilities were predominant (BACHMANN 1974). Low production levels in subsistence agriculture forced people to out-migration. Only few household had the opportunity to earn cash from local off-farm activities in order to pay debts and to buy food.

## External Influences

With increasing external influences in Nepal following the political transformation of the 1950s and the subsequent gradual integration of the Nepalese economy into the Asian and the world market, the values and perceptions of the "modern industrial and post-industrial civilisation" have increasingly been influencing patterns of decision-making and economic development in the area of reference. The influence of urban areas has become much more crucial for development. Significant migration has been observed for a long time and continues to be a major factor in the development of the rural areas of the hills of Nepal. These external influences have to be taken into account while observing the development trends in the project region and linking them to the development interventions.

Project interventions have been sponsored by Switzerland and other donors in the area of reference. A summary of the external project interventions in Dolakha and Sindhupalchok is intended to provide background information (see figure 1). The authors refrain from viewing external assistance as a main cause for change taking place within a society.

In 1969 the evaluation of the Jiri Multipurpose Development Project (1964-1971), a multi-sectoral programme assisting in agriculture, livestock, forestry and health, concluded that the lack of communication facilities and transport systems was a major bottleneck for the development of the area. Then, in the early 1970s, the Governments of Switzerland and Nepal designed the Lamosangu-Jiri Road Project (LJRP) and the complementary Integrated Hill Development Project (IHDP) in order to promote economic and social

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<sup>1</sup> VOEGELE estimated a food deficit of 20 % in 1976. Based on official data the cereal crop production in Dolakha was only 109 kg/capita in 1971 or approximately 50 % of the requirements (HMG 1980).

development and to slow down the ecological degradation through improved utilisation of natural resources, generation of off-farm employment opportunities and reduction of the population growth. The two projects were designed as an integrated rural development strategy and represented the most significant investment in the region. The total investment of the two projects (including the Charnawati Rehabilitation Project) was equivalent to approximately 160 Mio. SFr. at 1990 prices and including technical assistance (INFRAS 1991). This corresponds to an annual input of approximately US \$ 15-20 per capita or roughly 10% of the regional GDP between 1975 and 1990. The road investment has absorbed approximately half of the total investment (the final sectorial allocation of expenditure is given in figure 8 of the annex on p. 62).

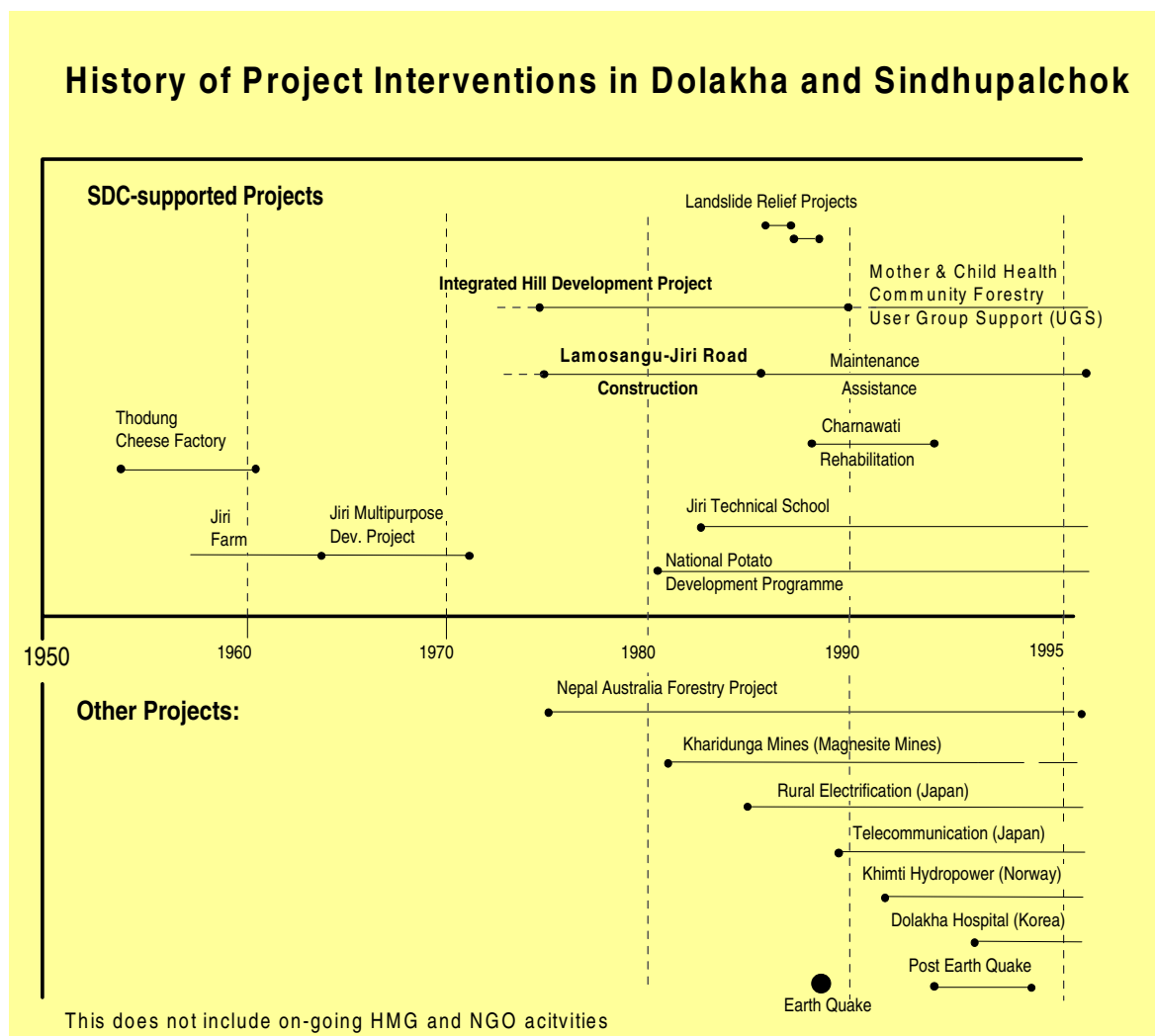


Figure 1: Brief overview on major development interventions with external funding in the core project area of the former LJRP/IHDP-area.

The construction and operation of the Jiri Technical School (since 1982), the Landslide Relief Projects (after the 1987 floods) and the Charnawati Rehabilitation Project (on LJR, 1988-1991) were other Swiss supported development efforts in the former LJRP/IHDP-area. Following the completion of IHDP, SDC supports activities in the forest and primary

health sectors. They are complemented by a User Group Support (USG) programme implementing activities in the fields of awareness generation (through adult literacy classes), repair and maintenance of community infrastructure and income generation.

After the completion of LJRP in 1985, SDC has been providing assistance for the road maintenance until 1995. This was complemented by a series of development efforts by other donors (e.g. the Nepalese-Australian Forestry Project, electrification with Japanese support, to mention only a few).

Until 1985 the LJRP/IHDP-area comprised the entire Dolakha District and the Eastern part of Sindhupalchok District (see map page iv). Due to administrative reasons the IHDP-area was expanded to all Sindhupalchok District for the third phase in 1985. The smaller core project area of LJRP and IHDP covered an area of 250'000 ha and a population of 230'000 persons in 1994. The following table 1 presents an overview on selected key indicators for Nepal and Dolakha District.

<b>Key Background Indicators</b>		
<b>Indicator</b>	<b>Nepal</b>	<b>Dolakha</b>
Population 1991	18,5 million	173'300
Population growth per year (1961-71/1971-81/1981-91)	2.07 %/2.66 %/2.08 %	-0,16%/1.47 %/1.46 %
Land use (1979, basis LRMP 1986)		
Agriculture	27 %	44'800 ha (21 %)
Forest (more than 40 % crown cover)	28 %	74'300 ha (35 %)
Pasture	12 %	34'100 ha (16 %)
Shrub/bushes	5 %	20'200 ha (9 %)
Others (ice, rocks, rivers)	19 %	40'800 ha (19 %)
Population density 1991	131 persons/km <sup>2</sup>	81 persons/km <sup>2</sup>
Human Development Index	0.162(1970) 0.289 (1992)	n.a. n.a.

- 1) The Human Development Index (HDI) comprises the following indicators: Life expectancy at birth, literacy rate, number of years of schooling and the adjusted real GDP per capita. During the same period the HDI rose from 0,254 to 0,382 in India.

*Table 1: Overview on key indicators for Nepal and Dolakha. The whole Dolakha district is part of the core project area and therefore used for comparative analysis. Source: CBS 1994, LRMP 1986 and UNDP 1994.*

## **From Impact Monitoring to Development Trend Monitoring**

Wide and intense debates were going on whether the focus of the two projects was realistic and the intended objectives could be achieved, considering the high financial input of

IHDP and LJRP. In 1983, the Swiss Parliament mandated a review of the IHDP experience, since it represented a key project for SDC in terms of the conceptual framework as well as the financial input. This evaluation expressed doubts regarding the chances of success of such ambitious objectives, the integrated and government-oriented focus and shed light on the scattered data base to judge the project's efficiency, effectiveness and sustainability (BASLER 1984).

In 1986 SDC mandated INFRAS to conduct an impact monitoring project. The methodology for this impact monitoring was not to monitor and identify the project impacts once and for all but to conduct a series of interpretative survey studies, spread over a longer period of time of about a decade, lasting well beyond the end of the actual project interventions (INFRAS 1986). The underlying idea was to generate time series of hypotheses, observations and conclusions. Therefore, after the first monitoring round in between 1986 and 1987 (INFRAS 1988) a second round was conducted between 1988 and 1990 (INFRAS 1991).

With the completion of LJRP and IHDP, the "impact-oriented" focus of the previous two monitoring rounds had to be adjusted. For this third round many other development interventions in the local as well as changes in the overall political framework conditions have influenced development trends in the area and reshaped the project impacts. Therefore, the monitoring of development trends has become the major focus and not tracing impacts.

An internal assessment conducted by SDC in 1991 revealed that a comprehensive impact monitoring is methodologically highly ambitious and that complex socio-economic systems cannot be analysed as a whole with reasonable methods (SDC 1991). One of the conclusions was that future efforts should concentrate on selected key variables and processes. This has resulted in a "lean version" of this third round focusing on the monitoring of major development trends and not on tracing detailed but isolated project impacts.

## 2. Methodology

For the purpose of monitoring impacts the basic methodology developed consists of a fabric of complementary tools: formulation of ex-ante hypotheses to be verified, rapid rural appraisal for qualitative observations, selected micro-surveys for the collection of limited quantitative data and the photo point monitoring. Evidence drawn from these sources was complemented by selected secondary data as published by various institutions or persons.

All three monitoring rounds were designed to focus the primary data and information collection efforts on qualitative aspects. "Realistic pictures" of trends should be looked for, rather than volumes of data. Therefore, qualitative survey instruments such as the Opinion and Perception Survey and interviews with opinion leaders were designed to focus on qualitative observations. Such information collection constituted the methodological cornerstone for the second as well as for this third monitoring round. Opinion and Perception Surveys were conducted in 1989 by SACHERER (1990) and ADHIKARY ET AL. (1990) and in 1994 by BAJRACHARYA ET AL. (1995). The aim of these surveys was to collect qualitative observations and statements on development trends as perceived by local people representing different social strata: teachers, VDC chairpersons, small and big farmers of different caste and gender.

Due to methodological problems and high costs, no control area for a situation without project interventions could be selected to test the set of key questions<sup>2</sup> and impact hypotheses formulated initially. The collection of data in an area without many development interventions creates expectations on the part of local people (which cannot be met) and there are no longer any such undisturbed control areas to be found in Nepal. In regions without the strong presence of bilateral donor projects, HMG has offered a similar level of basic needs services (e.g. education, communication infrastructure, drinking water & sanitation) which follows a rational distribution of development investments between HMG and the various donors.

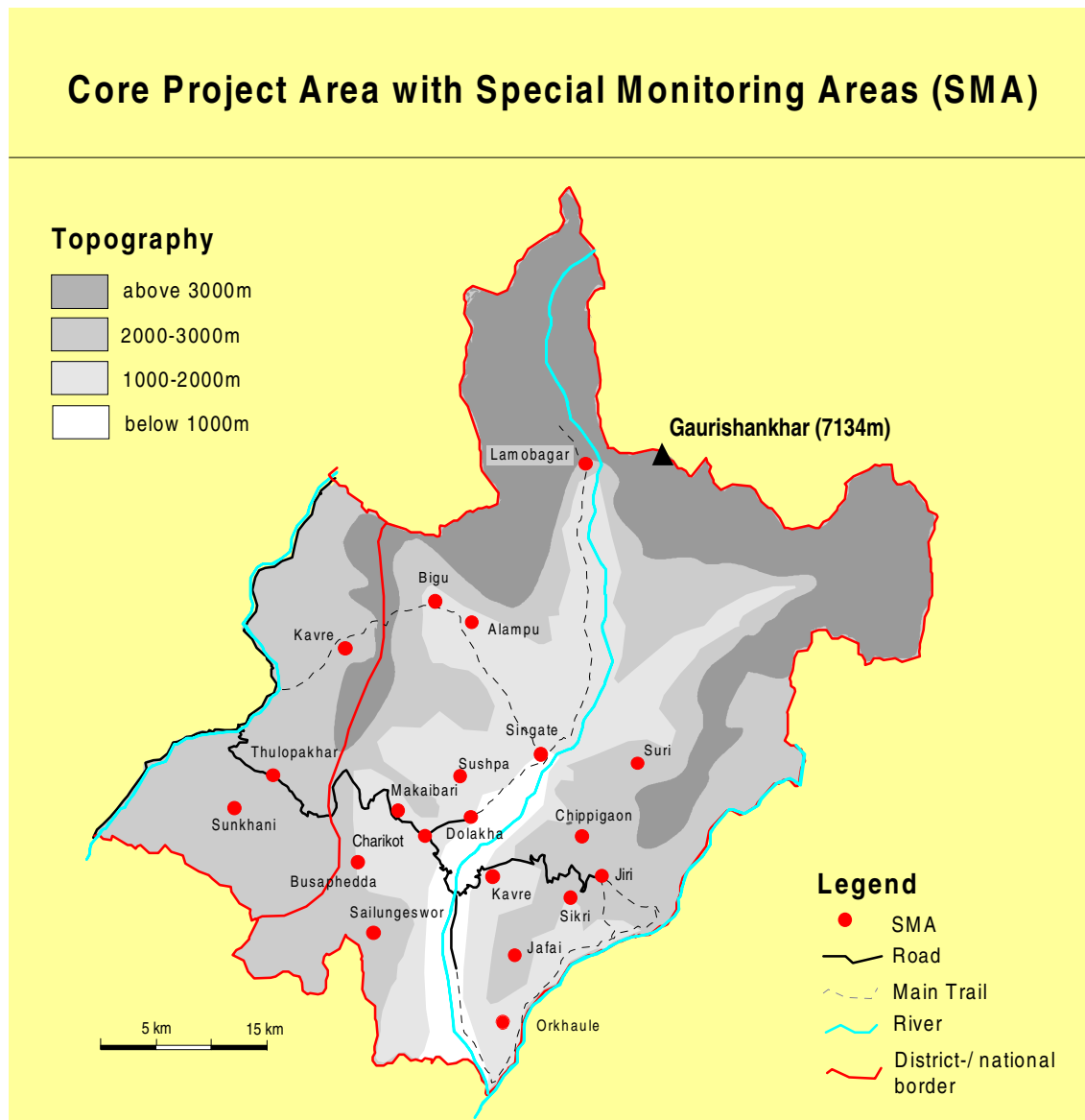
For selected secondary indicators the establishment of a comparative analysis was attempted. The reference areas of Dolakha were Okhaldunga (no direct road access, East of Dolakha), Palpa (with the trilateral TWP/PDP) and the average of the hill districts. Though these official data do often not say much about the absolute level (e.g. of crop production) it is assumed that the trends expressed in the time series are more reliable and may serve for interpretation if utilised in a cautionary manner.

In order to obtain a qualitative time series and to achieve a high level of representativity as well as to eliminate confounding factors as far as possible, a network of carefully selected Special Monitoring Areas (SMAs) in the project region was established (figure 2). This

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<sup>2</sup> The set of the initial key questions is attached in the annex, p. 61.

covers a broad variation of living and production conditions within the region. This observation network comprises 20 villages or settlements (not entire VDCs) with distinctly different intensities and patterns of external project interventions (high/low IHDP input), as well as different geographic aspects (on-road/off-road) and socio-economic settings.



*Figure 2: Location of the Special Monitoring Areas. They are located at various distances south and north of the road and covered areas with high and low IHDP inputs.*

The interdisciplinary, gender-balanced teams of experts conducting the OPSs in 1989 and 1994 surveyed all SMAs in order to obtain qualitative evidence on perceptual changes of living and production patterns in the area. Selected micro surveys were conducted to expand time series for relevant indicators, such as traffic on LJR, housing construction along LJR, development of local markets and tourism in Jiri.

The Photo Monitoring was established systematically in 1989. This network of photo points comprises a time series of photos showing changes in the landscape dating back to the 1970s. Most of the photo points were retaken in 1994 concurrently with field work of the micro surveys. A selection of the photo pairs and corresponding interpretations on changes are attached in the annex of this document.

### 3. Development Trends at Regional Level

#### 3.1. Natural Resources and Primary Production

The former LJRP/IHDP area's natural resources (especially fodder and fuelwood) were heavily over-utilised during the 1960s. The decreasing forest cover caused soil erosion problems. Retrospectively, the paradigm that population growth leads to over-exploitation of natural resources thus accelerating erosion and ultimately causing silting up and flooding downstream has been questioned in many recent studies (IVES 1987, BRUIJNZEEL/BREMMER 1989). Nevertheless, the situation of natural resources such as forests, land and water in the region remains critical. These natural resources are important production factors and are getting increasingly scarce on a per capita basis.

The trends illustrated by the selected indicators shown in table 2 are based on qualitative field information and literature review. They are only partially based on quantitative data and they may not be representative for the whole area nor for all population segments. Nevertheless they circumscribe the aggregate development trends as observed during the field work for the three monitoring rounds.

Major Changes in Trends in Natural Resources			
Indicator	1960-1975	1975-1990	1990-1995
(1) Land use changes	marginal	↗	→
(2) Tree plantation	negligible	↑	↘
(3) Supply of forest products	inadequate	↘	→
(4) Protection of forest resources	low	↗	→
(5) Number of livestock	high	→	↘
(6) Agricultural production (food)	inadequate	↗	↗
(7) Use of chemical fertilisers	low	↑	↗
(8) Irrigation facilities	negligible	↗	→
(9) Diversification of agric. production	little	↗	→
(10) Access to tapped drinking water	low	↑	↗

Legend: → the same, ↗ moderate increase, ↘ moderate decrease, ↑ significant increase, compared to the previous period.

Table 2: *Qualitative descriptions of trends in natural resources in the former LJRP/IHDP area before (1960-1975), during project implementation (1975-1990) and afterwards (1990-1995).*

For interpretation purposes the reader has to be aware that a change in the direction of arrows between two periods may be more fuzzy in reality since many changes occur

gradually but continuously. Often the trend breaks indicated become evident only in a longer term ex-post perspective. For better reference the numbers of the indicators presented in the tables are repeated in the outside margin of the following text.

## Land use changes

The conversion of pasture land to forest was the major change of land use observed during the past 20 years. In some villages (e.g. Jiri) the area of dense forest has substantially increased. Several of the photo points attached in the annex clearly illustrate the increase in forest and tree coverage. The trend of establishing new forests has stopped with the termination of IHDP, though some private tree planting has continued. Road construction and spreading settlements occupy increasing amounts of land. (1)

The cultivated area under annual crops remained stable (but the cropped area has increased). No observations were made that land on marginal slopes has newly been cultivated. In contrary, BAJRACHARYA ET AL. (1995) give evidence that due to the labour shortage (in winter time) an increasing area of the less productive land is kept fallow by bigger farm households.

Although approximately 4'000 ha of pasture land have been afforested in Dolakha District, the supply situation of forestry products from public land (ca. 70'000 ha) has further deteriorated, increasing the time needed to collect firewood and fodder. In growth centres kerosene is being substituted for fuelwood. Whereas fuelwood prices doubled during the past 5 years the subsidised kerosene price increased only by 25 % during the same period. Close to remaining natural forests many families still exploit these fuelwood resources as they depend on selling fuelwood (Sikre, Sushpa). The trend towards better protection of afforested but also natural forests contributes to the perceived fuelwood shortage despite growing tree coverage. (2), (3)

Although people appreciate the new afforestations ("they look nice"), these pine monocultures do not diversify through natural regeneration because secondary broad leafed species sprouting in afforested plots are intensively utilised by farmers. Unless the pine forests are dense, the protective effect of these trees against soil erosion is limited. So far local people have not been involved adequately in the establishment and management of the afforestations. The handing over of forest management to local people has started after 1990. As it is a time consuming process to build up institutions for local forest management, many problems in community forestry are still not solved (user rights, distribution of benefits). Since the afforestations are still relatively young (the oldest are 25 years old, but the major areas are much younger) the benefits from sustainable harvesting are small. Due to legal and marketing problems there has been only very limited attempt to utilise these forest resources on a commercial basis. (4)

The plantation of fodder trees on private land is clearly documented for the period 1975-1989 (evidence from photo points). This trend appears to have slowed down in the SMAs. (2), (5)

A possible explanation could be that farmers in general have less big and small livestock. But there is a trend to keep more milk-giving animals close to market centres and roadheads. This reduction of the amount of livestock can be attributed to the shortage of labour and the scarcity of fodder from public land due to the decrease of natural residual forests and protection of afforestations.

## Food production

(6) In the 1960s and 1970s the population of the core project area suffered from severe food deficit. This deficit had driven many people or even families to migrate and to settle in India or the rural Terai. Except in a few cases, there were no major breakthroughs in agricultural production technologies in the past 20 years (neither in the former project area nor in other hill districts<sup>3</sup>), but a number of small improvements occurred. The population has increased by 30 % over the past 20 years and the food deficit decreased from an estimated 30 % in 1975 to an estimated 10 % nowadays. The food production of the four major cereal crops maize, rice, wheat and millet has increased by approximately 50 % between 1973 and 1993 according to official statistics. The production increase for potatoes amounts to more than 300 % for the same period. The overall production increase on the basis of official data can be estimated at 60 % for the basic staple crops. A similar production increase is reported for other hill areas (see figure 10) as well. The food production increase estimated is assumed to be the result of many small changes in the agricultural system which cumulatively contributed to a substantial increase in the regional food production over time. This estimated average food production growth rate of 2.5 - 3 % per year would slightly exceed the population growth rate. The major factors contributing to this trend are:

- The major production increase in staple crops (maize, rice, millet, wheat, potato) is attributable to the increase in the cropping intensity. The cropping intensity is defined as the number of harvests on the same field (e.g. rice in summer and millet in winter = cropping intensity of 2.0). The available data on this crucial indicator show an extremely high level of uncertainty due to fragmented data. LRMP estimated a very high cropping intensity of 1.68 for Dolakha in 1979 based on aerial photo interpretation. CEDA (1990) estimated a cropping intensity of 1.34 in a household survey. This contrasts with an increase in the cropping intensity in the hills of Nepal from 1.23 to 1.77 (or 44 %!) between 1981 and 1991 (CBS 1994). In ISR 90 we have estimated an increase from 1.23 to 1.4 (or 9 %) between 1975 and 1990 for Dolakha (INFRAS 1991). This might have been a conservative estimate. The cropping intensity in 1994 may be in the order of 1.5 to 1.6.
- This change in cropping pattern was eased by other factors as well: general increase of the educational standard (e.g. training), an increasing tendency to adopt

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<sup>3</sup> The major agricultural success stories in Nepal are poultry industry in Kathmandu, citrus fruits, cheese production and fish production (THAPA 1994).

stall feeding and increased efficiency in the use of plant nutrients. Although a reduced availability of compost and manure is reported by most of the farmers since less numbers of animals are kept (BAJRACHARYA ET AL. 1995), the cattle today are increasingly fed in stalls, as a result of forest protection and improved water availability. Additional crop cycles could be cultivated on good soils as result of a gradually developed nutrient cycle and a diversification in the cultivation of new varieties of crops (e.g. potatoes).

- The import of chemical fertiliser has increased tremendously (from zero to 1 600 t per year between 1975 and 1994, according to official statistics<sup>4</sup>), mainly as a result of lower transportation costs. Despite the reduction of fertiliser subsidies and a corresponding price increase, the use of fertiliser in Dolakha has increased above the average of other hill districts in Nepal. Although not all of this fertiliser might have been applied in the core project area, substantial yield increases can be expected. Yield increases especially may have resulted from irrigated land. On good soils even small amounts of fertiliser show a significant response in yields. (7)
- The productivity in the region has substantially increased for potato and oranges but stagnated for maize, rice, wheat and millet according to official data. This is also supported by the farmers perception (BAJRACHARYA ET AL. 1995).
- There exists also more intense kitchen gardening in settlements close to market centres, mainly for own consumption. There has been no significant diversification of the local production for marketing purposes so far. The price incentive provided by local markets seems not to be significant enough to produce more food.

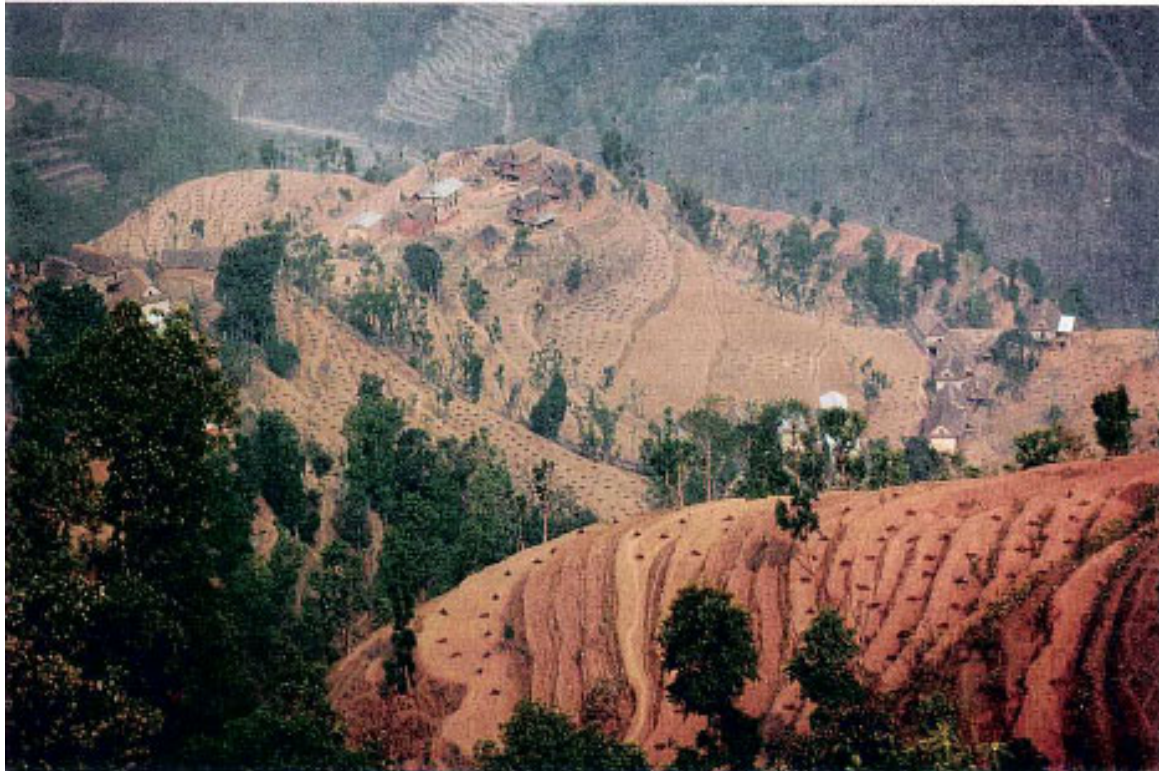
The evidence supporting changed practices leading to a higher food production are not reflected in the perception of the local people in 1994 (BAJRACHARYA ET AL 1995). The Opinion and Perception Survey concluded that agricultural production has increased but that no significant changes were observed in cropping patterns, fertiliser application, availability of irrigation schemes and application of HYVs or other new agricultural practices. This could be attributed to a gradual and slow transformation process in the agricultural system which is not perceived as progress in comparison to the pace of change of the weather or changes observed in non-agricultural sectors of the economy. Therefore, slow changes are difficult to trace in the field, especially for short time spans when the variation of different weather conditions affects agricultural productivity more significantly.

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<sup>4</sup> This would amount to a fertiliser input of approximately 80 kg/ha whereas the average was 31 kg/ha for all Nepal in FY 92/93 (CBS 1994). The real rate of application may be only 20-30kg/ha because the supply centres in Dolakha also serve the needs of adjacent areas and the effective cultivated area is almost double the area indicated by official statistics.

## Agricultural marketing

The southern part of the area, where three-quarters of the population live, has become self sufficient in the production of staple crop (except for rice). Although many families report food deficits of several months, these deficits are now covered by surplus production in other villages within the former core project area. The balance of demand and supply is achieved by intra-village (informal) or intra-regional trade (local markets). It is estimated that 75 % of the households still do not produce enough food for the entire year. 20 % of the households produce surplus food and 5 % of household have to purchase food mainly from off-farm income. The remaining food deficit is covered by rice imports (which are declining on a per capita basis, see figure 14) and other food bought in the market. The cash needed is earned from seasonal migration, remittances, portering and other off-farm employment.



*Figure 3: Illustration of the difficult production conditions in the hills. The dung has to be portered in many "dhoko"-loads (backpack) to the terraced land. Each holding consists of many small fields usually scattered at different altitudes.*

Overall the region does not export substantial amounts of agricultural products<sup>5</sup>. There is no change of major export trend observable since the road opened. On the contrary,

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<sup>5</sup> Seed potatoes are the major agricultural export commodity. It is estimated that ca. 500 - 1000 t are exported annually.

significant amounts of rice, vegetables, fruits and livestock are imported. This is attributed to the following constraining factors:

- Farm gate prices for staple food crops are low and the transport costs of portering the surpluses to regional markets are high. The transport of food to or from remote areas is expensive. The farmer in remote areas does not get the revenue from market sales which allows him to cover marketing risks and labour input. Therefore, many off-road farmers have stopped selling food at on-road local markets (e.g. vegetables). The competitiveness of local products in market centres is decreasing rapidly with increasing distance from the road.
- Government investments to improve the production and ownership structure of agricultural land are also very low in Nepal (THAPA 1994). Hence, there is no price incentive to increase labour or capital inputs. Both are scarce and expensive compared to the productivity increase which can be achieved.
- Low transport costs on the road have increased the urban market supply zone for agricultural and consumptive commodities. Due to the open border and the absence of trade barriers for agricultural products, the price and supply situation in India affects local markets as well. If there is a glut in India the surplus production is sometimes dumped into Nepalese markets, reducing prices and diminishing local production incentives. The fact that maize and wheat production prices in Nepal are above world market prices (SHARMA 1994) shows the economic disadvantage of hill agriculture (the hills of Nepal are topographically rather comparable to mountain areas elsewhere).
- The application of new agricultural technologies has contributed towards more intensive cropping patterns. Though no evidence for a productivity increase in staple crops is given by official data, the crop cuts conducted during IHDP revealed higher crop productivity levels than official data suggested (see figure 11). Also the farmers reported productivity improvements for potato, paddy, wheat and millet (CEDA 1990). However, for the past 5 years not much has changed in the perception of the farmers. Exceptions are found in villages along the road, e.g. Kavre (Dolakha) and in the case of potato, BAJRACHARYA ET AL. 1995.
- Lack of irrigation facilities for winter crops is, similar to the pre-project era, still perceived to be a major bottleneck for off-season farming in winter time. The irrigated area in winter has marginally increased between 1975 and 1990. The use of High Yielding Varieties has not increased further, HYV seeds are not available in the private market. Some varieties have shown a poor performance under difficult climatic conditions. (8)
- The extension of appropriate production techniques has remained negligible in the hills of Nepal (REGMI RESEARCH 1990). In the study area new agricultural technologies (seeds, soil conservation etc.) show only a marginal diffusion and they did not find their way to the underprivileged communities. Access to the new technologies and inputs is reported to be often difficult for women since their

husbands are frequently away for extended periods. Many of the households report having no access to agricultural extension services.

ADHIKARY ET AL. and SACHERER (1990) reported significant diversification in agriculture, ranging from new cropping patterns to a bigger variation of vegetables grown for own consumption. BAJRACHARYA ET AL. (1995) did not observe a continuation of this trend in diversification during the past 5 years. Possibly such subtle changes in nutritional habits may only be observable over longer periods of time. The nutrition habits of the people living in settlements close to the road have changed due to consumer goods being available in the markets. More ready-made food is being consumed (noodles, snacks, bottled products, esp. alcohol). In off-road areas food habits have not changed significantly. (9)

### **Water resources**

- (10) As mentioned above, the lack of water is a major constraining factor during winter time. It affects agricultural and domestic use. Especially before the monsoon starts the run-off of local rivers is very low. This affects the potential for irrigation facilities as well as the availability of drinking water. The drinking water demand is growing due to population growth and changed hygiene practices. However, many people do not perceive drinking water as a major problem. Either they are served with tapped drinking water or nearby traditional water sources remain available (BAJRACHARYA ET AL. 1995). The maintenance of many of the drinking water schemes is poor. Due to the fact that many donor agencies are still funding the maintenance or construction of new drinking water schemes, there is only limited incentive for the local people to invest in maintenance. In Chippigaon, (see page figure 2) a new scheme was constructed recently by UNICEF just next to an older, broken IHDP-scheme. Misappropriation of community benefits by a few families or unauthorised installation of private taps are widespread and often hampering the proper functioning of the schemes. In many places the tapped drinking water is polluted due to lack of maintenance or protection of intake structures.

### 3.2. Human Resources and Social Development Trends

The mega-trends observed with regard to social development and value changes relates to the road and the appearance of new mass media in rural areas, a general trend which is observed all over Nepal and the Subcontinent. The road has linked the project area more closely to the "modern world": the economic inter-linkages to urban areas have become more important. Information flows and the communication services, linking rural and urban subsystems, have become more intense. The facilities of radio, television, video centres and new print media do penetrate the rural life systems and the seasonal migrating labour force gets increasingly exposed to an urban life style and "modern values".

Major Changes in Trends in Human Resources			
Indicator	1960-1975	1975-1990	1990-1995
(1) Population growth rate	zero	↗	→
(2) Family planning acceptors	little	↗	↗
(3) Child mortality rate	high	↘	↘
(4) Users of rural health posts (HP)	few	↗	↗
(5) Number of schools	few	↗	↗
(6) School enrolment (girls and boys)	low	↑	↗
(7) Value change (modernisation)	low	↗	↗
(8) Women's status at household level	low	↗	↗
(9) Political awareness of women	none	→	↗
(10) Economic status of low castes	low	↗	↗

Legend: → the same, ↗ moderate increase, ↘ moderate decrease, ↑ significant increase, compared to the previous period.

Table 3: *Qualitative descriptions of major social trends in the LJP/IHDP area before (1960-1975), during project implementation (1975-1990) and after (1990-1995).*

#### Population, health and education

Within the last 20 years the population in Dolakha District has grown by more than 40'000 persons. This is equivalent to a growth rate of approximately 1.5 % per year. Due to a lack of statistical data, no detailed analysis of the demographic trends could be performed. There is, however, evidence that the population growth rate is decreasing. Already NEW ERA (1990) gave evidence that the awareness of family planning methods was very high in the former project area (compared to other districts). BAJRACHARYA ET AL. (1995) have reported that the awareness of family planning has increased substantially over the past years, especially among the wealthier and better educated population segments.

(1), (2)

Sterilisation is reported to be the dominant family planning method (cost-effective and available).

- (3), (4) Rural health services have become more easily accessible and child mortality has decreased as perceived by the local people (BAJRACHARYA ET AL. 1995). However, the quality of rural health services is still considered to be very poor and even decreasing (PANDEY 1994). The access to central health facilities in the region (local hospitals, drug stores in market centres) as well as in Kathmandu has considerably improved for those who can afford it, mainly due to the improved transport facilities provided by the road. In the perception of the people the better access to health facilities in general is a striking change for the better in their quality of life.

- (5), (6) The number of school going children in Dolakha has substantially increased from 5'000 in 1974 to 41'000 in 1994. The level of education is increasing, both for males and females. The literacy rate has considerably increased in Dolakha over the past 25 years, but at similar rates as in other regions. The secondary data do not suggest a significantly better performance of Dolakha as compared to other areas. Similarly, the number of schools and school enrolments between 1976-93 in the former core project area has not increased faster than in other districts (NO FRILLS, 1995a).

Many poor families in the northern part of the area still cannot afford to send their children to school since it is not completely free of cost (stationery and recurring costs of the school after grade 5, loss of labour for farm and household work). However, they value a better education for their children very high. This is also seen in the continuous increase in the proportion of girls in school, which has been more noticeable in Dolakha compared to the other selected districts. Although there is an increasing trend in the participation at the beginning (school enrolment), the dropout rates after a certain period of time remains very high.

### **Social and economic status, value changes**

- (7) Many of the younger generation value off-farm jobs higher than agricultural work. The diffusion of innovations in the agricultural sector is slower than expected in face of the increasing literacy and education level. This - in comparison to other occupations - makes agricultural employment the occupation in which those people remain who do not have any other choice. Interviews conducted with the younger generation give evidence for a value change among girls as well as boys. Both strive for an urban life style (BAJRACHARYA ET AL. 1995). In the search for employment according to their education, many young people, especially from rich families, migrate to an urban area.

Increasingly women of poorer households resume responsibility for farm management during the time their husbands take up seasonal jobs outside the project area. Women have in the past less frequently received training related to improved farming practices. The access of women to the related official information network is still poor. To cope with the

increasing labour demand in the household and agricultural production, labour productivity of women appears to be increasing (saving of time due to nearby water taps and new cooking habits such as noodles, etc.).

All opinion surveys conducted, however, give evidence that the living conditions for most of the people have improved significantly, especially within the road corridor (SACHERER 1990, ADHIKARY ET AL. 1990 and BAJRACHARYA ET AL. 1995). All the OPSs suggest that social values appear to shift more towards individualism and new and urban consumption patterns. This is a trend which is more or less seen in other parts of Nepal as well. To what extent new social or economic solidarity has grown or might grow out of this trend is difficult to assess. The loss in traditional solidarity forms and rituals has been reported by the older generation mainly as the price for the increasing flexibility required to adjust to the new demands and social transformation process. The value change is mainly driven by increasing diffusion and utilisation of new communication facilities which link the area with the outside world (road, television, newspapers). The increased influence of modern values is also indicated in the travel purpose. Although many journeys are made for multiple-purpose, there is a clear trend over the past twenty years towards travelling for economic purposes (marketing or buying, portering, duty etc.) which has increased on the road as well as on trails (INFRAS 1995).

New ideas and values are being disseminated and are visibly adopted in the road corridor. New economic opportunities are increasingly taken up. This process challenges traditional values. An increasing economic status observed among traditionally underprivileged castes and ethnic groups (Sherpas, Tamangs) may be largely confined to the road corridor. There is a shift in occupational patterns across castes and ethnic groups driven by labour shortage and access to new economic opportunities. Such opportunities are increasingly taken up irrespective of religious rules. All these trends seem to gradually reduce at least the perceived social disparities among different castes, ethnic groups and classes of people.

Low caste groups become increasingly aware and are gaining self-respect due to exposure to the modern world. This reduces the degree to which they are exploited by the traditionally ruling groups of the rural society. Social disparities on grounds of inherited caste do however remain effective - the related transformation process would take much more time than one generation. The increased mobility has contributed to the breaking up of caste rules during the past 20 years. Activities which were banned due to religious values earlier are now increasingly being taken up due to economic requirements (Brahmin farmers ploughing fields or Brahmin women rearing chickens).

The political change to multi-party democracy in 1990 has favoured the formation of political fractions within the community. Where earlier a homogeneous ethnic composition was favourable for community work, political factors have become more determinant now. This has negatively affected community and maintenance work and has even led to sabotage in some cases.

## Status of women

Despite the fact that women's daily drudgery and hardship is increasing due to more seasonal migration of men, the status and living standard of women in general is improving due to better access to cash and education. Girl child education is valued very highly by parents (BAJRACHARIA ET AL. 1995). This may have contributed to a faster growth rate of girls in school in Dolakha, according to official statistics, compared to other districts (INFRAS 1995).

(8)

During the absence of their male counterparts, women enjoy more decision-making power. But the degree of women's decision making power depends very much on their social background. The lower the social status of the family, the higher the decision-making power of the women in general (a Tamang woman has more decision-making power at household level than a Brahmin woman). Whether the absence of the men has resulted in an empowerment of women cannot be generalised. Crucial decisions such as the purchase or selling of land or big livestock remains the domain of the men, even when women increasingly manage farms and handle cash.

- (9) An increasing trend in women's participation was observed in development institutions such as credit saving schemes, in the education and health sector as well as in forest user groups (BAJRACHARYA ET AL. 1995). Although women's awareness of local political processes was observed to be increasing, especially during the past 5 years, their representation in political institutions remains low.

## Economic status of low castes

- (10) Traditional off-farm enterprises could maintain their occupations only if they were able to learn modern techniques. Damais (tailors) with modern designs are able to make a fairly good income. Sarkis (shoemakers) had to shift to other occupations or migrated and also many of the Kamis (smiths) have taken up new employment since the road opened the market for cheap manufactured goods. In the market centres many of the local people sold their land to business men just before the dizzy price development started (e.g. Jirels in Jiri and Tamangs in Charikot). Nevertheless SACHERER (1990) and BAJRACHARYA ET AL. (1995) reveal evidence that also low caste people have benefited from new opportunities. Even poor people are nowadays aware of wage rates and they are more mobile and less dependent on rich people or big landowners due to other cash income opportunities (migration).

Whether economic and social disparities have increased or not is difficult to judge with qualitative evidence. SACHERER (1990) argued that in general disparities did not increase. ADHIKARY ET AL. (1990) and BAJRACHARYA ET AL. (1995) report, however, that in general the poorer section of the population has been able to grasp only a small proportion of the new economic opportunities (see also the arguments which favor the hypotheses of increasing economic disparities on p. 22).

The still prevailing problem of social and economic disparities can be illustrated by a small case study concerning Lokta paper production. The Jiri area already was considered a major production centre in Nepal in the 1960s<sup>6</sup>. In 1992 a group of Thamis started a Lokta paper factory with a credit received from the Agricultural Development Bank. Though the international market for Lokta paper was booming during the past years the new paper producers could not compete with quality standards and prices of competitors. When they could not repay the loan any more the factory was auctioned and a Sherpa from Kathmandu (who originates from Dolakha District) bought the majority of the factory and started production again. The irony of the story is that this Sherpa used to be the major exporter of Lokta paper from the area to Kathmandu already before, and that the Thamis may end by being workers in their former factory. That appears to be a typical accumulation process of middle-men or wealthy population segments which have better access to economic resources, linkages to markets and the local political establishment and general information.

Self-promoted institution building at the local level is still at its infant stage. Compared to twenty years ago the number of intermediary institutions has somewhat increased but the overall pattern has not changed substantially. Many of the new institutions, such as user's groups and NGOs are often not functioning properly or are formed on ad-hoc basis and have only a short longevity. This rather fragmented institutional structure - similar to other hill areas in Nepal - can be attributed to the scattered population, complex ethnic and political patterns as well as the low level of so far developed market linkages.

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<sup>6</sup> STEBLER (1970) estimated that almost 1 million sheets of Lokta paper were produced annually in the Jiri area and were sold to Kathmandu during the late 1960s.

### 3.3. Regional Economy

The extension of inter-linkages between the rural and the urban sector induced by the Lamosangu-Jiri road has become a key trend in the transformation process of the regional economy since 1975. The major part of the population depends as the main pillar of their livelihood on subsistence agriculture. However, subsistence agriculture increasingly becomes a part-time occupation, or a secondary occupation especially in the road corridor. The constraining economical, geographical and social conditions provide only limited local opportunities for the generation of cash income from agriculture and off-farm activities.

Table 4 summarises the major trends in the regional economy in the former LJRP/IHDP-area.

Major Changes in Trends in the Regional Economy			
Indicator	1960-1975	1975-1990	1990-1995
(1) Agricultural production (per capita)	low	→	→
(2) Off-farm employment and income in the area	low	↗	↗
(3) Economic disparities (inner regional)	substantial	↗	→
(4) Long term or permanent migration	very high	↘	↘
(5) Seasonal migration	low	↗	↗
(6) Mobility (travellers on road)	none	↑	↗
(7) Import of goods (per capita)	low	↗	→
(8) Competitiveness of local products	moderate	↘	↘
(9) Aid inflow	low	↑	↘
(10) Land prices (along the road)	low	↑	↗

Legend: → the same, ↗ moderate increase, ↘ moderate decrease, ↑ significant increase, compared to the previous period.

Table 4: *Qualitative descriptions of selected economic trends before LJRP/IHDP (1960-1975), during project implementation (1975-1990) and after (1990-1995).*

#### Employment and income

- (1) Subsistence agriculture provides the major portion of household income. Though the overall cereal production has substantially increased (see p. 10) the per capita growth was small during the past 20 years (approx. 1% per year and per capita) and there is no marketable surplus production from the former core project area. Major employment is provided by agriculture and export of labour force is the most important off-farm activity. Seasonal migration and the increase in the number of school-going children have

contributed to the shortage of (cheap) local labour force, e.g. for the collection of fodder and fuelwood.

The total labour force in Dolakha was estimated at 100'000 labour units in 1990 (= economic active population, INFRAS 1991). However, only 10-20 % of these labourers are full or part-time occupied in industry, business and services. An increasing amount of employment is generated in the off-farm sector especially in market centres along the road. Commerce and catering related jobs dominate. But also new services emerge in these fast growing centres (from repair services to legal services). The number of small scale cottage industries has grown, but many of the registered ones are not functioning. The construction sector (roads, houses, drinking water and other local infrastructure) absorbs an unknown but relevant proportion of the off-farm employment. The construction of the Khimti Hydropower Project alone may engage several hundred labourers. (2)

During the past five years some carpet and thangka painting activities have been established or spread in the road corridor. The volume of employment generated by these often informal small enterprises is difficult to assess and could easily be underestimated, since it is scattered. Up to 3'000 persons are on government pay roles in Dolakha (more than 1'000 are in Charikot alone and there are ca. 1'200 teachers in Dolakha District). Most of the staff members come from outside. But some of the educated youth from the area were able to work as teachers. Portering remains a major source of cash income for poor families.

The availability of off-farm income is an indicator for the improvement in the standard of living (increased purchasing power) since the agricultural sector produces mainly for self-consumption. Within all observed SMAs the off-farm income situation has significantly improved during the past twenty years as well as during the past five years for almost all population segments (INFRAS 1991, PANDEY 1994, BAJRACHARYA ET AL. 1995). However, it is mainly outsiders and traditionally privileged people who have been capable of exploiting the most profitable new business opportunities in the formal or semi-formal sector.

Intra-regional disparities remain significant and have not decreased. The northern villages, at higher altitudes and bigger distances from the road, are poorer and have less directly benefited from the road in terms of employment and agricultural production increases. However, these northern villages perceived an increase in crop productivity and a related increase in agricultural income during the past 5 years (INFRAS 1995, on the basis of BAJRACHARYA ET AL. 1995). This indicates that it might have taken more time until the northern part could utilise new inputs now available along the road corridor (e.g. fertiliser). The southern SMAs (at lower altitudes) show a higher material standard of living. Kavre (Dolakha) appears to be an outstanding island of development which however cannot be compared with the overall standard in the project area (as did SACHERER in 1990). (3)

The newly emerging business and agricultural opportunities in the road corridor mainly remain in the hands of the traditional elites or new immigrants. No evidence could be found that economic disparities among different castes and income class have been

decreasing during the past 5 years (though precise data on household income is not available). The following observations may indicate an increase in income disparities between the top 20 % and the bottom 20 % of households during the past 20 years in the former project area:

- A coherent social security policy by the government is not available in rural areas. Therefore poor people depend on farm and off-farm income, whereas a rich minority in Kathmandu enjoys a fast increasing living standard, such as studies abroad, due to business and tourism related income.
- In 1987 significantly more households in the road corridor perceived an improvement in their income and living standards compared to near-road and off-road areas (LCRC 1988).
- With the appearance of helicoptering (and mules in Jiri) the volume of long distance portering has been reduced. This has reduced the employment opportunities for small farmers and underprivileged castes.
- The increase in seasonal migration contribute to an increase in the proportion of female-headed households. In 1987 almost 10 % of the sampled households were headed by a women (LCRC 1988). Though many of them were engaged in off-farm employment (running a tea-shop or grocery shop) and may have resumed new responsibilities, many of them remain poor and women-headed households are among the poorest households all over the world (UNDP 1994).
- The diversion of project funds of all donors in favour of the already privileged elite or government staff has been reported by SACHERER (1990) and is continuing in the opinion of local people (BAJRACHARYA ET AL. 1995). This contributes to increasing disparities.

The fragmentary data does not allow any conclusion whether the gap between the top 20 % and the bottom 20 % of households has increased or decreased or whether the development of a middle class, which is perceived to be an important indicator for the sustainability of regional economic activities, has been fostered or not. However, in Nepal as a whole the regional inequality between urban and rural areas has grown in recent decades (REGMI RESEARCH 1990). There is no evidence that Dolakha or Sindhupalchok could reverse such a trend.

### **Migration and mobility**

- (4), (5) During the 1960s permanent out-migration of the project area was observed. This resulted in a stagnating population. Between 1971 and 1991 the population living in the core project area has increased by 30 %. The corresponding demand in new jobs could not be met locally which has led to a prominent trend towards seasonal migration to Kathmandu and other parts of Nepal to earn cash. Seasonal migration to cultivate land in the Terai was



The number of scheduled buses has increased from an estimated number of 12 in 1987 to 18 in 1990 and 28 in 1995.

A number of the people who migrated to Kathmandu earlier, have become wealthy businessmen now. Some are coming back to the region to invest in the industrial sector: Two big industries are going to be started soon (one carpet and one mineral water factory), utilising the cheap labour and land of the area.

## Transport and trade

- (7) The road has opened large possibilities for the transport of goods. This has led to an increase of imports due to lower transport costs, but not of exports because the agricultural production has not been extended due to various reasons. The imported agricultural products are sold at even lower prices in the local markets than the local products due to high production costs in the hills. This has created a local market for cheap imports. The export of local products to external markets has not improved so far.

Transport costs have undergone a revolution since 1975. The cost of carrying 1 ton by porter for 1 kilometer was approximately Rs. 160 in 1994. To transport the same amount on road would now cost Rs. 5. Transport by helicopter incurs costs of approximately Rs. 120/t. Considering that aerial distances are 2-3 times shorter than the distances on ground that have to be walked or driven, effective aerial transport costs are Rs. 40-60/t and km. Therefore, porters at present lose jobs more due to the increased utilisation of big cargo helicopters than as a result of road transport facilities. Until 1992 portering costs and air transport costs with small planes were found to be almost equal. As a result of the liberalisation of the air transport sector in 1992, new enterprises emerged, leasing or buying big cargo helicopters. As a result the transport costs for bigger loads have been reduced considerably in off-road areas. Helicopters can easily reach off-road areas without major pre-investment and wherever there are significant good flows they replace portering. The stagnation of goods flow on LJR and the reduction of goods transiting Jiri toward the East since 1989 can be attributed to this process (see figure 5).

The flow of imports has increased and led to a variety of goods being sold in the local markets. The general consumption level per capita in the region has somewhat increased (1-2% in terms of volume) but much less than one might assume from the fancy products available nowadays in local markets. There is no information available about the value of goods, but it can be assumed that the value of imported goods has increased considerably (consumer electronics, etc.). The consumption is limited by the low purchasing power of local consumers. Because the demand for cash cannot be met by the employment opportunities within the region, the pressure for migration in the search of labour has further increased. But since this flow of income is neither continuous nor reliable, many people have to take up loans to bridge the food deficient months. After a phase of repaying

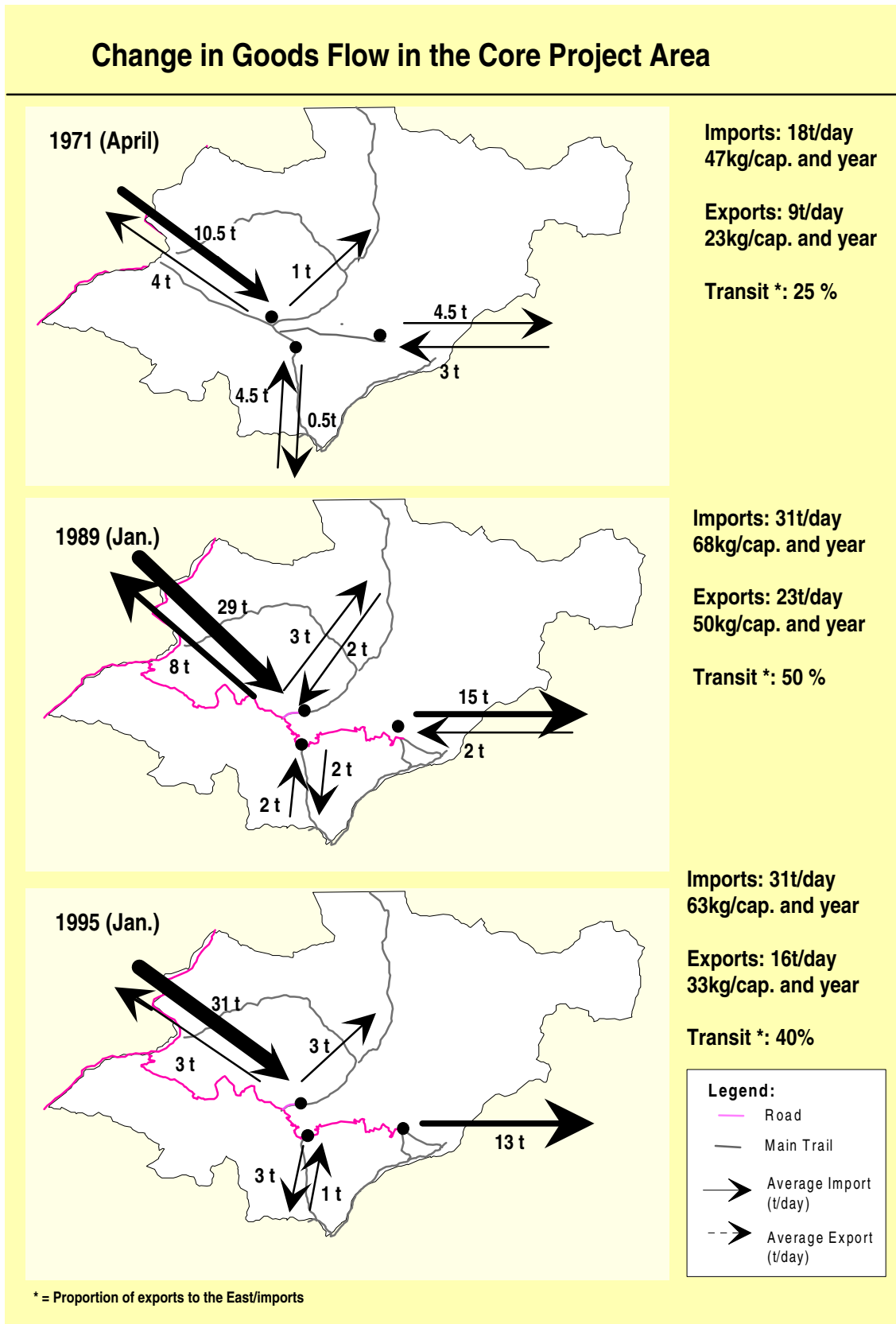


Figure 5: Change in regional goods flow. Overall imports have grown substantially after the opening of the road. A significant proportion of the imports are transit goods towards Eastern regions. Compared to 1989 the volume of exports and transit goods has decreased. Source: SCHMID 1973, CEDA 1989, SAGUN 1995.

debt with cash earned during the construction of the Lamosangu-Jiri road, the level of indebtedness of smaller farmers appears to be increasing again. The income through the road construction has raised the expectations regarding the level of consumption which after 1990 was maintained by more seasonal migration and new development investments (of other donors).

- (8) The regional trade deficit has increased since imports are growing at far higher rates than exports (see figure 14). Since 1989 exports are even decreasing because magnesite is not exported any more (magnesite export did contribute to some employment generation). Other exports have not increased and consist of seed potatoes, cheese, Lokta paper, thangkas and some livestock. Imports are mainly rice, salt, clothes, sugar, other consumption goods and more and more construction material. Also the national balance of trade is highly negative because imports are twice as valuable as exports. The trade deficit in the former LJRP/IHDP-area is balanced by income from remittances, government investments and expenditures and private investments in the area.

### **Monetary flows**

- (9) Apart from the prices of selected goods, no data are available on regional economic development at all. A very relevant indicator would be the monetary flows to and from the project area (including private and public investments and consumption). In figure 5 an updated summary of the monetary flows in 1994 is presented on the basis of estimates derived from import and export of goods (SAGUN 1995) and the model developed in ISR 1990 (INFRAS 1991).

The major changes compared with the estimates of the monetary flows in ISR 1990 relate to the reduced inflow of SDC funds into the region. After the termination of LJRP and IHDP the flow of Swiss funds decreased substantially. This reduction was compensated partly by higher financial input from other donors, higher remittances since few local people are earning money in Japan or the UN peace keeping forces and last but not least by higher expenditure by HMG and its District offices.

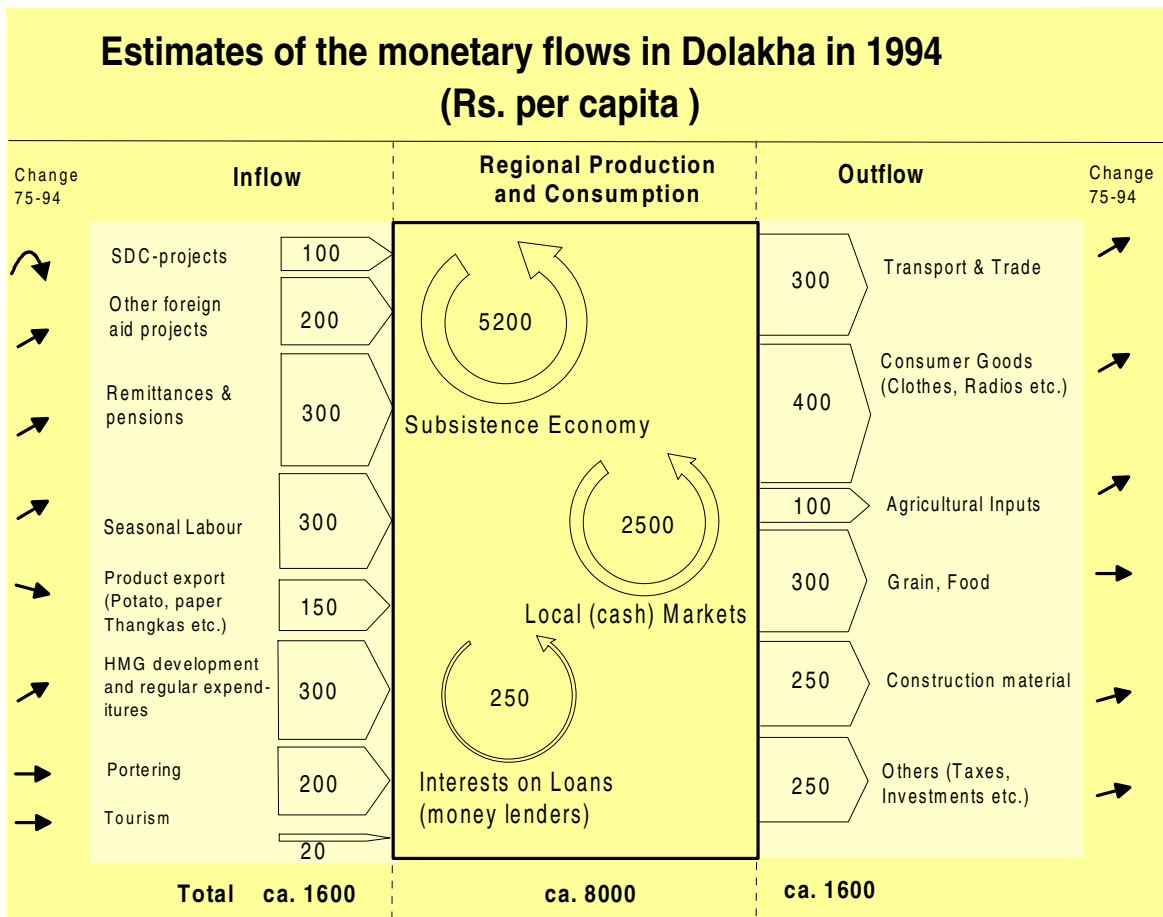


Figure 6: Rough model of the regional economy in the former LJRP/IHDP area. Assumption: Regional GDP is equivalent to 160 US \$ or 90 % of the Nepalese average of 180 US \$ per capita. All other data are guesstimates based on import and export flows.

### Settlement development

Housing construction is continuing along the road: in 1994 approximately 2'500 houses were counted in the road corridor, whereas only several hundreds were counted 20 years ago (KAPPELER 1984). The annual growth rate within the 200 m road corridor and including the major settlements is estimated to be between 15-20 % per year since 1977. The main regional growth centre has shifted from the roadhead in Jiri to the Charikot-Dolakha area in the 1990s. Factors enforcing this development are the location of the district administration in Charikot, the increasing flow of pilgrimage to Dolakha and the splendid view of Gaurishankar from the Charikot area. The standard of houses has considerably increased (electrification, more durable roofing) and is approaching urban construction style along the road but also in nearby off-road villages. This has resulted in a strong increase of import of construction material (cement, iron and even bricks). The majority of newly constructed houses serve business and domestic purposes. (10)

The land prices in Jiri and Charikot but also along the road have shown a staggering development. From a few thousand Rupees per ropani<sup>7</sup> in 1975 land prices exploded to Rs. 300'000 in the bazaar area and up to Rs. 1 million for top locations in Charikot. This trend started before the road reached those places and has continued since then.

The transport facilities provided by LJR have in the perception of the people become significant for the life perspectives of the population of the region, for the broad majority of people interviewed as well as for the business community. Although many of the new business opportunities were taken up by outsiders or rich people from within the area the road has attracted investments. However, a "substantive drain-off" of benefits related to the road to the urban areas, mainly Kathmandu, has to be expected (quantitative figures are not available) but this in turn may offer job opportunities for the seasonal migrants from the former project area.

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<sup>7</sup> 1 ropani is approximately 500 m<sup>2</sup>.

## **4. Conclusions**

### **4.1. Sustainability of Development Trends and Project Interventions**

The discussion concerning sustainability includes two aspects. First, the sustainability of LJRP/IHDP activities as defined by SDC (1990, e.g. maintenance of the road and drinking water schemes, continuation of forest management etc.). Second, the sustainability of prevailing economic, social and ecological development trends as defined by the Brundtland-Commission (WCED 1987). Some of the present trends appear not to be sustainable because the fulfilment of the needs of the present generation reduces the ability of future generations to satisfy their needs (e.g. increased fragmentation of land holdings affects productivity, slow creation of new job opportunities, migration of young and educated persons). Here, we cannot offer a comprehensive assessment of both sustainability levels but rather some illustrations will be highlighted.

Although people's perceptions vary from place to place, there appears to be a consensus that the road has induced more lasting and relevant changes than the IHDP. Local people attribute more positive impacts to the road (ADHIKARY ET AL. 1990, BAJRACHARYA ET AL. 1995). The road has become a vital backbone of the regional economy inducing growth of settlements, creating new business opportunities along the road in trade and commerce sectors, opening better access to urban education and health facilities, easing the seasonal migration and last but not least, reducing the prices of imported goods (salt, etc.). Many of the megatrends observed in the development of the regional economy can be attributed to the road. The standard of living in the former LJRP/IHDP region has been increased substantially for all segments of the population and the reduction of inputs from Swiss development cooperation after 1990 has not negatively affected this trend.

Most of the training and education activities of the IHDP were discontinued, thus reducing the scope for sustainability, and many of the trained persons have left the area. In many places people were still aware of the "Dandapakhar-programme" but even in former high input areas they reported that IHDP has been more active elsewhere than in their village (BAJRACHARYA ET AL. 1995). Fading memories regarding all education and training activities of IHDP may be attributed to the circumstance that these interventions covered only segments or individuals of the local community. In Dolakha, the Tukis, the multi-purpose development cum agricultural extension workers, are thinly spread and many people only know their name (this was already observed by ADHIKARY ET AL. 1990).

## Project induced activities

The following aspects give evidence on the sustainability of selected activities induced by LJRP/IHDP:

- Dandapakhar: The former centre of the IHDP is planned to be re-used as a police training centre. All former project offices have been shifted to Charikot which has become the major growth centre of the region.
- Maintenance of community infrastructures is not regular and inadequate in most places. Only in a few cases it was reported to be done on an ad-hoc basis. Many user groups were formed but most of them are not functioning properly due to social or political reasons or due to the disinterest of the group members.
- All the schools (IHDP assisted 107 schools in roofing and more than 300 schools in furniture supply) appear to be maintained either with local funds, through HMG support or foreign aid (especially Japanese and UGS). However, the roof construction technology has drastically changed, as documented by photo point no. 7 (shift from local material to CGI sheets combined with aluminium roof structure).
- Traditional community organisations (such as labour exchange systems) are losing support but they are being replaced to some extent by new structures. There are about 65 registered NGOs in Dolakha, but only very few of them are active. The process of institution building at local level has started but is at a preliminary stage (PANDAY/SINHA 1994). Many of the local users groups are getting registered. But only a few are functioning and most have a short longevity. Some of the organisations were started with local initiative but many others depend on external (donor) influence and financial support.
- After completion, the LJR maintenance was supported by the Swiss until 1995. Though the regular maintenance costs have been reduced over the years, they still are in the range of Rs. 100'000 - 200'000/km. Private benefits in the transport sector are estimated at Rs. 50'000 - 60'000/km, while the public income from duties and taxes is estimated at Rs. 30'000 - Rs 40'000/km (INFRAS 1995). The Department of Roads will only be able to spend Rs. 25'000/km in future. With this budget the present (excellent) road condition can hardly be maintained. Given the economic role of the road and the clear benefits perceived by local people many of the users might be willing to pay more for roads, provided the extra money is utilised for maintenance.
- Despite the intention to integrate IHDP into local structures with the participation of the people, the findings by BAJRACHARYA ET AL. (1995) suggest that this was not achieved to the extent as expected initially. This can partly be attributed to the institutional set-up: the Nepalese Government and administration followed a "top-down" approach guided by decision-making at central (Kathmandu) level during the time of project implementation.

## Sustainability of the mega-trends

Sustainability to be assessed at the regional level comprises the three interlinked dimensions of economy, society and environment. Many of the prevailing development trends in the area negatively (-) or positively (+) affect the overall sustainability:

### Economic dimension:

(-) The continued population growth and the slow growth of off-farm employment force people to migrate. This migration process causes a significant "brain-drain" of young and educated persons. Though there is evidence that few people having gained experiences out of the area do return, there is a loss of "human capital".

(-) The small land holding and the increasing fragmentation of the cultivated land hampers efficient land use.

(-) The market integration has established new outlets for manufactured products and agricultural surpluses from other areas of Nepal or India and China, hampering the local production (high production costs). Intra-regional as well as inter-regional economic disparities are increasing.

(+) New economic opportunities have attracted investments in housing construction (residential and business) and many immigrant families have opened commercial activities in the road corridor.

(+) New market centres are emerging along the road. Charikot, with the district headquarters, is a major nucleus for the transformation of the earlier "remote area" (lack of transport, scattered population) towards a "rural intermediate area" (agriculture dominance with increasing role of the off-farm sector).<sup>8</sup> "Economically integrated areas" still have a rural appearance but provide residential, or recreational services for (polluted) urban areas. This trend appears to be now developing in the case of Kathmandu-Charikot.

### Social dimensions:

(-) The degree of endogenous institutional development has not substantially advanced and many of the community activities are hampered by political conflicts and foreign project interventions interfere with self-reliance.

(-) Increasing dissemination of individualism, consumerism and modern values is leading to social conflicts, especially between different generations, causing an erosion of traditional systems and a marginalisation of old people.

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<sup>8</sup> This classification is utilised by the OECD countries to develop specific rural development strategies (OECD 1993).

(+) The education and awareness of all social groups and especially women have considerably increased over the years providing a basis for social and economic transformation within the area.

(+) Decentralisation and the political transformation towards democracy have not significantly eased planning and implementation of development effort. Public administration lacks transparency. However, the framework for the creation of business, establishment of NGOs and user's committees as well as the pluralism in print media has improved.

#### **Environmental dimension:**

(-) Though more forest resources are visible from the photo point monitoring the supply of forest products does not meet the requirements and the forest resources per capita are declining. The substitution processes has started slowly (electricity for light and kerosene for cooking).

(-) Urbanisation and growing settlement densities generate waste management and water pollution problems.

(+) The forest cover in the area is increasing although experts forecast in the 1970s that the local forests would disappear by the year 2000.

(+) An increase in agricultural production (through more intensive cropping intensities) could be achieved without substantial amounts of new agricultural inputs.

(+) The permanent out-migration as well as the seasonal migration reduces the pressure on local natural resources.

## **4.2. Initial Expectations and Impacts Revisited**

The expectations and objectives related to LJRP and IHDP changed over time and were differently interpreted according to the professional background of the experts and institutions involved (MAUCH 1981). The expectation of IHDP as stated by the initial agreement between the Governments of Nepal and Switzerland (SWISS GOVERNMENT 1975) was to achieve the following objectives:

1. The inflow of cash money into the local economy in the form of wage earnings (e.g. road labourers) shall be channelled as far as possible into development generating activities.
2. Agricultural activities shall lessen the food deficit, improve the nutritional status of the population and create a marketable surplus of agricultural products.

3. Through forest and watershed management the erosion phenomena and the soil conservation problems should be brought under control.
4. Non-agricultural development in the fields of cottage and small scale industry and tourism shall relieve the pressure on land and decrease seasonal migration.

The Lamosangu-Jiri Road was initially considered as part of the IHDP framework and the bilateral agreement for the road does not provide specific objectives to be achieved. Clear yardsticks are lacking to compare the original expectations with the results provided by several evaluations of LJRP and IHDP and the three monitoring rounds. SCHWEFEL (1986) doubts whether it is methodologically possible at all to conclude from project impacts their contribution on the macro-economic situation at regional and national level. The impacts of education and training for human resources development are especially complex to monitor. They become visible only after years or generations and then can no longer be attributed to external factors. Furthermore, skills acquired by people as a result of project interventions are often applied in other occupations or persons move to other areas.

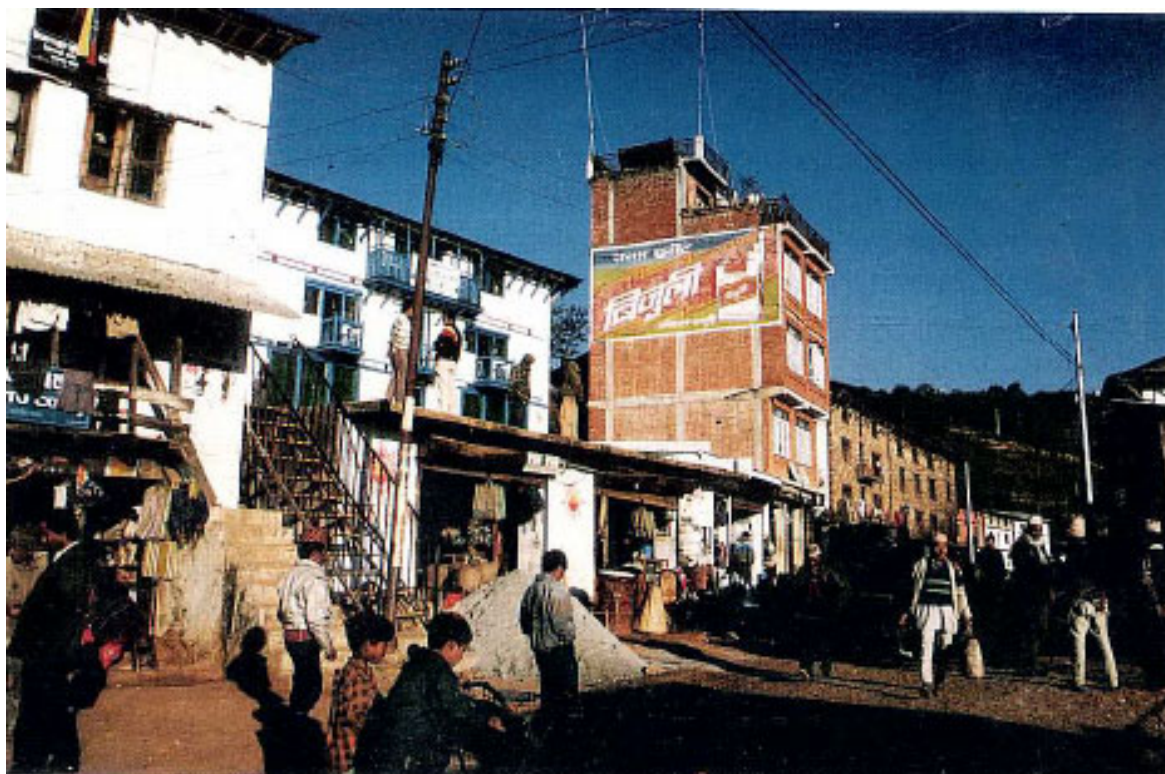
In 1982 the interim evaluation conducted by IDS (1982) concluded that "it is not unreasonable to expect some physical and concrete outcome in terms, of say, an increase in production or employment opportunities or even reversal of the deteriorating ecological balance. Unfortunately, nothing of this sort is discernible from the investigations and analysis we have been able to carry out so far". That this position reflects the most pessimistic point of view is illustrated by the findings presented here. The following observations appear relevant in re-assessing the ex-ante objectives or hypotheses as stated in the bilateral agreement:

1. To divert cash inflow to investments: During project implementation, significant employment opportunities have been created for local people during road construction, afforestation plantation and the construction of local infrastructures. This income was partly channelled into development or investment activities (house improvement and construction, see p. 27), used to repay dept and to increase consumption levels (e.g. of clothes, electronic equipment etc., INFRAS 1991). The road has significantly increased the mobility of local people, partly for economic reasons (employment, market) and partly for social reasons (education, health, visits). The initial fear that road construction would replace portering could not be observed. Road construction actually increases the demand for portering due to the need of distributing the newly imported goods from roadheads to off-road consumption points. So porter routes shifted.
2. To reduce the food deficit: Overall food production has considerably increased (as did the population during the same period of time). The per capita food deficit has been reduced somewhat and the nutritional status of the population has been improved for large segments of the population. However, no significant marketable surplus could be developed since there are no incentives for surplus production (high production and transportation costs). Fruit and vegetable production has been improved and diversified, but cheap imports reduce the

potential for marketing in local markets as well as in nearby urban areas (e.g. Kathmandu).

3. To reduce environmental degradation: Afforestations on public land and tree planting on private land contributed to reduce top soil erosion. However, the contribution may be small given the rough topography, critical geological conditions and the strong climatic forces during monsoon. However, the protection of the afforestations have increased the biomass production in the area and have impressively reshaped the landscape (see photo points in the annex). Although the sustainable utilisation of these still relatively young afforestations has yet to be developed, they certainly provide a potential for future utilisation. The plantation of fodder trees was -though only partly attributable to IHDP - a major factor in balancing dwindling forest resources and improving the local farming systems. The environmental degradation trends prevailing in the 1970s have been reversed partly.
4. To develop off-farm activities: The creation of off-farm opportunities (besides road construction work) could not absorb significant amounts of local labour. Due to cheap imports local cottage and small scale industry can hardly compete with manufactured goods imported from India and China. Economically, international tourism plays a marginal but gradually increasing role. Yet the area is mainly transited on the way to the Everest area. However, there is a potential and the volume of Nepalese tourism has steadily grown over the past 5 years. The economic dynamics in the road corridor have attracted investors (mainly from outside the area) but wages earned out of the area through seasonal migration have increased and remain the most important economic factor to balance the trade deficit in the region. There is much less permanent migration in the area now compared to twenty years ago, due, among other things, to the road.

These findings largely correspond with those reported by GTZ in a comparative review of experience with Integrated Rural Development Projects. A conclusion was that the adverse framework conditions (political, social, economic and ecological) in implementing these projects were often underestimated during the implementation phase. As a result the achievements seldom coped with the high ambitions stated at the beginning (GTZ 1994). The World Bank (1994) reports "a universal denial" of maintenance (roads, drinking water schemes etc.) and increasingly emphasises social aspects such as the real needs and willingness to invest of the local people. This contrasts with the findings from the Opinion and Perception Surveys: local people attribute many of the positive impacts to the road because they are tangible and supersede or tend to forget the role of education and training aspects and related behavioural changes.



*Figure 7: Illustration of the new, urban house construction style in Charikot. Even the bricks have to be imported from Kathmandu. The role of Charikot as district headquarters, its road access and electrification have induced a settlement boom after the end of the road construction which continues unabated.*

The road has directly and indirectly triggered other aid supported projects into the area: Kharidhunga magnesite Mine (Indo-Nepal conglomerate), electrification and telecommunication expansion (Japanese support), Khimti Hydropower Project (Norwegian support), Dolakha hospital (Korean support) and NGO supported projects (such as UNICEF), just to mention the larger investments. These new activities, together with the regular HMG activities, have helped to bridge the intensive phase of Swiss aid inflow into the former project area and to maintain the regional consumption levels.

The maintenance of all this newly established infrastructure can hardly ever be financed through local resources alone. Financial and technical support from the central government (and even external sources<sup>9</sup>) will also be required in future. From the economic point of view the sustainability of the developed infrastructure depends on the willingness to pay of the national government and others. Besides infrastructure development, the transformation processes which have been observed are based on human potentials and cultural values which continues to be effective whatever future government policy will be in practice. As long as the political willingness of national and international institutions to

<sup>9</sup> At present approximately 25 % of HMG's development expenditures are financed by loans from international institutions.

support remote and rural areas continues to guarantee a basic living standard, the development and modernisation process in the study area can be considered as fairly sustainable.

Settlements in hill areas all over the world face higher infrastructure and maintenance cost than they do in plains (scattered population, high infrastructure costs etc.): unless tourism or other natural resource based earnings are further developed, a substantial inflow of external capital through the export of labour, public investments or subsidies is required to maintain or develop local infrastructures and related socio-economic processes. The large nearby markets of India and China will also in future allow the production of manufactured and even agricultural products at lower cost than supplies from the hill region studied. It therefore remains a decision of political choice whether or not to retain the hill districts of Nepal as places which allow people to develop their livelihood systems. This decision will be taken by people, supported by government policies and market factors.

## Annex

### Photo Point Monitoring

Photos taken purposely or casually by Swiss expatriate experts between 1968 and 1980 were collected in the course of preparing ISR 87. While preparing ISR 90 the photo points were located in the field and new photos were taken in May 1989 by Mr. H. U. Kröni. In November 1994, a third round of photos was taken by Ms. Regula Meierhofer.

Constraints in time, weather, light situations and changes in the environment of the photo points, such as growing trees covering up the view, did not allow to cover all 79 photo points established in 1994. The following 18 photo points provide insights into the major visible changes in the landscape along the Lamosangu-Jiri Road corridor.

The photo points are concentrated mainly in the road corridor for two reasons. First, most of the old photos were taken from the road itself or from trails where nowadays also the road passes through. Second, during the photo point monitoring in 1989 it proved to be more time consuming than expected to find old photo points and the cost-benefit ratio to cover selected photo points in a one day walking distance from the road was assessed to be unfavourable.

The presentation of selected photo points includes the initial old photo (various dates), the picture from May 1989 and the picture from November 1994. Since the effort for this photo monitoring was related to other field work - and therefore was conducted in an opportune manner in order to save time - the dates and seasons of the pictures often do not correspond. This reduces the possibility of direct comparison to a certain extent.

#### **1. Lamosangu (6.1975, 5.1989, 11.1994)**

Between 1975 and 1989 around 60 new houses were constructed. The number of fodder trees doubled. In the same period, electrification took place. In 1989 the new processing plant for magnesite minerals was established at the site, where in 1975 the camp for the construction of the Lamosangu hydropower plant was established. The Arniko Highway was rehabilitated on this stretch in 1989.

Between 1989 and 1994 the settlement along the road has not grown much. A dense cover of fodder trees has grown on the campus of the magnesite processing plant. New fodder trees were planted on the steep slopes and on the shore of the Sun Kosi. The total number of individual trees has tripled. The shore of the river as well as the shore of the different creeks in the picture seem to be more stable, erosion on the river bank was reduced due to a more dense vegetation cover.

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**2. Road and forest near Thumpakhar (1.1978, 5.1989, 11.1994)**

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The erosion induced through road construction visible in 1978 has been completely stopped due to a dense cover of forest. The pine trees of the road bench afforestation have considerably grown within 7 years. Between 1978 and 1989 also the indigenous fodder trees grew a lot. This trend was not extended until 1994 though. The fodder trees are smaller than in 1989: this indicates a high demand for leaves as fodder (stall feeding).

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**3. Afforestation above Dandapakhar (8.1976, 5.1989, 11.1994)**

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This pasture land (the so called "Weidli") was afforested by IHDP in 1976. Though the forest is protected the broad leafed species and grass was being harvested in 1989. In 1994 the tree density has considerably increased. The trees of this afforestation now show a remarkable growth (tree height is 10-12 meters). Among the trunks of pine trees a very limited number of shrubs of deciduous trees was growing in 1994.

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**4. Afforestation in Dandapakhar (1975, 5.1989, 11.1994)**

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The trees within the afforestation have grown to a height of up to 12 meters. No mixed forest has developed in the meantime. This afforestation is still a monoculture of pine trees. Indigenous tree species moving into the afforestations are very likely to get cut out again by the local farmers, collecting fuelwood and fodder for their livestock. This indicates that fuelwood and fodder are a scarce resource in the region.

In 1994 the lower parts of the slope were also covered with young pine trees. In the foreground a lot of new fodder trees on terraces are seen (compared to 1975).

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**5. North Slope of Pakhar Khola (7.1977, 5.1989, 11.1994)**

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Between 1977 and 1989 the forests grew more dense, afforestations were made partially, the number of fodder trees increased near the settlement, the number of houses remained more or less unchanged.

Between 1989 and 1994 not much visible change occurred in the settlements. The number of trees (fodder trees and pine trees ) and the overall density of forest increased enormously.

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## **6. Thulopakhar (6.1976, 5.1989, 11.1994)**

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At least 10 out of 30 houses improved their roofs between 1976 and 1989. Straw was getting replaced by stone slates and in a few cases by wooden shingles. This indicates an increase in the general state of wealth. Besides that, one floor was added to one house. The village has been electrified in the meantime. There are more fodder trees on the terraces behind the village.

After 1989 not much change occurred concerning the infrastructure of the settlement and the standard of the houses. The number of fodder trees has increased by some more trees.

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## **7. Primary school in Thulopakhar (6.1976, 5.1989, 11.1994)**

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After the road construction in 1985 electrification took place in Thulopakhar. 9 new buildings were constructed: 1 school complex, 1 bank (Nepal Bank Limited), 7 dwelling houses. The three schools (right) were roofed with IHDP assistance. The new schools (left) were constructed with a new construction technology and were supported by the recent post earthquake rehabilitation project (the earthquake was in 1988).

3 new houses were built in the settlement, partly replacing *kacha* (wooden) houses close to the bank and opposite the *stupas*. 5 new buildings are being built on the school ground. The school appears to be very well maintained. Several new pine trees (13) are growing around the school building but the deciduous trees in the foreground of the picture in 1989 have vanished.

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## **8. Shildhunga (4.1977, 5.1989, 11.1994)**

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The road alignment is completely integrated into the landscape since the tree cover along the road has significantly increased. Between 1977 and 1989 around 7 new houses were constructed in the area of the hill (centre). In the same period electrification has taken place. A forest nursery was planted behind the hill in 1989.

By 1994 the pine trees within the nursery of 1989 grew to approximately 5 meters. The vegetation cover has increased.

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## **9. Mure**

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The school house in the foreground was rebuilt between 1977 and 1980 and received a stone slate roof. The small huts near the school were removed during the early 1980s. The shops shifted to nearby Mure on LJR (visible on the left side). Mure, which consisted of a few farm houses in 1977 when road construction was going on, developed to a major

catering centre on the road consisting of 65 houses in 1994. This trend will be reinforced with the Sailung road branching off from the LJR here.

By 1989 the road alignment is already integrated into the landscape and the pine tree afforestation above the road becomes clearly visible. In 1994 the forest has grown further and is to be considered as closed forest now. A new forest is growing just behind the school. The agriculture land below the road did not change much.

### **10. Halaule Khola (ca. 1977, 5.1989, 11.1994)**

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Some new houses have been constructed and the standard of houses compared to 1977 has impressively increased. The settlement received electrification after 1989. The new compound in the middle of the slope belongs to a local person who is working in Japan. The house serves as lodge and restaurant for Japanese group tourists. And nearby a carpet factory is now being constructed (not visible here).

The heavily degraded oak trees did not change, since they are still utilised every second year. Some 60 trees are newly growing at the road bench which were not there in 1989.

### **11. Gully in Bonch (6.1987, 5.1989, 11.1994)**

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During the rainy season in 1985 the small river had a big flood and left its bed by the road crossing. On its new way the flood destroyed several houses and fields (two people died). Between 1985 and 1987 corrections of the river bed were made by LJR. The area which had been destroyed by the new gully recovers gradually and is greening again in 1989. In 1989 the whole slope appears unstable and during the rainy season several parts of the slope were moving.

In 1994 the cracks of the gully are densely revegetated. The whole slope appears to be quite stabilised. 3 new houses were built on the right side of the gully, 2 big new houses were built on the left side.

### **12. Charikot (2.1981, 5.1989, 11.1994)**

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Between 1978 and 1989 the settlement in Charikot grew out of practically nothing. The number of dwelling and business houses multiplied rapidly. In 1994 410 houses were counted in Charikot, an increase of 60 % compared to 1987. Due to the location of all the government offices Charikot has taken over the function of a local centre with substantial potential for further development (tourism).

The pine trees of the afforestation (IHDP) above the settlement have considerably grown and cover large portions of the hill. One reason for this afforestation was to safeguard the water flow for the drinking water scheme during dry season.

### **13. Charikot (8.1978, 5.1989, 11.1994)**

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Due to the enlargement of the road in the bazaar area, the little wooden *kacha* houses with the shops around the curve were pulled down after 1989. Some of them have moved to the Bazaar area extending along the local road from Charikot to Dolakha. Television antennas are widespread (there were none in 1989) and even some satellite dishes can be found. This indicates a shift in the material standard of living from subsistence agriculture towards a more consumer oriented living style.

### **14. Busti Bridge (4.1980, 5.1989, 11.1994)**

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This bridge is on the old main trail from Lamosangu to Jiri over the Tama Kosi. Since the Lamosangu-Jiri road was opened, the trail has only local importance. Changes between 1980 and 1989 are: on the left and right side of the Tamakosi two new houses have been constructed on each side. One house has a new tin roof. The forest area has hardly changed.

By 1994 the forest has grown more dense. Shrubs seem to cover a bigger area. Although the forest seems to be more dense, four small land slides have occurred on the left side slope. On the right side of the Tamakosi four new houses have been constructed (three of them with a stone slate roof, one of them with a CGI roof).

### **15. Jiri Market (1980, 5.1989, 11.1994)**

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In 1980 the foundations of the new buildings on the market place in Jiri Manedanda are visible. During the following 9 years 13 new buildings were constructed in this area. The tin roof shelter has been enlarged. The growth of this Hat Bazaar between 1989 and 1994 is remarkable considering the competition with the permanent Bazaar in Jiri Valley.

In 1994 6 new houses were built in Jiri Manedanda. The right slope of Jiri Manedanda is newly covered with fodder trees. The trees of the afforestation behind the settlement have grown 3-4m. The slope in the background is also more densely covered with trees.

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**16. Jiri Valley (1973, 5.1989, 11.1994)**

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The fruit orchard (at the bottom left) established under the Jiri-Multipurpose Development Project in the early 1970s is still visible though it is used as pasture because the apple trees did not survive. With the construction of the road (which is not visible but crosses the photo in the middle) many new houses appear, especially in 1989. Also in 1994 some new houses are detectable.

The forest cover on earlier pasture land (towards the top of the ridge) has considerably increased. Trees towards Jiri Manedanda (left) start to hide houses on recent photos. The changes on agricultural land, however, are not substantial.

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**17. Jiri (3.1980, 5.1989, 11.1994)**

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Jiri, the terminal point of LJR and starting point for the Solu Khumbu region, is an important trading place for consumer goods. Jiri Technical School and the hospital underline the importance of this regional centre. In the past, most goods from Kathmandu were portered to Solu Khumbu. Today the merchandise gets transported by truck to Jiri, where it is re-traded. The rest of the distance is still covered on foot.

Between 1980 and 1989 an immense construction boom has taken place in Jiri. The number of houses increased from 44 to 340 in 1987 (LCRC 1988). Since then house construction has continued and in 1994 501 houses were counted (SAGUN 1995). But the high growth rates observed during the first years after the road reached here have slowed down in recent years. Jiri has lost a lot of importance as trading centre because many goods are getting transported by helicopter from Kathmandu directly to Solu Khumbu now (Lukla, Namche Bazaar). Concerning land use and afforestation not much has changed since 1989.

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**18. Jiri Valley (1968, 5.1989, 11.1994)**

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The tree cover on the slopes has substantially increased between 1968 and 1989. Since then the forest density has further increased since the trail to Shivalaya - which was not there in 1968 and leads to the Everest area - is less visible though still heavily utilised.

The number of houses in the Jiri agricultural centre (bottom right) has increased during the 25 year period. The house construction boom in Jiri (left) was the result of the LJR ending here.

In the middle slope pasture land or long cycle fallow land was converted to agriculture. Overall the landscape is more clearly structured compared to 25 years ago (settlement, forest, agriculture, pasture).

1.



INFRAS

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INFRAS

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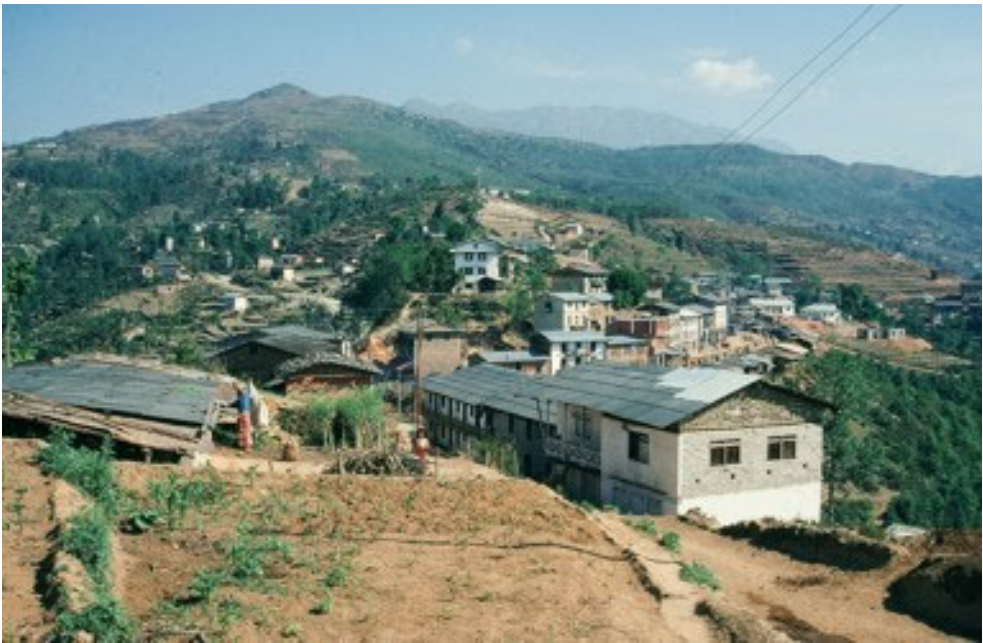


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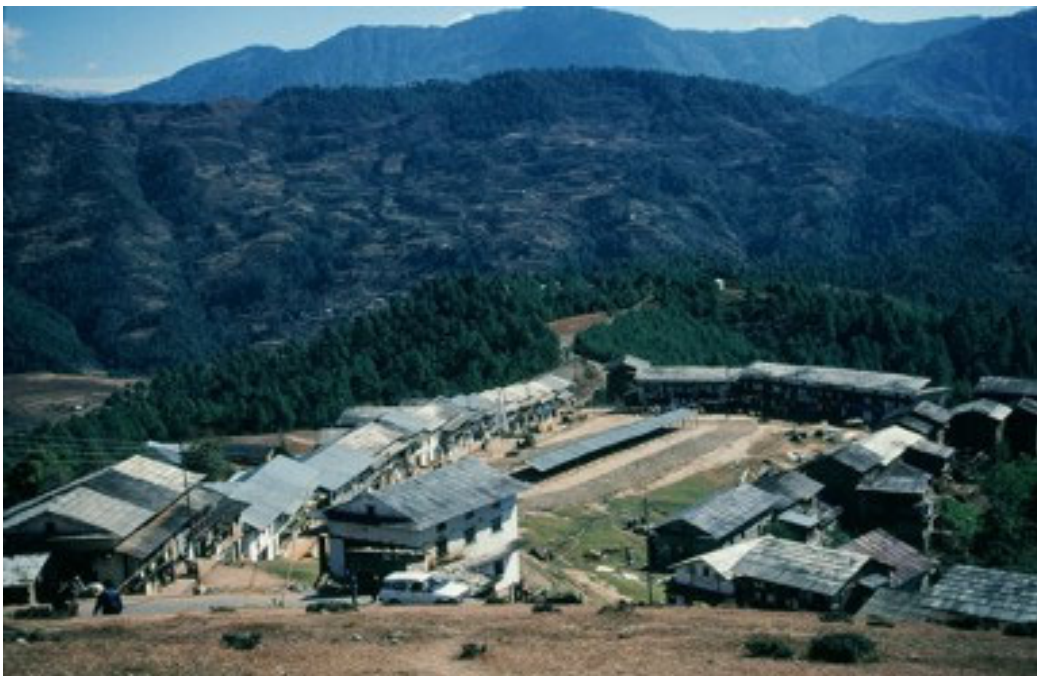
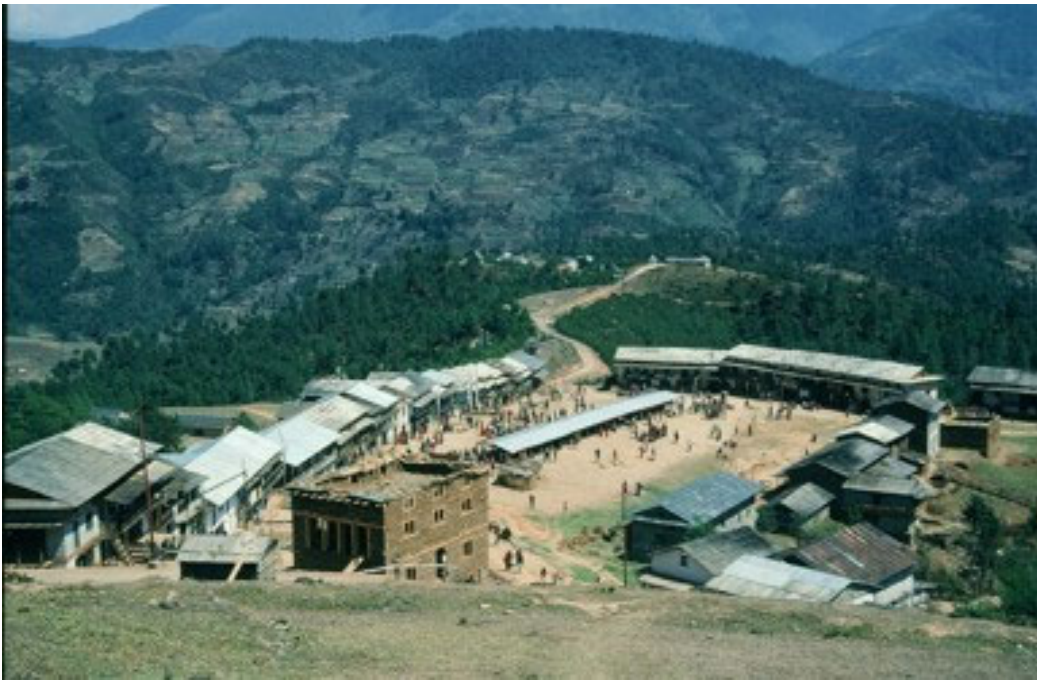


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## Initial Key Questions (INFRAS 1988)

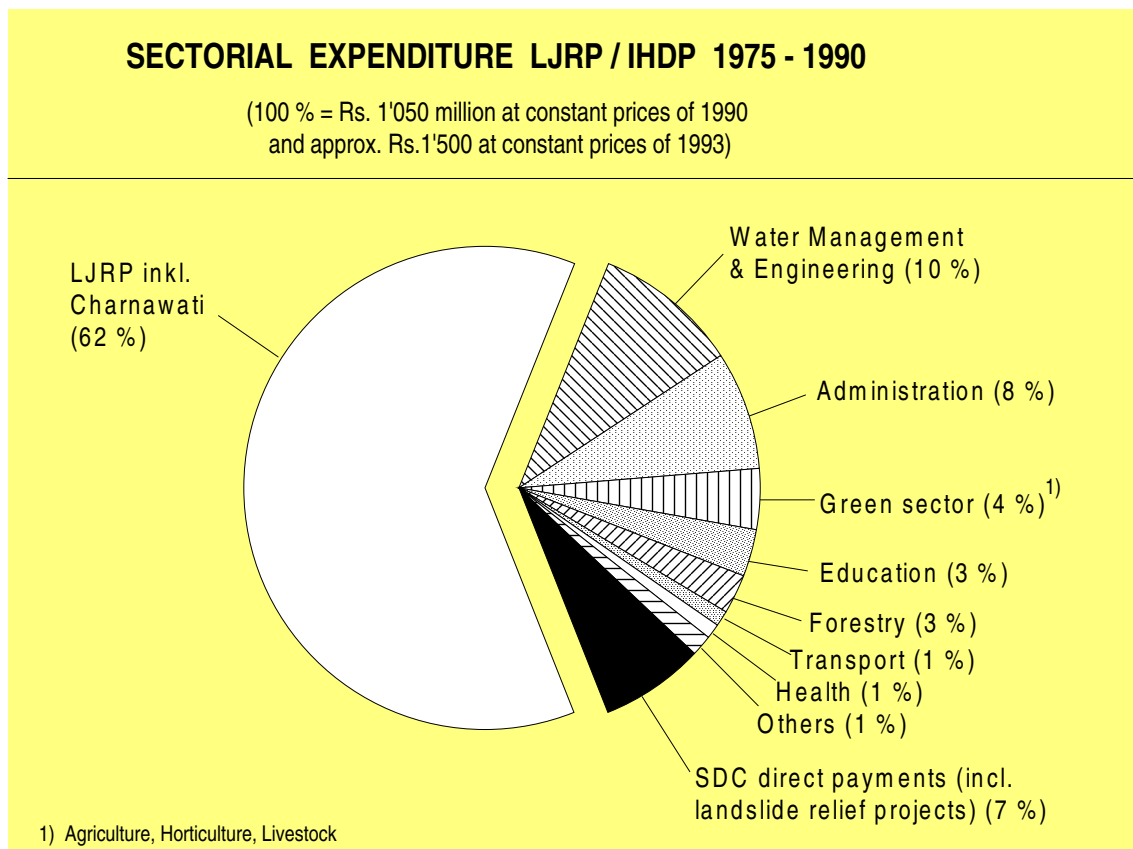
### Objective-oriented Key Questions

1. To what extent have the projects stimulated **self-propelled and sustainable development** processes?
2. How and to what extent have the projects influenced the **ecological balance** in the region?
3. What are the projects' impacts on the material standard of living of different households, particularly on their **food situation**?
4. What are the projects' impacts on the **health and education status** in different segments of the population? What is the impact on population growth?

### Related component questions:

5. **Who travels** on the road and for what purposes? What **amounts and kinds of goods** are transported? What kind and amounts of goods are transported to which destinations?
6. Did the projects induce changes in the **structure of settlements** in the region? If so, what are they, and what is their significance?
7. How did the projects affect **aggregate economic growth** of the region? How did they affect within-region economic disparities? Inter-regional disparities? Rural-urban linkages?
8. What are the project's impacts on **communication** among different ethnic groups, on sense of **social responsibility**, and on **initiative** in the community?

## Figures and Tables



*Figure 8: Overview on local sectorial expenditure of LJRP, IHDP and the Charnawati Rehabilitation Project. The overall input was estimated to represent approximately 10 % of the regional GDP during the period 1975-1990.*

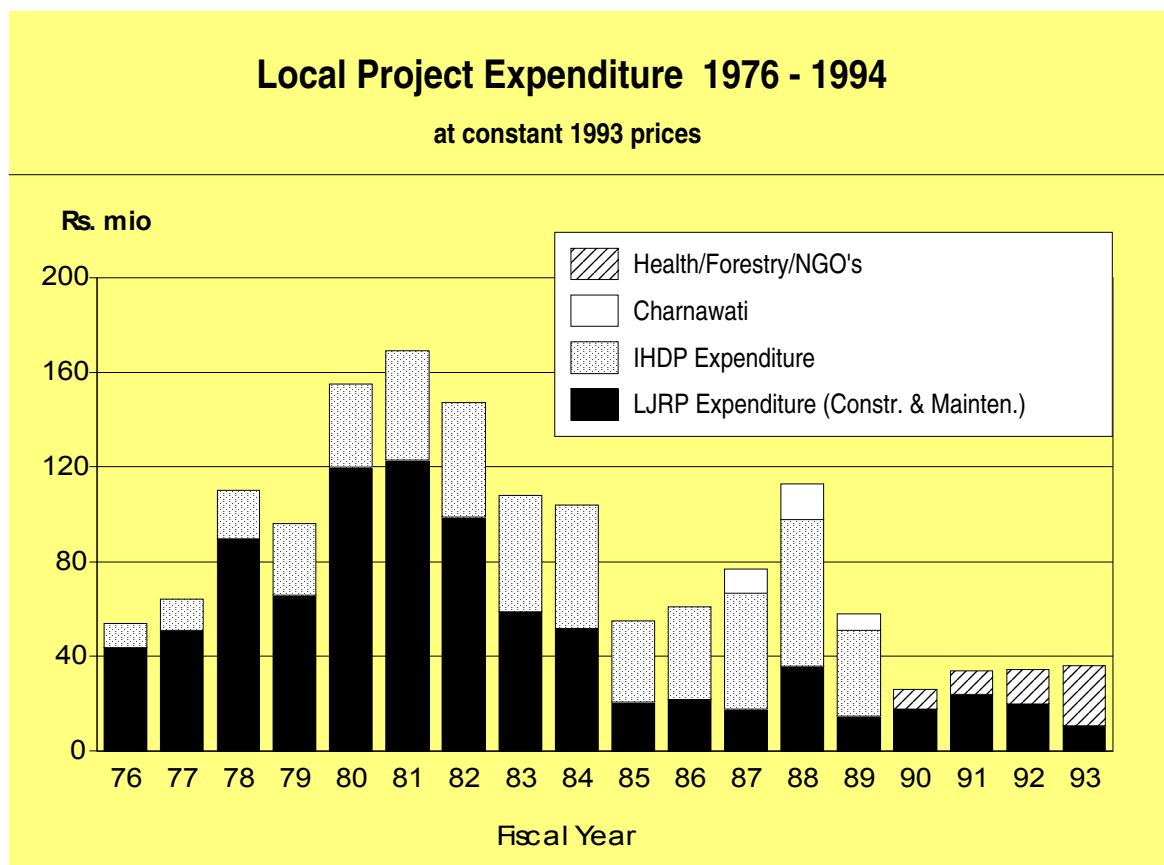


Figure 9: Development of project expenditure by Switzerland and HMG in the LJRP/IHDP area. The fund flow was considerably reduced after peak road constructoin period (1978-1982) and further declined after the end of IHDP (mid of 1990). Additionally to these funds, Switzerland has been supporting the Jiri Technical School since 1982. Source: INFRAS 1991 and SDC.

<b>ACHIEVEMENTS IHDP</b>					
S.No.	Programme	Unit	SpD 1)	DoD 2)	Total
1.	Scholarships for Local Students	Student	1151	951	2102
2.	Furniture Assistance for Schools	School	200	143	343
3.	Functional Adult Literacy Course	Class	479	421	900
4.	Integrated Progressive Farmers Training	Person	446	523	969
5.	Active Agri Extension Workers: "Tuki"	Person	60	229	289
6.	Improved Cereal Seed Distribution	Ton	132	98	230
7.	Improved Potato Seed Distribution	Ton	143	88	231
8.	Vegetable Seed Distribution	Ton	6	4	10
9.	Fruit Tree Sapling Distribution	Piece (1000)	395	94	489
10.	Nursery & Orchard Establishment	Number	27	114	141
11.	Chicken Distribution	Number (1000)	59	21	80
12.	Animal Distribution (Male for cross breeding): Goat, Pig, Buffalo, Cow	Number	272	135	407
13.	Forest Nursery Establishment	Number	14	63	77
14.	Afforestation	Hectar	882	3919	4801
15.	Roof Assistance for Schools	School	53	54	107
16.	Drinking Water Supply Scheme: New	Number	162	123	285
17.	Drinking Water Supply Scheme: Repair	Number	45	62	107
18.	Irrigation Scheme (New + Repair)	Number	7	12	19
19.	Health Post Building Construction	Number	5	9	14
20.	Service Center Construction	Number	1	1	2
21.	Other Building Construction	Number	31	18	49
22.	Suspension Bridge Construction	Number	3	13	16
23.	Women Volunteer Training	Person	101	97	198
24.	Integrated Village Women Training	Person	3351	1880	5231
25.	Medicine Supply to the Health Post	NC (1000)	978	371	1349
26.	Natural Family Planning	Village P.	-	18	18
27.	Skill Development Training	Class	32	65	97
28.	Raw Material Supply	NC (1000)	404	251	655
29.	DWSS User Committee Training	Committee	81	74	155
30.	Awareness Campaign	Places	36	26	62
31.	Training for Village- and District-Level Planning	Person	479	598	1077
<b>ACHIEVEMENTS LJRP</b>					
		Unit	SpD 1)	DoD 2)	Total
1.	Blacktop	km	28	82	110
2.	Traffic	Passengers Vehicles	- -	- -	2000 3) 80 3)

1) SpD: Sindhupalchok District  
2) DoD: Dolakha District  
3) Average number per day in both directions in Khadichaur (1994)

Table 5: Overview of LJRP/IHDP activities and achievements. Source: IHDP 1990.

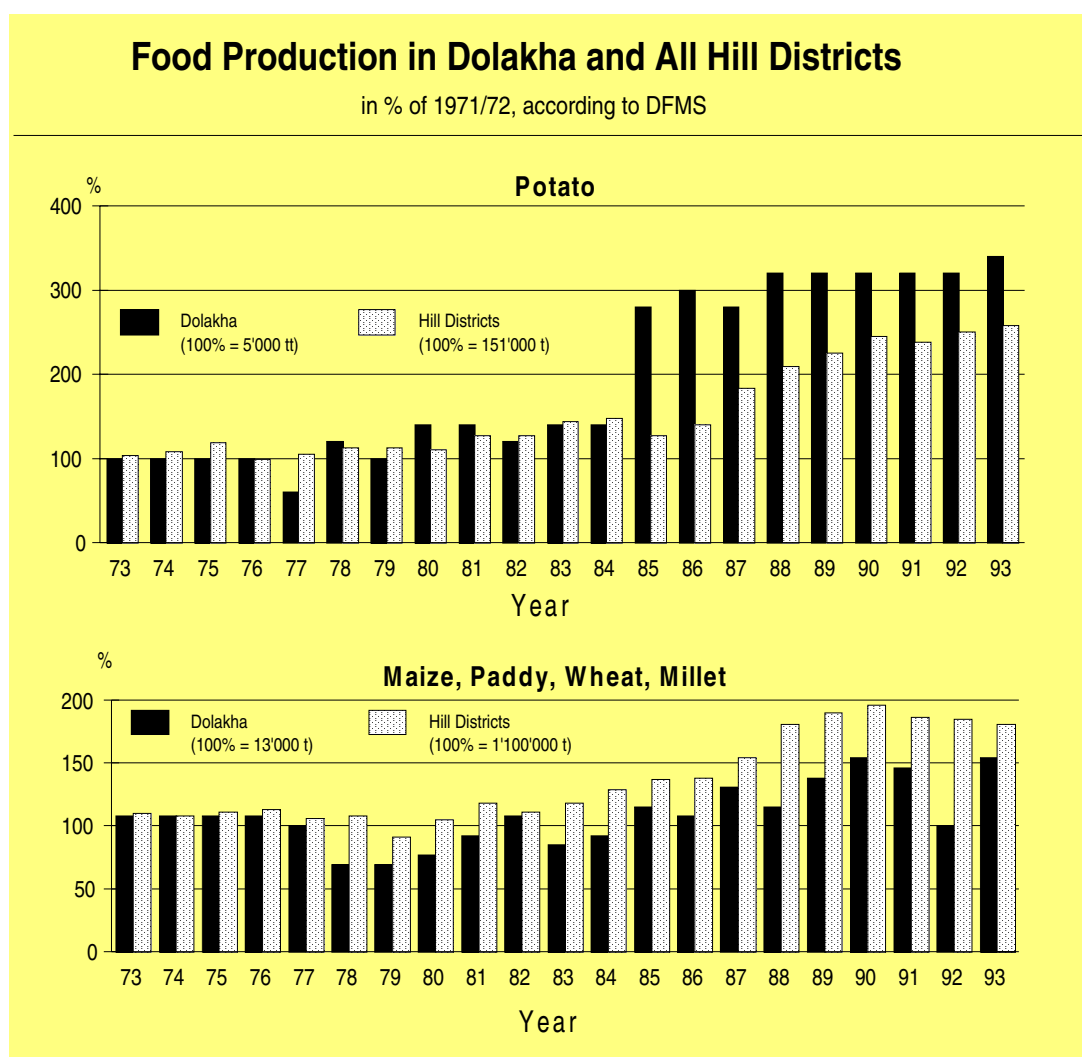


Figure 10: Development of the agricultural production in Dolakha compared to the hills average of Nepal. The indicated increase in the production of staple crop is approximately 50-60 % (considering high yearly fluctuations due to varying weather conditions). However, distributing this production to the population results in very low production figures of 130 kg grain equivalents/capita. As the basic need is 200 kg grain equivalents/capita, the above figures probably indicate a systematic underestimation. Source: DFMS.

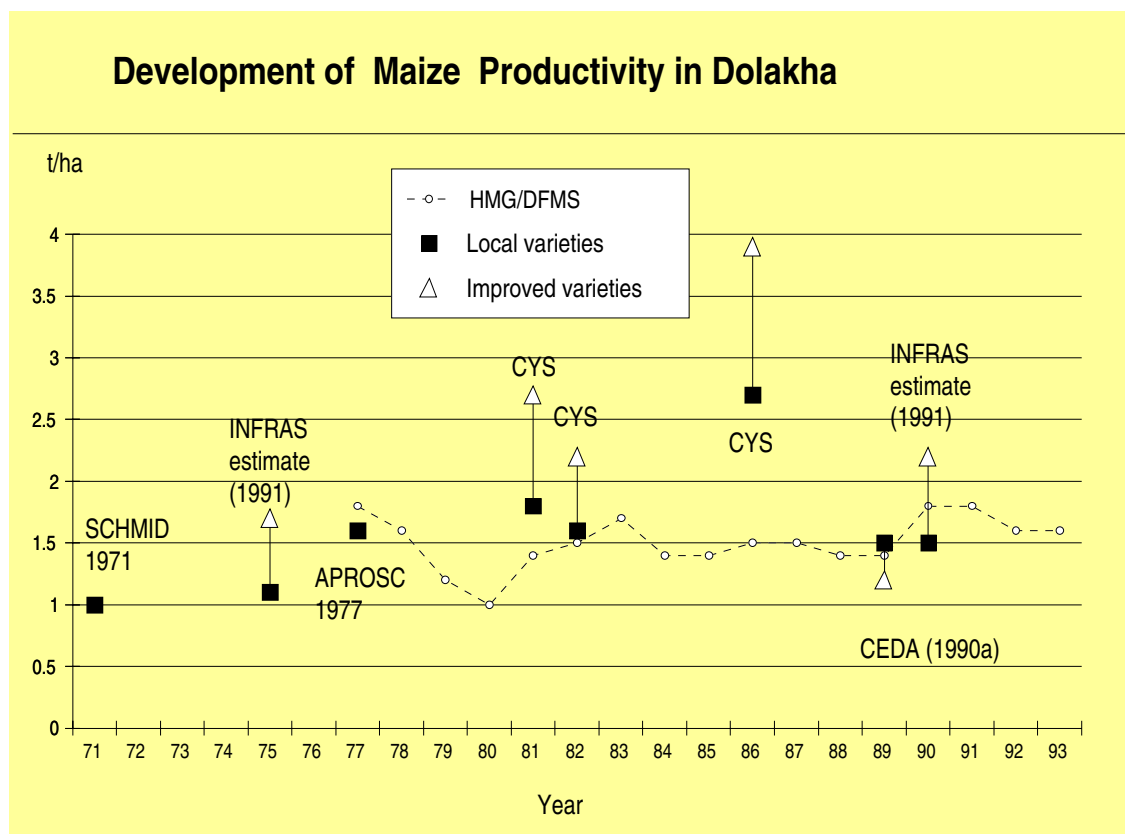


Figure 11: Illustration of the development of the maize productivity. For the interpretation one must be aware that this figure compiles data stemming from different sources which collected data with different methods. However, the crop cuts conducted by the crop yield surveys (CYS) during IHDP indicate slightly higher yields than estimates from qualitative surveys or official estimates.

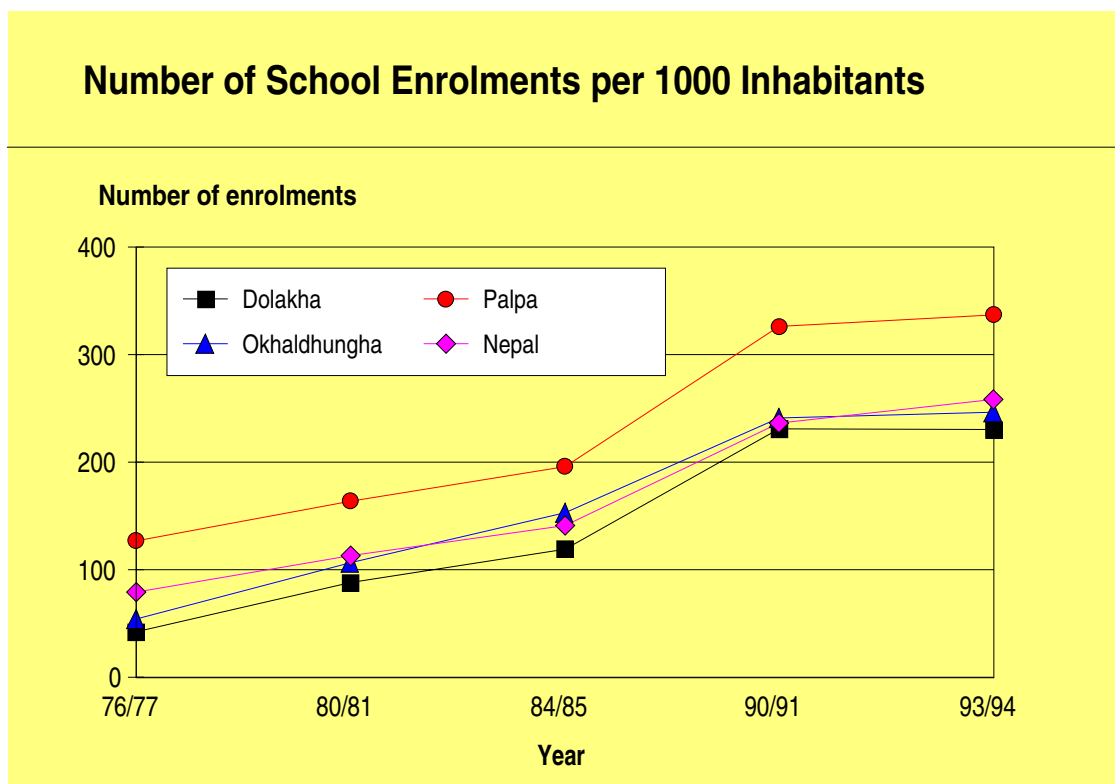
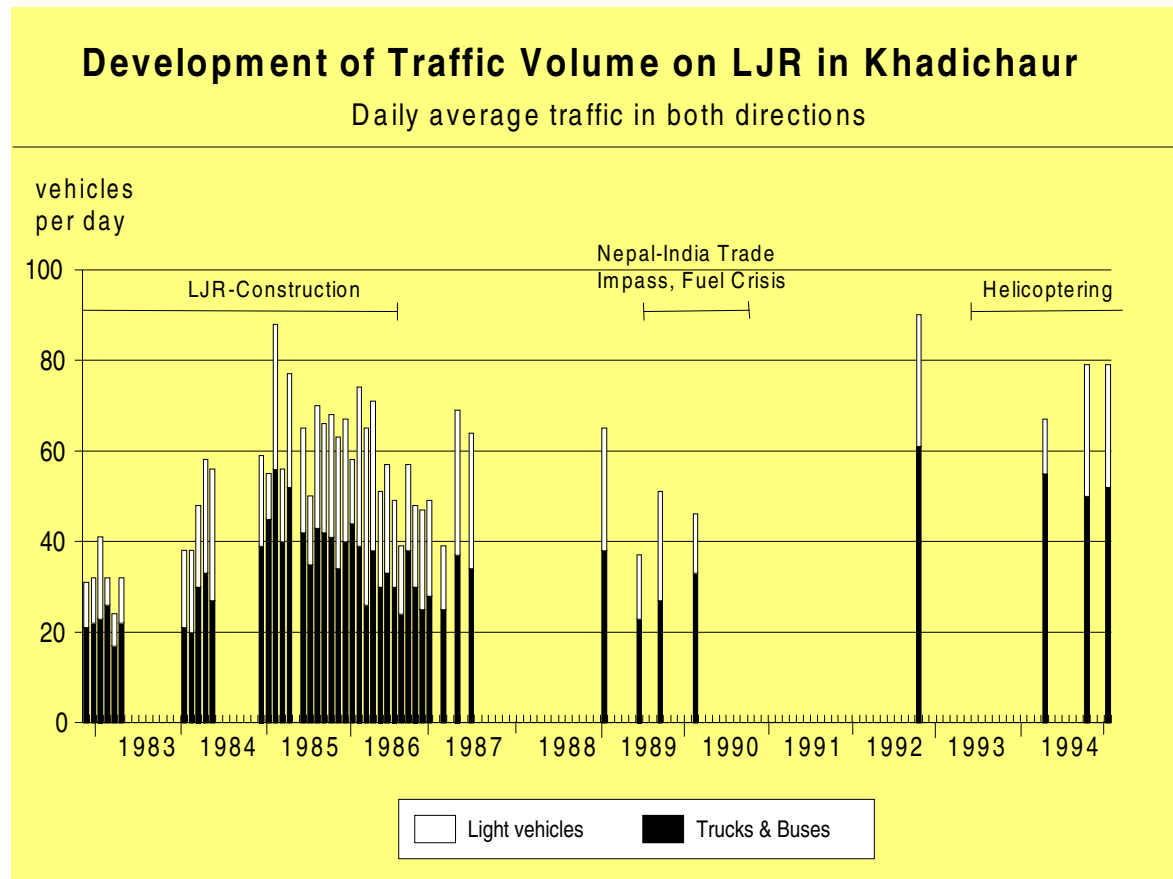


Figure 12: Relative development of school enrolments. Compared to many other districts Dolakha District shows a better performance especially between 1985 and 1990: Out of 1000 inhabitants 300 are going to school now. Source: CBS.



*Figure 13: The overall volume of vehicles on LJR has not increased. During road construction (up to 1985) much construction related traffic was recorded and up to 1990 many LJR/IHDP project vehicles were circulating during traffic counts.*

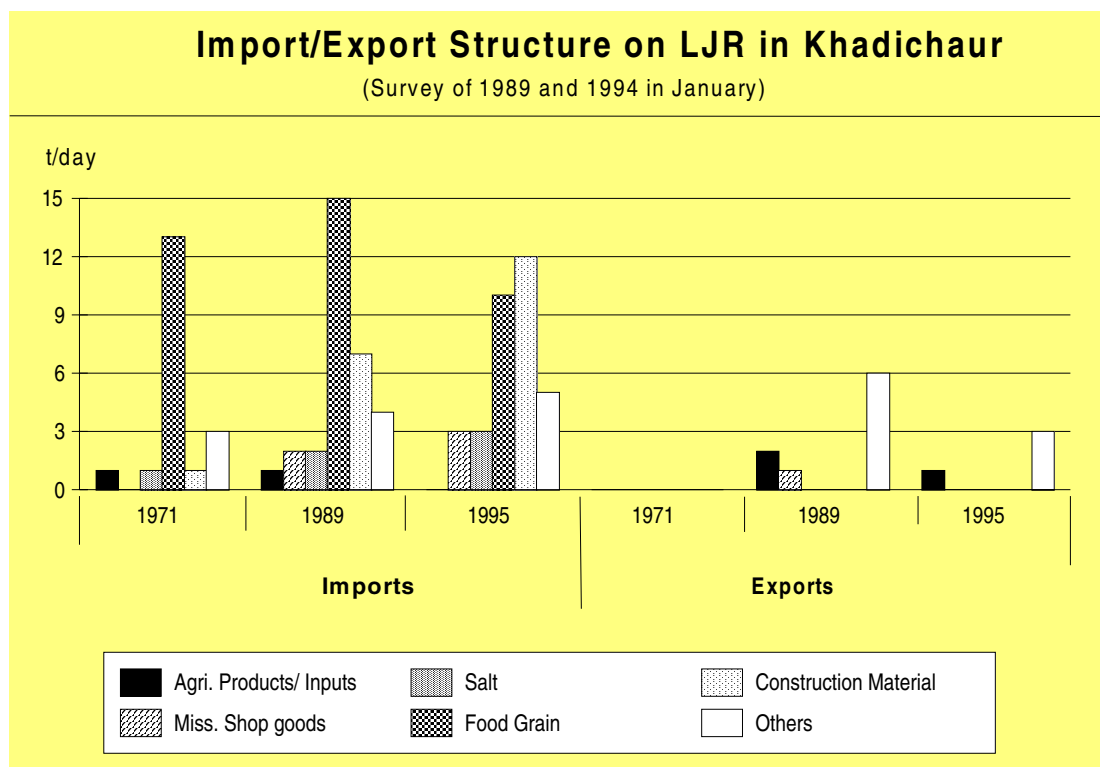


Figure 14: Overall import level (in terms of volume) has not dramatically increased on a per capita basis whereas the composition of goods traded changes: less food grain, more construction material and consumer goods (clothes, electronics etc.) imported. The exports dropped on a per capita basis and in absolute terms mainly due to the reduced extraction of magnesite in recent years.

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This report summarises the findings on the major social, economic and ecological changes during the past 20 years as observed in three monitoring studies conducted in the former area of the Integrated Hill Development Project and the Lamosangu-Jiri Road Project. The development investment has contributed to positive results in terms of improvement of standards of living and the mobility of local people. However, the road has raised aspirations towards urban living styles, increased the import of goods and created new dependencies. The overall sustainability of the physical infrastructure and of new agricultural technologies, skills and know-how appears to be questionable.