

## **ROAD CONSTRUCTION IN THE NEPAL HIMALAYA: THE EXPERIENCE FROM THE LAMOSANGU – JIRI ROAD PROJECT**



**Urs Schaffner**

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Cover photograph: Lamosangu Bridge 750 m.a.s.l r.h. lower corner on the Arniko Highway is the starting point of the road. With 15 hairpin bends, the road climbs 500 m. up a fragile slope to reach fairly stable alignment. Photograph by the author.

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## FOREWORD

Extreme difficulty of access - in varying degree of course for different parts of the mountains - is one of the dominant characteristics of mountain communities, and one of the most formidable constraints on the effective implementation of the essential programmes of progressive rural development in mountain regions. So it is throughout the hills and high mountain districts of Nepal. The building of all-weather roads through the mountains to improve access and to open remote areas to the benefits of modern technology is exceptionally costly and technically very complicated, particularly on steep and unstable slopes.

This Occasional Paper, which Urs Schaffner prepared while working as a short-term staff member of ICIMOD, describes a twelve-year task of building a 110-kilometre road through the 'fragile mountains' of the central Himalayas in Nepal. It attempts to identify and record, for the consideration of other road engineers in these mountains, the lessons of experience of this particular road project. It is not in any sense intended as an "evaluation" of this highly complex project as a whole. This would require a full assessment of social and economic factors (and objectives) well beyond the scope of this discussion which is strictly limited to the technical engineering aspects of road construction as encountered in the building of the road over the mountains from Lamosangu to Jiri over the years from 1974 to 1986.

This Himalayan task was undertaken by His Majesty's Government with very substantial capital aid and technical assistance from the Government of Switzerland. The Swiss aid project involved not only the transfer to the Himalayas of the technical knowledge of mountain road construction acquired over long experience in the Swiss Alps, but also the innovative adaptation of this engineering knowledge and experience to the special environmental (and socio-economic) conditions of the 'middle hills' of Nepal. In an understandable effort to maximise the social

and economic benefits of this new mountain road, HMG Nepal and the Swiss Government extended their collaboration into a related Integrated Hill Development Project (which is separately discussed in a review of Rural Development Projects in Nepal undertaken by Mr. B. B. Pradhan and published in 1985 as ICIMOD Occasional Paper No. 2). In the lengthy process of road construction, many useful lessons were learnt by all concerned. Though this Paper is based very much on the professional judgements of one of the Swiss engineers (albeit the Swiss Project Leader who spent some eight years working on this road project in the Nepal Himalaya), the whole enterprise was very much a team effort - on an international scale. I cannot emphasise this too strongly. Above all, a very warm and special acknowledgement must surely be given to the professional contribution of the staff at all levels of His Majesty's Department of Roads - most particularly to the Chief Engineer, the Regional Engineer and the Project Management staff (all Nepalese, of course) of the Lamosangu-Jiri Road Project. Their experience of road building in the special conditions of Nepal was undoubtedly an essential ingredient in the Project's successful completion.

And, whatever the technical and managerial contribution of the project professional staff both Nepalese and Swiss, we must not forget that the road was actually built by many thousands of sturdy and hard-working Nepalese labourers, skilled and unskilled: the great majority of them hill farmers compelled by the general poverty of hill agriculture to work "off-the-farm" to earn supplementary cash incomes. Their achievement in the most difficult conditions is there for all to see and use - a spectacular mountain road that will undoubtedly provide an essential and lasting stimulus to rural progress in a hitherto inaccessible region of central Nepal.

The engineering, economic and financial issues of road construction in the mountain are fundamental to any consideration of integrated mountain development throughout the Hindu



Kush-Himalaya. Each of the sovereign States of this Region has had important practical experience in this field of mountain infrastructure - whether it be with the Karakoram Highway in Pakistan, the Phuntsoling-Thimphu road in Bhutan, the Lhasa-Kathmandu Highway across the Tibetan Plateau and through the Nepal Himalaya, or the tremendous achievements of the Border Roads Organisation throughout the Indian Himalaya. Early next year, ICIMOD will organise an international 'expert meeting' of mountain highway planners and engineers to promote the exchange across national frontiers of professional knowledge and experience of mountain road construction. In the meantime,

we must express our thanks to Urs Schaffner for this particular and most useful contribution from the Nepal mountains to this international exchange.

Finally, we at ICIMOD are specially grateful to HMG Nepal Department of Roads, to the Government of Switzerland, and to the Swiss Association for Technical Assistance (SATA) in Nepal for assisting, facilitating and encouraging this ICIMOD publication, intended as a modest contribution to the welfare of all who live and work in the inaccessible hill communities of this mountain Kingdom and of its neighbours throughout the Hindu Kush-Himalaya.

Colin Rosser  
Director

## ACKNOWLEDGEMENTS

All the Swiss Technical Assistance personnel who worked at varying times and for varying periods on the Lamosangu-Jiri Road Project described in this ICIMOD Occasional Paper (or on the associated Integrated Hill Development Project) would wish me to express our very high appreciation of the warm, friendly and highly professional relationships that developed between the Swiss team and their Nepalese colleagues at all levels in a number of HMG Ministries. The construction of this mountain road through very rugged terrain in the middle hills of Nepal was an international working **partnership** in every sense.

I am sure that all involved, both Swiss and Nepalese, learnt a great deal about the technical and management problems of road construction in the Himalayas. The short paper that follows is an attempt to summarise the lessons learnt personally by just one of the engineers privileged to have been involved. It is hoped that it will be found useful by all engaged in similar enterprises in road building

in these splendid but difficult mountains.

I must add my thanks to my friends and colleagues on the staff of HMG Nepal Department of Roads for much professional assistance, and to my former employers in the Swiss Government and SATA in Nepal for permission to publish this personal assessment of our experience with the building of the Lamosangu-Jiri Road. It is important to state that I alone am responsible for the judgements made - which do not necessarily represent the views of any government or agency. A special word of thanks must be given to Dr. Krishnakumar Panday, formerly a staff member of the IHDP Project along the Lamosangu-Jiri Road, now on the professional staff of ICIMOD, for his many helpful and knowledgeable suggestions and comments. Finally, I am grateful to Dr. Colin Rosser, Director of ICIMOD, who encouraged me to write this Paper as a contribution to the international exchange of knowledge about an important aspect of integrated mountain development here in the Hindu Kush-Himalaya.

Urs Schaffner

## ABBREVIATIONS

CBR	California Bearing Ratio
DDC	Directorate of Development Cooperation
DOR	Department of Roads
HMG/N	His Majesty's Government of Nepal
IHDP	Integrated Hill Development Project
LJRP	Lamosangu-Jiri Road Project
mt	Metric Ton
ms	Mountain Side
vs	Valley Side
MWT	Ministry of Works and Transport
NC	Nepalese Currency
SATA	Swiss Association for Technical Assistance
SG	Swiss Government
WFP	World Food Programme

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