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HIS MAJESTY'S GOVERNMENT OF NEPAL

TRAIL SUSPENSION BRIDGE PROJECT

A

Consolidated

FINAL REPORT

on

SURVEY AND PRIORITY RANKING OF TEN TRAIL BRIDGES

Conducted

for

USAID - NEPAL

November - 1980

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FOREWORD

The Trail Suspension Bridge Project has been designed by USAID-Nepal in line with HMG/N's development objective of increasing the quality of life of the rural population of Nepal by providing necessary trail net work system in their areas of living.

In order to achieve this objective, the project concentrated on upgrading HMG/N's institutional capacity to improve the methodology for proper bridge site selection. To that end, USAID-Nepal has prepared an initial ranking scheme (IRS) which has been described in detail in the TSB-Project Paper.

This study was conducted to test the applicability and validity of this ranking scheme on ten bridge sites and on the basis of the experiences and knowledge gained during its application prepare a standard field site survey manual to be utilised by the SBD survey team in future bridge site selection.

This report presents the outcome of the ranking survey on the said bridges and provides the findings of the study as well as the reasons for introducing significant changes in the initial ranking scheme.

It also provides a report on the Instruction & Field Training Program conducted by EAST Consulting Engineers on the use of the draft site Survey Manual to conduct socio-economic site surveys of trail bridges in Nepal. The course was meant specially for enabling the SBD

Survey staff to properly utilise the Manual in future, and also for receiving constructive comments, if any, for the refinement of the Draft Manual.

A separate Chapter (Chapter 7) gives the details of the changes made in the Draft Manual. The report consists of two annexes. Annex 1 provides copies of notes of meeting of all important meetings held during the course of the study. Annex 2 is the site survey Manual in its final form. One hundred separate copies of this Manual have been submitted to USAID-Nepal as per the contract terms.

ACKNOWLEDGEMENT

EAST Consulting Engineers values greatly all the assistance and information provided by USAID-Nepal and SBD of His Majesty's Government during the study period and expresses sincere thanks to them.

Sincere thanks are extended to the Project Development Officer Mr. S.J. Freundlich, Mr. David J. Gaphart and other PDIS officials in USAID-Nepal, and to the former Project Manager Mr. A.P. Upadhyaya, and the newly appointed Project Manager Mr. A.K. Dhungana of SBD for their useful help and sincere advice during our assignment.

We wish to thank all the persons contacted who generously provided valuable information and help which have contributed substantially to this work.

We also wish to acknowledge our indebtedness to all the members of our study group for their active participation.

Last but by no means least, all the village informants of the individual project areas are worthy of our appreciation and thanks.

November, 1980

EAST CONSULTING ENGINEERS
K A T H M A N D U

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GROUP INVOLVED IN THE MANUAL PREPARATION AND INSTRUCTION & FIELD TRAINING PROGRAM

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SCOPE OF SERVICES

The scope of services, in general, envisaged the requirement of conducting the survey and ranking of ten specific proposed sites for suspension bridges, utilizing the Ranking Scheme developed in the Trail Suspension Bridge - Project Paper.

The services constitute four different phases which are as follows:

1. Provision of a numerical score of each of the ten specific bridge sites, utilizing the socio-economic Ranking Scheme developed in TSB-PP.
2. Provision of 100 copies of a brief, step by step, bilingual (Nepali/English) Field Manual for utilization by SBD personnel in future surveys and ranking of potential bridge sites.
3. Provision of instruction to SBD personnel so as to enable them to utilize the Ranking Scheme during future surveys of potential bridge sites.
4. Provision of 10 copies of the Final Report incorporating any recommendations for changes in the Ranking Scheme.
- Additional services requested and changes made during the study period
5. Provision of 45 copies of the Draft Manual in English. for distribution to SBD survey team during instruction and field training program.

6. Provision of 3 copies of the Draft Report on Instruction & Field Training Program.
7. Provision of 10 copies of the consolidated Final Report including all aspects of the study, instead of the Final Report mentioned in 4 above.

CHAPTER ONE

1. INTRODUCTION

The Trail Suspension Bridge Project represents a collaborative effort between HMG-Nepal and USAID-Nepal to upgrade the HMG/N's institutional capacity to rationally improve the national suspension bridge and trail network system.

Achievement of this purpose will be based on a sound process of surveying and ranking potential bridge sites prior to final site selection, design and construction of bridges by HMG/N's Suspension Bridge Division.

The initial designs of this ranking and surveying procedure are outlined in detail in the USAID - Trail Suspension Bridge Project Paper (TSB-PP) extract of which from pp 39 - 54 is given in Chapter 2 of this report.

USAID being desirous to refine and develop this initial ranking procedure, with the aim of incorporating them eventually into the standard operational Site Survey Manual to be utilized by the Surveyors of Suspension Bridge Division in future surveys and ranking of potential trail bridges in the country, entrusted EAST Consulting Engineers to conduct experimental surveys on ten pre-selected bridge sites. The bridge sites selected are of 700 series scattered from east to west of Nepal, as shown in the location map attached at the end of this report. The bridge sites and their location are as follows:

TABLE: T. 1 BRIDGE SITES AND THEIR LOCATION

S.No.	Series No.	Location Name	Rivers	Districts
1.	717	Leguwaghat	Arun Kosi	Bhojpur/Dhankuta
2.	718	Nibuwa Banchare	Nibuwa Khola	Dhankuta
3.	702	Bimere	Likhu Khola	Okhaldhunga/ Ramechhap
4.	719	Manthalignat	Tama Kosi	Ramechhap
5.	713	Benighat	Trisuli	Gorkha/Dhading
6.	705	Thumsikot	Madi Khola	Kaski
7.	708	Rimnaghat I	Thulo Bheri	Rukum/Jajarkot
8.	710	Janglaghat	Karnali	Achham/Surkhet
9.	712	Tikhatar	Seti	Doti
10.	706	Jaljibi	Mahakali	Darohula/and India

The objective of the study is mainly twofold. First, to derive weighted scores for all ten bridge sites and rank them in order of priority by applying the initial ranking procedure (see Chapter 2) second, based on the field experience and knowledge develop a standard bilingual site survey Manual (see Annex 2 of this report) to be used in future surveys and ranking of bridge sites by SBD's survey teams.

This is a consolidated final report of the whole study and includes the ranking of all 10 bridges based on their weighted scores. Chapter 4 provides the numerical score for each bridge site and their ranking in order of priority. Apart from some interpretations and minor changes made in the initial ranking procedure prior to the field study, all calculations and methods to derive the weighted score for bridge sites are completely based on the initial ranking scheme. The minor changes (as given in Chapter 3 of this report) were discussed and approved by USAID-Nepal prior to the beginning of field investigations.

A separate Chapter 5 of this report is also being presented which precisely describes the findings of the field study and reasons for making significant changes in the initial ranking scheme. The changes were proposed based on the experience and knowledge gained during the field applications of the initial ranking procedure.

Based on the revised ranking scheme a draft site survey Manual was developed and compiled by EAST in July, 1980. An instruction course and field training program was also organised by EAST to deliberate upon the draft Manual. Chapter 6 provides a detail account of the deliberation and about the field training program. Some important points were raised by the participants, in this instruction course, and based upon the outcome of this training program some minor but important additions and alternations (see Chapter 7) were incorporated in the preparation of the final Manual which is attached at the end of this report.

CHAPTER TWO

INITIAL RANKING SCHEME (IRS) - EXTRACTS FROM TSB/PROJECT PAPER

CHAPTER TWO

2. INITIAL RANKING SCHEME (IRS)* I

PART III C. Site Selection Procedure and Examples of Application

General Methodology

Given the large number of discrete sub-projects involved in the trail suspension bridge project and the desire to take social benefits into account, standard quantitative analysis which compares alternative projects in terms of present value, rate of return or other similar measures, is neither financially nor technically feasible. The project selection procedure which has been devised for the suspension bridge program minimizes these problems by focussing on a set of factors which are easier to measure, and can be expected to correlate with the ultimate economic and social benefits being sought. In addition to the advantage of ~~expediency~~, the procedure which has been developed also affords an advantage of flexibility since it makes it possible to take into account factors of an intangible and qualitative nature which would remain outside the scope of normal quantitative analysis.

The relative importance to be given to each factor must, however, be arbitrarily decided; and the final score or value for each sub-project will depend on the choice of factors and relative weights. It is important to recognize, therefore, that the final value assigned to each sub-project has no significance other than to provide a comparison to other sub-projects which have been valued on exactly

* Extracts of Page 39 to Page 54 from USAID Trail Suspension Bridge - Project Paper (367-0119), August 1979.

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the same basis. This limitation might suggest that any such ranking procedure should be kept very simple and used only as a pre-screening device for selecting those projects which can then be subjected to more intensive quantitative analysis. In the present case, however, given the extensive study and analysis that has already been carried out with respect to suspension bridge in Nepal, the nature and importance of the benefits are much better known. A ranking system for the suspension bridge has therefore been developed which is sufficiently comprehensive to serve as a final site selection procedure rather than simply an initial screening device.

As shown in the attached table, the ranking procedure consists of five components: (1) the criteria or set of factors to be examined for each bridge site; (2) the respective units, e.g., rupees, man-days, tons, etc., by which each factor can be measured; (3) the range of values for each factor's measurement unit; (4) a common rating scale; and (5) the factor weights which determine the relative importance of each factor in the overall score. The criteria, which are discussed in detail below, must be arbitrarily chosen, as must be the respective weight each criterion or factor is given in the total score. The measurement units, range of values and common rating scale are means by which each criterion or factor can be translated into terms of a common denominator and added together for a final score. Mechanically, the value actually observed in each case is compared to the range, converted into percentage terms and then multiplied by the factor weight.*

* See next page

RANKING SCHEME FOR TRAIL SUSPENSION (SED) BRIDGE

CRITERIA	Measurement Unit	Range of Factor Values	Common Rating Scale-Percent	Factor Weight
I. <u>Economic Factors</u>				(.65)
1. Cost	Total financial cost less portersage	Rs.2,000,000 to Rs.200,000	0-100	.25
2. Time savings for through traffic	Man-days per annum	0 to 10,000	0-100	.25
3. Local production of basic food crops	Tons per annum	0 to 4,000	0-100	.10
4. Major local exports (Cash crops/ghee/cottage industry)	Rupees per annum	0 to 3,000,000	0-100	.25
II. <u>Social Services</u>				(.20)
5. Local population served	No.of persons within 10 km of bridge	5,000 to 40,000	0-100	.05
6. Improved access to health facilities	No.of additional persons within 3 hour walk of facility (Five Hrs. for Hosp.)	0 to 10,000	0-100	.05
7. Improved access to education facilities	No.of additional school age children within 2 hr. walk of facility	0 to 1,500	0-100	.05
8. Improved access from administrative facilities	No.of additional persons within 4 hours of nearest administrative center	0 to 16,000	0-100	.05

CRITERIA	Measurement Unit	Range of Factor Values	Common Rating Scale-percent	Factor Weight
<u>III. Other Factors</u>				(0.15)
9. accident prevention	Reported drownings during past 5 years	0 to 10	0-100	.05
10. Local support of project	Evidence of past self-help and likelihood of local trail and bridge maintenance	high medium low	100) 50) 0)	.05
11. Land ownership	percent of small farms (1 ha. or less) within 1 km of bridge	0 to 100	0 to 100	.05
12. Presence of integrated rural development program	Inclusion of bridge site in rural dev. program area	Yes planned within 2 yrs. No	100)) 50) 0)	.02

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As an example, population within the local area of influence of each bridge site has been chosen as one of the factors and assigned a weight of .05. If, in the case of bridge site A, local population is estimated at 25,000 which is near the lower end of the range, this site's score on the population criterion is 33 percent and its weighted score for the population criterion is $(57(.05)=2.9$. If, in the case of bridge site B, local population is estimated at 35,000, site B obtains a score of 86 percent for the population criterion and a weighted score for population of 4.3. When the weighted scores for each of the other factors are similarly calculated, the values can then be totalled to give an overall score for each bridge site.

* The conversion formula is actual value observed less minimum value of the range, divided by the difference between the maximum and minimum value of the range. In the case of the cost factor, however, for which a higher amount constitutes a disadvantage, the conversion formula must be modified. In this case, the cost of particular bridge should be subtracted from the maximum of the range and the difference then expressed as a percentage of the difference between the maximum and minimum of the range.

Ideally, all potential bridge sites should be surveyed and then the range of values for each criterion established to fit the actual minimum and maximum values observed. This would provide the broadest dispersion of weighted scores and maximize the differentiation among the total number of bridges. However, as a practical matter this would be too time consuming. As a realistic compromise, it is therefore proposed that once a dozen or so sites have been surveyed, the tentative range of values be readjusted to fit the actual range of observed values.

Criteria. Altogether twelve criteria or factors have been selected for the evaluation of each bridge site. Some of the criteria, e.g., bridge cost, are readily quantifiable and specifically represent the factor which should be taken into account. Other criteria, such as access to health facilities, serve as proxies for what one would actually like to measure in this case, health improvement. Since the practical difficulties of evaluating health improvement are too great, a simpler proxy measure has been chosen based on the assumption that a reduction in travel time will induce more people to utilize health service posts and that the treatments provided will be of positive benefit. The only real limit to the number and variety of criteria to be taken into account is the practical consideration of finding a useful measure which can be used to differentiate the degree to which the factor is present or operative at each potential bridge site. The twelve criteria with their relative weights are outlined as follows:

(1) Cost (C.25). All other things being equal, the site selection process should obviously favor those crossings which can be spanned at less expense. The importance of this factor is such that it is weighted to constitute 25% of the overall score for each bridge site. Of the total financial cost of each bridge, portorage of materials to the site is the cost component which varies the most, and in the case of more remote sites, portorage can constitute as much as 50% of the total cost of construction. Since the more remote sites will tend to comprise smaller and less advantaged populations, the portorage component has been eliminated from the cost comparison on grounds of social-equity. The range of values for the cost factor has been set provisionally at Rs.200,000 to Rs.2 million.

(2) Time saving for through traffic (Q.25). Through traffic is defined to include all travellers for whom the origin and the destination of travel lie outside the local area of influence of the bridge site. Since the majority of proposed bridges are expected to be on existing trails, the economic importance of through traffic should, in most cases, be substantially greater than that of local traffic. This criterion is therefore also given a weight of 25% in the overall score. The time saving for through traffic is calculated as the product of total crossings multiplied by the average delay which occurs in the absence of the bridge. Although conceptually simple, actual derivation of the traffic and delay factors constitutes the most difficult part of the whole site selection procedure. The traffic estimate should be based on a traffic count

supplemented by extensive local interviewing to adjust for seasonal variations. The average delay estimate similarly requires extensive local interviewing in conjunction with a high degree of educated judgment to determine the next best alternative means of crossing. In the simplest case, this will be an existing ferry or ropeway for which waiting time may vary from an hour up to several days depending on traffic volume and river conditions. In other cases, delay may amount to as much as a week as a result of lengthy detours during periods in which the crossing is completely unfordable. Conversely, during any period in which the crossing is fordable by foot, delay should be treated as being negligible and total time savings counted as zero, regardless of how high traffic flow may be. Similarly, delay and time savings should be counted as zero irrespective of the crossing delay during any period in which the trail may be impassable, due for example, to heavy rains or snow.*

* The special case in which a trail realignment may be planned which would eventually divert traffic away from the crossing should be taken into account by adjusting total time savings downward in proportion to the remaining useful life of the bridge as opposed to the normal expected life of 30 years. A similar adjustment should also be made for criterion 9 concerning accident prevention.

to adequately reflect such variations, traffic and delay figures should be estimated on a month to month basis, and even on a weekly basis during periods of peak traffic or peak delay.

(3) Local production of food crops (.10). Existing production of basic food crops in the area of influence of the bridge site is highlighted as a factor since this is the major economic activity in the hill area and warrants priority attention given the present trend of declining yields. As discussed in the overall economic analysis, major increases in production depend on complementary efforts that might be carried out in conjunction with the improved crossing. Even in the absence of such investments, however, the crossing improvement can provide some stimulation in terms of improved access to purchased inputs and marketing of output. Given the very substantial amount of survey work which would be required to project complementary investments and resultant crop increases, existing production is taken as a proxy of the potential for agricultural improvement. For purposes of comparison, the agricultural area of influence is arbitrarily defined as that encompassed within a ten kilometer radius from the bridge site. As a general presumption, only the area on the side of the river farthest from the nearest principal market center should be considered. Thus the maximum area would be defined by $\frac{1}{2}(\pi r^2)$ or approximately 16,000 hectares. The second step is to estimate within this total area the amount of arable land. For the entire hill area, the ratio of arable land to total land is on the order of 1:16. Each bridge site may of course vary substantially from this average. Aerial photography would provide the easiest means of

assessing arable land and should be used when available from the Canadian photographic mapping mission. Otherwise, the assessment must be based on a combination of local interviewing and data available at panchayat and/or district headquarters. The third step, on the basis of arable land, is to estimate production, also through local and panchayat contacts. Implied yields above 4 tons per hectare indicate that further survey work is required to re-check the data since average yields in the hill area are on the order of 2.0 to 2.5 tons per hectare.

(4) Major local exports (.05) Simulation of local exports can be a significant benefit ensuing from ~~improved crossing facilities~~. Although the same could be said of imports, the latter can be assumed to be sufficiently limited by ~~income constraints~~ that only exports from the area of influence merit special attention. The export estimate also serves as a rough proxy for possible local employment effects. The first step in estimating exports is to determine the three or four main commodities, if such exist, which are being produced locally and marketed outside the area. For each commodity, a tonnage estimate must then be made on the basis of information gathered during the traffic count in conjunction with local interviews. The third step is to convert the weight estimates into monetary terms. Although actual commodity values may vary significantly both seasonally and geographically, the same set of prices should be used for all bridge sites. These prices should be derived from national average retail price data, rounded off and expressed as averages: e.g., paddy

and potatoes Rs.1.75/kg; wheat, maize, millet Rs.2/kg; fruit and vegetables Rs.3/kg; herbs and spices Rs.5/kg; ghee Rs.30/kg; cottage industry products Rs.40/kg.

(5) Local population served (.05). Local population within the area of influence has been included among the set of criteria as a general measure of the potential local impact of bridge construction on all spheres of activity: economic, political, social and cultural. The area of influence is again arbitrarily defined in terms of a 10 km radius; but in order to provide a better reflection of the potential social and cultural interchanges between the two sides of the crossing, the whole 10 km circle should be included. Population within the area may be estimated from local panchayat census data and, if available, from aerial reconnaissance photographs (using a grid/dwelling count technique). The latter would also provide the best means for estimating improved access to health, education and administrative facilities as discussed under the following three criteria.

(6) Improved access to health facilities (.05). Several studies that have been carried out in Nepal indicate that travel time is a key factor in the frequency of utilization of rural health facilities. Analysis of data on attendance at hospitals, health posts and ayurvedic centers shows that the majority of patients live within a maximum of three hours walk from the facility. This time limit is therefore adopted as the parameter for purposes of assessing this criteria.

Since distance travelled within three hours will vary from site to site depending on the difficulty of the terrain, the first step is to convert time into distance, e.g., three hours equals 8, 10 or 12 km according to local conditions. Second, the distance from the local health facility to the crossing is deducted as is the distance value of the average delay which has been estimated for the crossing. The remainder, if positive, establishes a perimeter on the far side of the crossing which comprises the population presently within the three hour limit. Finally, a second perimeter is drawn beyond the first to represent the additional distance value of the time delay to be eliminated by the bridge. The estimated population within the two perimeters is the value which is then used to represent improved access to health facilities as a result of the bridge. If a hospital is used as the focal point, the time factor should be increased to 5 hrs. If aerial photos are not available, the average population density of the area from panchayat census data should be used in the calculations.

(7) Improved access to education facilities (.05). The benefit of an improved crossing in terms of access to education is similar to that for health and the same method should be used to estimate the number of additional potential beneficiaries. However, even though many children walk extraordinary distances to attend daily schools, a two hour distance limit should be imposed in order to deal only with the area for which the influence of the bridge can be expected to be reasonably significant. Only primary (grade 1 through 3) and lower

that for health and education. However, the perimeter maximum is defined as four hours travelling distance, the longer time being justified in this case on grounds that the travel is being performed as part of the official's duties rather than on personal initiative. Any overlapping area should be excluded as in the case of education and health facilities.

(9) Accident prevention (.05). Although accidents as a result of crossing unbridged or poorly bridged rivers do not appear to be any more significant than most of the other hazards confronted in rural Nepal life, there are periodic reports of drownings as well as loss of livestock and goods. Given the isolation of hill and mountain areas such occurrences may in fact be much more frequent than is commonly known. Each site survey should investigate the occurrence of drownings over the past five years to provide a representative period. An average number should be taken in the event that conflicting reports on accidental drownings appear equally knowledgeable.

(10) Local support of the project (.05). The degree of local support of the project can provide an excellent indication of the importance of the project to the area and an indirect measure of the economic and social benefits it can be expected to generate. Local financial contribution to construction costs and/or commitment of voluntary labour would be readily quantifiable measures of local support but would introduce an impractical consideration given the

secondary (grade 4 through 7) schools should be considered. This age group comprises approximately 25% of Nepal's population and unless local panchayat census data suggests a higher or lower proportion 25% should be used to estimate the number of school age children out of the total population within the additional area of influence. Given the fact that there are many more schools than health facilities, a further test should also be applied in order to avoid counting as potential beneficiaries those children who are already within a two hour distance of similar school. If, for example, all of those on the far side of the crossing who are brought within two hours of the school taken as the focus are already within a two hour range of a school on their own side of the river, the education factor would be given a zero score for this particular bridge site.

(8) Improved access from administrative facilities (.05). The impact of a bridge with respect to administrative services is more difficult to specify given the variety of services in question and the differences in the real or perceived need for such services. If the question is viewed in terms of travelling to an administrative center, the choice of an appropriate time-distance factor is too uncertain to provide a useful point of comparison. Accordingly, for this criterion, the concept is reversed and attention focussed on travel from the relevant administrative center to the area of influence. What is being gauged in this case then is the increased access to the population on the part of officials located at the administrative center: rural development advisors, agricultural extension agents, police, etc. Measurement of this criterion is exactly the same as

technical and manpower requirements of SBD bridges and the private contracting procedures which have been adopted for construction. Therefore the criterion of local support is based on a judgement on the part of the survey team with respect to the likelihood of local trail and bridge maintenance. In arriving at the assessment, particular attention should be given to evidence of past efforts on the part of the nearest panchayats or villages to improve and maintain other local infrastructure. Measurement of local support is then expressed in terms of three alternatives: strong, medium or poor.

(11) Land ownership (.03). The degree of concentration or distribution of land ownership has been included as a criterion on grounds of social-equity and the fact that the advantages of an improved crossing can lead to increased land values, especially in the immediate vicinity of the crossing. Using one hectare as the definition of small holding, it is quite likely that all sites will score the same value for this criterion given the high degree of land fragmentation in the hill area. In this case, the effect of this criterion on the overall score for each site will be neutral. However, in some cases, there may be a higher degree of land concentration and the percentage of small farmers should be graded downward accordingly. As a practical simplification, only the area within one kilometer of the bridge site need be considered since the area closest to the bridge is where the impact on land values and economic rent will be the greatest. The question to be considered is how much of this area (160 hectares) is owned by individuals owning one hectare or less.

(12) Presence of integrated rural development program (.02).

Whether or not the bridge site falls within an area covered by a major, organized rural development program has been included as a criterion on grounds of the potential interrelationships that can exist between the improved crossing and other rural development activities that may help to promote many of the potential benefits inherent in the bridge. Measurement of this criterion is limited to a simple three possibility response (yes/no/planned within two years) in order to avoid the difficulties involved in a subjective comparison of the comprehensiveness and effectiveness of different rural development programs.

CHAPTER THREE

3. MINOR CHANGES MADE IN 'IRS' PRIOR TO FIELD SURVEYS

During the development of Interview Schedules in February 1980, it was observed that some minor changes in the Initial Ranking Schedule developed in the TSB-Project Paper were necessary and that some clarification on the interpretations of the criteria was necessary prior to the field surveys.

Main issues discussed and conclusion reached were the following:

1. Since construction cost is an important decision variable in the choice of suspension bridges, it was decided that if the construction cost of a particular bridge exceeded the maximum factor range of Rs 2,000,000/- a negative value should be assigned to such a bridge.
2. In the case of time savings, no negative values were assigned even if, in some cases, the bridge construction resulted in considerable detour i.e. addition of travel time instead of time savings. Also, while calculating the time saving criterion, delay time should be based on a 10 hour day.
3. The influence area should be delineated on the basis of a 10 Km walking distance instead of a 10 Km radius circle drawn on the map. It was observed that the 10 Km map radius not only resulted in the inclusion of very large area into what may be called an

effective local influence area but it also provided greater possibilities for the existence of an alternate crossing facility in the nearby not permitting the given area to be totally represented as the local influence area of a given bridge. Thus it was thought more logical to take a 10 Km walking distance limit for the local influence area of the bridge, which then eventually would narrow down the map radius. A 6 Km map radius was arbitrarily assumed to encircle a 10 Km walking distance from the given bridge.

4. On the case of land ownership criterion a limit of $\frac{1}{2}$ hectare instead of 1 hectare was considered more realistic to denote smallness of farm per family. It was reported that the National Planning Commission figure was also $\frac{1}{2}$ hectare, which is justified because of the high degree of land fragmentation observed in the hill areas of Nepal. To be more reasonable it was decided that the closeness of the area to the bridge site where the impact of land value and rent increases should be narrowed down to a circle of $\frac{1}{2}$ Km radius instead of 1 Km radius.
5. Although accidents as a result of crossing unbridge rivers also cause loss of livestock and goods, its accurate assessment was thought to be practically impossible. Thus, no consideration was given to such loss and only drownings resulting in the loss of human lives, although vaguely determined by field enquiries, were to be considered.

6. In serving values for local administrative units it was decided that the factor weight should be based on the number of different kinds of administrative units present within a 4 hour distance limit. For example, if only 1 effective administrative unit is reported, it will secure 1 percent score, if 2, 2 percent and so on up to a limit of 5 percent for 5 units and more.
7. In cases where rivers over which the bridge is being constructed act as the boundary of two districts, the movement of officials of one district to the other district (except for bank and post office facilities) for official purposes can very easily be considered nil. Thus, in such cases the effect of administrative units except for bank and post offices, should be taken as nil.

These considerations and minor changes were discussed with USAID-Nepal and were approved by them prior to the start of field studies. A letter of confirmation dated February 22, 1980 from USAID was received.

CHAPTER FOUR

RESULTS OF SURVEY AND PRIORITY RANKING OF TEN TRAIL BRIDGES

CHAPTER FOUR

4. RESULTS OF SURVEY AND PRIORITY RANKING OF TEN TRAIL BRIDGES

Table T-2 shows the results of priority ranking. Detailed weighted scores are given in Table T-3. In the TSB-PP, the factors are divided into three categories - (a) Economic factors (65%), (b) Social factors (20%), and (c) Other factors (15%). In table T-4, Land Ownership and Presence of IRD Program included in other factors of the TSB-PP are grouped with the Economic factors, whereas, Accident Prevention and Local Support are grouped with the Social factors, thus, setting up only two major factors i.e. economic and social. A study of Table T-4 shows that economic factors play the major role in deciding the overall priority ranking of the bridges. The only exception to this is the Tikhatar Bridge, which is ranked in number three position because of the social factors. Due to the effect of social factors the position of other bridges does not seem to vary much in the overall ranking.

German Consult Study on Trail Suspension Bridge Feasibility (cost-benefit) has grouped the studied bridges into three categories in order of economic priority. The bridges at Jungalaghat and Manthalighat fall under high priority, the bridge at Madi Kholā falls under medium priority, whereas the bridges at Benighat and Leguwaghat come under low priority. Almost the same priority ranking was obtained in the present study also. This indicates that the present study methodology is also primarily dominated by economic factors as in the case of cost-benefit analysis.

Moreover, a study of Table T-3 shows that the cost factor is the dominant economic factor in the total weighted score of each bridge. Weighted score of each bridge due to cost factor is almost 50% of the total weighted score, the only exception being the Jungalaghat and Leguwaghat.

TABLE - T.2 : RESULTS OF PRIORITY RANKING

Bridge Name	Bridge No.	River	Span in meters	Type of Bridge	Weighted Score
1. Manthali Ghat	719	Tama Koshi	124.60	Suspension	45.83
2. Jungla Ghat	710	Karnali	143.80	Suspension	45.13
3. Tikhatar	712	Seti	98.20	Suspension	40.18
4. Madi Khola (Thumsikot)	705	Madi Khola	56.60	Suspended	35.26
5. Bimire	702	Likhu Khola	104.60	Suspended	33.75
6. Nibuwa Banchare	718	Nibuwa Banchare	69.60	Suspension	32.56
7. Beni Ghat	713	Trisuli	151.40	Suspended	28.39
8. Rimna Ghat - I	708	Thulo Bheri	88.60	Suspension	27.85
9. Jaljibi Ghat	706	Mahakali	182.60	Suspended	21.96
10. Leguwa Ghat	717	Arun	310.80	Suspended	10.03

TABLE T.3 DETAILED WEIGHTED SCORES

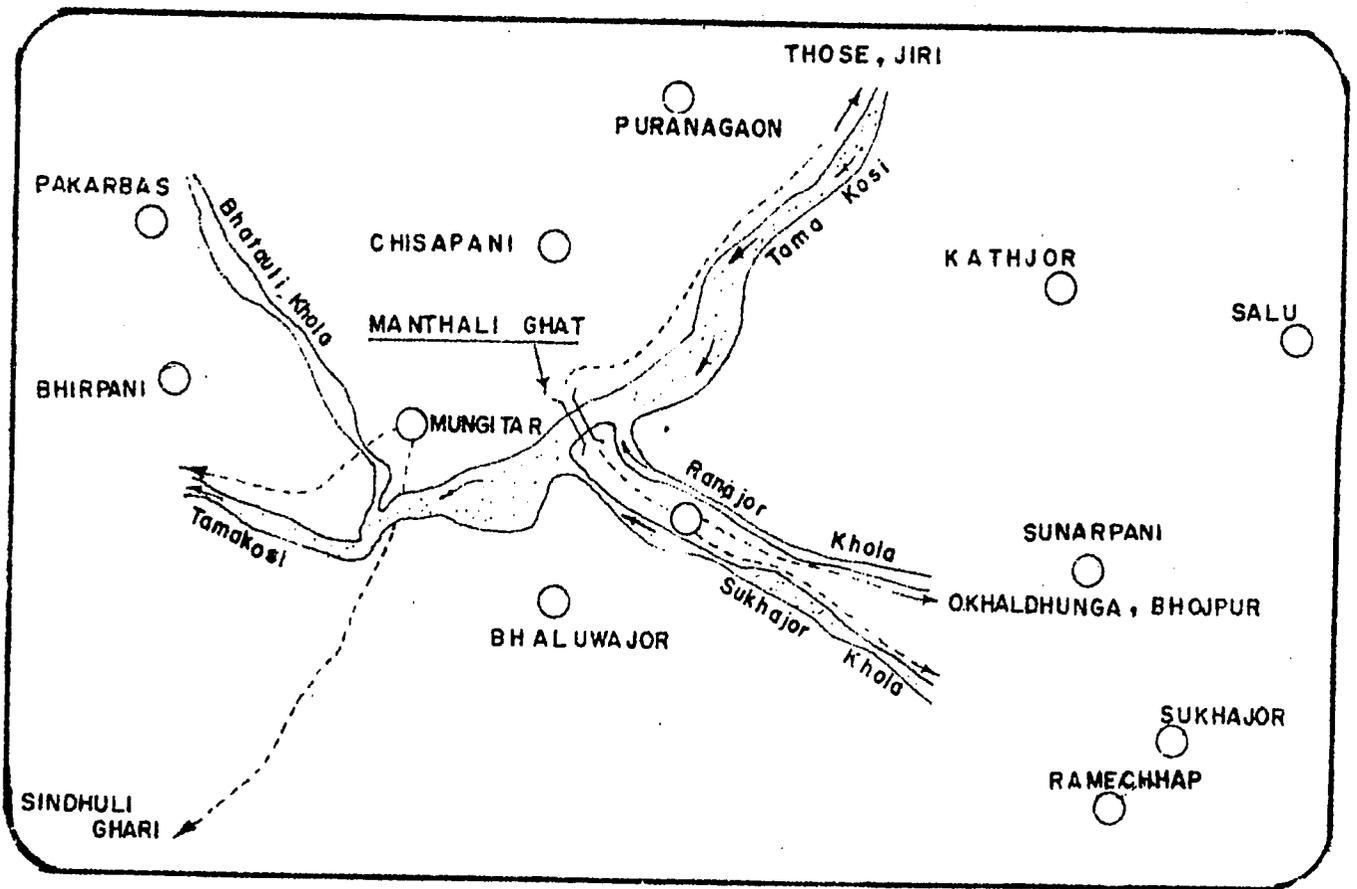
CRITERIA Nos.	LEGUWA 717	NIBUWA 718	BIMIRE 702	MANTHALI 719	BENIGHAT 713	MADIKHOLA 705	RIMNAGHAT 708	JANGALA 710	TIKHATAR 712	JALJIBI 705
1. Cost	-5.00	17.40	18.72	18.93	15.00	21.75	15.83	5.50	16.81	11.71
2. Time	0.64	0.00	1.20	6.40	1.34	0.78	1.15	25.00	1.10	0.00
3. Crops	3.78	4.00	3.57	5.12	1.55	3.76	0.54	1.03	1.76	0.50
4. Exports	0.96	2.01	1.31	1.20	1.00	0.44	0.82	0.86	0.71	1.34
Total of Economic Factors	0.38	23.41	24.80	31.65	18.89	26.73	18.34	32.39	20.38	12.95
5. Population	2.41	2.85	2.35	4.35	2.70	2.16	0.76	2.74	3.32	1.56
6. Health	0.13	0.00	0.99	0.93	0.96	0.42	0.00	0.00	0.00	0.00
7. Education	0.52	0.00	1.65	3.72	0.99	0.99	0.75	0.00	2.51	0.00
8. Admn.	0.17	0.00	0.50	0.55	0.33	0.11	0.00	0.00	0.94	0.00
Total of Social Factors	3.23	2.85	5.49	9.55	4.98	3.68	1.51	2.74	6.80	1.56
9. Accidents	0.00	0.00	0.00	0.00	1.00	1.00	0.50	0.00	4.00	1.00
10. Local Support	2.50	2.50	2.50	2.50	2.50	2.50	2.50	5.00	5.00	2.50
11. Land	1.92	1.80	0.96	2.13	1.02	1.35	3.00	3.00	3.00	1.95
12. IRD	2.00	2.00	0.00	0.00	0.00	0.00	2.00	2.00	1.00	2.00
Total of other Factors	6.42	6.30	3.46	4.63	4.52	4.85	8.00	10.00	13.00	7.45
G. TOTAL	10.03	32.56	33.75	45.83	28.39	35.26	27.85	45.13	40.18	21.96

TABLE - T.4 : INFLUENCE OF ECONOMIC & SOCIAL FACTORS ON PRIORITY RANKING

Overall Ranking (A+B = 100)	Ranking based on Economic Factors only (A = 70)	Ranking based on Social Factors only (B = 30)	Remarks
1. Manthali Ghat (45.83)	1. Jungla Ghat (37.39)	1. Tikhatar (15.80)	<p><u>A. Economic Factors (70)</u></p> <p>1. Cost (25)</p> <p>2. Time Savings (25)</p> <p>3. Local Food Production (10)</p> <p>4. Local Exports (5)</p> <p>5. Land Ownership (3)</p> <p>6. Presence of IRD Programme (2)</p> <p><u>B. Social Factors (30)</u></p> <p>7. Local Population Served (5)</p> <p>8. Improved Access to Health Facility (5)</p> <p>9. Improved Access to Education Facility (5)</p> <p>10. Improved Access to Adm. Facility (5)</p> <p>11. Accident Prevention (5)</p> <p>12. Local Support (5)</p>
2. Jungla Ghat (45.13)	2. Manthali Ghat (33.78)	2. Manthali Ghat (12.05)	
3. Tikhatar (40.18)	3. Madi Khola (28.08)	3. Beni Ghat (8.48)	
4. Madi Khola (35.26)	4. Nibuwa Banchare (27.21)	4. Bimire (7.99)	
5. Bimire (32.75)	5. Bimire (25.76)	5. Jungla Ghat (7.74)	
6. Nibuwa Banchare (32.56)	6. Tikhatar (24.38)	6. Madi Khola (7.18)	
7. Beni Ghat (28.39)	7. Rimna Ghat - I (23.34)	7. Leguwa Ghat (5.73)	
8. Rimna Ghat - I (27.85)	8. Beni Ghat (19.91)	8. Nibuwa Banchare (5.35)	
9. Jaljibi (21.96)	9. Jaljibi (16.90)	9. Jaljibi (5.06)	
10. Leguwa Ghat (10.03)	10. Leguwa Ghat (4.30)	10. Rimna Ghat - I (4.51)	

29

Bridge Name MANTHALI GHAT Bridge No 719
 Type SUSPENSION Span in meters 124.60
 Location MANTHALI River TAMA KOSI
 Village Panchayat BHALUWAJOR (Left Bank) CHISA PANI (Right Bank)
 District/s RAMECHHAP (Left Bank) RAMECHHAP (Right Bank)
 Present Crossing Facility BOAT (Dry Season) DETOURING FROM BANDRE BRIDGE (Wet Season)
 1 inch = 1 mile Map No. 72 I/3 Co-ordinator (N) 27°23.0' (E) 86°02.4'



Sketch showing Bridge site location

PRIORITY RANKING NO.

1

Total Numerical Score

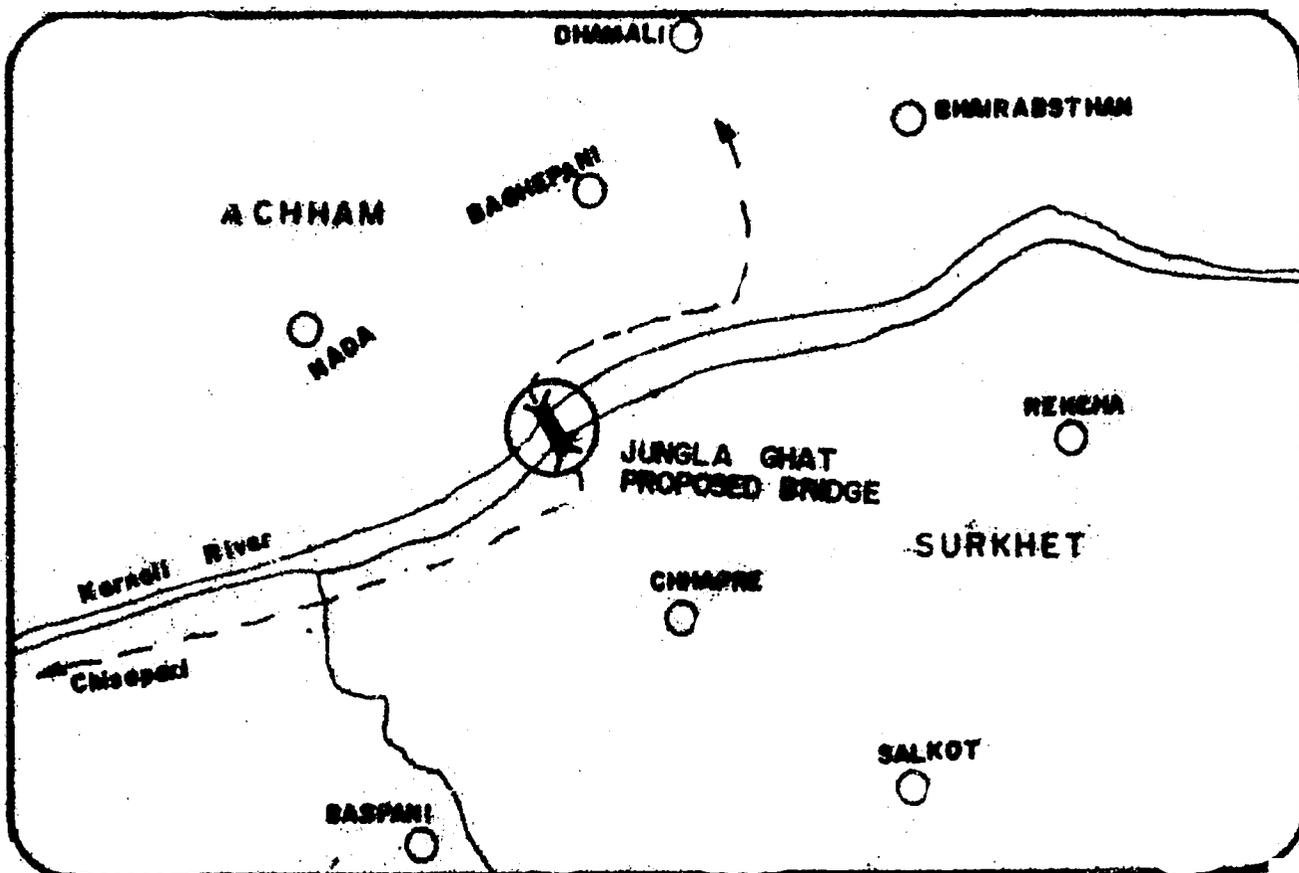
45.83

CRITERIA/FACTORS	Measurement Unit	Actual Value observed or calculation	Factor Range	CRV %	FW	WV
1. Cost	Financial cost minus Transportation cost in Rs.	6,37,578	2,00,000 -20,00,000	75.69	0.25	18.93
2. Time Savings	Mandays/annum	2,558	0-10,000	25.58	0.25	6.40
3. Local Crops	Tons/annum	2,046	0- 4,000	51.15	0.10	5.12
4. Local Exports	Rs./annum	7,19,313	0-30,00,000	23.98	0.05	1.20
5. Local Populations..	No. of Persons in the influence area	35,466	5,000 -40,000	87.05	0.05	4.35
6. Improved Access to HF	Additional Benifitted population	1,850	0-10,000	18.50	0.05	0.93
7. Improved Access to EF	Additional Benifitted students	1,116	0- 1,500	74.40	0.05	3.72
8. Improved Access from AF	Additional Benifitted persons	8,821	0-16,000	55.13	0.05	0.55
9. Accident Prevention	Reported drownings in past 5 years	Nil	0- 10	0.00	0.05	0.00
10. Local Support	Evidence of past self-help	Medium -50%	0%,50%,100%	50.00	0.05	2.50
11. Land Ownership	Percent of small farms	71%	0% -100%	71.00	0.03	2.13
12. Presence of IRD	Inclusion of Bridge site in IRD Program Area	No - 0%	0%,50%,100%	0.00	0.20	0.00

CRV : Common Rating ValueHF : Health FacilityFW : Factor WeightsEF : Education FacilityWV : Weighted ValueAF : Adm. Facility

TOTAL WEIGHTED SCORE: 45.83

Bridge Name JUNGLA GHAT Bridge No 710
 Type SUSPENSION Span in meters 143.80
 Location JUNGLA GHAT River KARNALI
 Village Panchayat CHHAPRE (Left Bank) BAGHEPANI (Right Bank)
 District/s SURKHET (Left Bank) ACHHAM (Right Bank)
 Present Crossing Facility BOAT (Dry Season) CABLE WAY (Wet Season)
 1 inch = 1 mile Map No. 62 $\frac{H}{5}$ Co-ordinator (N) 28°54.2' (E) 81°23.4'



Sketch showing Bridge site location

PRIORITY RANKING NO.

2

Total Numerical Score

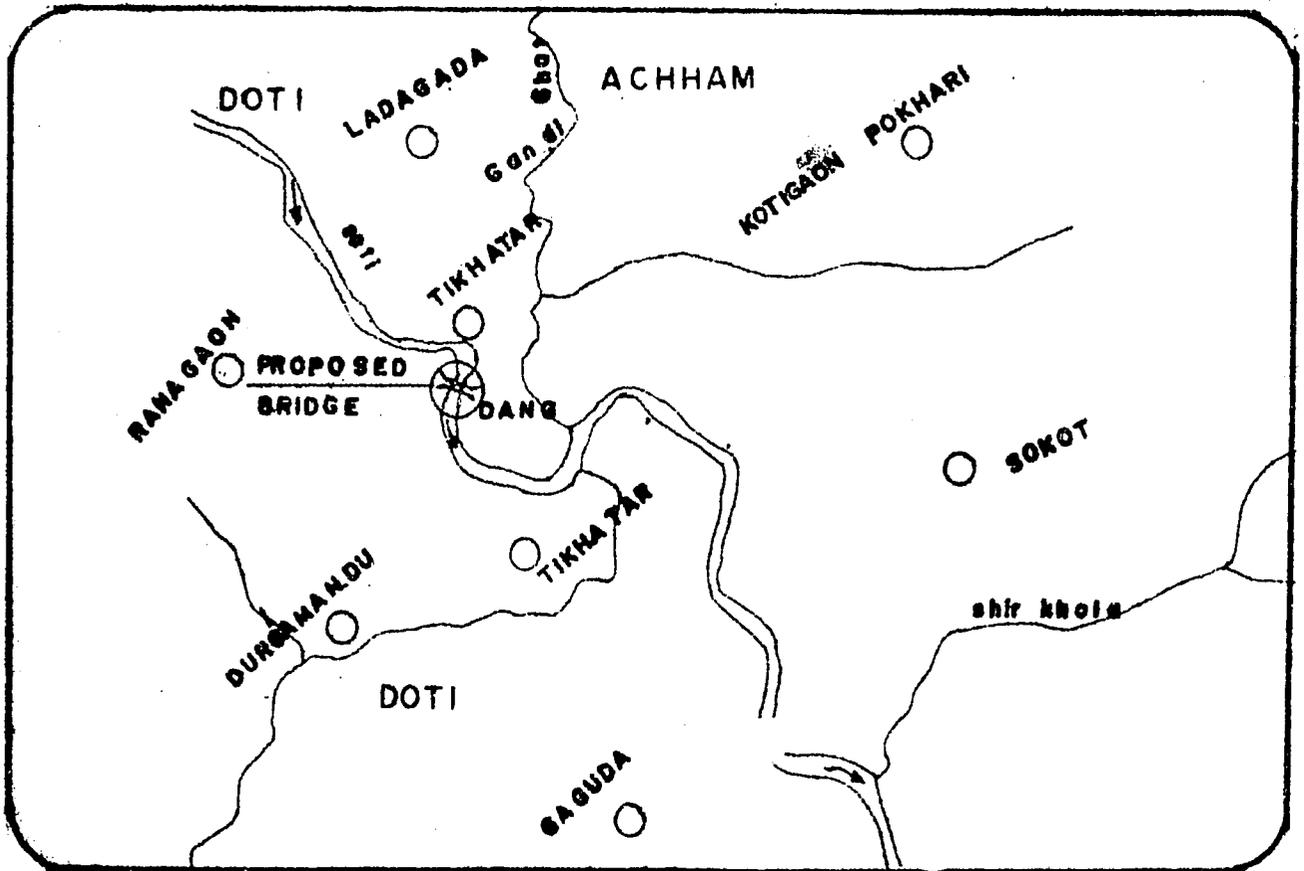
45.13

CRITERIA/FACTORS	Measurement Unit	Actual Value observed or calculation	Factor Range	<u>CRV</u> %	<u>FW</u>	<u>WV</u>
1. Cost	Financial cost minus Transportation cost in Rs.	16,03,945	2,00,000 -20,00,000	22.00	0.25	5.50
2. Time Savings	Mandays/annum	43,973	0-10,000	100.00	0.25	25.00
3. Local Crops	Tons/annum	410	0- 4,000	10.25	0.10	1.03
4. Local Exports	Rs./annum	5,17,500	0-30,00,000	17.25	0.05	0.86
5. Local Populations..	No. of Persons in the influence area	24,159	5,000 -40,000	54.74	0.05	2.74
6. Improved Access to HF	Additional Benifitted persons	Nil	0-10,000	0.00	0.05	0.00
7. Improved Access to EF	Additional Benifitted students	Nil	0- 1,500	0.00	0.05	0.00
8. Improved Access from AF	Additional Benifitted persons	Nil	0-16,000	0.00	0.05	0.00
9. Accident Provention	Reported drownings in past 5 years	Nil	0- 10	0.00	0.05	0.00
10. Local Support	Evidence of past self-help	Strong-100%	0%,50%,100%	100.00	0.05	5.00
11. Land Ownership	Percent of small farms	100%	0% - 100%	100.00	0.03	3.00
12. Presence of IRD	Inclusion of Bridge site in IRD Program Area	Yes - 100%	0%,50%,100%	100.00	0.20	2.00

CRV : Common Rating ValueHF : Health FacilityTOTAL WEIGHTED SCORE : 45.13FW : Factor WeightsEF : Education FacilityWV : Weighted ValueAF : Adm. Facility

✻

Bridge Name TIKHATAR Bridge No 712
 Type SUSPENSION Span in meters 98.20
 Location DANG River SETI
 Village Panchayat TIKHATAR (Left Bank) 'TIKHATAR (Right Bank)
 District/s DOTI (Left Bank) DOTI (Right Bank)
 Present Crossing Facility BOAT (Dry Season) CABLE WAY (Wet Season)
 1 inch = 1 mile Map No. $62\frac{G}{3}$, $62\frac{G}{4}$ Co-ordinator (N) 29°10' (E) 81°00'



Sketch showing Bridge site location

PRIORITY RANKING NO.

3

Total Numerical Score

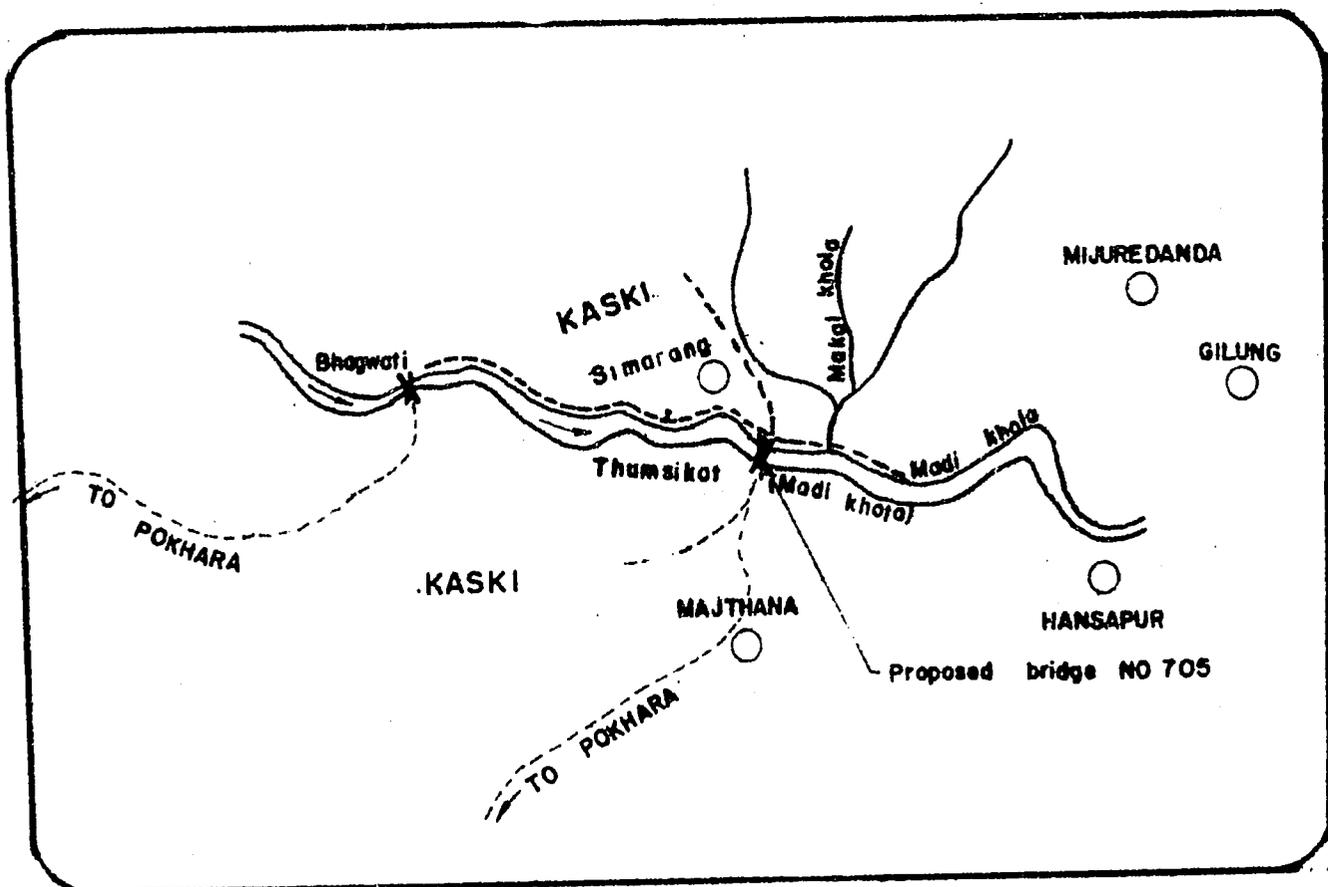
40.18

CRITERIA/FACTORS	Measurement Unit	Actual Value observed or calculation	Factor Range	<u>CRV</u> %	<u>FW</u>	<u>WV</u>
1. Cost	Financial cost minus Transportation in Rs.	7,89,878	2,00,000	67.23	0.05	16.81
2. Time Savings	Mandays/annum	438	-20,00,000	4.38	0.25	1.10
3. Local Crops	Tons/annum	704	0- 4,000	17.60	0.10	1.76
4. Local Exports	Rs./annum	4,26,000	0-30,00,000	14.20	0.05	0.71
5. Local Populations...	No. of Persons in the influence area	28,221	5,000	66.35	0.05	3.32
6. Improved Access to HF	Additional benefitted persons	Nil	-40,000	0.00	0.05	0.00
7. Improved Access to EF	Additional benefitted students	762	0- 1,500	50.80	0.05	2.54
8. Improved Access from AF	Additional benefitted persons	7,478	0-16,000	46.73	0.05	0.94
9. Accident Prevention	Reported drownings in past 5 years	8	0-10	80.00	0.05	4.00
10. Local Support	Evidence of Past self-help	Strong-100%	0%,50%,100%	100.00	0.05	5.00
11. Land Ownership	Percent of small farms	100%	0% - 100%	100.00	0.03	3.00
12. Presence of IRD	Inclusion of Bridge site in IRD Program Area	Planned - 50%	0%-50%-100%	50.00	0.20	1.00

CRV : Common Rating ValueFW : Factor WeightsWV : Weighted ValueHF : Health FacilityEF : Education FacilityAF : Adm. Facility

TOTAL WEIGHTED SCORE : 40.18

Bridge Name MADI KHOLA Bridge No 705
 Type SUSPENDED Span in meters 56.60
 Location THUMSIKOT River MADI
 Village Panchayat SAIMARANG (Left Bank) MAJITHANA (Right Bank)
 District/s KASKI (Left Bank) KASKI (Right Bank)
 Present Crossing Facility WOODEN BRIDGE (Dry Season) WCODEN BRIDGE (Wet Season)
 1 inch = 1 mile Map No. 71 $\frac{D}{4}$ Co-ordinator (N) 28°12.8' (E) 84°08.6'



Sketch showing Bridge site location

PRIORITY RANKING NO.

4

Total Numerical Score

35.26

BRIDGE NAME : MADI KHOLA (THUMSIKOT)

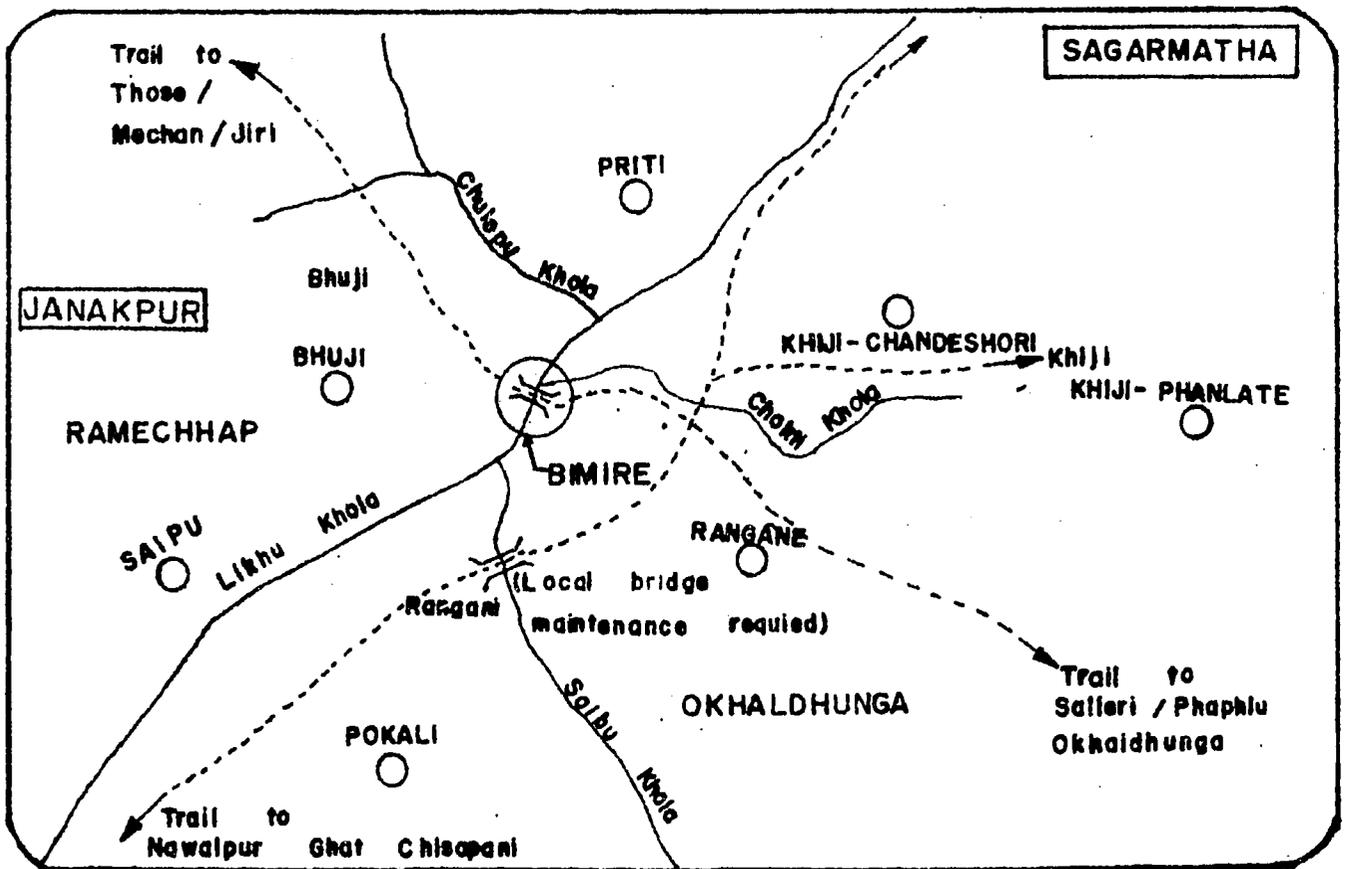
BRIDGE NO. 705

CRITERIA/FACTORS	Measurement Unit	Actual Value observed or calculation	Factor Range	<u>CRV</u> %	<u>FW</u>	<u>WV</u>
1. Cost	Financial cost minus Transportation cost in Rs.	4,34,009	2,00,000 -20,00,000	87.00	0.25	21.75
2. Time Savings	Mandays/annum	312	0-10,000	3.12	0.25	0.78
3. Local Crops	Tons/annum	1,505	0- 4,000	37.63	0.10	3.76
4. Local Exports	Rs./annum	2,62,200	0-30,00,000	8.74	0.05	0.44
5. Local Populations..	No. of Persons in the influence area	20,122	5,000 -40,000	43.21	0.05	2.16
6. Improved Access to HF	Additional Benifitted persons	833	0-10,000	8.33	0.05	0.42
7. Improved Access to EF	Additional Benifitted students	298	0- 1,500	19.87	0.05	0.99
8. Improved Access from AF	Additional Benifitted persons	1,673	0-16,000	10.46	0.05	0.11
9. Accident Prevention	Reported drownings in pas 5 years	2	0- 10	20.00	0.05	1.00
10. Local Support	Evidence of past self-help	Medium-50%	0%, 50%, 100%	50.00	0.05	2.50
11. Land Ownership	Percent of small farms	45%	0%-100%	45.00	0.03	1.35
12. Presence of IRD	Inclusion of Bridge site in IRD Program Area	No - 0%	0%, 50%, 100%	0.00	0.20	0.00

CRV : Common Rating ValueHF : Health FacilityFW : Factor WeightsEF : Education FacilityWV : Weighted ValueAF : Adm. Facility

TOTAL WEIGHTED SCORE : 35.26

Bridge Name **BIMIRE GHAT** Bridge No **702**
 Type **SUSPENDED** Span in meters **104.60**
 Location **BIMIRE GHAT** River **LIKHU KHOLA**
 Village Panchayat **KHIJI** (Left Bank) **BHUJI** (Right Bank)
 District/s **RAMECHHAP** (Left Bank) **OKHALDUNGA** (Right Bank)
 Present Crossing Facility **BAMBOO BRIDGE** (Dry Season) **DETOURING FROM SATTALPULCHAIN** (Wet Season)
 1 inch = 1 mile Map No. **72 $\frac{1}{7}$** Co-ordinator (N)**27°28.4'** (E)**86°17.7'**



Sketch showing Bridge site location

PRIORITY RANKING NO.

5

Total Numerical Score

33.75

BRIDGE NAME : BIMIRE

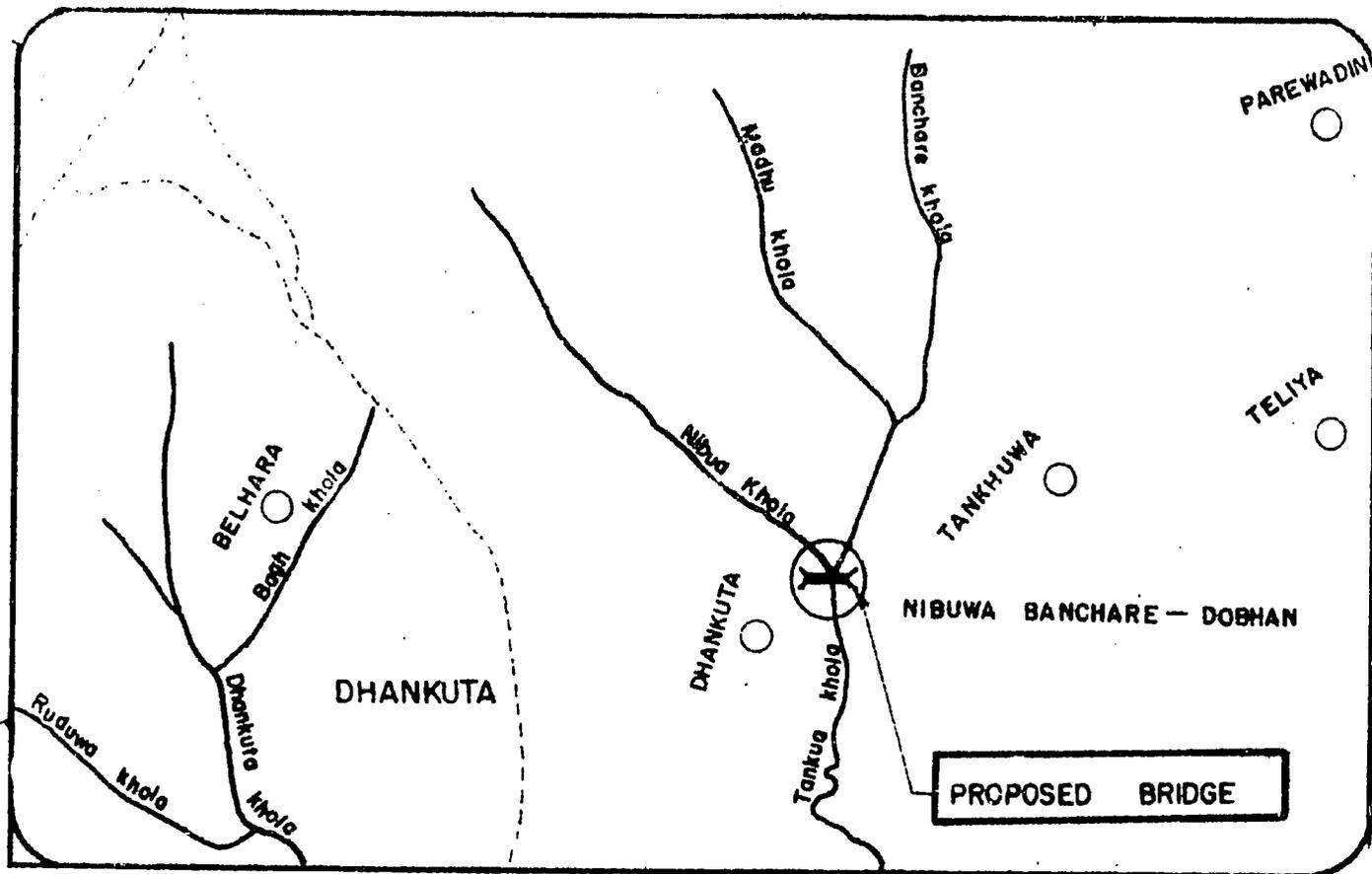
Bridge No. : 702

CRITERA/FACTORS	Measurement Unit	Actual Value observed or calculation	Factor Range	CRV %	FW	WV
1. Cost	Financial cost minus Transportation cost	6,52,461	2,00,000 -20,00,000	74.86	0.25	18.72
2. Time Savings	Mandays/annum	480	0-10,000	4.80	0.25	1.20
3. Local Crops	Tons/annum	1,428	0- 4,000	35.70	0.10	3.57
4. Local Exports	Rs./annum	7,84,990	0-30,00,000	26.17	0.05	1.31
5. Local Populations..	No. of Persons in the influence area	21,417	5,000 -40,000	46.91	0.05	2.35
6. Improved Access to HF	Additional Benifitted persons	1,981	0-10,000	19.81	0.05	0.99
7. Improved Access to EF	Additional Benifitted students	495	0- 1,500	33.00	0.05	1.65
8. Improved Access from AF	Additional Benifitted persons	3,971	0-16,000	24.82	0.05	0.50
9. Accident Prevention	Reported drownings in past 5 years	Nil	0- 10	0.00	0.05	0.00
10. Local Support	Evidence of past self-help	Medium-50%	0%,50%,100%	50.00	0.05	2.50
11. Land Ownership	Percent of small farms	32%	0%-100%	32.00	0.03	0.96
12. Presence of IRD	Inclusion of Bridge site in IRD Program Area	No. 0%	0%,50%,100%	0.00	0.20	0.00

CRV : Common Rating ValueFW : Factor WeightsWV : Weighted ValueHF : Health FacilityEF : Education FacilityAF : Adm. Facility

TOTAL WEIGHTED SCORE : 33.75

Bridge Name NIBUWA BANCHARE Bridge No 718
 Type SUSPENSION Span in meters 69.60
 Location NIBUWABANCHARE-DOBHAN River NIBUWA BANCHARE
 Village Panchayat TANGKHUWA (Left Bank) DHANKUTA T.P. (Right Bank)
 District/s DHANKUTA (Left Bank) DHANKUTA (Right Bank)
 Present Crossing Facility LOCAL BRIDGE (Dry Season) LOCAL BRIDGE (Wet Season)
 1 inch = 1 mile Map No. 72 $\frac{M}{5}$ Co-ordinator (N) 26°59.24' (E) 87°22.27'



Sketch showing Bridge site location

PRIORITY RANKING NO. 6

Total Numerical Score 32.56

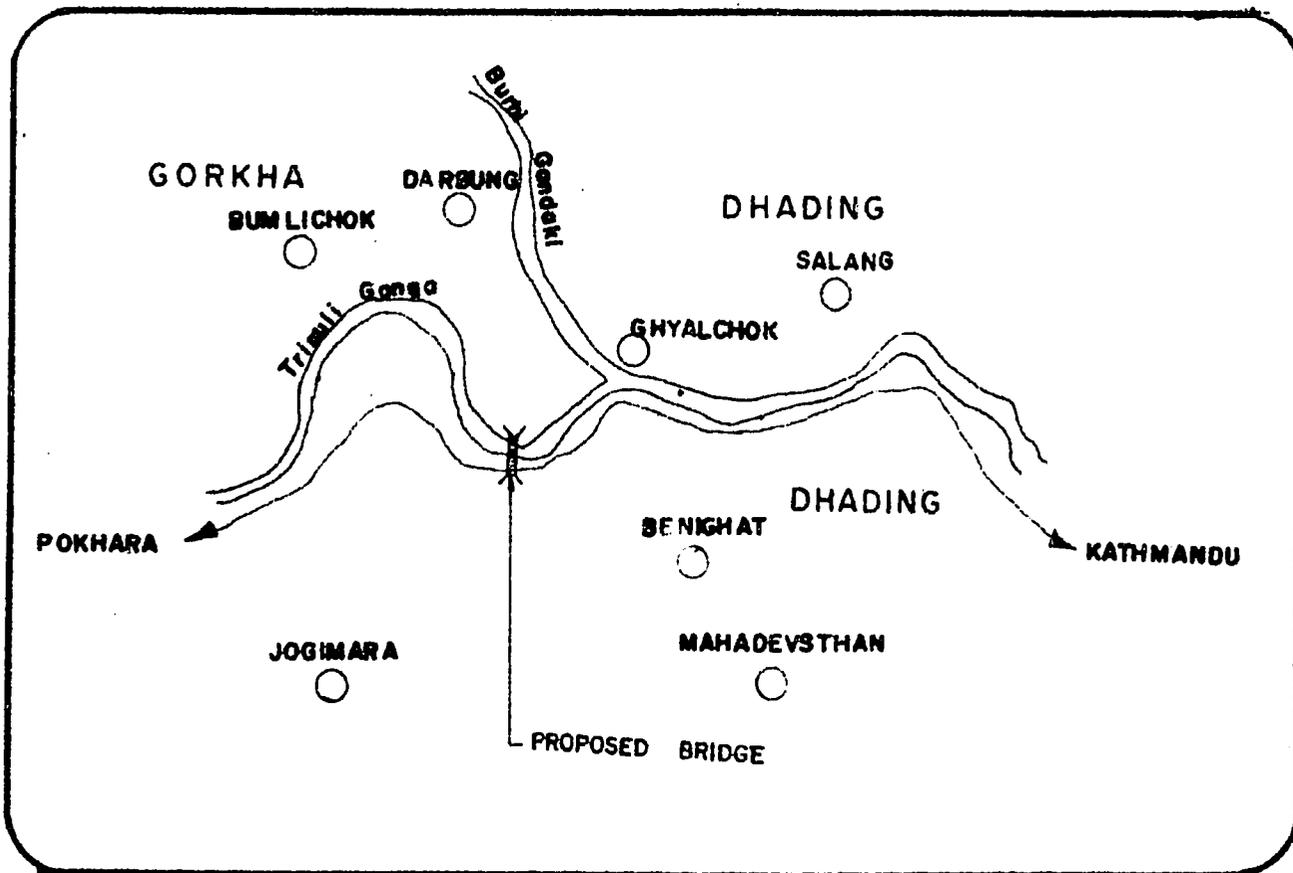
CRITERIA/FACTORS	Measurement Unit	Actual Value observed or calculated	Factor Range	<u>CRV</u> %	<u>FW</u>	<u>WV</u>
1. Cost	Financial cost minus Transportation cost	7,47,460	2,00,000 -20,00,000	69.58	0.25	17.40
2. Time Savings	Mandays/annum	Nil	0-10,000	0.00	0.25	0.00
3. Local Crops	Tons/annum	1,599	0- 4,000	40.00	0.10	4.00
4. Local Exports	Rs./annum	12,05,800	0-30,00,000	40.20	0.05	2.01
5. Local Populations	No. of Persons in the influence area	24,969	5,000 -40, 000	57.05	0.05	2.85
6. Improved Access to HF	Additional benifitted stu persons	Nil	0-10,000	0.00	0.05	0.00
7. Improved Access to EF	Additional benifitted students	Nil	0- 1,500	0.00	0.05	0.00
8. Improved access from AF	Additional benifitted persons	Nil	0-16,000	0.00	0.05	0.00
9. Accident Prevention	Reported drownings in past 5 years	Nil	0- 10	0.00	0.05	0.00
10. Local Support	Evidence of past self-help	Medium-50%	0%, 50%, 100%	50.00	0.05	2.50
11. Land Ownership	Percent of small farms	60%	0% - 100%	60.00	0.03	1.80
12. Presence of IRD	Inclusion of Bridge site in IRD Program Area	Yes - 100%	0%, 50%, 100%	100.00	0.20	2.00

CRV : Commo. Rating ValueHF : Health Facility

TOTAL WEIGHTED SCORE : 32.56

FW : Factor WeightsEF : Education FacilityWV : Weighted ValueAF : Adm. Facility

Bridge Name BENI GHAT Bridge No 713
 Type SUSPENDED Span in meters 151.40
 Location BENI GHAT River TRISULI
 Village Panchayat BENI GHAT (Left Bank) GHYALCHOK (Right Bank)
 District/s DHADING (Left Bank) GORKHA (Right Bank)
 Present Crossing Facility BOAT (Dry Season) BOAT (Wet Season)
 1 inch = 1 mile Map No. 72 $\frac{A}{13}$ Co-ordinator (N) 27°48.5' (E) 84°46.6'



Sketch showing Bridge site location

PRIORITY RANKING NO.

7

Total Numerical Score

28.39

CRITERIA/FACTORS	Measurement Unit	Actual Value observed or calculation	Factor Range	CRV %	FW	WV
1. Cost	Financial cost minus Transportation cost in Rs.	9,20,028	2,00,000 -20,00,000	60.00	0.25	15.00
2. Time Savings	Mandays/annum	542	0-10,000	5.42	0.25	1.34
3. Local Crops	Tons/annum	620	0- 4,000	15.50	0.10	1.55
4. Local Exports	Rs./annum	6,00,000	0-30,00,000	20.00	0.05	1.00
5. Local Populations..	No, of Persons in influence area	23,896	5,000 -40,000	54.00	0.05	2.70
6. Improved Access to HF	Additional Benifitted persons	1,921	0-10,000	19.21	0.05	0.96
7. Improved Access to EF	Additional Benifitted students	296	0- 1,500	19.74	0.05	0.99
8. Improved Access from AF	Additional Benifitted persons	2,655	0-16,000	16.60	0.05	0.33
9. Accident Prevention	Reported drownings in past 5 years	2	0- 10	20.00	0.05	1.00
10. Local Support	Evidence of past self-help	Medium-50%	0%, 50%, 100%	50.00	0.05	2.50
11. Land Ownership	Percent of small farms	34%	0% - 100%	34.00	0.03	1.02
12. Prosence of IRD	Inclusion of Bridge site in IRD Program Area	No - 0%	0%, 50%, 100%	0.00	0.20	0.00

CRV : Common Rating Value

HF : Health Facility

TOTAL WEIGHTED SCORE : 28.39

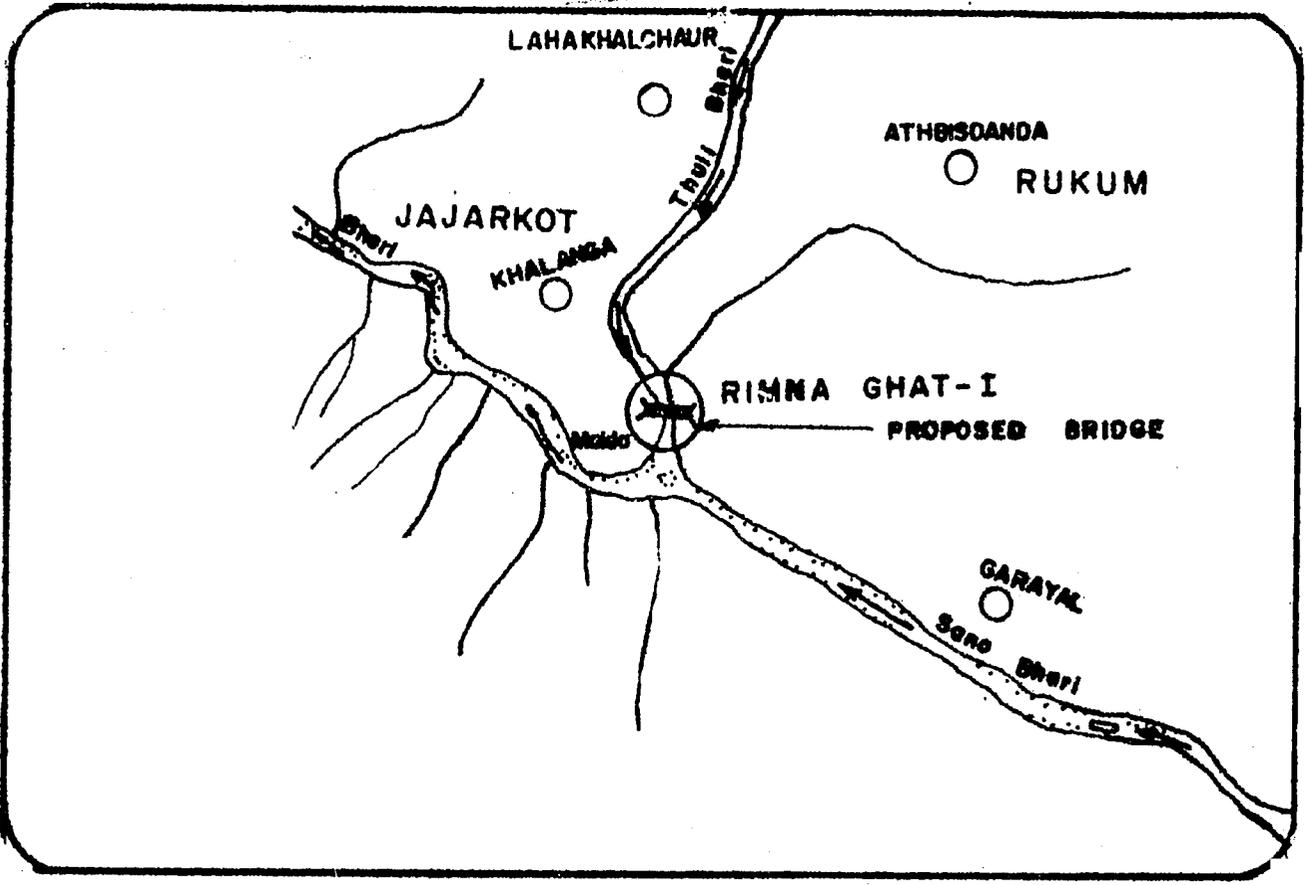
FW : Factor Weights

EF : Education Facility

WV : Weighted Value

AF : Adm. Facility

Bridge Name RIMNA GHAT : I Bridge No 708
 Type SUSPENSION Span in meters 88.60
 Location RIMNA GHAT River THULI BHERI
 Village Panchayat GARYAL (Left Bank) KHALANGA (Right Bank)
 District/s RUKUM (Left Bank) JAJARKOT (Right Bank)
 Present Crossing Facility BOAT (Dry Season) CABLE WAY (Wet Season)
 1 inch = 1 mile Map No. 62 $\frac{L}{6}$ Co-ordinator (N) 28°42' (E) 82°17'



Sketch showing Bridge site location

PRIORITY RANKING NO.

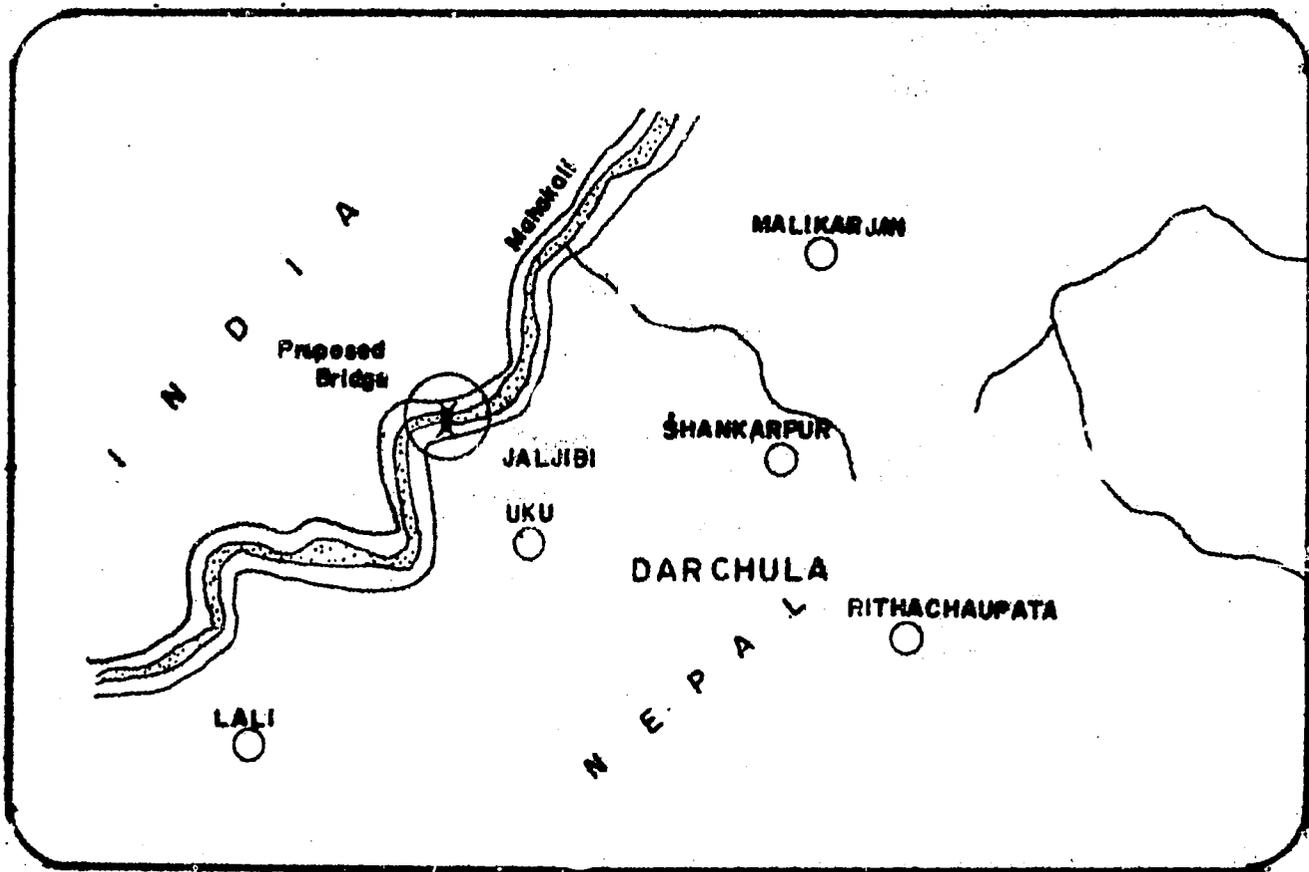
Total Numerical Score

CRITERIA/FACTORS	Measurement Unit	Actual Value observed or calculation	Factor Range	<u>GRV</u> %	<u>FW</u>	<u>WV</u>
1. Cost	Financial cost minus Transportation cost in Rs.	8,80,529	2,00,000 -20,00,000	63.30	0.25	15.33
2. Time Savings	Mandays/annum	458	0-10,000	4.58	0.25	1.15
3. Local Crops	Tons/annum	215	0- 4,000	5.38	0.10	0.54
4. Local Exports	Rs./annum	4,91,901	0-30,00,000	16.40	0.05	0.82
5. Local Populations..	No. of Persons in the influence area	10,297	5,000 -40,000	15.13	0.05	0.76
6. Improved Access to HF	Additional Benifitted persons	Nil	0-10,000	0.00	0.05	0.00
7. Improved Access to EF	Additional Benifitted students	224	0- 1,500	14.94	0.05	0.75
8. Improved Access from AF	Additional Benifitted persons	Nil	0-16,000	0.00	0.05	0.00
9. Accident Prevention	Reported drownings in the past 5 years	1	0- 10	10.00	0.05	0.50
10. Local Support	Evidence of past self-help	Medium-50%	0%,50%,100%	50.00	0.05	2.50
11. Land Ownership	Percent of small farms	100%	0% -100%	100.00	0.03	3.00
12. Presence of IRD	Inclusion of Bridge site in IRD Program Area	Yes -100%	0%,50%,100%	100.00	0.20	2.00

GRV : Common Rating ValueHF : Health FacilityFW : Factor WeightsEF : Education FacilityWV : Weighted ValueAF : Adm. Facility

TOTAL WEIGHTED SCORE : 27.85

Bridge Name J/LJIBI Bridge No 706
 Type SUSPENDED Span in meters 132.60
 Location JALJIBI River MAHAKALI
 Village Panchayat LIKU (Left Bank) : INDIA (Right Bank)
 District/s DARCHULA (Left Bank) INDIA (Right Bank)
 Present Crossing Facility SUSPENSION BRIDGE (Dry Season) SUSPENSION BRIDGE (Wet Season)
 1 inch = 1 mile Map No. 62 C/6 & C/5 Co-ordinator (N) 29°46' (E) 80°22'



Sketch showing Bridge site location

PRIORITY RANKING NO.

9

Total Numerical Score

21.96

BRIDGE NAME : JALJIBI

BRIDGE NO. 706

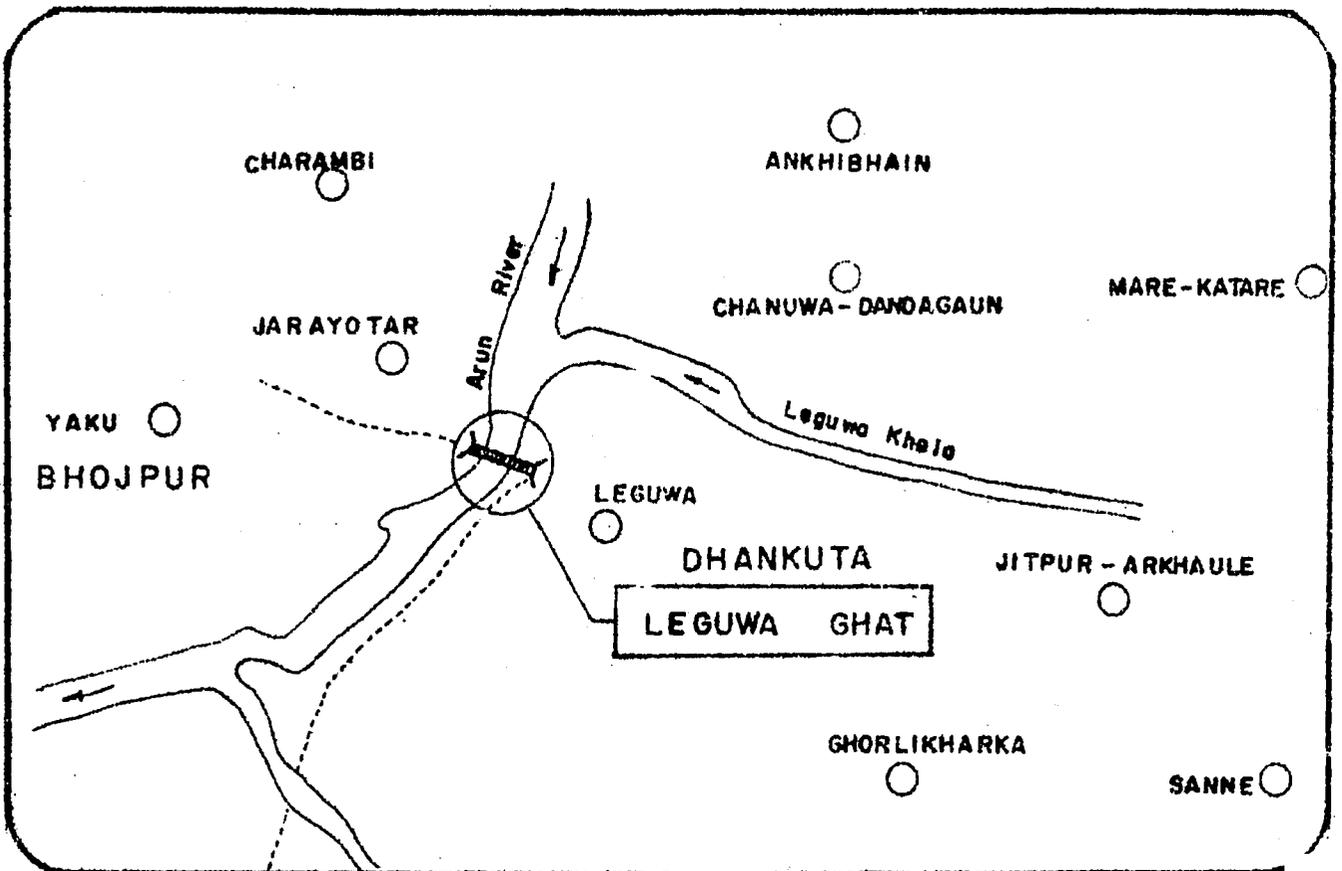
CRITERIA/FACTORS	Measurement Unit	Actual Value observed or calculation	Factor Range	CRV %	FW	WV
1. Cost	Financial cost minus Transportation cost in Rs.	12,00,000	2,00,000 -20,00,000	44.45	0.25	11.11
2. Time Savings	Mandays/annum	Nil	0-10 000	0.00	0.25	0.00
3. Local Crops	Tons/annum	199	0- 4,000	5.00	0.10	0.50
4. Local Exports	Rs./annum	8,02,530	0-30,00,000	26.75	0.05	1.34
5. Local Populations	No. of Persons in the influence area	15,912	5,000 -40,000	31.18	0.05	1.56
6. Improved Access to HF	Additional benefitted persons	Nil	0-10,000	0.00	0.05	0.00
7. Improved Access to EF	Additional benefitted students	Nil	0- 1,500	0.00	0.05	0.00
8. Improved Access from AF	Additional benefitted persons	Nil	0-16.000	0.00	0.05	0.00
9. Accident Prevention	Reported drownings in the past 5 years	2	0-10	20.00	0.05	1.00
10. Local Support	Evidence of past self-help	Medium-50%	0%,50%,100%	50.00	0.03	2.50
11. Land Ownership	Percent of small farms	65%	0% -100%	65.00	0.03	1.95
12. Presence of IRD	Inclusion of Bridge site in IRD Program Area	Yes - 100%	0%-50%-100%	100.00	0.20	2.00

CRV : Common Rating ValueHF : Health Facility

TOTAL WEIGHTED SCORE : 21.96

FW : Factor WeightsEF : Education FacilityWV : Weighted ValueAF : Adm. Facility.

Bridge Name	LEGUWA GHAT	Bridge No	717
Type	SUSPENDED	Span in meters	310.80
Location	LEGUWA GHAT	River	ARUN
Village Panchayat	LEGUWA	(Left Bank)	JARAYOTAR (Right Bank)
District/s	DHANKUTA	(Left Bank)	BHOJPUR (Right Bank)
Present Crossing Facility	BOAT	(Dry Season)	BOAT (Wet Season)
1 inch = 1 mile Map No.	72 $\frac{M}{8}$	Co-ordinator (N)	27°08.7' (E) 87°16.1'



Sketch showing Bridge site location

PRIORITY RANKING NO.

10

Total Numerical Score

10.03

BRIDGE NAME : LEGUWA GHAT

BRIDGE NO. 717

CRITERIA/FACTORS	Measurement Unit	Actual Value observed or calculation	Factor Range	CRV %	FW	WV
1. Cost	Financial cost minus Transportation cost in Rs.	23,60,998	2,00,000 -20,00,000	(-)20.00	0.25	(-)5.00
2. Time Savings	Mandays/annum	254	0-10,000	2.54	0.25	0.64
3. Local Crops	Tons/annum	1,510	0- 4,000	37.75	0.10	3.78
4. Local Exports	Rs./annum	5,75,070	0-30,00,000	19.17	0.05	0.96
5. Local Populations	No. of Persons in the influence area	21,879	5,000 -40,000	48.23	0.05	2.41
6. Improved Access to HF	Additional benifitted persons	255	0-10,000	2.55	0.05	0.13
7. Improved Access to EF	Additional benifitted students	154	0- 1,500	10.27	0.05	0.52
8. Improved Access from AF	Additional benifitted persons	2,758	0-16,000	17.18	0.05	0.17
9. Accident Preven- tion	Reported drownings in the past 5 years	Nil	0- 10	0.00	0.05	0.00
10. Local support	Evidence of past self-help	medium-50%	0%,50%,100%	50.00	0.05	2.50
11. Land Ownership	Percent of small farms	64%	0% -100%	64.00	0.03	1.92
12. Presence of IRD	Inclusion of Bridge site in IRD Program area	Yes 100%	0%-50%-100%	100.00	0.20	2.00

CRV : Common Rating Value

HF : Health Facility

TOTAL WEIGHTED SCORE : 10.03

FW : Factor Weights

EF : Education Facility

WV : Weighted Value

AF : Adm. Facility

BRIDGE SITES IN PICTURE



Construction Camp at Bimere
bridge site.

Bimere April 16, 1980



Dry season existing crossing
facility at Bimere.

Bimere April 17, 1980



Local people being interviewed
at village Pradhar Pancha's
house.

Bimere April 8, 1980



A well-built boat near Leguwa
bridge site. Much safer than
a dug - out.

Leguwa March 3, 1980

Previous Page Blank



Traffic Count, being conducted.

Benighat

March 30, 1980



Trying to arrive at a group opinion.

Benighat

March 31, 1980



A comparatively much safer temporary local bridge made for dry season use.

Madikhola

March 20, 1980



Locally made cable crossing for the use of wet season, does reflect local initiative taken and intensity of the project need.

Tikhatar

March 15, 1980



A difficult trail portion between Tikhatar and Jungalaghat. Photo shows the Field Crew handling their personal luggage.

Near Lodeghat March 17, 1980



Sheeps are mostly used as local commodity carriers in most parts of Far Western Nepal.

Jungalaghat March 23, 1980



Socio-Economic Questionnaires being administered, to a group of local knowledgeable people.

Rimnaghat - I April 8, 1980



Local children using a traditional life-belt to cross the river. A common practice in Far Western Nepal for crossing rivers.

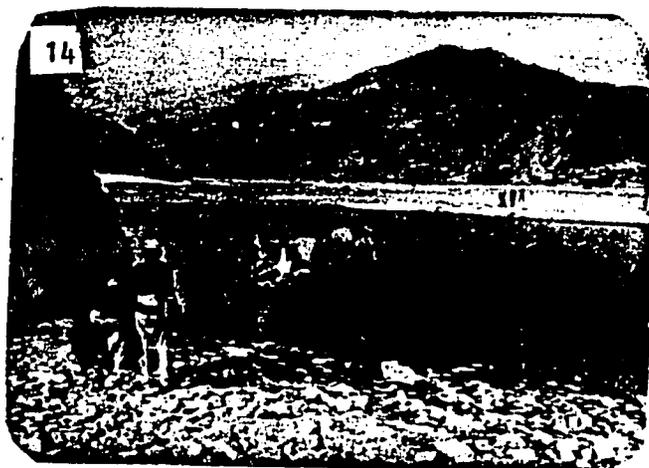
Rimnaghat - I April 7, 1980



A very poorly maintained existing bridge.
No wonder, many people ford the river
than to risk crossing this bridge.

Nibuwa Banchara

March 11, 1980



People being ferried across Tamakosi
River in a dug-out.

Manthalighat

April 2, 1980

5. STUDY FINDINGS AND THE REASONS FOR REVISING THE INITIAL RANKING SCHEME

The initial ranking scheme which has been formulated by USAID-Nepal on the basis of the wealth of information and data already made available on trail bridges notably by the German Consult Study, and EAST's previous Research Study, although conceptually simple looking, nevertheless entails considerable manipulation in obtaining the required data, the availability of which is made more complicated by the need to depend on more subjective judgements which have to be inevitably used in establishing the correctness of field information.

Validity of the field information and the difficulties encountered in obtaining objective field data, presented as one of the major problems in the application of the initial ranking scheme.

The most difficult task during the study was the collection of reliable field data which required arduous efforts. Although the initial ranking scheme aims at focussing on a set of factors which are much simpler and easier to measure, our field experiences has indicated that they are on the contrary sufficiently difficult to measure in the field conditions currently prevailing in rural hills of Nepal.

Firstly, while the approach to employ a set of objective criteria decidedly represents an innovation in the field of bridge site selection, some of the criteria suggested in the initial ranking scheme have been

found to be operationally difficult to apply in the existing situations as indicated above. Secondly, it was also found that the weights given to different criteria in terms of percentage ratios needed some changes so as to bring them closer to reality. Thirdly, some of the concepts employed in the criteria needed some refinement which resulted in the change of their nomenclature as well as in the indicators employed for measuring them. Finally, the field application also strongly suggested that some of the criteria be dropped and others be instituted in their place.

The summary sheet on the following page shows the revised set of criteria, their indicators or measurement units, factor range, factor weight etc. As shown in the summary sheet, the main features of the revised scheme and the reasons behind such changes are briefly presented below:

Cost: For all the bridges under this study, except the bridge at Jaljibi, accurate cost data were available as the detailed estimates of all the bridges under study were completed. For the bridge at Jaljibi the cost data had been figured out on the basis of its given span and cost figures available for other suspended trail bridges of the study.

However, for certain bridges to be surveyed in future, cost figures will have to be roughly calculated as described in the Manual which will not be as accurate as those used in this study.

SUMMARY SHEET: PROPOSED RANKING SCHEME FOR TRAIL BRIDGES

CRITERIA/FACTORS	Measurement Unit	Range of Factor Values	Common Rating Scale-Percent	Factor Weight
I. <u>Economic Factors</u>				(0.50)
1. Cost	Total Estimated cost minus total transportation cost	Rs. 2,000,000 to 200,000	0-100	0.20
2. Through Traffic	Non-Local Traffic in AADT	0-500	0-100	0.15
3. Local Production of Food Crops	Tons per annum	0-2500	0-100	0.10
4. Major Local Exports	Rupees per annum	0-1,500,000	0-100	0.05
II. <u>Social Factors</u>				(0.30)
5. Local Population Served	No. of persons within <u>10 km walking distance</u> from bridge site	5,000-40,000	0-100	0.10
6. Presence of Health Facilities	Hospital (within 5 Hrs. walking Limit) Health Post (within 3 Hrs. walking Limit) Ayurvedic Clinic (within 3 Hrs. walking Limit)		0-100	0.03 0.02 0.01
7. Presence of Education Facilities	High School (within 4 Hrs. walking Limit) Middle School (within 3 Hrs. walking Limit) Primary School (within 2 Hrs. walking Limit)		0-100	0.03 0.02 0.01
8. Presence of Administrative Facilities	- Agricultural Support Offices (within 4 Hrs. walking Limit) - Banking Institutions (within 4 Hrs. walking Limit) - Law Courts, Land Revenue Offices Cottage Industries (within 4 Hrs. walking Limit)		0-100	0.02 0.02 0.02

SUMMARY SHEET contd...

CRITERIA/FACTORS	Measurement Unit	Range of Factor Values	Common Rating Scale-Percent	Factor Weight
	- Post Offices	(within 4 Hrs. walking Limit)		0.01
	- Other Govt. Offices	(within 4 Hrs. walking Limit)		0.01
III.	<u>Other Relevant Factors</u>			(0.20)
9.	Risk Factor	Degree of Risk involved in using the existing crossing facilities	high medium low Nil	100 50 25 0 0.04
10	Local Support of the Project	Degree of intensity of local bridge demand + Local Initiative for building and maintaining the existing crossing facilities	high medium low Nil	100 50 25 0 0.04
11.	Type of River	Major Medium Minor	- - -	100 60 20 0.08
12.	Presence of the Main Trail	If the bridge site lies in the Main Trail	Yes No	100 0 0.02
13	Presence of IRD Program	Inclusion of bridge site in the IRD Program area	Yes Planned within 2 years No	100 50 0 0.02

To attain a more balanced distribution of factor weights between economic and social elements it was felt necessary to reduce the cost factor weight from 0.25 to 0.20.

Range of factor value although seemingly within the factual limit, would need correction in view of the inflation rate in later dates.

In cases where the actual cost figure for a certain bridge exceeds the maximum estimated range, a negative value is obtained. It has been decided to take zero value as minimum value in such cases.

Time Saving for Through Traffic: The actual derivation of the annual average delay factors constitutes the most difficult part of the whole ranking system, and this was also admitted in the initial ranking scheme. An accurate assessment of annual average delay time considering wet & dry seasons presents considerable difficulties based as it is on many variables such as, traffic volume, river conditions, crossing facilities, detours (difficult to judge accurately in the field) and also on the whims and moods of the people who man the mode of crossing. All these variables are very difficult to ascertain, even to approximate acceptable degree of accuracy.

The best estimate for average delay factors throughout the year can only be made if sufficient time and resources are available

to conduct traffic surveys for at least 3 days each during wet, dry and peak seasons on every site. However, within the present context of SBD's limitations such as budget, uncertainties in hill logistics and finally insufficient manpower, we felt that it was not worthwhile to recommend such an expanded traffic survey. Thus it was felt that the simpler non-local annual traffic volume could represent this criterion, the avoidance of the difficult measurement for delay factor for time saving calculations would also reduce the chances of error.

This necessitates the nomenclature of this criterion to be changed to Through Traffic only, the measurement unit being the annual average daily traffic including all seasons wet, dry as well as peak (if any) and the factor range being suitably adjusted to 0-500 annual average daily traffic.

As the delay factor is eliminated, all bridge sites would now score traffic points depending directly upon their traffic volume, irrespective of the nature of the rivers to be spanned. Thus a river even if it is fordable throughout the year will score proportionate traffic point which is not a justifiable proposition. Hence the proposed scheme has introduced a new criterion - River Factor. The traffic factor weight is reduced from 0.25 to 0.15 and a factor weight of 0.08 is suggested to be employed for river factor establishing a direct interrelationship between traffic and river factor.

The rivers are defined as major, medium and minor broadly based on EAST's previous research study's recommendation.

Local Food Production: Measurement of this criterion i.e. the assessment of accurate quantity of existing food production in the area of influence, itself presented difficulties in the absence of reliable local information. No reliable data were available at local panchayats or even in District Headquarters. Local interviewing could with some degree of accuracy supply only names of local crops produced in the area. In sum, most of the data required were to be obtained from secondary sources (i.e. from the 'Agricultural Statistics of Nepal - 1977, published by the Ministry of Food and Agriculture/HMG).

The cropping intensity (the ratio of harvested area to the cultivated area) which was left out in the initial ranking scheme was taken into account in the calculation of food production, as it was an important factor.

Based on the actual values observed during site surveys, the maximum factor range was changed from 4000 tons/year to 2500 tons/year to bring it closer to present field situations.

Major Local Exports: Arriving at the best estimates for major local exports for a whole year presented even more problems than food production, because of the lack of secondary data. The estimate of this factor had to be based on the local inquiries.

However, high degree of educated judgement is necessary on the part of the surveyor to accurately establish this figure. Also observed was the invalidity of the national average retail price to be applied for such a small area of influence of a trail bridge. A more reasonable figure would be the district average retail price. The maximum factor value of this criterion was found to be very high in the initial scheme, i.e. 30 lakhs thus was reduced to 15 lakhs based on field experience.

Although the assessment of the quantity of major local exports created some complications during our first survey it was felt that it can be improved hopefully in later surveys.

Local Population Served: Before commenting on this factor and on other related social factors such as access to health, school & administrative facilities, the concept of influence area as defined by the initial ranking scheme must be made clear.

It is assumed arbitrarily in the scheme for want of simplification that a 10 Km radius circle (modified later in more clear terms as a 10 Km walking distance around the bridge equivalent to a 6 Km map radius circle) would define the influence area of the bridge.

Our experience during the study reveals that the influence area for local impact, in reality, would be defined by a random perimeter composed of about 10 Km walking limit from the bridge

site for an average local hill dweller. Assumption made in our survey for hill walking was 2 Km/hour, and thus with 10 hours walk in a day, an average person can traverse 20 Km. Thus a day's walk back and forth from the bridge site should define the limit of local influence area which does not necessarily have to coincide with the circumference of a circle on a map (whatever may be its radius) and thus cannot be defined by a circle but actually makes an irregular and usually an oblong shape having larger dimensions towards the upstream and downstream sides of the river.

The next problem encountered was the correct determination of the population within the defined area of influence. This was because of the unavailability of reliable area maps defining the boundaries of village panchayats which are changed frequently because of political reasons. Population determination from local inquiries created even more uncertainties hence the figures were collected from the CBS-census figures of 1971 corrected in terms of the village panchayats' boundary adjustments of 1976. An annual increase of 2.5% was taken as the national average for population increase. Fractions of population served were also taken to arrive at a more correct assessment by the use of wards of a village panchayat. Although the correctness of these arbitrary figures is open to debate, no more reliable assessment could be made either.

In future surveys, however, the situation is likely to improve considerably. For one reason, the 1981 census is imminent and this data for the village panchayats would be useful at least for some more years to come.

The criterion, although fraught with some minor difficulties mentioned above, was found to be satisfactorily measurable for the better reflection of the potential social and cultural interchanges between the sections of population residing on both sides of the river, although local traffic figure assessment was found to be subjected to much more uncertainties as explained earlier than the assessment of population figures.

Thus the concept of influence area is more clearly defined in the revised scheme. A more easily and reliably measurable influence area is proposed taking into consideration the field situations. However, all other elements remain the same.

Other Social Factors: Benefits accruing to the local population as a result of improved access to the existing Health, School and Administrative facilities were the other factors considered significant in the initial ranking scheme, but unfortunately the prescribed method of their field measurement involved many difficulties and the validity of the concept of its measure is also questionable. During the course of the study certain useful observations were made on its measurement concept and on how far and well the concept of their measure would reflect reality.

First of all the representation of areas by the use of concentric circles for reflecting additional benefited population was very difficult to establish precisely and did not present a true picture of reality. As already discussed in the preceding paragraphs of Local Population Served, the circular definition of area of influence is itself invalid in the field situation.

It was our experience that the exact determination of any overlapping population as potential beneficiaries, was found to be practically impossible to calculate accurately. Efforts were made to acquire information on this during field surveys but this mathematical exercise had been discarded later during data processing as being redundant. While the suggested method seems academically precise and respectable it presents many difficulties in actual application in the field and does not produce the desired result.

The most difficult part of the calculation is to arrive at a reasonable figure of local population density. As already said, panchayat figures on population were debatable and in the absence of village panchayat maps showing accurate area demarcations, the determination of population density figures presented no less difficulties. This, being a crucial item in the calculation of all these three social factors discussed here needs more attention if the same concept of measure is to be followed.

Our field experience, during the course of the study has also indicated that the increased use of the existing facilities by the local population depends not only on the elimination of the travel delay, but also on the quality and capacity of those facilities. It also depends, specially in the case of schools, on the nature of the terrain leading to the schools. Apart from the saving in travel time, the quality of services offered by the facilities and their capacity are the main determinant for the increase in their use after the construction of the bridge.

The difficulty and unreliability of the measurements of accurate delay time, population density, and the ineffectiveness of the suggested method in arriving at the values of additional benefitted population, have all made this criterion vulnerable to controversy, and thus a simpler approach is recommended.

It is therefore proposed that additional scores be given to a bridge site on the strength of the presence of those facilities within a specified distance from the bridge site that can be comprehensibly measured and informed by the local villagers. The revised procedure for measuring these social factors, would then be much easier to operate and closer to the field reality than the prescribed one.

The factor weights have been modified to reflect their relative need and importance to the local rural poor.

Other Factors: Other factors constituting 15% of the total score are accident prevention, local support, land ownership and presence of the IRD program. Our observations on the use of these criteria as effective measures in fixing priority ranking were as follows:

Accident Prevention:

The criterion by itself and the reasons for its inclusion are noteworthy but again the assessment of the accurate figures is very much problematic. Most of the local reports are self conflicting and not reliable although different knowledgeable sources claim to have a hundred percent knowledge of this. Drownings covered over a period of past 5 years generally do not represent the actual risk involved in the existing crossing facilities. And the cases where mishaps or accidents had occurred prior to the period of 5 years causing many deaths warrant attention and can not be neglected merely because the accidents had happened beyond the 5 years limit. In the case of Jaljibi, the present bridge poses a big risk for the people presently using it, because of its very bad condition. It would not be surprising in such cases if a boat crossing or any other alternative involved less risks.

As this criterion does not clearly reflect the risk involved in the present mode of crossing, it is thus extremely difficult to assess properly.

As discussed above, the factual determination of drownings poses problems. Also the adoption of the past five years as the cut-off point to measure the degree of risk involved in the present crossing facilities is subject to controversy.

Thus, this criterion is given a new nomenclature in the revised scheme i.e. the Risk Factor. The degree of risk factor is to be measured on the basis of the visual observation of the surveyor supplemented by the history of accidents in the present mode of crossing, be it a boat crossing, cable crossing, rope crossing, a badly built local bridge, or even the fording of the river.

Local Support of the Project:

This criterion is introduced to measure the degree of local support for the proposed bridge construction project which should provide not only an excellent indication of the need and importance of the bridge to the local people but as mentioned in the initial scheme, an indirect measure of the social and economic benefits it can be expected to generate. It is our observation that this can be more precisely ascertained by observing the history of the bridge demand, i.e. the measurement of the popular participation in demanding the bridge, the summation of activities for the identification of needs, organising for representation and other necessary actions taken for getting favorable decisions made. These can

be found out from local story of the bridge demand, substantiated by official data figures (like petitions for the demand of the bridge) mostly available in S&D or LDD files. The assessment of this criterion can also be made additionally by observing the local initiative in erecting and maintaining existing crossing facilities and this would be more representative than the assessment of evidence of past local efforts to improve and maintain other types of local infrastructure as prescribed in the initial ranking scheme. Our experience in assessing past local efforts to improve and maintain all other local infrastructure correctly within the time limit of 3 days at each site was not self convincing. Therefore, it was the opinion of the study team that the efforts made by the local people over the years to get approval for the bridge could not be ignored, nor could the initiative in installing and maintaining the existing crossing facilities be overlooked.

For the reason it is suggested here that future surveys should properly record the history of bridge demand and the local efforts in installing the existing crossing, as the indicator for recording the local support for the project.

Land Ownership:

We experienced much difficulty in explaining to local respondents what was being asked for. It was that even when

they understood the problem, the informants themselves were not very sure of their information. Thus it was extremely difficult to obtain even approximate accurate figures on this criterion.

Also the assumption that an area 1 or $\frac{1}{2}$ Km round the bridge site should be treated as the immediate vicinity of the bridge, where land value may rise due to bridge construction is not true, as we observed that the area where the land value might increase would be more reasonably represented by a 150 - 200 ft. wide strip of land along the approach trails of the proposed crossing on both banks.

However, the information on the percentage distribution of small land holdings is difficult to obtain except by means of a separate household survey which falls beyond the scope of a survey like this.

Also the assumption that the land value would increase following the construction of the bridge and that for equity reasons the bridge site with a relatively larger number of small holdings in its vicinity should be given priority has not been borne out by the field work. On the other hand it was found that the plots of land other than the small strips in the near vicinity of the proposed crossing do not record an increase in price.

Thus, it was the consensus of the study team to drop this criterion altogether from the scheme.

Presence of IRD Program:

Although the measure of this criterion is simple and objective, many of the IRD programs now in operation as well as those under consideration in the country cover such large areas (Anchal) that it was found difficult to accurately determine the exact nature of interrelationship between an organised IRD programs and the bridge. However, it was felt that such a relationship does exist. Thus, it was decided to keep this criterion as it is.

Presence of Main trail:

However, during the surveys, it was observed that the construction of a new trail suspension bridge should be aimed at improving certain existing main trails rather than random construction of bridges throughout Nepal,

Thus, the revised scheme has introduced a new factor on the presence of main trail which has been given a weight of 2%.

OVERALL PRIORITY RANKING PROCESS AND ITS LIKELY FUTURE IMPACT

Finally, few words on the future overall impact as we see it from the result of the application of the revised priority ranking scheme on the nationwide selection of suspension bridge sites will be in order, and are as follows:

- The way the list of criteria is structured, it is invariably likely to result in higher priority for mid-hill bridges at the expense of those in the remote mountain areas. Therefore, a regional consideration should achieve an advance parcelling of resources, following which the interregional priority ranking should be undertaken.

- Secondly, politics and popular decision-making process should be allowed to play their proper role. In other words, the order of priority for different bridge sites in a district should be left to internal sorting out of criteria, explicit or implicit. Once this has been done, the ranking scheme should be applied at the national level in order to identify priority bridges from the list submitted at the district level. When the districts discover over time that their priority demand list is subjected to a set of more objective, measurable, rational and nationally applicable criteria, their own approach to the district level selection process is likely to be gradually objective, tempered and reasonable.

CHAPTER SIX

6. REPORT ON ONEDAY INSTRUCTION COURSE AND FIELD TEST ON DRAFT MANUAL

The OBJECTIVE of the instruction course and field training program was to give an orientation regarding the use of the Manual for conducting socio-economic site surveys of Trail Suspension Bridge sites to all the technical staff of SBD, who will conduct the site surveys of suspension bridges in future.

Another aim of this training course was to open a deliberate discussion on the draft Manual by the future users so as to clarify all doubts raised by them and to incorporate necessary modifications if found reasonable before preparing the final Manual.

The field training program was specially arranged to help the SBD survey teams in visualising the actual field conditions and the problems likely to be encountered during the future field data collection process.

Both the courses were jointly sponsored by SBD/USAID-Nepal and organised and conducted by EAST's personnel who actually took part in the development of the draft field Manual.

The instruction course was held at Hotel Blue Star's Seminar Hall, in Kathmandu on 5th September 1980.

The field training program was conducted in Benighat Bridge site on 7th September 1980.

List of participants and some glimpses of the course in photographs are given at the end of this Chapter.

The details of what transpired during the class room course and field program are given in the succeeding paragraphs.

OPENING REMARKS

The instruction course was formally opened by Mr. A.K. Dhungana, the newly appointed Project Manager of the Suspension Bridge Division. After the opening of the course, he requested Mr. S.B. Pradhananga, Superintending Engineer, Department of Roads to say a few words. Mr. Pradhananga said that the Chief Engineer could not attend this function due to other pressing matters. Mr. Pradhananga said he was glad that such instruction courses were being conducted and wished all success for the seminar.

FIRST SESSION

Introduction and enumeration of the objective and scope of the Manual.

Speaker: Mr. P.C. Joshi

Mr. Joshi thanked Mr. A.K. Dhungana and Mr. S.B. Pradhananga for their remarks. He began his speech by outlining the objective of the study as a whole and of the Manual in particular. Mr. Joshi traced back the history of the study saying that different people and firms had conducted studies on it. He referred to the studies conducted by

German Consult, SATA and EAST Consulting Engineers. He said that the present Manual was based upon the scheme developed by USAID-Nepal and the test study done by EAST Consulting Engineers.

Mr. Joshi, then, emphasized the need for constructing bridges in the correct locations. He went on to say that, without proper studies, if the bridge was to be located even some hundred meters upstream or downstream of the traditional crossing point, it would not be optimally utilised.

Referring to the scant resources on the one hand and the demand for large numbers of bridges on the other Mr. Joshi said that this was the primary reason why an objective priority ranking scheme had to be developed and utilised in deciding the priority of trail bridge locations.

Mr. Joshi, then, enumerated briefly the criteria selected in the site survey Manual. He emphatically pointed out that the Manual had been kept deliberately open so that changes could be easily incorporated into it, should there be any need for them. He said that it had been presented in a draft form and was open for discussion in this seminar.

Mr. Joshi also enumerated the range of factor values assigned to different criteria and their implications. He explained that the Manual had basically two parts, one part dealing with the explanation of the objective and scope of the Manual which will be useful to the new users of the Manual and the second part consisting of the specific instructions to the surveyor for the proper conduct of the survey.

Mr. Joshi, then, wound up his speech by saying that further detailed discussions on specific disciplines would be conducted by the concerned experts.

DISCUSSIONS

Mr. A.K. Dhungana enquired whether all the participants were cognizant of criteria, factor values and ranges, and weight attached to each criterion. No response came from the participants. However, Mr. Joshi said that the individual experts could discuss and answer the questions raised on a particular aspect. He, then, introduced Dr. Mahesh Banskota to the participants and requested him to speak.

SECOND SESSION

Economic Aspect of the Manual.

Speaker: Dr. Mahesh Banskota

Dr. Banskota started by saying that the Manual should not be taken as a foolproof Manual. He said it was very difficult and almost impossible to develop a foolproof Manual in the context of the present stage of suspension bridge development in Nepal.

Dr. Banskota said that investment studies like economic feasibility studies incorporating cost-benefit analysis required modifications in the context of Nepal.

Dr. Banskota, then, briefly discussed the economic component of the Manual and said that a total of 50% weight had been given to economic

factors. He said "Giving weight has been discussed by the study team for many long hours and given the fact that our economic structure is what it is now, we have chosen 50% as the weight for economic factors". He mentioned that there was no hard and fast rule about it and added that after gaining the necessary survey experience during future surveys, the weights could be changed as necessary.

Dr. Banskota, then, explained the different economic factors and weights given to these factors. He said that the cost factor had been given 20% weight. The cost computation should be taken as total cost minus transportation cost. The second economic factor had been taken as non-local through traffic in annual average daily traffic. The non-local traffic had been defined as the traffic crossing the proposed site farther than half a day's walk. Dr. Banskota explained that as the concept of time of the field informants was difficult to ascertain, a different approach had been employed in the Manual.

Regarding the local production of food crops, Dr. Banskota said that it was difficult to collect data on it in the field. It would entail a detailed household survey but time constraints would not permit it. Therefore, the secondary data published by 'Agriculture Statistics of Nepal' for production had been extensively used. And he recommended that this practice be followed for the sake of uniformity.

On the question of major local exports, Dr. Banskota said that only the prices of major export commodities should be taken from the publication of Agricultural Marketing Information.

Dr. Banskota emphasised the importance of socio-economic data collection. He said that the socio-economic data collection and analysis was such more complex than technical data collection and analysis. He added that while technical data collection involve^d physical factors, the socio-economic data collection involved human elements and social environment which are relatively more complex.

Dr. Banskota said that the information collection task was a very difficult one. Therefore, he advised the participants to be very careful while collecting information. Information received in the field should be cross-check whenever possible, because information easily available may not be very useful and in some cases erroneous.

Dr. Banskota, then, said that on analysis of data and ranking computation Mr. Ghimire would speak in the later session.

DISCUSSION

Interesting questions were raised by the participants and lively discussions followed. There were questions on why primary data should not and can not be collected, why household surveys should not be undertaken, and on the use of aerial photographs to determine the area of arable land etc. Some participants also raised the question whether the cost factor should be eliminated altogether. Following discussions on these questions the concensus reached was that, should better data be available in the given environment and constraints it should be

taken, and if factors and factor values needed to be changed it could and should be changed in future, however for the present situation the Manual prepared should be strictly followed.

THIRD SESSION

Socio-Cultural Aspect of the Manual.

Speaker: Mr. B.K. Shrestha

Mr. Shrestha began his talk by saying that he being a social scientist himself approached the question of the suspension bridge site selection from the social point of view, although the subject matter sounded highly technical. He also cited by way of example the story of 'the blind men and the elephant to emphasise his remark'. Mr. Shrestha added that the suspension bridge construction was one of the important factors in the overall national development plan. He said this Manual was expected to help the decision making process and added that it would pave the way for the decision makers in future to determine the course on investment of scarce resources in a rational way in the country's development, because it was the call of the time that the main issues involved in the development of Nepal were the distribution of funds and investments that this should be examined in the regional context.

Mr. Shrestha, then, moved on to the social factors considered in the proposed ranking scheme for trail bridges. He said that the social considerations that had been envisaged were the indicators of the living condition of the rural population.

He said that much depended upon the validity of the data collected or in other words the reliability of the field data. Therefore, he emphasised that the data collection should be done very carefully and honestly.

He said that the proxy variables such as local population served by the bridge, presence of health facilities, presence of education facilities etc. had been taken as factors contributing to the enhancement of the living conditions of the rural population. Mr. Shrestha then enumerated the social criteria. In respect of the local population served, he said that it should be taken from census data but the influence area should be determined on the basis of group opinion on a half day's walking distance from the bridge. In this connection Mr. Shrestha also mentioned the lack of time concept and different distance measurement units used by local people, like Shyoole Kosh etc. The participants were advised to use their own judgement in administering questionnaires.

Regarding the presence of health facilities, Mr. Shrestha explained the rationale behind subdividing the facilities into hospital, health post and ayurvedic clinic facilities.

Similarly Mr. Shrestha explained the remaining social factors e.g. presence of education facilities, presence of administrative facilities. Dealing with the questionnaires he explained how to administer them and how to collect data.

Mr. Shrestha also explained the rationale for considering other relevant factors such as risk factor, local support of the project, type of river, presence of the main trail and of IRD programs.

DISCUSSIONS

One of the participants asked whether this Manual would be used only for those bridges to be financed by USAID-N or it would be applied to other bridges also. Mr. Dhungana of SBD volunteered to reply this question and said for the present this Manual would be used for the bridges to be financed by USAID-N and as far as its application for other bridges was concerned it would be decided later.

Also asked by the participants were other interesting questions such as whether the application exercise of this Manual would be as futile as in other HMC projects like the family planning program, the new education plan etc., whether SBD was aware of the preparation of this Manual by EAST and whether SBD was consulted during the preparation of this Manual etc. Replying to the last question Mr. Dhungana said that SBD was aware of the Manual's preparation and that this seminar was in essence, one of the processes of consultation. He added that this Manual was still in a draft form, and therefore comments and proposed improvements etc. were welcome.

Relevant questions were asked on health facilities and regional parity versus resource allocation. The questions were well taken and discussions were held. The consensus reached was that the Manual was

open to changes, and if necessary, changes could be introduced after future field application and on the basis of experiences gained in the field.

FORTH SESSION

Collection, processing and computation of data and priority ranking of bridges.

Speaker: Mr. L.P. Ghimire

Mr. Ghimire opened the afternoon session by saying that he would explain how to administer the questionnaire and would acquaint the participants with the questionnaire form and computation thereof. He first explained that in the questionnaire form one often comes across the word "right and left side of the crossing". For uniformity, to determine the right side and the left side, one should face towards the stream flow and his right hand side and the left hand side will be termed as the right and left sides of the crossing respectively.

He explained the Interview Schedule (A) for traffic survey and said the form designed was simple. He pointed out that a copy of the Nepali questionnaire was attached with the Manual deliberately for instruction purpose. Mr. Ghimire specially dealt with the note accompanying the schedule where the instructions are enumerated in detail.

Similarly, Mr. Ghimire also explained the Interview Schedule (B) for social and economic surveys. He explained the rationale behind the

assessment of the cost of the bridge, wherein the transportation cost had been deducted from the total cost. By doing so, the social equity and to some extent regional balance in distribution of bridge sites could be achieved. He also noted that the cost of the bridge would not be available to the surveyor for a new site. In such cases, Mr. Ghimire explained, a graph of cost versus span should be produced by SBD for suspension and suspended bridges from their recent cost records and this graph should be used to estimate roughly the cost of the said bridge with the known span.

The Mr. Ghimire explained how to achieve group consensus in extracting the traffic figures for local as well as non-local traffic. Mr. Ghimire also explained that knowledgeable and related persons should be gathered and the consensus on traffic should be arrived at on the third day of the survey. By then the actual traffic count figures would also be available for cross-checking. He also explained that three traffic season e.g. dry season, wet season and peak season traffic and said that peak season traffic might not exist in case of many bridges.

Mr. Ghimire went into the details of how to administer the questionnaire and collect data for different factors like local food production, major local exports, etc. He explained how to determine the principal market centres and the influence of the bridge vis-a-vis the market centres.

Dwelling on the population data in the influence area, Mr. Ghimire said the influence area of the bridge had been taken as the area covered by half a day's distance from the bridge in all directions and pointed out that in effect it would be of irregular shape. But for want of simplification in the case of local food production only it has been decided to take a circular area covered by 6 Km map radius.

Mr. Ghimire read out each line in the questionnaire form and explained the issues involved. He said that the questionnaire form was made very simple and was self-explanatory with the foot notes included.

Mr. Ghimire, then, drew the attention of the participants to the worked out example on Tikhatar Bridge which was distributed to them along with the questionnaire form in Nepali script. He went over each step and computation thereof. He explained the factor range, common rating value (CRV), Factor weight (FW) and weighted value (WV) etc. in detail.

Referring to the cost criterion he said the cost of the bridge was the total cost minus total transportation cost. He also said that the factor range of Rs. 200,000 to 2,000,000 should be amended in future due to inflation and the inflation rate should be uniformly applied as determined by SBD's design office as and when necessary. He also explained that in the case of negative CRV value, which is possible in certain cases, the participants were instructed to take zero as the minimum value. Regarding through (non-local) traffic he

explained how to compute and correlate the traffic count figures and interview figures. He also underlined the need for taking into account the three seasons for computation of the traffic volumes for whole year.

Similarly, he described all the steps involved in the use of primary data and secondary data and the computation method.

DISCUSSION

Participants showed great interest and raised many questions such as how to ascertain the local export quantities. It was felt that the answers delivered were to the satisfaction of the participants. The consensus reached was that the surveyors must make a thorough desk study and should more or less know the range of data that can be expected during the field survey.

CLOSING REMARKS

Speaker: Dr. P. Pradhan

Summing up the issue raised in the previous sessions Dr. Pradhan mentioned that if any new methods or procedures were to be employed in any system it is always the case that the first instinct would be to reject them. Saying that it happens in any discipline and system, Dr. Pradhan cited examples of how people start by rejecting the new ideas and methods, which after thorough examination and experiences gained, would be accepted if they proved to be useful for the system. Therefore, he said that it was but natural that one would have a

negative view on new methods, but one should also try to understand the necessity and usefulness of these new methods to bring fruitful results. Dr. Pradhan also referred to the questionnaire aspect of the Manual and requested the participants to be careful while utilising the present Manual, which is an open one and can be amended as need arises.

VOTE OF THANKS

Speaker: Mr. I.R. Onta

Mr Onta said that in such gathering someone is always entrusted with the task of extending thanks to all participants. He began by saying that he could see the keen interest taken by the participants in the seminar and that the discussions had been very lively. He thought that the issues raised in the discussions had been very interesting and stimulating, as well as fruitful in making the final Manual more meaningful.

He said that the time had come for the technicians to come out of the confines of the technological aspects and grasp the whole spectrum of the socio-economic system while planning and preparing for a technical project.

On behalf of EAST Consulting Engineers, Mr. Onta thanked the participants for their active participation in the seminar, Mr. A.K. Dhungana, Project Manager, for opening the seminar and for his active

participation and Mr. S.B. Pradhananga, Superintending Engineer (DOR) for his valuable remarks. Mr. Onta also extended thanks to the speakers for their valued lectures and to SBD and USAID-Nepal for sponsoring this instruction course program on the use of the Manual.

Lastly, Mr. A.K. Dhungana informed the participants that the field visit program for practical application would be held at Benighat on Sunday Sept. 7, 1980. He also informed them that a USAID bus would pick them from the predetermined stops.

FIELD TRAINING PROGRAM

- Field Trip to Benighat Bridge Site: On 7th September, 1980, as planned earlier, a USAID-Nepal Bus picked up all interested participants of SBD from various points in the city and proceeded towards Benighat Bridge site at about 9,00 AM. A separate jeep alongwith EAST's training personnel and the project personnel left at the same time.

The whole team reached the site at 12.30 PM. The construction of the bridge at Benighat had been completed only a few days ago, and the team could see the tar painting work on the bridge deck being carried out.

- Field Survey Procedure: Explained: Although the draft Manual was self explanatory and gave all necessary details on how to conduct the field survey, it was felt that an explanation of its details

to the participants before the start of the sample survey was necessary. The participants were divided into four different survey groups and were asked to choose the team leaders. Engineer Mr. Koirala, Mr. Upadhyaya, Mr. Adiga and Mr. Gyawali were selected to guide the survey teams. Copies of Interview Schedules A & B were distributed to the team leaders. These interview schedules were printed in Nepali language so that both the surveyors and local informants could easily understand them.

The job of explaining the process of administering the questionnaire to the local informants was undertaken by the Project Co-ordinator Mr. P.C. Joshi. He said that though the procedure was explained in the draft Manual in detail, the process of administering the interview schedules could be a little confusing, hence he advised the participants to be very careful and vigilant while obtaining information from the interviewees. He emphasised that cross questioning and cross-checking of the information gathered was vitally necessary utilising the surveyor's own judgement. Then he explained, step by step, the use and application of the interview schedules, to generate information from the local people.

- Actual Field Survey by the Participants: The four different survey teams formed as stated earlier, were then advised to start the sample survey.

During the survey which lasted for about 2 hours, EAST's personnel observed each team's performance. This gave an opportunity to the trainers to visualise the difficulties encountered by the trainee surveyors and also to note down any mistakes made by the trainees. At the same time some good suggestions from the trainees to modify or refine certain parts of the schedules were also noted down.

For example, it was found that the surveyors on both banks of the crossing were noting down the traffic from both sides, whereas the Manual had prescribed one way traffic count on each bank. Thus it was noted down that a foot-note clarifying this should be provided at the end of Interview Schedule - A for avoiding such errors in future surveys.

Next the surveyors found that the people were always inclined to give peak season traffic even when they were asked to provide dry and wet season traffic. Thus it was suggested to ask Q.No. 2.1 of Interview Schedule - B only after asking Q.No. 2.3 on peak season. This needed a rearrangement of the question numbers.

Another note was made on Q.No. 4 on Major local Exports. A question raised by one of the participants was if the major local exports included animals, should they be included? The question was well taken and a foot-note was added at the end of Q.No.4 stating clearly that the animals exported should also be taken if they are one of the major local exports.

It was also observed that the field participants were trying to convert the local weights into tonnage and because of lack of conversion table in the Manual, they had difficulty in doing so in the field. They were advised to do this conversion exercise in their office after the survey, as it was not necessary to indulge in this conversion exercise in the field. Thus a specific note about this was added at the end of Q.No. 4. Besides, it was also decided to include a conversion table in the final Manual.

After finishing the field survey exercise at Benighat it was decided that discussions should be held at a suitable place on the way back. This allowed the participants to exchange views on their field experiences while in the Bus, without losing much of travelling time any more, as it was already late for a return trip to Kathmandu.

Discussions: An open discussion was held between the participants and the trainers, at a suitable place (photo No. 8) on the way back. Participants showed more interest in the whole scheme now than they had shown during the class room instruction course in Kathmandu. Varied but relevant questions were asked. Mr. Adiga had doubts about the definition provided for medium river on page 16 of the Manual as he thought it was little confusing. This was well taken and it was decided that suitable modification on this should be made in the final Manual. All other questions were interesting but they were answered to the satisfaction of all the participants.

LIST OF PARTICIPANTS

	<u>Seminar</u>	<u>Field Trip</u>
A. <u>SBD'S TECHNICAL STAFF</u>		
1. Arun K. Dhungana (FM)	P	P
2. Dipak Chalise (AE)	P	P
3. M.P. Upadhyaya (AE)	P	P
4. Gopal Das Shrestha (OS)	P	P
5. Surya Pd. Shrestha (OS)	P	A
6. Shivaji Pd. Ghimire (OS)	P	A
7. Indra Gyawali (AE)	P	P
8. Kalyan Gyawali (AE)	P	P
9. Chhabilal Roy (OS)	P	A
10. Lokesh Joshi (OS)	P	P
11. S.N. Manandhar (AE)	P	A
12. P.B. Adiga (AE)	P	P
13. Rajendra Pradhananga (AE)	P	P
14. S.N. Thakur (OS)	P	P
15. Krishna Gopal Shrestha (OS)	P	P
16. Mohan Ratna Tamrakar (OS)	P	A
17. Bharat Man Shrestha (OS)	P	P
18. S.B. Gussai (OS)	P	A
19. Dev Nandan Roy (OS)	P	A
20. R.B.L. Karna (OS)	P	A
21. Dhana Raj Sapkota (AE)	P	P

	<u>Seminar</u>	<u>Field Trip</u>
22. Asha Man Tandukar (AE)	P	A
23. Narayan Khanal (OS)	P	P
24. Dhana Raj Sapkota (OS)	P	P
25. C.B. Bhujel (OS)	P	P
26. M.B. Chand (OS)	P	P
27. Indra Pd. Paudyal (OS)	P	A
28. Ruplal Shrestha (OS)	P	P
29. Ram Babu Shrestha (AE)	P	P
30. N.K. Koirala (AE)	P	P
B. <u>DEPT. OF ROADS</u>		
1. S.B. Pradhanang (SE)	P	A
C. <u>SATA</u>		
1. D. Panchitto (CE)	P	A
2. A. Grob (CE)	P	A
D. <u>EAST CONSULTING ENGINEERS</u>		
1. P.C. Joshi (CE)	P	P
2. Dr. M. Banskota (Economist)	P	A
3. B.K. Shrestha (Social Scientist)	P	A
4. L.P. Ghimire (CE)	P	P
5. Dr. P. Pradhan (Project Adviser)	P	P
6. I.R. Onta (CE)	P	P

	<u>Seminar</u>	<u>Field Trip</u>
E. <u>USAID - NEPAL</u>		
1. S.J. Freundlich (PDO)	P	P

ABBREVIATIONS

P : Present

A : Absent

PM : Project Manager

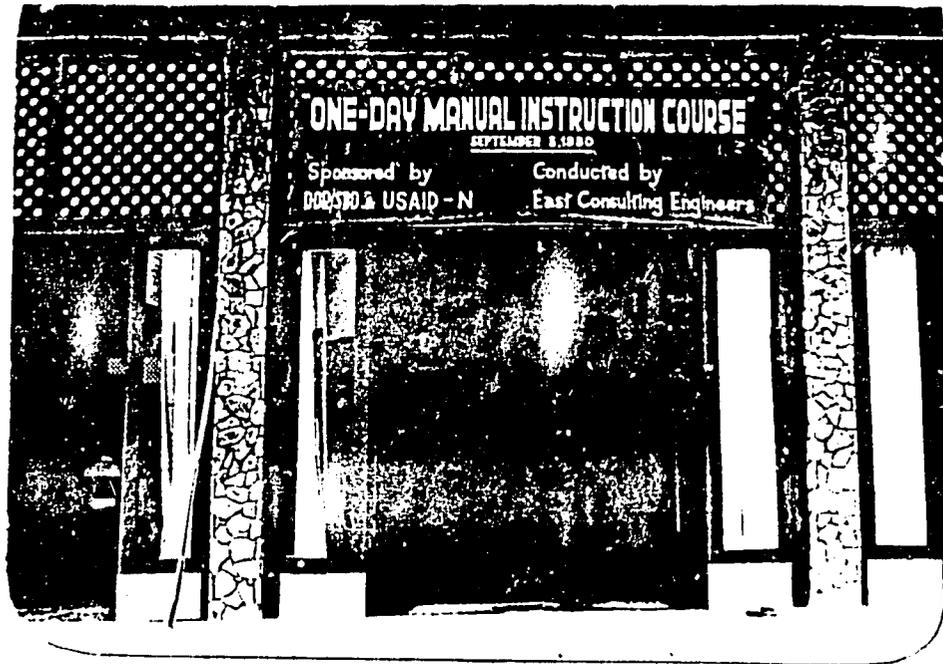
AE : Assistant Engineer

OS : Overseer

CE : Civil Engineer

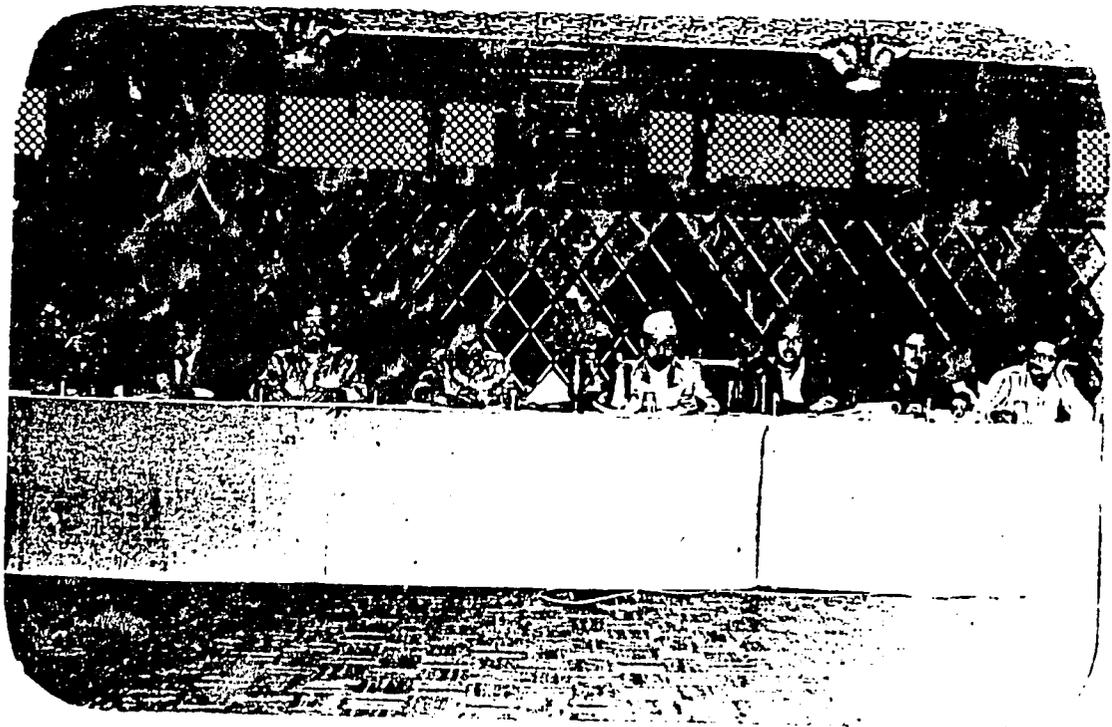
SE : Superintending Engineer

PDO : Project Development Officer

GLIMPSES OF TRAINING PROGRAM IN PICTURES

1

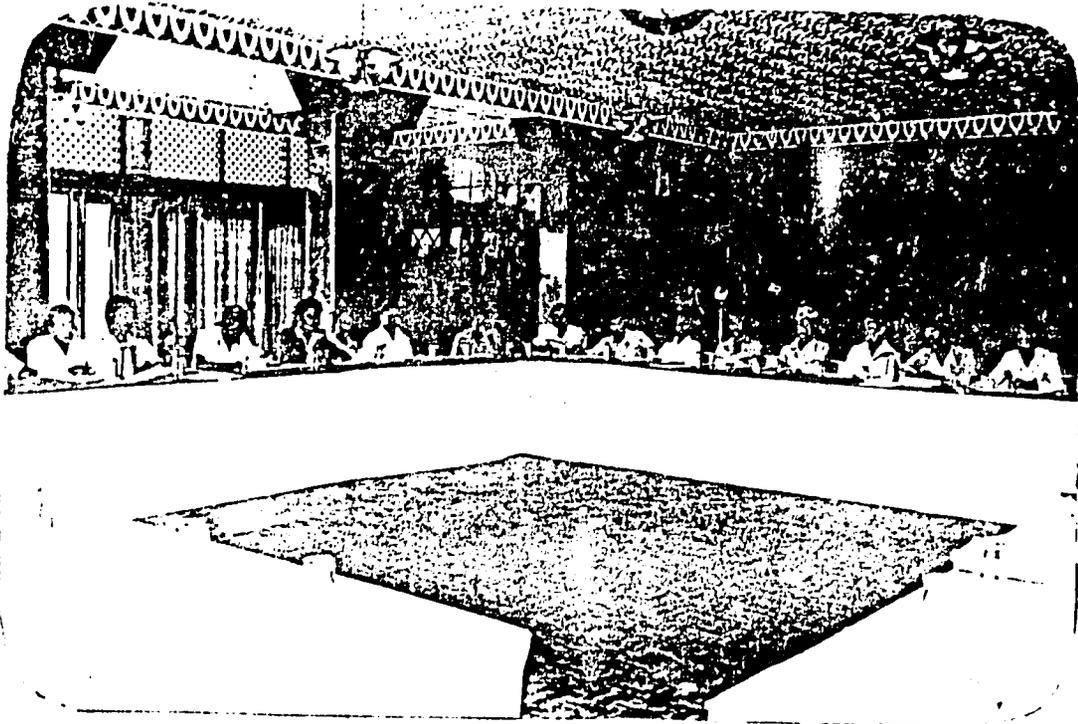
Outside view of the Seminar Hall at Blue Star Hotel



2

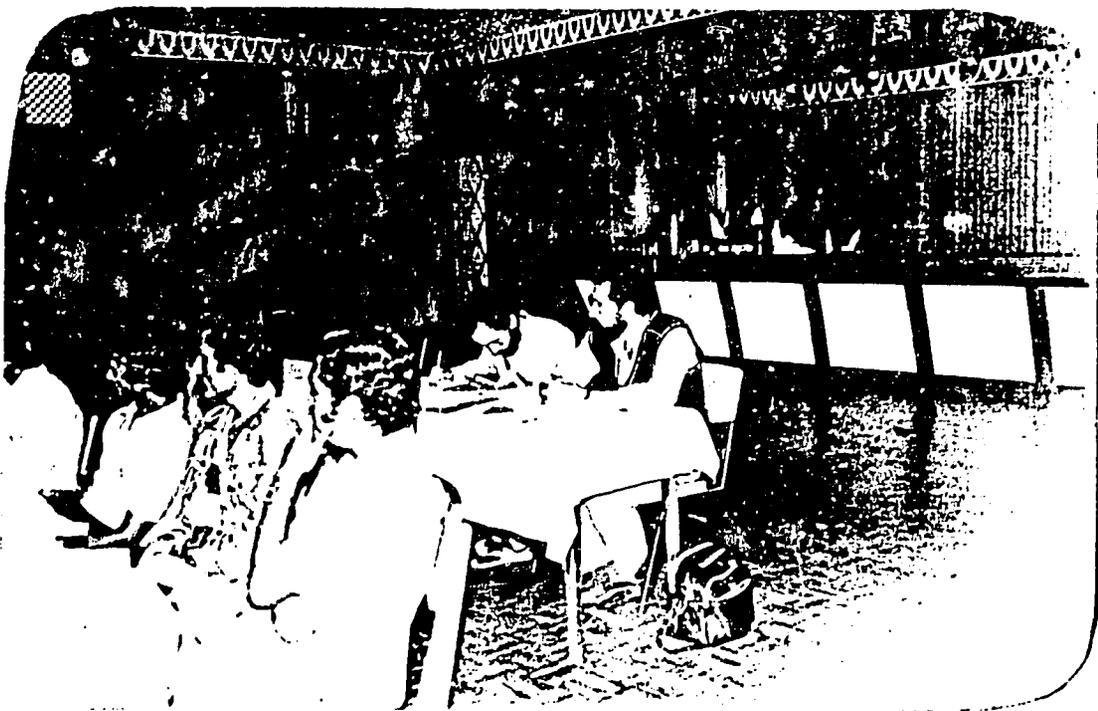
Photo showing the training consultants of EAST just after opening of the course. Mr. S. B. Pradhananga, Mr. A. K. Dhungana from DOR, and Mr. S. J. Freundlich are also seen in the picture.

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3

SBD's Technical staff (Participants), taking part in the Seminar with keen interest.



4

Civil Engineers from SATTA taking part in Seminar are seen in background.



5

Consultation among the EAST's training personnel just before the field training program at Benighat Bridge site.



16

SBD's personnel engaged in actual field survey interview with the local knowledgeable people.



7

Mr. Sapkota, a civil engineer of SBD, collects the socio - economic field data from local informants.



8

Group discussion followed just after the completion of field survey by the participants.

CHAPTER SEVEN

7. MODIFICATIONS MADE IN THE DRAFT MANUAL

Some minor but important modifications (additions and alternations) were made in the Draft Manual on the basis of the observations made by EAST's personnel during the instruction course and field training program. No formal comments were received either from USAID, or from SBD. However, Project Development Officer Mr. S.J. Freundlich of USAID informed verbally that there were no comments and the draft manual was approved, with minor modifications to be done as noted down in training course.

The modifications which were incorporated in the preparation of the final Manual are as follows:

1. Definitions of the river types have been more clearly elaborated now, to avoid any ambiguity. This was one of the minor but important observations made during field training by one of the participants.
2. During the field training program, it was observed that the traffic count was conducted on both way traffic as it was not clearly mentioned in the questionnaire. Specific instruction for taking only one way traffic on each bank has now been given in the Manual (Section 3) as well as in the foot notes of Interview Schedule - A.

3. Mention has been made in Question 1 of Interview Schedule - B about the method of calculation of the rough cost estimate, in case the detailed design and estimate of the concerned bridge have not been completed.
4. During the field training program, one of the participants noted that the local informants were more (or always) inclined to give the peak season's traffic even when they were asked to give the normal traffic of the year. Hence it was proposed that questions should be asked on peak season traffic first and then on the traffic on the rest of the season. Thus the questions on Q. 2 of Interview Schedule - B were rearranged.
5. In the draft Manual, Q. 4 of Interview Schedule - B did not mention whether to take the animals as major local exports (if such animal export existed). This was an important issue raised during the field training program. Thus in the final Manual a specific foot note has been added. Also during the field training the participants expressed difficulties in converting local measure into tonnage weight. Thus a conversion table has been provided at the end of the Manual. It was also observed that the participants were converting the units in the field, an exercise which should be obviously done more precisely in the office. A note to this effect has also been added in the foot note.

6. Some relevant changes have been made in the design of the work sheets to make them easier to handle. Necessary blank spaces and appropriate columns have also been provided in the final Manual. Lastly all typographical and other errors which were observed in the draft Manual have been corrected. However some errors have still managed to creep in and an errata has been attached.

(A - 1)

ANNEX 1: COPIES OF NOTES OF MEETING HELD DURING THE COURSE OF THE STUDY

Meeting No. 1

Notes of Meeting (6 pages)

Date: Feb. 27, 1980

Time: 6 PM - 8.30 PM

Expert's Pannel Meeting

At the office of EAST Consulting Engineers

Present

- | | |
|------------------------|----------------------|
| 1. Mr. S.J. Freundlich | 7. Mr. P. Subba |
| 2. Mr. P.C. Joshi | 8. Mr. L.R. Onta |
| 3. Mr. L.P. Ghimire | 9. Mr. R.R. Shrestha |
| 4. Mr. B.K. Shrestha | 10. Miss S. Kansakar |
| 5. Dr. M. Banskota | 11. Mr. K. Sangam |
| 6. Dr. H. Bista | |

Mr. Joshi, Project Co-ordinator, briefed the pannel on the development of the study so far achieved. He particularly emphasized the point that after a through review and discussion on the project paper, questionnaires had been designed. The questionnaires were pretested at Benighat. Included in this exercise were the senior consultants who spent two days in the site. Main difficulties encountered were in the area of (1) Concept of time (2) Concept of distance.

(A - 2)

In so far as the first concept was concerned local people had different ideas about the concept of time and so also with the concept of distance. The degree of variation was tremendous. Therefore, these field realities reinforced the need to make significant changes in the questionnaires and introduce derivative methods. Thus with respect of the first one the concept of time block has been introduced rather than hours of travel time. Time block essentially implies block-s of time in terms of 2 or 3 hrs; 2 or 3 hrs making one time block spread over the whole day of 10 hrs. Similarly with regard to distance, for example, instead of asking local people about how many panchayats or population fall within a 10 km radius it was agreed that first the village panchayats will be identified in the map within or approximately 10 Km radius and the question would be rephrased something like this -- what are the names of VP that can be reached from the present crossing facility in half a day or to and fro from the present site.

Mr. Bihari Shrestha briefed on the questionnaire one by one indicating how and why the questions are included. Regarding the population statistics Mr. Steve mentioned that CDO's office records could be fruitfully utilised specially with regard to population and VP within the district. Mr. Banskota agreed by saying that if CDO has these information the lower units like the VP must have these information which could be used. Therefore, for these information

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three alternatives will be applied (1) Writing letters to send the population information (2) CDO's information source (3) Population census.

Finding out population density is complicated. But this is intended mainly to ascertain the number of people that would be served after the construction of the bridge facility. Mr. Joshi elaborated this theme by drawing graphs and figures in the map. Population of all VP with one day's to and fro distance on the either side of the river will be taken. Density will be the product of total population on either bank divided by $\frac{1}{2} \times 2$. Mr. Ghimire demonstrated the idea of population that would benefit from the bridge to reach health posts etc. in the board by drawing the illustrative diagrams.

Mr. Steve suggested that planned institutions in the area should be included. But it was rejected on the ground that it would be only tentative. So IRD will be mentioned as an indication for future activity.

Mr. Steve hinted that the phrasing of questionnaires should be as simple as possible considering the fact that these will be used by relatively untrained personnels in future. Scoring of the institutions available within the influence area was also discussed. So also local support of the project was discussed. Mr. Steve mentioned that local projects need to be defined clearly in the manual.

Dr. Banskota briefed economic questionnaire. Three points were discussed:

- (1) Time savings
- (2) Food products
- (3) Exports

For (1) traffic survey will be conducted. The concept of toll has been included to identify local and non local traffic. It was observed that people within 5 hrs distance paid in kind and beyond that distance paid in cash. It will be further checked depending on areas.

For (2) type of products will be collected from field but production and yield rates will be calculated from the secondary data.

For (3) local information as well as judgement will be used. Mr. Steve also agreed that exports data are fairly difficult to collect.

During traffic count pack animals count will also be done and will be used to derive porter numbers. Other animals will be taken as export commodities.

It was also stated that information on accidents resulting in loss of animals and properties would be difficult to ascertain and if it is gathered it would be incorrect. Thus only drowning (human lives lost) will be taken.

Dr. Manskota said that secondary data source will be used to recheck economic informations.

On the question of ownership of land holding Mr. Steve mentioned that 20 ropanis is too large per family to denote smallness of farm. He suggested that it could be lowered to reasonable limit to fit local condition for example 10 ropanis and less. Mr. R.R. Shrestha pointed out that NPC (National Planning Commission) is also using 10 ropanis as small holdings in their survey. This minimum limit to indicate small farms was agreed by all pannel experts.

Mr. Steve asked if the tonnage information will be cross checked from field information but it was mentioned that production estimate will be made on the basis of secondary data only as the field information on this seems very misleading.

Main issues discussed and agreed upon are as follows:

1. No negative value to be assigned even if the construction of the bridge results in additional travel time in certain cases because of detour.
2. It was agreed to narrow down the radius of influence area which is to be drawn in the map. As a 10 km radius in a map means much more travel distances in hills because of rugged topography. About 5 to 7 km map radius would be approximately equal to 10 km travel time.

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3. Small farm limit of 10 ropanis will be taken.
4. Score of value to be assigned to different administrative facilities. It shall vary from .01 to .05 according to the number of facilities available.
5. Use of official sources to collect population data. Use of CDO's office and population census will be used according to conditions.
6. Loss of property and animals while crossing will not be taken.
7. Negative value only in case of construction cost will be taken.

Note: Copy is sent to Mr. S.J. Freundlich for confirmation.

Confirmation received.

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Meeting No. 2

Notes of Meeting (5 Pages)

Date: June 3, 1980

Time: 6.30 PM - 8.00 PM

Expert's Pannel Meeting

Re: Discussions on the Proposed Changes in the TSB-PP initial Ranking Scheme.

Place: Office of EAST Consulting Engineers, Keshar Mahal, Kathmandu.

Present

1. Mr. S.J. Freundlich Project Dev. Officer PDIS/USAID/N
2. Mr. P.C. Joshi Project Co-ordinator EAST. C.E.
3. Mr. L.P. Ghimire Deputy Project Coordinator EAST. C.E.
4. Mr. B.K. Shrestha Sr. Consultant/Sociology EAST. C.E.
5. Mr. I.R. Onta Sr. Consultant/Engineering EAST. C.E.
6. Dr. H. Banskota Sr. Consultant/Economics EAST. C.E.
7. Dr. F. Pradhan Project Adviser EAST.C.E.

The meeting was arranged to evaluate the proposed changes made by EAST's study group, in the initial TSB/PP ranking scheme, based on the experiences and knowledge gained during the application of initial TSB/PP ranking scheme in 10 pre-selected bridge sites. The evaluation and decisions were made to make way for the preparation of the Draft site survey Manual.

The discussions were focused mainly on the draft report Part 2, presented to USAID by EAST, entitled "Report on Study Observations and Proposed Changes in the Ranking Scheme". The report along with the Part 1 "Survey and Priority Ranking of Ten Trail Bridges" were submitted to PDIS/USAID/N on May 30, 1980.

Main issues discussed (Criteria wise) and decisions made were as follows:

1. Cost Factor

- 1.1. Revised Factor weight of 0.20 is O.K.
- 1.2. Minimum CRV shall be taken as Zero and not negative even if the Cost of the bridge comes excessively high (i.e. more than the maximum factor range)
- 1.3. Cost inflation shall be included. Calculations involving inflation factor shall be clearly mentioned in the manual.
- 1.4. Practical suggestion to be made in the Manual for the intra-regional priority ranking, mainly as a policy decision tool.

2. Through Traffic (Time Savings)

- 2.1. The proposal of taking only the annual average non-local daily traffic for measuring this criterion is accepted thus delay time is not to be measured.
- 2.2. River Factor, i.e. the nature of the river whether it is fordable, partly fordable or unfordable throughout the year shall be considered along with the non-local traffic.
- 2.3. The factor weight is reduced from 0.25 to 0.15 and the remaining factor weight 0.10 is to be addressed to river factor. However, as decided at the later part of the meeting, that the IRD programme area criteria should also be included, we have decided to reduce the factor weight for river factor to 0.08 and give 0.02 factor weight to IRD programme criteria.

- 2.4. The factor range for non-local average annual daily traffic will be 0 to 500.
3. Local Crops Production
 - 3.1. Based on the actual value observed on 10 study bridges, the maximum factor range shall be modified to 2500 Tons.
4. Major Local Exports & Imports*
 - 4.1. Imports value will now be included for basic essential consumer goods.
 - 4.2. The method of calculating imports value shall be clearly spelled out in the manual.
5. Local Population Served
 - 5.1 Appropriate questionnaires will have to be designed to assess this criterion more accurately, as per the new definition of influence Area. Concept of new influence area shall be clearly discussed in the manual.
- 6,7,8. Regarding the Health Facilities, School Facilities, and Administrative Facilities, New proposal has been accepted, considering the many difficulties in application of old concept. Factor weights and its sub-division taken are O.K.
9. Instead of accident prevention factor, risk factor is introduced now. Its measuring procedure shall be clearly defined in the manual. Factor weight is O.K.
10. Local support of the project: The proposal for measuring it is O.K.

* However, imports and their values could not be included because of the absence of primary as well as secondary data. (Hence also excluded in the Manual.)

11. Rive Factor: Factor weight now modified to 0.08 from the proposed 0.10 (as explained earlier in Through Traffic factor).
12. Trail Factor: Though not discussed in the meeting we later on decided to include this criterion, on the basis of presence of main trails for which the bridge crossing will be a part, instead of Trail Improvement Programme. The proposed criterion has been changed slightly now as follows:

Presence of a main trail	If the proposed bridge crossing lies in a main trail	Main 100%	Ordinary trail 0%
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13. Presence of IRD Programme: This was proposed to be deleted, but during the discussion it was decided that this criterion being very important should be included. Thus keeping the measurement procedure same, this criterion is given a factor weight of 0.02.

The Land Ownership criterion is deleted mainly because of the difficulties involved in its accurate assessment. Considering the present absence of primary or secondary data and mainly because of Survey limitations, this criterion, though commendable, have to be deleted.

SUMMARY

Majority of the proposed changes have been accepted and decisions taken. The draft site Survey manual shall be prepared based on these changes.

It has also been decided that EAST shall propose some further additional site surveys before the final printing of the manual is taken up. This however, will be a subject of future discussions with PDIS.*

Note: Copy was sent to Mr. S.J. Freudlich for confirmation.

Confirmation received.

* However on future discussions with PDIS, this preposition was dropped.

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Meeting No. 3

Notes of Meeting (Two Pages)

Date: July 7, 1980

Time: 2.30 PM to 3.30 PM

A joint meeting between SBD, SATA, USAID and EAST's personnels was held on July 7, 1980, at SBD's office between 2.30 to 3.30 P.M. to discuss the forthcoming training program.

Personnels Present:

- | | | |
|----|--------------------------|-------------|
| 1. | Mr. A.P. Upadhyaya | - SBD |
| 2. | Mr. J. Kraehenbuehl | - SATA |
| 3. | Mr. Steven J. Freundlich | - USAID-N |
| 4. | Mr. D. Suwal | - USAID-N |
| 5. | Mr. P. Joshi | - EAST.C.E. |

Main issues discussed and finalised were as follows:

1. Draft Manual will be submitted by EAST to USAID before 31st July, 1980.
2. 45 Extra copies of Draft Manual will be prepared in English and submitted to USAID.
3. The Draft Manual will be jointly evaluated by SBD/SATA, USAID & EAST before the instruction sessions by EAST's personnel. This will be done before August 15.

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4. One day training program will be organised. The place will be decided in a latter date. This will be done somewhere around the last week^{*} of September, 1980.
5. EAST's personnel shall join a field training program, organised by SBD/SATA/USAID, to be conducted at a bridge site near to Kathmandu preferably at Mahesh Khola Bridge / Benighat Bridge site.
6. The final manual will be prepared and submitted to USAID at the end of November, 1980.

Circulated to:

Mr. A.P. Upadhyaya	Project Manager, SBD
Mr. J. Kraehenbuehl	Civil Engineer, SATA
Mr. Steven J. Freundlich	Project Dev. Officer, USAID
Mr. D. Suwal	Program Specialist, USAID
Mr. P.C. Joshi	Project Co-ordinator, EAST

Copy of this was sent to Mr. S.J. Freundlich for confirmation.

Confirmation received.

* However, the training program took place in the first week of September, 1980.

ANNEX 2

FINAL SITE SURVEY MANUAL IN ENGLISH AND NEPAL

HIS MAJESTY'S GOVERNMENT OF NEPAL TRAIL SUSPENSION BRIDGE PROJECT



Site Survey M A N U A L

for conducting
Socio - Economic Site Surveys
of Trail Bridges in Nepal

Financed by USAID - Nepal

for the use of
SUSPENSION BRIDGE DIVISION, SURVEY TEAMS

Developed & Compiled by

November — 1980

 EAST

E R R A T A

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PREFACE

This Manual describes in detail a comprehensive procedure for conducting socio-economic site surveys of trail bridges so as to ensure a proper ranking of bridge sites in order of socio-economic priority.

The Manual aims at providing clear guidelines to Suspension Bridge Division's Survey Teams and equipping them with a knowledge of the application of the site selection procedure which is called here Priority Ranking Scheme (PR Scheme).

The Priority Ranking Scheme was initially designed and developed by USAID-Nepal on the basis of the studies done by EAST Consulting Engineers, German Consult and SATA. EAST Consulting Engineers, on the basis of the knowledge and experience gained during its field surveys based on the PR Scheme on 10 pre-selected bridge sites, proposed some revisions in the initial scheme in May, 1980. These revisions were approved and incorporated into the revised scheme on which the present Manual is based. It contains four different sections and two annexes. The first two sections are meant especially for those manual-users who need initial orientation of the study, whereas the last two sections give specific instructions to the surveyor for the proper conduct of the survey. Models of Interview Schedules and Worksheets are appended to the Manual as annexes.

(i)

The Manual is purposively kept open for refinement in future as more surveys will be conducted in accordance with this Manual. However, any major deviations from the instructions contained herein must be satisfactorily explained and approval from authorised person(s) for such deviations documented in the Manual itself.

It is felt that this Manual will make a substantial contribution to the enhancement of SBD's present professional and institutional capacity for selecting and ranking trail bridge sites in the country in a more rational way.

The study has been funded by USAID-Nepal, and EAST extends sincere thanks to USAID-Nepal for entrusting it with such an important task. EAST has put sincere efforts in preparing this Manual, so as to make it more functional and applicable in the present field situations.

Finally, EAST would like to extend a personal note of thanks to all those involved in this task.

NOVEMBER 1980

EAST CONSULTING ENGINEERS
K A T H M A N D U

(ii)

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SECTION 1.

INTRODUCTION

1.1 The Trail Suspension Bridge Project

The Project, financed by USAID-Nepal, is one of a series of ongoing efforts of the Government of the United States to assist Nepal in those projects which directly aim at providing maximum benefits to the rural poor.

Suspension bridges in the hills of Nepal are one of those important projects by virtue of which a large section of the rural population will be the primary beneficiaries whose time, labour and money involved in crossing turbulent rivers would be saved by the presence of such bridges. The suspension bridge project is a socially feasible project which has the potentiality of generating a number of social benefits for the rural poor. However, the relative magnitude of these benefits will depend on the location of the bridge. Thus, one of the primary objectives of this project is to evolve a systematic site selection procedure resulting in a Priority Ranking Scheme (PR Scheme) which is intended to be incorporated eventually into a manual which will be utilized in future by the regular survey teams of HMG's Suspension Bridge Division (SBD). Once this objective is achieved, it is expected that the bridge sites selected thereafter will meet the best of costs, engineering and socio-economic criteria thus ensuring maximum benefits to the population served.

(1)

1.2 Development of Priority Ranking Scheme

The Priority Ranking Scheme was initially designed and developed by USAID-Nepal. The scheme is described in detail in the Project-Paper. The proposed set of criteria have a pertinent bearing on the issues involved in the selection of trail bridges and constitute the first systematic attempt ever made to bring together a set of variables which are related to the selection of bridge sites. For details of the initial scheme and its concept, the reader is requested to refer to the Trail Suspension Bridge - Project Paper (367-0119) developed by USAID-Nepal in August, 1979.

SECTION 1.

It is true that USAID's attempt to design a systematic objective procedure of bridge selection has decidedly been an innovation in this field, but it is also equally true that its successive development and refinement is vitally necessary. As such, the responsibility of its first application and refinement was entrusted to EAST Consulting Engineers (ECE). ECE was called upon to carry out an experiment of the new concept on ten pre-selected bridge sites and to prepare a field Site Survey Manual on the basis of the knowledge and experiences gained during such an experiment.

Following its surveys, ECE came out with proposals for some changes in the initial scheme and other reasonably viable factors and factor values so as to make them more easily applicable in the present field situation.¹⁾

The proposed changes and refinement in the previous PR Scheme were discussed and evaluated in a joint meeting between ECE's personnel and PDIS/USAID personnel. The proposed changes were accepted with minor modifications.

(2)

The revised scheme was the result of ECE's surveys and is based mainly on the following basic considerations.

- To make the field data more easily measurable in the field and to make it easier for the SBD's survey teams to handle.
- To introduce necessary changes in some of the weights previously given to different criteria so as to bring them closer to reality.
- To modify the initial range of factor values so as to fit them into the actual observed conditions - a point also admitted and referred to in the Project Paper.²⁾

1) For more details, see ECE's Final Report on Survey and Priority Ranking of Ten Trail Bridges, November, 1980.

2) Trail Suspension Bridge - Project Paper (367-0119).

SECTION 1.

- Some of the concepts employed in the criteria needed some refinements, and changes are made accordingly in the nomenclature of the criteria as well as in the indicators employed for measuring them.
- Finally, the field surveys also strongly suggested that some criteria be dropped and others be developed in their place.

The following Summary Sheet shows the revised priority ranking scheme on which this Site Survey Manual is based.

SUMMARY SHEET: PROPOSED RANKING SCHEME FOR TRAIL BRIDGES

SECTION 1.

CRITERIA/FACTORS	Measurement Unit	Range of Factor Values	Common Rating Scale-Percent	Factor Weight
I. Economic Factors				(0.50)
1. Cost	Total Estimated cost minus total transportation cost.	Rs. 2,000,000 to 200,000	0-100	0.20
2. Through Traffic	Non-Local Traffic in AADT	0-500	0-100	0.15
3. Local Production of Food Crops	Tons per annum	0-2500	0-100	0.10
4. Major Local Exports	Rupees per annum	0-1,500.000	0-100	0.05
II. Social Factors				(0.30)
5. Local Population Served	No. of persons within <u>10 km walking distance</u> from bridge site	5,000-40,000	0-100	0.10
6. Presence of Health Facilities	Hospital (within 5 Hrs. walking Limit) Health Post (within 3 Hrs. walking Limit) Ayurvedic Clinic (within 3 Hrs. walking Limit)		0-100	0.03 0.02 0.01
7. Presence of Education Facilities	High School (within 4 Hrs. walking Limit) Middle School (within 3 Hrs. walking Limit) Primary School (within 2 Hrs. walking Limit)		0-100	0.03 0.02 0.01
8. Presence of Administrative Facilities	- Agricultural Support Offices (within 4 Hrs. walking Limit) - Banking Institutions (within 4 Hrs. walking Limit) - Law Courts, Land Revenue Offices, Cottage Industries (within 4 Hrs. walking Limit)			0.02 0.02 0.02
			0-100	0.02

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SUMMARY SHEET contd...

CRITERIA/FACTORS	Measurement Unit	Range of Factor Values	Common Rating Scale-Percent	Factor Weight
	- Post Offices	(within 4 Hrs. walking Limit)		0.01
	- Other Govt. Offices	(within 4 Hrs. walking Limit)		0.01
III. Other Relevant Factors				
9. Risk Factor	Degree of Risk involved in using the existing crossing facilities	high medium low Nil	100 50 25 0	0.04
10. Local Support of the Project	Degree of intensity of local bridge demand + Local Initiative for building and maintaining the existing crossing facilities	high medium low Nil	100 50 25 0	0.04
11. Type of River*	Major Medium Minor	- - -	100 60 20	0.08
12. Presence of the Main Trail	If the bridge site lies in the Main Trail	Yes No	100 0	0.02
13. Presence of IRD Program	Inclusion of bridge site in the IRD Program area	Yes Planned within 2 years No	100 50 0	0.02

* See Section 2.2, page 13 for definition of River types.

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SECTION 1.

1.3 Objective of the Manual

This Manual has been prepared to guide the Suspension Bridge Division's Survey Teams to conduct future field surveys of suspension bridge sites on the basis of a consistently defined set of socio-economic criteria requiring the use of uniform procedures so that a judicious allocation of resources could be made, and subjective and biased decisions could be avoided as far as possible.

The final objective of this Manual will be to prepare a priority list of suspension bridge sites at the national level. It is expected that the survey teams utilizing this Manual will adhere to the basic instructions and guidelines included therein and all data must be reported in the formats specified.

1.4 Scope of the Manual

(6) This Manual provides necessary background data, data sources, criteria determination, field data collection procedures, data analysis and submittal instructions for the conduct of the study by the regular survey teams of SBD.

The Manual is based on the revised ranking scheme. Altogether thirteen criteria have been selected on the basis of their relevance to the socio-economic issues affecting the selection of bridge sites. A more detailed explanation of each criterion and its determination is given in Section 2.2 of this Manual.

Different revised weights have been allocated to each criterion according to its relative importance to the local populace.

A procedure for calculating the final score of each bridge site is described in detail in the Manual. It is important to recognize here that the final score assigned to each bridge site has no significance other than to provide a comparison to other bridge sites which have been evaluated on the same basis.

STUDY ORIENTATION AND PREPARATORY WORKS

2.1 Main considerations of the Project

The Suspension Bridge Project is based on the following main considerations:

Economic Considerations

- The scheme deviates from the usual traffic analysis approach and adopts the alternative approach used for feeder or penetration roads, which instead of focussing directly on user savings, concentrate's upon the economic consequences of this in terms of increased production and value added.
- Both users and non-users benefits are considered. An approach has been adopted which examines both situations separately and combines them to give a net result.
- A trail suspension bridge project has a unique characteristic that the economic benefits generated for both users and non-users are virtually independent of the cost of each crossing improvement.
- Induced benefits to the local area of influence are most prominent in the agricultural sector. The crossing improvement can influence the agricultural inputs as well as the total agricultural output.
- The net impact on trade of a crossing improvement resulting from the reduction in transportation cost is likely to shift in favor of the local hill economy as opposed to the outside areas.

(7)

Social Considerations

- The demand in the form of requests and petitions for the construction of suspension bridges all over the country is so high that there is simply no reason to believe that the local population may not accept such a project.

SECTION 2.

- Local participation in the construction of suspension bridges in general is found to be very high throughout the country. Baglung bridges are the bright example.³⁾
- Given the severe problem of underemployment in the hills of Nepal, the opportunities for employment generated by the construction of suspension bridges, though on a one-time basis, can not be ignored.
- The high degree of social mobility existing in the hills of Nepal would amply justify the projects which provide improved access for such mobility. The benefits resulting from the improved access thus directly go to the rural hill population.
- Previous research studies on the social impact of trail bridges show that major social benefits distinctly observed are as follows:
 - (a) Better chances for availing the benefits of the existing health/ education facilities.
 - (b) Increase in social interactions and promotion of religious activities.
 - (c) Elimination of crossing hazards resulting in the loss of human life.
 - (d) Easy access to farm specially during the period of greater agricultural activities.
 - (e) Improved government services resulting from the provision of greater mobility to government officials into the area.
 - (f) Enhancement of the process of social and cultural interactions among the local women.

(8)

3) Refer to Trail Suspension Bridge Study, PART-B: EAST Consulting Engineers, 1978.

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SECTION 2.

For a deeper understanding of the project the reader is advised to refer to the Project-Paper (PP 18 - 64).

2.2 Criteria and their Determination

The criteria selected in the scheme are comprehensive, easier to measure and are expected to cover almost all issues discussed in the foregoing section.

The revised set of criteria shown in the Summary Sheet (attached at the end of section 1.2 pages 4 and 5 are made simpler for measurement considering the field situations, are easy for the SBD's survey teams to handle and are also easily understandable. Their weights have been suitably modified to bring them closer to reality. Some criteria are changed vis-a-vis those proposed in the Project-Paper along with their measurement units.

A brief description of the main features of the revised criteria is given below. The aim is to give an orientation of the study to the new users of this Manual.

(9)

Cost: All other things being equal, the site selection scheme should obviously favor those crossings which can be spanned at less expense. The total cost can be accurately determined only after a detailed design and estimate is prepared by SBD's Design Office. The estimate will provide the total cost and the transportation cost separately. The cost to be considered in the scheme will be the total cost minus the transportation cost. The currently prescribed factor range (200,000 to 2,00,000) should be modified every year on the basis of the inflation factor based on previous construction experience of SBD.

In certain cases where the ranking of a bridge is demanded prior to the completion of its detailed estimate, a rough cost estimate based on the most recent estimate figures of similar construction can be obtained by using a graph between the construction cost (without portage cost) and span of similar (suspension or suspended type) construction.

SECTION 2.

Through Traffic: Because of the unreliability involved in accurately assessing the time saving criterion, it is eliminated. The new criterion measures only the through traffic based on an actual 3-days' traffic count at the crossing for peak/dry seasons and determines wet and peak/dry seasons traffic on the basis of intensive local interviewing supplemented by the surveyor's own assessment.

Through traffic is defined as the traffic passing through the crossing but excluding all such traffic as is within a day's back and forth walk from the bridge site. In other words, it includes only that type of traffic whose origin and the destination of travel lie outside a day's back and forth walk from the bridge site (assumed to be equivalent to a 10 km. walking distance). All traffic other than this is regarded as local traffic.

(10) Through traffic usually indicates an economic purpose of travel. The economic importance of through traffic, in most cases, is substantially greater than that of local traffic. Long distance pack animals should also be included in the traffic count as they serve economic purposes. Usually they are of two kinds, goats/sheep or mules/buffaloes. About two goats/sheep or one mule/buffalo is to be taken as equivalent to a porter. This will be used to convert pack animals into porters (human traffic) in the traffic count.

Local Production of Food Crops: Existing production of basic food crops is taken as a proxy of the potential for future agricultural improvement. The agricultural area of influence is defined as that area which lies on the side of the river farthest from the nearest market center which can be covered in a day's back and forth walk from the proposed crossing. In the absence of maps or data showing the exact area of Village Panchayats (VPs) in the country, it has been decided that the agricultural area of influence should be taken as equivalent to a semi-circular area enclosed by a six km. radius which equals about 6000 hectares. For all practical purposes, the ECE's surveys indicate that the deviation between the assumed area (6000 hectares) and the area covered by a day's back and forth walk on one side of the river should not be so significantly great as to affect the estimate of the agricultural production to a large extent.

SECTION 2.

To estimate production, field interviews should be conducted to obtain the names of the basic food crops grown in the influence area and all other necessary data should be collected from the most recent publication of the 'Agricultural Statistics of Nepal', Department of Food and Agriculture/HMG-N. In the absence of valid local data, the district data given in the 'Agricultural Statistics' should be utilised. The book gives total area, cultivated area, harvested area and yield of basic food crops for all districts and from this the local estimate of crop production can be easily derived, as explained in Work Sheet No. 3, page 46. The range of factor values is taken as 0 to 2500 tons per year.

Major Local Exports: The influence area for exports should be considered same as agricultural area of influence. For more clearer definition of influence area, the reader is requested to refer the second paragraph on Local Population Served given below. The weight estimate of major local export is determined on the basis of three or four main commodities, if such commodities exist, which are being produced locally and marketed outside the area. Extensive local interview should be conducted to collect this information. The weight estimate is then converted into monetary terms based on prices derived from the district average retail price data available in the 'Agricultural Marketing Information' (A quarterly publication of the Ministry of Food, Agricultural & Irrigation, Marketing Services/HMG, Kathmandu). The range of the factor value is taken as 0 to 1.5 million rupees per annum. (11)

Local Population Served: Local population within the area of influence has been included among the set of criteria as a general measure of the potential local impact of bridge construction on all spheres of activity, economic, political, social and cultural.

The influence area of the bridge will be taken as the area around the bridge site which could be traveled back and forth in a day's walk. It is assumed here that the influence area would be defined by a random perimeter (depending on the topography of the area) composed of about 10 km. walking limit from the bridge site for an average local person who walks 2 km. per hour and generally travels 20 km. in a day.

SECTION ..

In the process of collecting population data, first, the names of the village panchayats or ward numbers which lie within a day's back and forth walk from the bridge site should be obtained from the local informants. Once the names of such village panchayats or ward numbers are available, the population data for such VPs or ward numbers can be obtained from the census data (1976) available from the Home and Panchayat Ministry. The census data (1976) should be used until such time when the 1981 census data are made available. The population projection should be made according as it is defined in section 2.3, page 16 of this Manual.

The whole of the influence area should be included so as to provide a better reflection of the potential social and cultural interactions between the two sides of the crossing. However, care should be taken to deduct any population which is served by any other bridge upstream or downstream on the same river within a day's walk from the proposed crossing.

(12) Other Social Factors: (Presence of Health, Education and Administrative facilities). The benefit of an improved crossing with respect to increased use of existing health, education and administrative services by the local population has been amply demonstrated by previous studies on suspension bridges. Therefore, these criteria have been included to reflect the benefits accruing to the local populace. It has also been established by previous studies that travel time is a key factor for the utilisation of these rural facilities. Therefore, different travel time limits are specified for different facilities depending upon the nature of those facilities and their users. For example, a 2 hrs. time limit is recommended for primary school children, whereas a 4 hrs. limit is prescribed for high school boys. Similarly, a 5 hrs. limit is proposed for a Hospital and 3 hrs. for a Health Post and an Ayurvedic Clinic and a 4 hrs. limit is specified for all local administrative services.

A very simple measurement method is recommended to assess these criteria, i.e. additional scores be given to a bridge site just on the strength of the existence of the mentioned facilities within the prescribed travel time from

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the proposed bridge site. The travel time can be conveniently derived by using the new method specified in the foot-notes of Qs. 6, 7, & 8 of Interview Schedule - B.⁴⁾

Different weights have been allotted to different kinds of facilities depending upon their relative importance and need to the local population. However, if there is more than one facility of the same kind on the same side of the river within the respective distance limits, double scoring should be avoided. If the same kind of facilities exists on both sides within the specified time limits, a zero score should be given for such facilities.

Other Relevant Factors

Risk Factor: This factor has been included in order to measure the relative magnitude of safety achieved in travel following the construction of a bridge. This factor is to be measured on the basis of field observation of the surveyor supplemented by the history of accidents in the present mode of crossing. The surveyor after analyzing the history of accidents supplemented by his personal field observation should express his opinion on Risk Factor in terms of four alternatives, high, medium, low or nil.

(13)

Local Support of the Project: The efforts made by the local people over the years in getting the bridge listed in the center's demand list can not be ignored. Also the degree of local initiative in installing and maintaining the present mode of crossing will be a good indicator of the importance of the project to the area.

For this reason the future surveys should record the history of local efforts. The surveyor should then observe the existing condition of the present mode of crossing, and finally record his judgement in terms of four alternatives high, medium, low or nil, to indicate the degree of local support.

Type of River: The nature of rivers plays an important role and is generally a key factor in deciding the relative need of an improved crossing

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at a particular place. And as the time saving criterion is excluded in the revised scheme which would have otherwise indicated the nature of rivers to be spanned, the necessity of introducing a new factor on river types became more prominent.

The rivers have been classified basically as major, medium and minor, depending upon whether they can be forded by the porters and pack animals in the immediate vicinity of the proposed crossing. A simple definition will be as follows:

A major river is one which is unfordable throughout the year.

A medium river is one which is fordable at some places (in the immediate vicinity of the proposed crossing) during the dry season with great difficulty. Such river can be spanned by temporary local bridges which are generally found in the immediate vicinity of the proposed crossing.

(14)

A minor river is one which is fordable easily during the dry season.

The surveyor, based on above definition of rivers and from his personal observation in the field, should classify the river. Being an important factor a relative weight of 8% is assigned to this criterion.

Presence of Main Trails: It can be reasonably said that the study and construction of new trail bridges should aim at completing improvements on certain main trails rather than construct bridges at random places throughout the country. Therefore, if the bridge crossing lies on a main trail, it should be given a higher score.

Main trails which have been used for centuries as important trade routes and postal routes, and which may still be serving the same purpose are especially those which have not yet been replaced by motorable roads. These trails connect places of historical interest and are usually wide with steep gradients mostly stepped by flagstones. Most of the main trails in the

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country have a north-south orientation and this should constitute an important, if not an obligatory, condition for defining a main trail.

Therefore, the revised scheme has included the trail factor as an important criterion and given a weight of 2%.

The surveyor with a knowledge of the above definition of main trail supplemented by a thorough map study of the trail, should be able to indicate whether the proposed crossing lies on a main trail or not.

Presence of Integrated Rural Development (IRD) Program: Although the exact nature of the potential interrelationship that can exist between the improved crossing and an organised IRD Program is very difficult to assess because of the very large areas covered by such IRD Programs, it can not be denied that such relationship does exist. Therefore, a simple measure in terms of three possible responses (yes, planned within two years, no) should be recorded. The surveyor, therefore, should find out the responses from the central co-ordinating IRD office at Shree Mahal, Kathmandu, under the newly (1980) opened Ministry of Local Development.

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2.3 Background Data Collection

Background data needed for the study should be collected prior to the field visit. The data required are as follows:

- 1" = 1 mile Topographical Map of the concerned area prepared by Survey of India. SBD's Design Office has a set of 1" = 1 mile maps covering nearly all of the country. The index map should be referred to for locating the particular map sheet or sheets. A photostat copy of this map is recommended for field use.
- Anchal (Zonal) and, if available, District map of the area should be collected from the Topographical Survey Department/HMG, Baneshwar, Kathmandu. These maps will be primarily used to gather first hand

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information on the survey area and to familiarize the surveyor with the names of the survey area and its surroundings.

- Population figures should be estimated from CBS 1971 Census Data adjusted by the Ministry of Home and Panchayat (MHP) in 1976 to account for boundary changes, assuming the annual growth rate to be 2.2 percent. Once this figure is obtained, the population projection for subsequent years should be done by using the following formula:

$$P_n = P (1 + r)^n$$

P_n = Population after nth year

P = 1976 population figure CBS/MHP*

r = growth rate (assume 2.2% per year)

n = No. of years after 1976.

*1981 CBS Census data should be used to estimate population, once it is made available.

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- To estimate agricultural production, 'Agricultural Statistics of Nepal' published by the Department of Food and Agriculture, Marketing Services, Kathmandu, should be used. At present, only the 1977 publication is available; nevertheless, the latest publication should be used as far as possible.
- For estimating the monetary value of major local exports, the district-wise average retail price of the commodities in question should be taken from the Quarterly Publication 'Agricultural Marketing Information' published by the Ministry of Food and Agriculture, Kathmandu.

For additional information, it is advisable to make reference to the following reports:

- Final Report on Survey and Priority Ranking of Ten Trail Bridges EAST Consulting Engineers, Kathmandu, November 1980.

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- Trail Suspension Bridge - Project Paper (367-0119) August 31, 1979; USAID-Nepal, Kathmandu.

2.4 Study of Site Location Map

The 1" = 1 mile topographical map prepared by Survey of India is the most appropriate map for the site survey study of trail suspension bridges.

These maps are available in SBD's Design Office. In case, these maps are not available in SBD, the next place to contact is either Royal Nepal Army or topographical branch of the Survey Department of HMG-N from where the map can be available on loan. A photocopy of the map should be made and the approximate location of the proposed crossing should be marked.

The trail route should be observed very carefully in the map, and whether it is a main trail or not should be noted. It should also be noted if the river happens to be the boundary of two districts, in which case the names of the districts should also be noted. District or Zonal maps available from the Topographical Survey Department should be used to list roughly the names of the village panchayats around the proposed crossing to get general information about the survey area prior to the field visit.

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The photostat copy of the map thus marked should be taken to the field for verification of the information already collected.

* * *

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INSTRUCTIONS FOR FIELD SURVEY

3.1 Traffic Count

Traffic count shall be conducted at the proposed site to estimate the traffic volume. As most of the SBD's technical site surveys are conducted during the dry season and the socio-economic surveys are also to be done simultaneously, it is only possible to conduct a dry season traffic count at most of the sites.

These surveys should be conducted at the traditional crossing points for at least 3 consecutive days generally starting at 5 AM in the morning and closing at 7 PM in the evening. Traffic questionnaire (Interview Schedule - A) should be used to conduct such traffic surveys. Foot notes of the Interview Schedule - A⁵⁾ should be strictly followed.

(18) Use 4 enumerators, 2 on each bank for one way traffic count. Train and supervise these enumerators throughout the first day of the traffic count. If necessary, also supervise them during the second day of the survey. Count also the pack animals which are usually goats/sheep, or mules/buffaloes etc, and convert them into equivalent human porters as per the footnote given in Schedule - A.

At the end of each day complete the questionnaire by totalling the traffic volume. See that all blanks are completely filled in.

After 3 days of counting, find out the average daily through (non-local) traffic. This figure should be assumed to represent the non-local A.D.T. (Average Daily Traffic) in the dry season/peak season. The local traffic volume is not necessary for the study but it should be recorded for academic interest as well as for future references.

5) See Annex 1, page 26 of this Manual.

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The A.D.T. of wet and dry/peak seasons should be assessed by using Q. No. 2 of Interview Schedule - B.⁶⁾ Because of the time constraint, the traffic estimate for wet and dry/peak seasons should be made by intensive local interviews with boatmen, ferry operator(s), supplemented by surveyor's field impression.

If the traffic count falls in the peak season, then A.D.T. for the rest of the dry season and wet season should be assessed on the basis of local interview and surveyor's personnel impression.

3.2 Use of Socio-economic Interview Schedule

This interview schedule is marked as Interview Schedule - B. A model of this schedule is attached to Annex 1 of this Manual.

The question numbers are purposively arranged to represent the criteria numbers. For example, Question No. 5 represents Criterion No. 5 on local population served, similarly, Question No. 10 represents criterion No. 10 on local support of project and so on.

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The following instructions should be followed while using Interview Schedule - B. The instructions are described criteria-wise as follows:

Criterion 1: As the accurate cost estimate can be prepared only after the completion of the field survey and detailed design, it should normally be left unattempted till the detailed cost estimate is prepared by the SBD's Design Office. However, in particular cases, when the priority ranking of certain bridge projects needs to be done prior to its detailed design, the following procedure should be followed to arrive at a rough cost estimate.

- i) Fix the approximate span of the proposed crossing.
- ii) Select the type of trail bridge (Suspended or Suspension).

6) See Annex 1, page 28 of this Manual.

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- iii) Find out the construction costs (total cost minus transportation cost) of 5 or 6 selected bridge types (Suspended or Suspension) from SBD's previous construction record. Mark their spans.
- iv) Draw a graph: Span vs Construction Cost.
- v) Using this graph mark out the construction cost against the selected span.
- vi) Use this cost figure to calculate cost criterion.

The range of factor values for cost is assumed as 0.2 million to 2 million at 1980 prices. Both lower and higher values should be modified each year by the inflation factor. The inflation factor will be found out on the basis of the rate of increase in bridge construction cost during the last 5 years. These data are obtainable from SBD's Design Office.

If the observed construction value exceeds the maximum value of the range resulting in a negative score, take zero value in such a case.

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Criterion 2: This questionnaire should be administered to a group of not more than 5 boatmen, ferry contractor(s) or any other person(s) connected with the crossing operation, as these people know obviously more about the traffic than other local informants.

Dry season generally lasts from 7 to 9 months depending upon the area's local climatic conditions. However, for all practical purposes, 8 months can be safely taken as dry season for the whole of the country. For the purpose of the survey, October to May should be taken as dry season and June to September as wet season.

The concepts of local and non-local traffic, dry season, peak season (when the traffic is much heavier), wet season, average daily traffic etc. should be clearly explained to the group prior to the interview. Once the group fully understands these concepts, the traffic questionnaire (Q. 2 of IS-B) is put before the group for discussion. Generally an interesting debate takes place before they arrive at a group opinion. If the surveyor

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feels that the answer is conflicting and/or contradictory, and differs considerably from the actual traffic count obtained in the field during the first two days of the survey, explain the questionnaire once again. After a group opinion is formed, the answer should be evaluated by the surveyor on the basis of his own field impression and then recorded.

If there is an exceptionally heavy traffic during some specific period (months/days) of the year, note these months/days and the A.D.T. of such period (known in the study as peak season). Peak season is defined as that season when the traffic is one and half times more than the dry season traffic.

The A.D.T. should invariably include the pack animal traffic converted into porter traffic, if such pack animal traffic exists. The conversion factor is given in the Work Sheet No. 2.1, page 45.

Criteria 3 to 8: For the first two days, when the traffic count is being conducted, the surveyor on the basis of his own assessment should identify the knowledgeable people of the area. These people are generally village social workers, school teachers, shopkeepers, local panchayat workers etc. These people should be invited at a suitable place and time on the third day of the survey. The participating group should not consist of more than 5 persons. However, the interview should allow or even encourage open discussion while forming the group opinion. Observer's frequent comments should be entertained if found relevant and intelligent.

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Answers to question 3 through 8 should be entered in the prescribed questionnaire form by the surveyor, using his own judgement at times as specified.

Criteria 9 & 10: The measurement of these criteria should be based on the local information supplemented by surveyor's personal judgement which should be compatible with the information gathered in the field.

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Criteria 11, 12 & 13: These criteria are basically objective in nature. Most or nearly all information sought by these criteria should be determined prior to the field survey, but will have to be verified, checked and corrected during the field survey.

3.3 Field Check

On the last day of the survey, usually the third day, all field data collected should be thoroughly checked.

The first thing to see is whether all field information desired by the interview schedules is gathered or not. See if any information is missing in the schedules.

Secondly, see that the reported information is not contradictory. If any contradictions are found they should be marked with red ink verified and corrected in the next day.

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* * *

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RANKING PROCEDURE AND REPORT SUBMISSION

4.1 Theoretical Explanation of Ranking Procedure

The ranking procedure consists of five components:

1. The Criteria or Factors.
2. The respective measurement units.
3. The maximum and minimum range of values for each factors's measurement units.
4. A common rating scale.
5. The factor weights which determine the relative importance of each factor in the overall score.

The measurement units, range of factor values and common rating scale are those means by which each criterion/factor can be translated into terms of a common denominator and added together for a final score.

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The value actually observed during the survey for each criterion or factor is compared with the factor range, then converted into percentage terms (common rating scale) and then finally multiplied by the factor weight.

The conversion into the common rating scale is obtained by subtracting the minimum value of the range from the actual observed value divided by the difference between the maximum and minimum value of the range. In the case of cost factor, however, for which a higher cost constitutes a disadvantage, the conversion formula is modified. In this case, the cost of a particular bridge should be subtracted from the maximum value of the range and the difference then expressed as a percentage of the difference between the maximum and minimum values of the range.

4.2 Worksheets

All information gathered during the survey is entered in specified formants known as Worksheets, for a systematic ranking computation.

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The worksheets will enable the surveyor to compute the score for each criterion in a step-by-step manner. This will result in a systematic computation, and will lead to consistency in result for all the proposed bridge sites covered by the survey. The model of worksheets for use is appended to this Manual as Annex 2.

For each criterion a step-by-step calculation method based on the ranking procedure explained in Section 4.1 above is shown in the worksheets. The worksheets are self explanatory as most of the explanations needed for completing them are given in the foot notes. See Section 2.2 to have a better idea of each criterion, if necessary. Some blank space is provided in the worksheet at the end of each criterion so that the surveyor can explain any exceptional matters connected with each criterion.

4.3 General Instructions for Completing the Worksheets

(24) Some general instructions for completing the worksheets and arriving at the overall score are given below:

- Collect both the completed field Interview Schedules - A & B.
- Re-check the field calculations specially on traffic count.
- Collect all necessary background data as mentioned in section 2.3 of this Manual.
- Calculate the score for each criterion following the procedure given in the worksheets. When scores for each criterion are derived, re-check all the calculations. Compute the score upto two places of decimal only.
- Fill in the Overall Score Sheet (page 42) to arrive at the final score.
- If it is felt that the overall score is too low or too high, check all the calculations once more and see that no error is committed anywhere in the calculation.

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4.4 Report Submission

Once the surveyor gets satisfied with the calculations, a report consisting of all necessary documentations (completed Interview Schedules, Worksheets, Maps, etc.) should be compiled and submitted in a typed copy to SBD's Design Office.

The SBD's Design Office once it collects such reports for all surveys conducted during a year from its different survey teams, will prepare a list of trail bridges in order of construction priority.

* * *

- Note:
1. If answer to the first question is 'No', the traveller is 'Non-local', if 'Yes', he is local.
 2. Local area is defined as the area covered by 10 km. walking distance from the crossing. It is assumed that an average hill traveller traverses 20 km if he walks 10 hrs. a day. Thus a day's back and forth walk from the crossing would cover all those places that come within 10 km walking distance from the crossing.
 3. Head counting of all travellers at the crossing will be done from 5 AM to 7 PM for at least 3 consecutive days. Employ 4 enumerators to conduct this job, 2 on each bank and supervise them at least two days. Also see note No. 9 below.
 4. In case of 'No Response' from the traveller simply note 'No Response'.
 5. If the answer to the first question is 'Yes', ask the second question. This will be helpful to cross-check the local influence area.
 6. In case of 'Pack Animals' write PA in the Serial No. column, note the kind of pack animals and their number. Two goats/sheep or one mule/buffalo are to be taken as equivalent to a traveller.
 7. PUT DOWN IN WRITING invariably, the Date, Sheet No. and Time of Traffic count.
 8. The location of a place, whether it is on the left or the right side of the river is determined by facing towards the flow (downstream) of the river.
 9. As the traffic count is done from both banks of the river, only one way traffic (coming or going) should be noted on each side.

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INTERVIEW SCHEDULE - B
(TO BE USED FOR SOCIO-ECONOMIC CRITERIA)

Surveyor Date
Bridge No. Bridge Name Location
River District/s (Left) (Right)

1. Cost

1.1 Contact design office of SBD to get the estimated cost figure for the proposed bridge. Enter these costs as follows:

Total Estimated Cost Rs.

Estimated Transportation Cost Rs.

*Cost without Transportation Rs.

Note the date of approval of estimate

*As the accurate cost estimate can be prepared only after detailed design of the bridge, in cases where the priority ranking of certain bridges needs to be done prior to its detail design, use the procedure prescribed in section 3.2, page 19 of this Manual, to find out the cost without transportation which should be filled in the above blank space. Put down the name of the person below who is involved in this estimation and the date invariably.

Name Date

2. Through Traffic

Ask the following questions to a group of local ferry operator(s) boatmen, contractor(s) etc. Arrive at a group opinion and enter the result using surveyor's own intellectual judgement.

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2.1 Which are the busiest crossing months (peak season) during the whole year, if any, and how many people and pack animals cross each day on an average in such busiest months? Peak season in almost all cases lies in the dry season.

Sl. No.	Months/Days	A.D.T	
		Traveller	Pack Animals
1.			
2.			
3.			
4.			

2.2 How many people cross here every day?

During dry season A.D.T. Local* Non-local*

During wet season A.D.T. Local Non-local

(29)

Note: *The traffic whose origin and destination lies within a day's back and forth walk from the bridge site is defined as Local Traffic. All other traffic will be regarded as Non-Local Traffic.

2.3 How many pack animals cross here every day?

Dry Season (A.D.T.)

Wet Season (A.D.T.)

Ask question Nos. 3, 4, 5, 6, 7 and 8 to a group of local knowledgeable people consisting of local village leaders, social workers, teachers, shopkeepers, local panchayat workers, etc. and try to arrive at a group opinion before entering the result. Use Q. No. 5 before administering Q. Nos. 3 and 4 to get the name of VPs of the influence area.

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3. Local Production of Food Crops

3.1 Which is the most frequently used market center closest to the proposed crossing?

Name of Market Center

Its Location: Left or Right

Name of VP:

3.2 Is it possible to reach that market center in one day?

Yes No

3.3 If No, how many days are required to reach that market?
..... days.

3.4 List the names of only those Village Panchayats (VPs) and Ward Nos. from Q. 5.1 whose location lie on the opposite side of the market center mentioned in Q. No. 3.1 above.

(30)

<u>VPs</u>	<u>Ward Nos. and their Corresponding VPs</u>
1.
2.
3.
4.
5.
6.

3.5 What are the major local food crops produced in the above VPs and Ward Nos.?

1. 2. 3. 4. 5.

4 Local Major Exports

4.1 What are the major local commodities* which are exported from the VPs and Wards mentioned in Q. 3.4 above?

	<u>Export Commodities</u>	<u>Quantity in local unit**/year</u>	<u>Tons/year</u>	<u>Price/unit</u>
1.				
2.				
3.				
4.				
5.				
6.				

* If animals are exported, note them also.

** Use local unit of measure and convert it into tonnage wt. Use the conversion table given at the end of this Manual. The conversion can also be done while completing the worksheets in office after field survey.

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5. Local Population Served

5.1 List the names of all VPs which can be completely covered in a day's back and forth walk from the bridge site. Mention ward Nos. and their corresponding VPs if the whole VPs cannot be covered in a day's back and forth walk. Mark the location of the VP whether it is on the Left or Right side of the river and also the district.

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Sl. No.	Name of VPs	Ward Nos. and their corresponding VPs	Location Left or Right	District's Name
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

5.2 Take the latest available census figures* and enter these in the following table against respective village panchayats as well as wards** mentioned in the above table.

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Sl. No.	Right Bank		Left Bank	
	Name of VPs/ Ward Nos.	Population	Name of VPs/ Ward Nos.	Population
1.				
2.				
3.				
4.				
5.				
6.				
7.				
	Total Population		Total Population	

Total Population (Right and Left Banks) (A)

* Mention the census year.

** Include the population figure of the Wards also, in case the whole VPs cannot be covered.

5.3 Are there any other bridges within a day's walk from the proposed bridge on the same river? Yes / No If yes, identify them in the map and write their locations.

Sl. No.	Name of other bridges in the same river	
	Upstream	Downstream
1		
2		
3		

5.4 Which of the wards and VPs listed in Q. No. 5.2 above are served by the above bridge? List those wards and VPs alongwith their population in the following table.

Sl. No.	Right Bank		Left Bank		Served by Bridge Name
	VPs/Wards	Population	VPs/Wards	Population	
1					
2					
3					
4					
	Total Population		Total Population		

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Total Population (Right Bank + Left Bank) (B)

5.5 Now subtract the total population (Right + Left Banks) shown in Q. 5.4 above from the total population (Right + Left Banks) shown in Q. 5.2 to get the population of the influence area of the proposed bridge i.e. A-B = _____.

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6. Presence of Health Facilities (HF)

6.1 What are the existing Health Facilities (Hospital, Health Post, Ayurvedic Clinic) within a day's back and forth walk from the proposed bridge site? List them below.

Sl. No.	Kind of HF	Left/Right	Name of VPs	No. of Times*	Distance in Kms**
1					
2					
3					
4					
5					
6					
7					

(34)

* Ask how many times one can walk back and forth in a day between the proposed bridge site and above mentioned HFs. Enter the answer reported.

** Divide 10 by the number of times reported and enter the result in kms.

Note: If the Kms calculated in Q. 6 above is more than 6 kms in the case of Health Post and Ayurvedic Clinic and 10 Kms in the case of Hospital, then the Health Facility score counted for such HF is zero, as being out of assumed walking limit.

7. Presence of Education Facilities (EF)

7.1 What are the existing Education Facilities (High School, Middle School, Primary School) within a day's back and forth walk from the proposed bridge site? List them below.

Sl. No.	Kind of EF	Left/Right	Name of VPs	No. of Times*	Distance in Km**
1					
2					
3					
4					
5					
6					

* Ask how many times one can walk back and forth in a day between the proposed bridge site and the EFs. Enter the answer reported.

** Divide 10 by the number of times reported and enter the result in kms.

Note: If the Kms calculated above is more than 8 Kms in the case of High School and 6 Kms in the case of Middle School and 4 Kms in the case of Primary School, then the EF score counted for such EF is zero, as being out of assumed walking limit.

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8. Presence of Administrative Facilities (AF)

8.1 What are the existing Administrative Facilities within a day's back and forth walk from the proposed bridge site? List them below.

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Sl. No.	Kind *** of AFs	Left/Right	Name of VPs	No. of Times*	Distance in Kms**
1					
2					
3					
4					
5					
6					
7					
8					

* Ask how many times one can walk back and forth in a day between the proposed bridge site and the Admn. Facilities. Enter the answer reported.

** Divide 10 by the number of times reported and enter the result in kms.

*** Take only those type of AFs which is mentioned in the Summary Sheet on page 4 and 5 of this Manual.

Note: If the Kms calculated above is more than 8 Kms then the AF score counted for such AF is zero, as being out of assumed walking limit.

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9. Risk Factor

9.1 The Survey team should note the history of accidents in the present mode of crossing by asking the local people and cross-check this information with persons directly connected with crossing operations, such as, boatmen, ferry contractors etc.

9.2 Accidents resulting in the loss of human life

Mention the year and No. of persons reported to have died while crossing the river.

Year :
 No. of Persons:

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The surveyor should then indicate the risk factor in terms of four alternatives (based on the above information and surveyor's own judgement.) However, the surveyor's judgement should be compatible with the information gathered.

High Medium Low Nil

10. Local Support of the Project

10.1 The surveyor should note down below the history of demand for the bridge by extensive local interviewing.

ANNEX - 1

11. Type of River

11.1 The surveyor should report the nature of the river at the crossing point based on the following simple river classification.*

Major Medium Minor

* For more details see section 2.2 page 13 & 14.

A Major River is one which is unfordable throughout the year in the immediate vicinity of the proposed crossing.

A Medium River is one which is fordable at some places (in the immediate vicinity of the proposed crossing) during dry season with great difficulty or with the help of temporary local bridges, if such bridges exist.

A Minor River is one which is fordable easily during the dry season.

12. Presence of Main Trail

12.1 If the crossing is a part of an already existing Main Trail, this should be recorded by the surveyor, by thorough map reading and by verification in the field. For classification of Main Trails, refer to Section 2.2, page 14.

Main Trail Ordinary Trail

13. Presence of IRD Program

Ask the following question to IRD's central office (Local Development Ministry) at Kathmandu.

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13.1 Does the proposed bridge site fall within the area where any organised IRD (Integrated Rural Development) Program is

Being implemented?

planned for implementation within the next two years?

not planned?

ANNEX - 2
WORKSHEETS - MODEL

OVERALL SCORE SHEET*

BRIDGE NAME: BRIDGE NO.:
RIVER : LOCATION :

<u>CRITERIA/FACTORS</u>	<u>FACTOR WEIGHT</u>	<u>WEIGHTED VALUE</u>
1. Cost	0.20	.....
2. Through Traffic	0.15	.....
3. Local Production of Food Crops	0.10	.....
4. Major Local Exports	<u>0.05</u>	<u>.....</u>
(A) SUB-TOTAL OF ECONOMIC FACTORS	0.50	.....
5. Local Population Served	0.10	.....
6. Presence of Health Facilities	0.06	.....
7. Presence of Education Facilities	0.06	.....
8. Presence of Administrative Facilities	<u>0.08</u>	<u>.....</u>
(B) SUB-TOTAL OF SOCIAL FACTORS	0.30	.....
9. Risk Factor	0.04	.....
10. Local Support of the Project	0.04	.....
11. Type of River	0.08	.....
12. Presence of the Main Trail	0.02	.....
13. Presence of IRD Program	<u>0.02</u>	<u>.....</u>
(C) SUB-TOTAL OF OTHER FACTORS	0.20	.....
GRAND TOTAL (A+B+C) =	<u>1.00</u>	<input type="text"/>

(42)

* Fill this sheet after completing the other worksheets, on each criterion to arrive at the overall score.

162

CRITERION 2: THROUGH (NON-LOCAL) TRAFFIC*

a)	<u>Seasonal Variation**</u>	<u>No. of days</u>	
	Peak Season		=(x)
	Dry Season	(245-x)	=(y)
	Wet Season		= 120
		Total:	<u>365 days</u>

b) Actual Traffic Count (Peak or Dry Season)

	<u>Date</u> (1)	<u>Travel- lers</u> (2)	<u>Pack Animals</u> (3)	<u>Equivalent Travel- lers***</u> (4)	<u>Total</u> (5)=(2)+(4)
First Day
Second Day
Third Day
		Total Traffic of 3 days			..... (A)

(44)

c) A.D.T. of Peak or Dry Season (Traffic Count Figure) $\frac{(A)}{3}$ = (B)

d) A.D.T. of Dry or Peak Season (Interview Fig.) (C)

e) A.D.T. of Wet Season (Interview Fig.) (D)

f) Annual Average Daily Traffic (AADT)****

- (i) (x) X B or C = =
- (ii) (y) X C or B = =
- (iii) (z) X D = =

Total Annual Traffic = (E)

AADT = $\frac{\text{Total Annual Traffic}}{365}$ = $\frac{(E)}{365}$ = (F)

ANNEX - 2
WORKSHEET NO. 2.1

- g) Factor Range 0 to 500 AADT
- h) Common Rating Value CRV = $\frac{(F) - 0}{500 - 0} \times 100 = \dots\dots\dots$
- i) Factor Weight FW = 0.15
- j) Weighted Value WV = FW X CRV = $\dots\dots\dots = \underline{\hspace{2cm}}$

- * Use Interview Schedule - A and Q. No. 2 of Interview Schedule B to obtain this information. Peak Season is that season when the traffic is one and half times more than dry season traffic.
- ** In almost all cases 'Dry Season' includes 'Peak Season' also. Hence 'Dry Season' means 'rest of the dry season' excluding the 'Peak Season'. Peak Season, Dry Season and Wet Season should add together to 365 days.
- *** Two goats/sheep are to be taken equivalent to a traveller and one mule/buffalo equivalent to a traveller.
- **** Multiply the ADT of peak season with peak season days, the ADT of dry season with dry season days, and the ADT of Wet Season with wet season days. Add the product and divide by 365 to get AADT.

(45)

165

CRITERION 3: LOCAL PRODUCTION OF FOOD CROPS

- | | <u>Name</u> | <u>Location</u> |
|----|---|-------------------|
| a) | Main Market Center of the influence area* | (Left/Right Bank) |
| b) | Basic Local Food Crops Grown in Influence Area* | (Right/Left Bank) |
| c) | Harvested Area of the District** | |
| | (Year) | District's Name |

	<u>Crop</u> (1)	<u>Area (Hectare)</u> (2)	<u>Percentage share of each crop</u> (3)
1.	.....	.....	.....
2.	.....	.....	.....
3.	.....	.....	.....
4.	.....	.....	.....
5.	.....	.....	.....
6.	.....	.....	.....
7.	Other	.....	.....
	Total	.....(A)	100.00 (B)

(46)

- d) Total Area of the District*** = Hectares (C)
- e) Total Cultivated Area of the District*** = Hectares (D)
- f) Proportion of cultivated Area = $\frac{(D)}{(C)} \times 100 = \dots\dots\dots \%$ (E)
- g) Ratio of Harvested Area in the District = $\frac{(A)}{(D)} = \dots\dots\dots$ (F)
- h) Area of Assumed Agricultural Influence Area = 6,000 Hectares
- i) Cultivated Area within the influence Area = $6000 \times \frac{(E)}{100} = \dots\dots\dots$ Hects (G)
- j) Harvested Area in the Influence Area = (F) X (G) = Hectares (H)

k) Food Production in the Influence Area**

(Take from (b) above) Major Crops (1)	Yield Rate (MT/ha) (2)	Harvested Area (ha) = (H) x Percentage share of each crop (3)	Estimated Projection (MT) (4) = (3) x (2)
.....
.....
.....
.....
.....
Total			..... (I)

l) Factor Range: 0 to 2,500 MT

m) Common Rating Value CRV = $\frac{(I) - 0}{2,500 - 0} \times 100 = \dots\dots\dots$

(47)

n) Factor Weight FW = 0.10

o) Weighted Value WV = FW x CRV = =

- * Use Q. No. 3 of Interview Schedule - B to obtain this information.
- ** Source: Agricultural Statistics of Nepal 1977. Department of Food and Agricultural Marketing Services, Agricultural Statistics Division. (However, use latest available edition).
- ** Source: Agricultural Statistics of Nepal, 1972. Central Bureau of Statistics, Nepal. (However, use latest available edition).

Note: If the influence area falls in more than one district take average data of the involved districts.

CRITERION 5: LOCAL POPULATION SERVED

- a) Local Population within the Influence Area according to
(Mention Census Year)
- b) $A - B = \dots\dots\dots (C)*$
- c) Growth Rate = 2.2% per year
- d) No. of years = (n) (Assuming census year** as the base year)
- e) Present Local Population within the Area of Influence
= $(C) \times (1 + 0.022)^n = \dots\dots\dots (D)$
- f) Factor Range of Population = 5,000 to 40,000
- g) Common Rating Value CRV = $\frac{D - 5,000}{40,000 - 5,000} \times 100 = \dots\dots\dots$
- h) Factor Weight FW = 0.10
- i) Weighted Value WV = $FW \times CRV = \dots\dots\dots = \underline{\hspace{2cm}}$

(49)

* As per Q. No. 5.5 of Interview Schedule - B.

** See Section 2.2, page 12 for more detail on Census Year.

CRITERION 6: PRESENCE OF HEALTH FACILITIES (HF)

a) Existing Health Facilities* (Hospital, Health Post, Ayurvedic Clinic) within 10 km walking distance from the bridge site

<u>S.No.</u>	<u>Kind of HF</u>	<u>Left/Right</u>	<u>Distance in Kms</u>
1
2
3
4
5

b) If there exists same kind of Health Facility on both sides of the river within the assumed walking limit (10 km for Hospital, 6 km for Health Post and Ayurvedic Clinic), then eliminate those facilities and mention the remaining facilities in the following table.**

(50)

<u>S.No.</u>	<u>Kind of HF</u>	<u>Left/Right</u>
1
2
3

c) Common Rating Value CRV = or 100 (for each facility mentioned in (b), CRV is 100 or else CRV is zero) (A)

d) Factor Weight FW

- 1. Hospital - 0.03
- 2. Health Post - 0.02
- 3. Ayurvedic Clinic - 0.01

ANNEX - 2
WORKSHEET NO. 6.1

e) Weighted Value WV = FW x CRV

- 1. Hospital = 0.03 x (A) = =
- 2. Health Post = 0.02 x (A) = =
- 3. Ayurvedic Clinic = 0.01 x (A) = =

Total

* Insert information from Q. No. 6 of Interview Schedule - B.

** If within the assumed walking limits, there are more than one of the same kind of Health Facility on the same side of the river, consider only one.

CRITERION 7: PRESENCE OF EDUCATION FACILITIES (EF)

a) Existing Education Facilities* (High School, Middle School and Primary School) within 8 km walking distance from the bridge site.

<u>S.No.</u>	<u>Kind of EF</u>	<u>Left/Right</u>	<u>Distance in kms</u>
1
2
3
4
5
6

b) If there exists same kind of Education Facility on both sides of the river within the assumed walking limit (8 kms for High School, 6 Kms for Middle School and 4 kms for Primary School), then eliminate those facilities and mention the remaining facilities in the following table.**

<u>S.No.</u>	<u>Kind of EF</u>	<u>Left/Right</u>
1
2
3

c) Common Rating Value CRV = 0 or 100 (For each facility mention in (b) CRV is 100 or else CRV is zero) (A)

d) Factor Weight FW

1. High School - 0.03
2. Middle School - 0.02
3. Primary School - 0.01

ANNEX - 2
WORKSHEET NO. 7.1

e) Weighted Value WV = FW x CRV

- 1. High School = 0.03 x (A) = =
- 2. Middle School = 0.02 x (A) = =
- 3. Primary School = 0.01 x (A) = =

Total

* Use Q. No. 7 of Interview Schedule - B to obtain this information.

** If, within the assumed walking limit, there are more than one of the same kind of Education Facility on the same side of the river, consider only one.

CRITERION 8: PRESENCE OF ADMINISTRATIVE FACILITIES (AF)

a) Existing Administrative Facilities* within 8 km walking distance from the bridge site.

<u>S.No.</u>	<u>Kind of AF</u>	<u>Left/Right</u>	<u>Distance in kms</u>
1
2
3
4
5
6

(54)

b) If there exists exactly same kind of Administrative facility on both sides of the river within the assumed walking limit (8 kms), then eliminate those facilities and mention the remaining facilities in the following table.**

<u>S.No.</u>	<u>Kind of AF</u>	<u>Left/Right</u>
1
2
3
4
5

c) Common Rating Value CRV = 0 or 100 (For each of the following facility CRV is 100 if it exists or else CRV is zero). (A)

1. Agricultural Support Offices
2. Banking Institutions
3. Law Courts & Land Revenue Offices, Cottage Industries
4. Post Office
5. Other Government Offices

d) Factor Weight FW

- 1. Agricultural Support Offices - 0.02
- 2. Banking Institutions - 0.02
- 3. Courts of Law & Land Revenue Offices - 0.02
- 4. Post Office - 0.01
- 5. Other Government Offices (.....) - 0.01

e) Weighted Value WV = FW x CRV

- 1. Agricultural Support Offices = 0.02 x (A) =
- 2. Banking Institutions = 0.02 x (A) =
- 3. Courts of Law & Land Revenue Offices = 0.02 x (A) =
- 4. Post Office = 0.01 x (A) =
- 5. Other Government Offices (.....) = 0.01 x (A) =

Total

* Use Q. No. 8 of Interview Schedule - B to fill this information.

** (i) If, within the assumed walking limit, there are more than one of the same kind of Administrative Facility on the same side of the river, consider only one.

(ii) If the river separates two districts, consider only the post and banking facilities.

(55)

CRITERION 9: RISK FACTOR

a) Degree of risk involved in using the existing crossing facilities, consider one of the following*:

1. High

2. Medium

3. Low

4. Nil

b) Common Rating Value CRV = 0 to 100. Depending upon the degree of risk involved as follows:

1. High - 100

2. Medium - 50

3. Low - 25

4. Nil - 0

c) Factor Weight FW = 0.04

d) Weighted Value WV = FW x CRV = =

* Use Q. No. 9 of Interview Schedule - B to obtain this information.

(56)

CRITERION 10: LOCAL SUPPORT OF THE PROJECT

a) Local Support for the project, consider one of the following*:

- 1. High
- 2. Medium
- 3. Low
- 4. Nil

b) Common Rating Value CRV = 0 to 100. Depending upon the local support for the project as follows:

- 1. High - 100
- 2. Medium - 50
- 3. Low - 25
- 4. Nil - 0

c) Factor Weight FW = 0.04

d) Weighted Value WV = FW x CRV = =

* Use Q. No. 10 of Interview Schedule - B to get this information.

(57)

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CRITERION 11: TYPE OF RIVER

a) Type of River. Consider one of the following*:

1. Major

2. Medium

3. Minor

b) Common Rating Value CRV = 20 to 100. Depending upon the type of river as follows:

1. Major - 100

2. Medium - 60

3. Minor - 20

c) Factor Weight FW = 0.08

d) Weighted Value WV = FW X CRV = =

* Use Q. No. 11 of Interview Schedule - B to get this information.

(58)

CRITERION 12: PRESENCE OF THE MAIN TRAIL*

a) Indicate whether the existing river/khola crossing lies in a main trail or not:

1. Yes

2. No

b) Common Rating Value CRV = 0 or 100. Depending upon whether the

1. Crossing lies in a main trail - 100

2. Crossing does not lie in a main trail - 0

c) Factor Weight FW = 0.02

d) Weighted Value WV = FW x CRV = =

* Insert the information from Q. No. 12 of Interview Schedule - B.

CRITERION 13: PRESENCE OF IRD PROGRAM*

a) Indicate whether the proposed bridge site fall within the area where any organised Integrated Rural Development Program (IRD) is

- 1. being implemented
- 2. planned for implementation within the next 2 year
- 3. not planned

b) Common Rating Value CRV = 0 to 100. Depending upon whether the

- 1. IRD Program is being implemented - 100
- 2. IRD Program is planned for implementation within the next 2 years - 50
- 3. IRD Program is not planned - 0

(60)

c) Factor Weight FW = 0.02

d) Weighted Value WV = FW x CRV = =

* Insert this information from Q. No. 13 of Interview Schedule - B.

CONVERSION TABLELand Area (Valley and Hill)

1 Muri Mato	=	127.18 sq.m.
4 Muri Mato	=	1 Ropani
1 Ropani	=	508.71 sq.m.
1 Hectare	=	10,000 sq.m.

Volume/Weight Conversionfor Rice (Marshi)

1 Muri	=	72.58 kgs
1 Pathi	=	3.629 kgs
1 Mana	=	454 gms

Weight Measurement

1 Maund	=	37.32 kgs
1 Maund	=	40 Sheers
1 Sheer	=	0.933 kg
1 Dharni	=	2.27 kgs
1 Ton	=	1000 kgs

for Wheat

1 Muri	=	62.260 kgs
1 Pathi	=	3.163 kgs
1 Mana	=	395 gms

Volume Measurement

1 Muri	=	0.087 cu.m.
1 Muri	=	90.92 litres
1 Muri	=	20 Pathis
1 Pathi	=	0.0043 cu.m.
1 Pathi	=	8 Manas

for Maize

1 Muri	=	63.120 kgs
1 Pathi	=	3.156 kgs
1 Mana	=	359 gms

श्री ५ को सरकार
पदयात्री भोलुङ्गे पुल परियोजना



स्थल सर्भेक्षण
पु स्ति का

नेपालमा पदयात्री भोलुङ्गे पुलहरूको सामाजिक
प्राथिक पक्षको आधारमा स्थल निर्धारण गर्नका
निमित्त:

प्राथिक श्रोत: (यु. एस. ए. आई. डी.-नेपाल)

प्रयोग कर्ता :
भोलुङ्गे मुल विधिजनका सर्भे टोलीहरू

परिमार्जन तथा संकलन कर्ता :

मंसिर २०१७

IN EAST

मूल सुधारकी सूचि

<u>पन्ना</u>	<u>हरफ</u>	<u>मूल</u>	<u>सुधार</u>
अ	१३	स्थलद्वरू	स्थल
२	२	प्रोजेक्टर	प्रोजेक्ट
५	१७	मध्ययम	मध्यम
८	१	परिच्छेद - २	परिच्छेद - १
११	१४	१८	१७
२१	१३	स्थल निर्माण	स्थल निर्धारण
२१	अन्तिम	यस्ता	यस्तो
अन्तिम पन्ना	४	२	४
अन्तिम पन्ना	८	६३, २६	६२, २६

पुस्तावना

यस पुस्तिकामा पद यात्री फोल्गे पुलहरूको सामाजिक - आर्थिक पक्षसंग सम्बन्धित सर्वेक्षण संवालयार्थ अपनाईने व्यापक प्रक्रियाको विस्तृत वर्णन गरिएको छ जसले गर्दा सामाजिक - आर्थिक आधारमा पुल स्थलहरूको समुचित प्राथमिकता निर्धारण गर्न सजिलो हुन जान्छ ।

यस पुस्तिकाले फोल्गे पुल शाखाका सर्वेक्षण टोलीहरूलाई भविष्यमा सर्वेक्षण गर्दा स्पष्ट मार्गदर्शन प्रदान गर्ने र ती टोलीहरूलाई स्थल क्वांट प्रक्रियाको प्रयोग गर्ने सक्ने युक्त तुल्याउने लक्ष्य राखेको छ, जुन प्रक्रियालाई यहाँ प्राथमिकता मूल्यांकन प्रणाली (प्रा.मू.प्रणाली) भनिएको छ ।

प्राथमिकता मूल्यांकन प्रणालीको प्रारंभिक डिजाईन, ईष्ट कन्सल्टिंग इन्जिनियर्स, जर्मन कन्सल्ट र साटाद्वारा पहिले गरिएका अध्ययनहरूको आधारमा यूएसएआइडी - नेपालले ग-यो । उक्त प्रारंभिक प्रा.मू.प्रणालीको आधारमा ईष्ट कन्सल्टिंग इन्जिनियर्सले १० जोटा पूर्व क्वांट गरिएका १० वटा फोल्गे पुल स्थलहरू सर्वेक्षणहरूको दौरानमा प्राप्त गरेको आफ्नो ज्ञान र अनुभवको आधारमा, प्रारंभिक प्रा.मू.प्रणालीमा (मई १९८०) मा केही संशोधनहरू पुस्तावित ग-यो । यी संशोधन स्वीकृत भएपछि संशोधित प्रा.मू.प्रणालीको आधारमा यो वर्तमान स्थल सर्वेक्षण पुस्तिका तयार गरिएको छ । यसमा चार विभिन्न परिच्छेदहरू र दुई परिशिष्टहरू छन् । पहिलो र दोश्रो परिच्छेद खास गरी त्यस्ता व्यक्तिहरूका लागि तयार गरिएका हुन् जसलाई यस अध्ययन बारे प्रारंभिक परिचय गराउनु आवश्यक छ, जबकि तेस्रो र चौथो परिच्छेदले सर्वेक्षणको उचित संवालयका लागि सर्वेक्षणकर्तालाई विशेष निर्देशनहरू दिन्छ । अन्तरवार्ता - तालिकाहरू र कार्य-पत्रहरूका नमूनाहरू परिशिष्ट १ र २ को रूपमा पुस्तिकाको पुष्पारमा राखिएका छन् ।

यस पुस्तिका अनुसार भविष्यमा संवालय गरिने स्थल सर्वेक्षणहरूको आधारमा पहिले सुधार गर्न सकिने संभावनालाई ध्यानमा राखि यस वर्तमान पुस्तिकालाई खुला बाईइंडेडो गरी प्रस्तुत गरिएको छ । तर हाललाई यसमा भएका निर्देशनहरूमा कुनै मुख्य परिवर्तन ल्याउनका लागि त्यस्ता परिवर्तनहरूलाई सन्तोषजनक रूपमा व्याख्या गरी

आधिकारिक व्यक्तिहरूबाट त्यसको स्वीकृति गराई यस पुस्तिकामा समावेश गरिनु पर्नेछ ।

भविष्यमा निर्माण गरिने विभिन्न पद यात्री फौजले पुलहरूको स्थल क्वाटर र प्राथमिकता मूल्यांकन गर्नका लागि फौजले पुल शाखाको वर्तमान पेशागत तथा संस्थागत क्षमताको संवर्धनमा यस पुस्तिकाले अझ बढी युक्तिसंगत रूपमा महत्वपूर्ण योगदान गर्नेछ भन्ने विश्वास लिइएको छ ।

यस महत्वपूर्ण अध्ययनका लागि भएको सर्व यूयसएवाइडी - नेपालले वहन गरेको छ र यस्तो महत्वपूर्ण कार्य सुम्पेकोमा यूयसएवाइडी - नेपाल प्रति, ईष्ट कन्सल्टिंग इन्जिनियर्स हार्दिक कृतज्ञता ज्ञापन गर्दछ । वर्तमान क्षेत्रगत अवस्थाहरूमा यस पुस्तिकालाई बढी कार्यमूखी र उपयुक्त बनाउने हेतुले यो पुस्तिका तयार गर्दा ईष्ट कन्सल्टिंग इन्जिनियर्सले यथासंभव इमान्दारी पूर्वक प्रयासहरू गरेको छ ।

अन्त्यमा, यस कार्यमा संलग्न सबै प्रति ईष्ट कन्सल्टिंग इन्जिनियर्स व्यक्तिगत रूपमा धन्यवाद दिन चाहन्छ ।

नोभेम्बर १९८०

ईष्ट कन्सल्टिंग इन्जिनियर्स
काठमाडौं ।

विषय सूची

पत्र संख्या

प्रस्तावना

(अ)

परिच्छेद १. परिचय

१ - ८

१.१. पद यात्री फोलुंगे पुल परियोजना

१

१.२. प्राथमिकता मूल्यांकन प्रणालीको विकास

१

१.३. पुस्तिकाको उद्देश्य

७

१.४. पुस्तिकाको परिधि (स्कोप)

७

परिच्छेद २. अध्ययन अन्तिमकरण र तयारी कार्यहरू

९ - २२

२.१. परियोजनाका मुख्य विचारणिय कुराहरू

९

२.२. आधारहरू (क्राईटेरियाहरू) र तिनको निर्धारण

११

२.३. पूर्व उपलब्ध हुन सक्ने तथ्यांकहरूको संकलन

१९

२.४. स्थल निर्धारण नक्साको अध्ययन

२१

परिच्छेद ३. स्थलगत सर्वेक्षण अध्ययनका लागि निर्देशनहरू

२३ - २८

३.१. सवारी (ट्राफिक) गणना

२३

३.२. सामाजिक-आर्थिक अन्तरवार्ता तालिकाको प्रयोग

२४

३.३. क्षेत्रगत जाँच

२८

परिच्छेद ४. मूल्यांकन प्रक्रिया र प्रतिक्रिया प्रस्तुतिकरण

२९ - ३९

४.१. मूल्यांकन (-याकिंडो) प्रक्रियाको सैद्धान्तिक व्याख्या

२९

४.२. कार्य पत्रहरू

३०

४.३. कार्य पत्र पुरा गर्नका लागि सामान्य निर्देशनहरू

३०

४.४. प्रतिक्रिया प्रस्तुतिकरण

३९

परिशिष्टहरू: परिशिष्ट १ : अन्तरवार्ता तालिकाहरूको नमूना

३२ - ५०

परिशिष्ट २ : कार्य पत्रहरूको नमूना

५१ - ६९

परिचय :

१.१. पद यात्री फोर्लुंगे पुल परियोजना :

यूएसएआइडी - नेपालद्वारा आर्थिक दायित्व वहन गरिएको यो परियोजना, गरीव ग्रामीण जनतालाई प्रत्यक्ष रूपमा अधिकतम फाइदा पु-याउने लक्ष्य भएका परियोजनाहरूमा नेपाललाई सहयोग गर्ने संयुक्त राज्य अमेरिका सरकारको निरन्तर बालु प्रयासहरू मध्येको एउटा परियोजना हो ।

नेपालका पहाडहरूमा फोर्लुंगे पुल बनाउनु, ती महत्वपूर्ण परियोजनाहरू मध्ये एक हो जसले गर्दा ग्रामीण जनसंख्याको एउटा ठूलो भागले मुख्य फाइदा पाउंछन् । यस्ता पुलहरूको निर्माणले उनीहरूले दुर्गम खोला, जंघार तर्नु पर्दा लाग्ने उनीहरूको समय, मेहनत र धनलाई जोगाउँछ । फोर्लुंगे पुल परियोजना सामाजिक दृष्टिले एक संभाव्य परियोजना हो जसमा ग्रामीण गरीव जनताका लागि कतिपय सामाजिक लाभ दिने क्षमता छ । जै होस्, यी लाभहरूको सापेक्षिक महत्ता पुल बनाइने ठाउँमाथि निर्भर गर्दछ । यस प्रकार, यस परियोजनाको एउटा प्रमुख उद्देश्य एउटा सुव्यवस्थित स्थल क्वाट प्रक्रियाको विकास गर्नु हो जसबाट एउटा प्राथमिकता मूल्यांकन प्रणाली (प्रा. मु. प्रणाली) तयार हुन सकोस् जसलाई श्री ५ को सरकारको फोर्लुंगे पुल शाखा (फो.पु.शा.) को नियमित सर्वेक्षण टोलीले मविष्यमा अनिवार्यतः उपयोग गर्ने स्थल सर्वेक्षण पुस्तिकामा समावेश गर्न सकियोस् । एक पटक यो उद्देश्य प्राप्त भयो भने त्यसपछि क्वाट गरिएको पुल स्थलले पुलको कुल खर्च, इन्जिनियरिंग र सामाजिक - आर्थिक आधारहरूलाई सर्वोत्तम रूपमा संग्रह गर्न सक्ने आशा गरिन्छ र यसले सेवा पु-याउने जनसंख्यालाई अधिकतम लाभ पु-याउने पनि निश्चित छ ।

१.२. प्राथमिकता मूल्यांकन प्रणालीको विकास :

प्राथमिकता मूल्यांकन प्रणालीको परिकल्पना र विकास शुरूमा नेपाल स्थित यूएसएआइडी कार्यालयले ग-यो । यस प्रणालीको विस्तृत वर्णन परियोजना - पत्रमा

(प्रोजेक्टर पेपर) गरिएको छ । फोर्लुगे पुलको स्थल क्लान्टसित सम्बन्धित बुंदाहरू माथि यस प्रस्तावित क्लान्टेरियाहरूको महत्वपूर्ण सम्बन्ध रहेको छ र यसले पुल स्थलको क्लान्टसित सम्बन्धित विभिन्न परिवर्तित तत्वहरूलाई एकजुट गराउने स्वभन्दा पहिलो सुव्यवस्थित प्रयास गरेको छ । यस प्रारम्भिक प्रणाली र यसको धारणाको विस्तृत जानकारीका लागि अगस्ट १९७६ मा यूएसएवाइडी - नेपालद्वारा तयार गरिएको फोर्लुगे पुल परियोजना - पत्र (३६७-०६१६) हेर्नु हुन पाठकलाई अनुरोध गरिन्छ ।

फोर्लुगे पुलको स्थल निर्धारण गर्ने सट्टा सुव्यवस्थित वस्तुगत प्रक्रिया तर्जुमा गर्ने यूएसएवाइडीको प्रयास यस क्षेत्रमा निश्चित रूपमा सट्टा नौलो कुरा (पुर्वचिन) भएको छ भन्ने कुरा सत्य हो तापनि यसको उच्चोच्च विकास र परिष्कार पनि ज्यादा आवश्यक छ भन्ने कुरो पनि उचीकै सांघो हो । तसर्थ, यसको प्रथम परिष्कार र परिष्कारको जिम्मेदारी ईष्ट कन्सल्टिंग इन्जिनियर्स (ईसीइ) लाई सुम्पियो । यस नयां धारणाको परिष्कार दशबोटो पूर्व क्लान्ट गरिएका पुल स्थलहरूमा गर्ने र यस्तो परिष्कारको दौरानमा प्राप्त गान अनुभवको बाधारमा सट्टा क्षेत्रगत स्थल सर्वेक्षण पुस्तिका (साईट सर्भे म्यानुयल) तयार पार्ने कामको अभिभारा, " ईसीइ " लाई दिइयो ।

सर्वेक्षणहरू गरिसकेपछि, " ईसीइ " ले प्रारम्भिक प्रणालीमा र यससंग सम्बन्धित अन्य युक्तिसंगत उपयुक्त तत्वहरूमा तथा तत्वका मूल्यमानमा केही आवश्यक संशोधनका लागि प्रस्ताव ग-यो जसले गर्दा यी कुराहरू वर्तमान स्थलगत स्थितिमा वढी सरलताका साथ प्रयोग गर्न सकियोस् । (१)

प्रारम्भिक प्राथमिकता मूल्यांकन प्रणाली (प्रा. मू. प्रणाली) सम्बन्धी प्रस्तावित संशोधन र परिष्कार वारे " ईसीइ " का र पीडीवाइएस । यूएसएवाइडीका

(१) विस्तृत जानकारीका लागि " ईसीइ " को दशबोटो पद यात्री फोर्लुगे पुलको सर्वेक्षण तथा प्राथमिकता वर्गीकरण सम्बन्धी अन्तिम प्रतिवेदन, (नोवेम्बर १९८०) हेर्नु होस् ।

परिच्छेद - ६

सम्बन्धित अधिकारी वर्ग (पर्सनलस) बीच संयुक्त बैठकमा विचार विमर्श र मूल्यांकन भयो । तदनुसार प्रस्तावित संशोधनहरू (केही मामुली परिवर्तन सहित) स्विकृत गरिए ।

यो संशोधित प्रणाली " ईसिइ " का सर्वेक्षणहरूको परिणाम हुनाको साथै मुख्यतः निम्नलिखित आधारभूत तथ्यहरू माथि आधारित छ ।

- क्षेत्रगत तथ्यांकलाई क्षेत्रमै वढी सरलतासाथ माप गर्न सकिने तुल्याउनु र यसलाई फोर्लुगे पुल शाखाका सर्वेक्षण टोलीहरूले उपयोग गर्न सरल तुल्याउनु ।
- विभिन्न तत्वहरूलाई पहिले दिइएका भारहरूलाई वास्तविकताको नजीक तुल्याउनका लागि त्यसमा केही आवश्यक संशोधन गर्नु ।
- वास्तविक अवलोकन गरिएका क्षेत्रगत अवस्थाहरूसित मेल खाँदो बनाउनका लागि विभिन्न तत्वहरूको मूल्यमानहरूमा आरम्भिक सीमामा परिवर्तन गर्नु, यो बुँदा परियोजना-मत्रमा (प्रोजेक्ट पेपर) पनि उल्लेख गरिएको छ । (२)
- आधारहरूमा समाविष्ट केही धारणाहरूमानै परिमार्जनको खाँचो पर्ने देखियो, तदनुसार केही आधारहरूको नामावलीका साथै त्यसको माप गर्ने सूचकहरूमा पनि केही परिवर्तनहरू गरिए ।
- अन्त्यमा, क्षेत्रगत सर्वेक्षणहरूको परिणाम स्वरूप केही आधारहरूलाई हटाइनु पर्ने र तिनका ठाउँमा अन्य आधारहरू विकसित गर्नु पर्ने कुरा सबल रूपमा देखियो ।

निम्नलिखित सारांश पत्रले संशोधित प्राथमिकता मूल्यांकन प्रणालीलाई देखाउँछ जसमाथि यो स्थल सर्वेक्षण पुस्तिका आधारित छ ।

(२) फोर्लुगे पुल - परियोजना-मत्र (३६७-०११६)

सारांश पत्र : पद यात्री फौलुंगे पुलरूवा लागि प्रस्तावित मूल्यांकन प्रणाली :

आधाररू । क्राईटेरियारू	मापन इकाई	मापन इकाईको मूल्य मानको सिमा क्षेत्र	साका मापन गर्ने, स्केल (प्रतिशतमा)	आधार भार
१. आर्थिक आधाररू				जम्मा(०.५०)
१. लागत तर्ज	कुल हुवानी तर्ज वाहेक वांकी अनुमानित कुल तर्ज	रू. २,००,००० देखि रू. २०,००,०००	०-१००	०.२०
२. वाह्य यात्रीरूको सवारी संख्या	दैनिक वार्षिक औसत सवारी संख्या (गैर - स्थानिय सवारी)	०-५००	०-१००	०.१५
३. स्थानिय उत्पादनका साधानरू	टन प्रति वर्ष	०-२५००	०-१००	०.१०
४. प्रमुख स्थानिय निर्यातरू	रू. प्रति वर्ष	०-१,५००,०००	०-१००	०.०५
२. सामाजिक आधाररू				जम्मा(०.३०)
५. स्थानिय प्रभावित जनसंख्या	पुल बन्ने ठाउँ देखि १० कि. मि. सम्म हिंडेर पुग्ने दुरी भित्रका मानिसरूको संख्या	५,०००-४०,०००	०-१००	०.१०

पारिचय - १

<p>६. स्वास्थ्य सुविधाएँ भरमा</p> <p>७. शिक्षा सुविधाएँ भरमा</p> <p>८. प्रशासनिक सुविधाएँ भरमा</p>	<p>अस्पताल (५ घंटा भित्र हिंडेर पुगिने) हेल्थ पोष्ट (३ ,, ,, ,,) आयुर्वेदीक क्लिनिक (३ ,, ,,)</p> <p>हाईस्कूल (४ घंटा भित्र हिंडेर पुगिने) मिडिल स्कूल (३ ,, ,, ,,) प्राइमरी स्कूल (२ ,, ,, ,,)</p> <p>- कृषि सम्बन्धी सहायक कार्यालयहरू (४ घंटा भित्र हिंडेर पुगिने)</p> <p>- वैकिंग संस्थाहरू (४ घंटा भित्र हिंडेर पुगिने)</p> <p>- अदालत, मालमोत कार्यालय, धोरु उद्योग (४ घंटा भित्र हिंडेर पुगिने)</p> <p>- हुलाक (४ घंटा भित्र हिंडेर पुगिने)</p> <p>- अन्य सरकारी कार्यालयहरू (,,)</p>	<p>-</p>	<p>०-१००</p> <p>०-१००</p> <p>०-१००</p>	<p>०.०३</p> <p>०.०२</p> <p>०.०१</p> <p>०.०३</p> <p>०.०२</p> <p>०.०१</p> <p>०.०२</p> <p>०.०२</p> <p>०.०१</p> <p>०.०१</p> <p>०.०१</p>
<p>३. अन्य सम्बन्धित आधारहरू</p> <p>-----</p> <p>६. नदी तर्दा हुने बोक्लिम</p>	<p>वर्तमान वारीपारी तर्ने सुविधाहरू उपयोग गर्दा हुने बोक्लिमको मात्रा</p>	<p>उच्च</p> <p>मध्यम</p> <p>निम्न</p> <p>नभएको (शून्य)</p>	<p>१००</p> <p>५०</p> <p>२५</p> <p>०</p>	<p>जम्मा (०.२०)</p> <p>०.०४</p>

१०. पुल प्राप्तिका लागि भरको स्थानिय प्रयास	स्थानिय पुलको मांगको पुवलताको मात्रा तथा वर्तमान तर्ने सुविधाको (भरमा) निर्माण र संभारको लागि गरिएको स्थानिय प्रयास र सहयोग	उच्च मध्यम निम्न नभएको (शुन्य)	१०० ५० २५ ०	०.०४
११. नदीको प्रकार †	ठूलो मझुथोला सानो	- - -	१०० ६० २०	०.०८
१२. मुल बाटोमा पर्ने भए	यदि पुल स्थल मुल बाटोमा पर्ने भने	पर्ने पर्दैन	१०० ०	०.०२
१३. एकीकृत ग्रामीण विकास कार्यक्रम क्षेत्र भित्र परेमा	ए.गा. वि. कार्यक्रम क्षेत्रमा पुल स्थल पर्ने भरमा	पर्ने दुई वर्ष भित्रको योजनामा पर्ने नपर्ने	१०० ५० ०	०.०२

† नदीको प्रकारको व्याख्या वारे, परिच्छेद २.२ पेज १८ हेर्नु होला ।

१.३. पुस्तिकाको उद्देश्य :

यो पुस्तिका फोलुंगे पुल शाखाका सर्वेक्षण टोलीहरूलाई सुसंगत रूपले परिभाषित सामाजिक - आर्थिक आधारहरूमा फोलुंगे पुल स्थलहरूको भावी स्थलगत सर्वेक्षण गर्ने काममा पथ प्रदर्शन गर्नेका लागि तयार गरिएको हो । यसमा समान प्रक्रियाहरू अपनाएरका क्व बस्ले गर्दा स्रोत र साधनहरूको न्यायोचित विनियोजन गर्न सकिएको क्व र विषयात एवं पुर्वाग्रहयुक्त निर्णयहरूलाई सकेसम्म कम गर्न मद्दत मिल्ने आशा गरिएको क्व ।

यस पुस्तिकाको मुख्य उद्देश्य राष्ट्रिय स्तरमा निर्माण गरिनु पर्ने फोलुंगे पुल स्थलहरूको एउटा प्राथमिकता सूची तयार पार्नु हुनेक्व । यस पुस्तिकाको उपयोग गर्ने सर्वेक्षण टोलीहरूले यसमा समावेश भएका आधारभूत निर्देशनहरू र मार्ग दर्शनहरूको पालन गर्नेक्व र तोकिएको ढांचामा सबै तथ्यांकहरू प्रस्तुत गर्नेक्व भन्ने ठोस आशा राखिएको क्व ।

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१.४. पुस्तिकाको परिधि (स्कोप) :

यस पुस्तिकाले फोलुंगे पुल शाखाका नियमित सर्वेक्षण टोलीहरूद्वारा सबै अध्ययन कार्य संचालन गर्नका लागि आवश्यक पृष्ठ भूमि, तथ्यांक तथा तथ्यांकका स्रोत, आधार, निर्धारण, क्षेत्रगत तथ्यांक संकलन प्रक्रिया, तथ्यांक विश्लेषण तथा प्रतिवेदन प्रस्तुत गर्ने निर्देशन प्रदान गर्दक्व ।

यो पुस्तिका संशोधित मूल्यांकन प्रणालीमा आधारित क्व । पुल स्थल क्वाट्र लाई असर पार्ने सामाजिक - आर्थिक पक्षहरूसितको सम्बन्धको आधारमा जम्मा तेह्र वटा आधारहरूको क्वाट्र गरिएको क्व । प्रत्येक आधारको अफ वढी विस्तृत व्याख्या र तिनको निर्धारण यस पुस्तिकाको परिच्छेद २.२ मा दिइएको क्व ।

स्थानिय जनसाधारणसितको सापेक्षिक महत्त्व अनुसार प्रत्येक आधारलाई िदा भिन्दै संशोधित भार प्रदान गरिएको क्व ।

परिच्छेद - २

प्रत्येक पुल स्थलको अन्तिम प्राप्तांक गणना गर्ने प्रक्रिया यस पुस्तिकामा विस्तृत रूपमा बयान गरिएको छ । यहाँ के कुरी स्वीकार गर्नु आवश्यक छ भने, प्रत्येक पुल स्थलले प्राप्त गरेको प्राप्तांकको महत्त्व त्यही आधारमा मूल्यांकन गरिएको अन्य पुल स्थलको प्राप्तांकसित तुलना गरेमा मात्र निस्कन्छ अन्यथा त्यसको आफ्नै कुनै महत्त्व छैन ।

सामाजिक विचारणिय कुराहरू :

- सम्पूर्ण मुलुक भरिने फोल्गे पुलहरू निर्माणका लागि अनुरोध र दरखास्तहरूका रूपमा आएका मांगहरू यति धेरै मात्रामा हुन् कि यस्तो परियोजनालाई स्थानिय जनसंख्याले स्वीकार नगर्ने भन्ने प्रश्न विश्वसनिय तथा तर्कसंगत लाग्दैन ।
- फोल्गे पुलको निर्माणमा प्राप्त स्थानिय सहभागिता, सामान्यतया: ज्यादा धेरै भएको मुलुक भरिने पाइन्छ । वाग्लुङ्ग जिल्लामा निर्मित स्थानिय पुलहरू यसको ज्वलन्त उदाहरण हुन् ।^(३)
- नेपालका पहाडहरूमा भएको निम्न रोजगारीको चर्का समस्यालाई ध्यानमा राख्दा, एक पटकै लागि भए पनि, फोल्गे पुल निर्माणले दिने रोजगारीको अवसरलाई पन्छाउन सकिन्न ।
- नेपालका पहाडहरूमा विद्यमान रहेको उच्च मात्राको सामाजिक गतिशिलतालाई पुल निर्माणले सुगम तथा सुधारीएको वाटो प्रदान गर्ने भएकोले यस परियोजनाको उपायदेयतालाई फेरि पुष्टि गर्दछ । सुधारिएको वाटोवाट हुन आउने फाइदाहरू यस प्रकार प्रत्यक्षतः ग्रामीण पहाडी जनसंख्यालाई जान्छ ।
- फोल्गे पुलहरूको सामाजिक असरबारे पहिले गरिएका अनुसन्धान अध्ययनहरूले देखाए अनुसार प्रष्टरूपमा देखापरेका प्रमुख सामाजिक फाइदाहरू निम्न बमोजिम हुन् :

(३) हेर्नु होस्, पद यात्री फोल्गे पुल अध्ययन, भाग - (क), ईष्ट कन्सल्टिंग इन्जिनियर्स, १९७८.

परिच्छेद - २

- (क) स्थानिय जनताले विषयमान स्वास्थ्य तथा शिक्षा सुविधाहरूको लाभ उठाउने राम्रा सुझावहरू पाउनु ।
- (ख) सामाजिक आदान प्रदानको प्रकृत्यामा वृद्धि र धार्मिक कार्यक्रमापहरू लाई प्रोत्साहित गर्न सहयोग हुनु ।
- (ग) खोला तर्दा ज्यू - ज्यानको क्षति हुने खतरा हट्नु ।
- (घ) खास गरी बेटीपातीको धेरै काम भईरहने समयमा (वर्षा याममा) खेत सम्म सजिलै पुग्न सक्नु ।
- (ङ) सरकारी कर्मचारीहरू त्यस क्षेत्रमा बढी आवागमन गर्न सको व्यवस्थाले गर्दा सरकारी सेवाहरू राम्ररी पुग्न सको अवस्थाको सिर्जना हुनु ।
- (च) स्थानिय महिलाहरू बीच सामाजिक र सांस्कृतिक आदान प्रदानका प्रक्रियाहरू बढ्नु ।

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परियोजनावारै अरू बढी जानकारीका लागि पाठकलाई परियोजना-पत्र (पृष्ठ १८-६४) हेर्नु हुन अनुरोध गरिन्छ ।

२.२. आधारहरू (क्रास्टेरियाहरू) र तिनको निर्धारण :

यस प्रणालीमा क्लौट गरिएका आधारहरू व्यापक छन् तापनि तिनको माप गर्न सजिलो छ र पूर्वलिखित परिच्छेदमा क्लफुल गरिएका फण्डे सबै बुंदाहरूलाई यिनै संगाल्ने प्रयत्न गरेको छ ।

परिच्छेद - २

परिच्छेद १.२ पृष्ठ ४,५ र ६ मा दिइएको सारांश पत्रमा दर्शाइएका संशोधित आधारहरू दौत्रगत स्थितिहरूलाई ध्यानमा राखेर माप गर्नका लागि सरलतम बनाइएका हुन्, ती आधारहरू फोर्लुंगे पुल शाखाका सर्वेक्षण टोलीहरूका लागि काम गर्न सजिला छन् र सजिलैसित बुझ्न सकिने छन् । तिनका मारहरूलाई वास्तविकताको नजिक ल्याउनका लागि उपयुक्त झले सुधारिएको छ । परियोजना-पत्रमा पुस्ताव गरिएका केही आधारहरू तिनका मापने ढ्काईका साथ फेरिएका पनि छन् ।

संशोधित आधारहरूका मुख्य मुख्य विशेषताहरूको संक्षिप्त विवरण आधारहरू के क्रममा तल दिइएको छ । यसको लक्ष्य यो पुस्तिका पहिलो पल्ट प्रयोग गर्ने सम्बन्धित व्यक्तिलाई यस अध्ययन वारे अभिमुख गराउनु हो ।

लागत स्वी : अन्य सबै थोक समान भएमा, स्थल क्वाट प्रणालीले प्रष्टतया : त्यस्तो वारीपारी तर्न ठाउँलाई लिनु पर्दछ जहाँ कम स्वीमा पुल बनाउन सकिन्छ । फोर्लुंगे पुल शाखाको डिजाईन अफिसबाट विस्तृत डिजाइन र अनुमानित लागत (इष्टिमेट) तयार गरि सकेपछि मात्र कुल लागत ठीक रूपमा निर्धारित गर्न सकिन्छ । इष्टिमेटले कुल लागत र परिवहन लागत कट्टा गरी बाँकी रहन आएको लागतलाई जनाउने छ । अहिले निर्धारित गरिएको लागत सम्बन्धि सिमा (२,००,००० देखि २०,००,०००)लाई फोर्लुंगे पुल शाखाको पहिलेका निर्माण अनुभवलाई ध्यानमा राखी मूल्य वृद्धि आधारमा प्रत्येक बर्ष परिमार्जन गरिनु आवश्यक देखिन्छ ।

केही अवस्थाहरूमा, जहाँ विस्तृत इष्टिमेटको काम पुरा हुनु भन्दा अगावै पुलको मूल्यांकनको माग गरिन्छ, त्यस्तो अवस्थामा त्यस्तै प्रकारको पुलको स्वभन्दा ताजा अनुमानित निर्माण लागतहरू (दुबानी स्वी वाले) र त्यस्ता पुलहरूको लम्बाई (स्पान) बीचको ग्राफ प्रयोग गरेर सम्बन्धित पुलको मोटामोटी लागत निकालेर सोही प्रयोग गर्न सकिन्छ ।

वाह्य यात्रीहरूको सवारी संख्या : पुल बनि सकेपछि खोला तर्न पहिले भन्दा कति समय कम लाग्दो रहेछ भन्ने आधारलाई ठीक ठीक बाँच्ने काम बति कठिन तथा अविवशनीय भएकोले यसलाई कटाइएको छ । नयाँ आधारले ज्यादै घुईचो भएको मौसम

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वा हिंडमा वारीपारी गर्ने ठाउँमा ३ दिनको वास्तविक ट्रान्जिट गणनाको आधारमा आवत - जावतको माप गर्दछ र गहन स्थानिय अन्तरवातिका साथ सर्वेक्षण कर्ताको स्थलगत निजी मूल्यांकनको आधारमा वर्णा र हिंडमा हुने जम्मा सवारी संख्या निर्धारण गर्दछ ।

वारीपारी गर्ने ठाउँबाट भएर जाने सम्पूर्ण सवारीहरू मध्ये पुल स्थलवाट एक दिनमा आवत जावत गर्न सक्ने (१० कि. मि. को दुरी अनुमान गरिएको छ) सवारीलाई कट्टा गरी बाँकी रहेको सवारीलाई वाह्य (भार-स्थानिय) सवारी भनि परिभाषित गरिएको छ । अर्को शब्दमा, पुल स्थलवाट एक दिनको हिंडाईमा आवत जावत गर्न सकिने सबै ठाउँहरू देखि टाढावाट आएका अरू सवारी (वाह्य सवारी) यस अन्तर्गत पर्दछन् । यस बाहेक अन्य सबै सवारी स्थानिय सवारीको रूपमा लिइएको छ ।

वाह्य सवारीको आवत जावतले प्रायः जसो भ्रमणको आर्थिक प्रयोजन जनाउने गर्दछ । यसको आर्थिक महत्त्व स्थानिय यातायात भन्दा प्रायः ज्यादै बढी हुन्छ । टाढा टाढा माल औसार्ने जनावरहरू पनि यसमा समावेश गरिएका छन् किनभने यसले आर्थिक प्रयोजना पूरा गरेको हुन्छ । यी जनावरहरू सामान्यतयाः दुई प्रकारका हुन्छन्ः भेडा-बाख्रा अथवा खच्चर-रांगो । करीब दुई ओटा भेडा-बाख्रा अथवा एउटा खच्चर - रांगोलाई एकजना भरिया वरावर लिइएको छ । सवारी आवत जावत गणना गर्दा मालसामान हुवानी गर्ने जनावरहरूलाई भरियामा परिणित गर्नका लागि यसो गरिएको हो ।

यस आधारको मूल्यमानको सिमा क्षेत्र दैनिक आवत जावतको वार्षिक औसतको रूपमा ० देखि ५०० सम्म लिइएको छ ।

स्थानिय उत्पादनका साधानहरू : आधारभूत साधान बालीको वर्तमान उत्पादनलाई भावी कृषि जन्य सुधारको मापका लागि निहित क्षमताको रूपमा लिइएको छ ।

कृषि जन्य प्रभाव क्षेत्रको रूपमा लिइएको क्षेत्र, प्रस्तावित वारीपारी गर्ने ठाउँ देखि हिंडेर एक दिनमा आवत जावत गर्न सकिने सबै ठाउँहरू जुन सबभन्दा नजीकको बजार

केन्द्र देखि नदीको पल्लो पट्टी पर्दछन् । गाउँ पंचायतहरूको ठीक ठीक क्षेत्र देखाउने नक्साहरू र तथ्यांकहरूको अभाव भएकोले ६ कि. मि. अर्धव्यासले ढाको अर्धवृत्त वरावरको क्षेत्रलाई कृषि जन्य प्रभाव क्षेत्र मान्नु पर्दछ भन्ने निर्णय गरिएको छ जुन करीव ६००० हेक्टर वरावर हुन्छ । जुनसुकै व्यावहारिक प्रयोजनका लागि पनि (ईसीइ का सर्वेक्षणहरू वाट पुष्ट भए अनुसार) कल्पना गरिएको क्षेत्र (६००० हेक्टर) र नदीको एक किनारा तर्फ एक दिनको हिँडाईमा आवत जावत गर्न सकिने क्षेत्रको क्षेत्रफल बीचको फरकले कृषि पैदावारको अनुमानलाई ठूलो मात्रामा असर पार्ने खालको हुने छैन ।

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उत्पादनको अनुमान गर्नका लागि, प्रभाव क्षेत्रमा उत्पादन हुने आधारभूत खाद्यान्न बालीका नाउँ प्राप्त गर्न क्षेत्रगत अन्तरवार्ताहरू गरिनु पर्दछ र श्री ५ को सरकारको साथ तथा कृषि विभागको स्वभन्दा पछिल्लो प्रकाशन 'नेपालको कृषि तथ्यांक' वाट सँगै आवश्यक तथ्यांकहरू संकलन गरिनु पर्दछ । ठोस स्थानिय तथ्यांक को अभावमा उपरोक्त कृषि तथ्यांकमा दिइएका जिल्ला स्तरिय तथ्यांकको उपयोग गरिनु पर्दछ । यस पुस्तकले सँगै जिल्लाको कुल क्षेत्र, खेती गरिएको क्षेत्र, बाली लगाइएको क्षेत्र र आधारभूत खाद्यान्न बाली उत्पादन देखाउँछ र यसवाट स्थानिय बालीको कुल उत्पादनको अनुमान सजिलैसित लगाउन सकिने छ । जुन कुरो कार्य पत्रको कार्य पत्र सं. ३ पृष्ठ ५५ मा व्याख्या गरिएको छ । यस आधारको मूल्यमानको सिमा क्षेत्र ० देखि २५०० टन प्रति वर्ष लिइएको छ ।

प्रमुख स्थानिय निर्यातहरू : कृषि प्रभाव क्षेत्रले ओगटेको क्षेत्रलाई नै निर्यातका लागि पनि प्रभाव क्षेत्र मानिएको छ । प्रभाव क्षेत्रको अफ बढी स्पष्ट परिभाषाका लागि पाठकलाई यस पछिको स्थानिय प्रभावित जनसंख्या (पृष्ठ १५) को दोश्रो अनुच्छेद हेर्न अनुरोध छ । प्रमुख स्थानिय निर्यातको अनुमानित परिमाण स्थानिय रूपमा उत्पादन गरिने र बाहिर बेचविक्रय गरिने तीन वा चार ओटा प्रमुख वस्तुहरूको आधारमा गरिएको छ । यी जानकारी संकलन गर्न विस्तृत स्थानिय अन्तरवार्ता गरिनु पर्दछ । अनुमानित परिमाण (तौलमा) लाई मीट्रिक रूपमा परिवर्तन गरिन्छ र यी

काम ' कृषि बजार सूचना ' (श्री ५ वी सरकार, खाद्य कृषि तथा सिंचाई मन्त्रालय, बजार सेवा, काठमाडौंको त्रैमासिक प्रकाशन) मा उपलब्ध जिल्लाको खुद्रा विक्री मूल्य तथ्यांकबाट लिइएको मूल्यमा आधारित गरिएको छ । यस आधारको मूल्य मानको सिमा रु.० देखि १५ लाख सम्म लिइएको छ ।

स्थानिय प्रभावित जनसंख्या : आर्थिक, राजनैतिक, सामाजिक तथा सांस्कृतिक सबै क्षेत्रहरू माथि, पुल निर्माणको संभावित स्थानिय असरको रूपमा, प्रभाव क्षेत्र अन्तर्गतको स्थानिय जनसंख्यालाई आधार मानिएको छ ।

पुल स्थलबाट नदीको दुवै तिर एक दिनको हिंडाईले आवत जावत गर्न सकिने सम्पूर्ण क्षेत्रलाई पुलको प्रभाव क्षेत्रको रूपमा लिइने छ । यस प्रकार औसत स्थानिय मानिसले घण्टाको २ किलो मिटरको दरले हिंडाई दिनको २० किलो मिटर हिंडाई हिंसावले पुल स्थलबाट १० कि. मि. को दूरी सम्मको ठाउँलाई प्रभाव क्षेत्रको रूपमा परिभाषित गरिएको छ ।

प्रभावित जनसंख्या निर्धारण गर्ने प्रक्रियामा सर्व प्रथम प्रस्तावित पुल स्थल देखि एक दिनमा आवत जावत गर्न सकिने गाउँ पंचायतहरूको नाउँ वा वडाहरूको संख्या स्थानिय व्यक्तिहरूबाट प्राप्त गर्नु पर्दछ । यस्ता गाउँ पंचायतहरूको नाउँ वा वडाहरूको संख्या प्राप्त भईसकेपछि, ती गाउँ पंचायतहरू अथवा वडाहरूको जनसंख्या तथ्यांक हाललाई गृह तथा पंचायत मन्त्रालयबाट उपलब्ध जन गणना तथ्यांक (१९७६) बाट प्राप्त गर्न सकिने छ । यी जनगणना तथ्यांक (१९७६) सन् १९८९ को जनगणना तथ्यांक उपलब्ध नहोउन्जेल सम्म मात्र उपयोगमा ल्याइनु पर्दछ । जनसंख्याको प्रक्षेपण यस पुस्तिकाको परिच्छेद २.३ (पृष्ठ २०) मा निर्देशित गरिए अनुसार गरिनु पर्दछ । तर्जु पर्ने ठाउँको वारी र पारी बीच हुने संभावित सामाजिक तथा सांस्कृतिक पारस्परिक क्रियाकलापहरूलाई राम्रोसँग सँगाले हेतुले सम्पूर्ण प्रभाव क्षेत्रलाई समावेश गरिएको छ । तर प्रस्तावित वारीपारी गर्ने ठाउँ देखि एक दिनको हिंडाईले आवत जावत गर्न सकिने दूरीमा त्यही खोला देखि माथिल्लो वा तल्लो भागमा अर्को पुलद्वारा सेवा पु-याइएको जनसंख्यालाई यसबाट घटाउनु पर्ने हुन्छ ।

परिच्छेद - २

अन्य सामाजिक आधारहरू : (स्वास्थ्य, शिक्षा तथा प्रशासनिक सुविधाहरू विद्यमान भएमा) वर्तमान स्वास्थ्य, शिक्षा र प्रशासनिक सेवाहरूको सन्दर्भमा नदी वारीपारी गर्ने सुधारिएको व्यवस्थावाट (पुलवाट) स्थानिय जनतालाई हुने लाभवारे फौलुंगी पुलवाट वारे गरिएका पहिलेका अध्ययनहरूले पर्याप्त मात्रामा फलकाई सकेका छन् । त्यसकारण स्थानिय जनसाधारणलाई पुग्ने फलदालाई पुत्यदा सममा फलकाउनका लागि यी आधारहरूलाई समावेश गरिएको छ । यी ग्रामीण सुविधाहरूको उपभोगका लागि आउंदा जांदा लाग्ने समय नै मुख्य कारक हो भन्ने कुरा पनि अन्य त्यस्तै अध्ययनहरू वाट कायम भई सकेको छ । तसर्थ सुविधाहरू र तिनको उपयोगकर्ताको आधारमा विभिन्न सुविधाहरूका लागि विभिन्न भ्रमण समयको सीमा तोकिएको छ । उदाहरणार्थ प्राथमिक विद्यालय जाने केटाकेटीहरूका लागि २ घण्टाको समय सीमा राखिएको छ भने हाइस्कूल जानेहरूका लागि ४ घण्टाको समय सीमा राखिएको छ । त्यस्तै, अस्पतालका लागि ५ घण्टा, स्वास्थ्य वीकी र आयुर्वेदी क्लिनिकका लागि ३ घण्टा र सबै स्थानिय प्रशासनिक सेवाहरूका लागि ४ घण्टाको समय सीमा राखिएको छ ।

यी आधारहरूको लेखाजोखा गर्न ज्यादा सरल मापन विधि सिफारिश गरिएको छ, जस्तै प्रस्तावित पुल स्थल देखि निर्धारित भ्रमण समय भित्र पुग्न सकिने ठाउंमा उपयुक्त सुविधाहरू भएमा कुनै पनि पुल स्थललाई थप अंक प्रदान गरिएको छ । अन्तरवार्ता फाराम (ब) का प्रश्नहरू ६,७ र ८ मा तोकिएको नयां विधि अपनाएर स्थानिय जनतासंग भ्रमण समय र दुरी संजिलैसित निकाल्न सकिन्छ । (४)

विभिन्न प्रकारका सुविधाहरूलाई तिनको सापेक्षिक महत्व तथा स्थानिय जनतालाई ती सुविधाहरूको आवश्यकताको आधारमा भिन्दा भिन्दै भार दिइएको छ । तर तोकिएको दूरी भित्र नदीको उही भागमा एकै प्रकारको एक भन्दा बढी सुविधाहरू छन् भन्ने त्यसको निम्ति दुई पटक अंक प्रदान गर्नु हुंदैन । तोकिएको समय सीमा भित्र नदीको दुवै तिर उही किसिमका सुविधाहरू छन् भने त्यस्ता सुविधाका लागि शुन्य अंक दिइनु पर्दछ ।

(४) हेर्नुहोस्, यस पुस्तिकाको परिशिष्ट १, पृष्ठ ४२ देखि ४५ सम्म ।

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अन्य सम्बन्धित आधारहरू :

नदी तर्दा हुने जोखिम: पुल निर्माण भईसकेपछि नदी तर्दा प्राप्त हुने सुरक्षाको सापेक्षिक मात्रा माप गर्नका लागि यस आधारलाई समावेश गरिएको हो । सर्वेक्षण कर्ताको स्थलगत अवलोकनका साथै वर्तमान वारीपारी तर्ने प्रक्रियामा हुने गरेको दुर्घटनाहरूको इतिहासको आधारमा यस कारकको माप गरिनु पर्ने हुन्छ । दुर्घटनाको इतिहासको विश्लेषणसंग मिल्ने गरी आफ्नो निजी क्षेत्रगत अवलोकनको आधारमा सर्वेक्षणकर्ताले जोखिम वारे आफ्नो राय उच्च, मध्यम, निम्न वा शुन्य गरी चार विकल्पहरू मध्ये एकमा दिनु पर्नेछ ।

परियोजनाको मांगको लागि भएको स्थानिय प्रयास : विगत वर्षहरूमा केन्द्रको माग सूचीमा प्रस्तावित पुललाई समावेश गराउन स्थानिय मानिसहरूले गरेका प्रयासहरूलाई त्यस पन्छाउन सकिन्छ । प्रस्तावित नदी तर्ने वर्तमान तरिका निर्माण गर्ने र त्यसलाई संभार गर्ने स्थानीय अगुवाहरू तथा प्रयासको मात्रा पनि त्यस क्षेत्रका लागि यस परियोजनाको महत्वको एउटा राम्रो सूचक हुनेछ ।

यस कारणले गर्दा भविष्यमा गरिने सर्वेक्षणहरूले स्थानिय प्रयासहरूको इतिहासको रेकर्ड नोट गर्नु पर्दछ । तत्पश्चात सर्वेक्षणकर्ताले वर्तमान नदी तर्ने तरिकाको हालको अवस्था अवलोकन गरी अन्त्यमा स्थानिय सहयोगको मात्रा दर्शाउन आफ्नो रायलाई उच्च, मध्यम, निम्न वा शुन्य गरी चार विकल्पहरू मध्ये एकलाई चुनेर दिनु पर्नेछ ।

नदीको प्रकार : नदीको प्रकारले (आकार प्रकार) महत्वपूर्ण भूमिका खेल्छ र सामान्यतया कुनै ठाउँ विशेषमा पुल बनाउने खाँची छ वा कुनै भन्ने निधी गर्ने एक मुख्य आधार हुन्छ । संशोधित प्रणालीमा पुलले गर्दा समय बचत हुने आधारको माप हटाइएको हुनाले (जसले पुल बनाउनु पर्ने नदीको स्वभावलाई अन्यथा संकेत गरेको हुन्थ्यो) नदीको प्रकारवारे नयाँ आधार ल्याउनु पर्ने आवश्यकता बढी महत्वपूर्ण भयो ।

प्रस्तावित तर्नै ठाउं नजीकैबाट साधारण यात्री भरिया र भारी बोको जनावरहरूले नदी तर्न सक्नु वा सक्दैनन् भन्ने तथ्यको आधारमा नदीहरूलाई ठूला, मझौला र साना गरी तिन खालमा आधारभूत रूपमा वर्गीकरण गरिएको छ । सरल परिभाषा यस प्रकार हुनेछ :

ठूलो नदी सालभरि नै हिंडेर तर्न नसकिने हुन्छ ।

मझौला नदी सुख्खा मौसममा (हिउदमा) प्रस्तावित पुल स्थान नजिकै कुनै त्यस्तै ठाउंवाट बडो कठिनाई साथ हिंडेर तर्न सकिन्छ । यस्ता नदीहरूमा स्थानिय वर्षा पुल बनाउन सकिन्छ, जुन प्रस्तावित तर्नै ठाउं नजिकै प्रायः जसो पाइन्छ पनि ।

सानो नदी सुख्खा मौसममा सजिलैसित हिंडेर तर्न सकिन्छ ।

सर्वेक्षणकालि उपर्युक्त परिभाषा र स्थलात निजी अवलोकनको आधारमा नदीको वर्गीकरण गर्नु पर्दछ । महत्वपूर्ण आधार भएको हुनाले यस आधारलाई न प्रतिशत सापेक्षाक भार दिइएको छ ।

मूल वाटोमा परेको भए : मुलुक भरि यत्रतत्र पुलहरू निर्माण गर्नु भन्दा केही मूल वाटो घाटोहरूको सुधार गर्नु तिर नै नयां फौलुंगे पुलको निर्माणको लक्ष्य हुनु पर्दछ भन्ने कुरो युक्तिसंगत रूपमा भन्न सकिन्छ । तसर्थ, मूल वाटोमा प्रस्तावित पुल पर्छ भने त्यसलाई एक महत्वपूर्ण आधार मान्नु पर्दछ ।

सर्वाे वर्षा देखि महत्वपूर्ण व्यापार मार्ग र हुलाक मार्गको रूपमा चलन चल्तीमा आएका मूल वाटोहरू, जुन अहिले पनि सोही कामका लागि उपयोगमा आई रहेका छन् र विशेष रूपमा ती जसमा हाल सम्म पनि मोटर चल्ने सडक बनि सकेको छैन । यी गोरेटो मूल वाटोहरूले ऐतिहासिक महत्वका ठाउंहरूलाई जोड्नुका साथै यिनीहरू प्रायः जसो चौडा हुने र ठाडो भिरालोमा हुंगाको सिट्टीले उक्लन बोल्न सजिलो पारिएको पाइएका छन् । मुलुकका धेरै जसो मूल वाटोहरू प्रायः उच्च दक्षिण पश्चिमका छन् र यसलाई मूल वाटोको परिभाषा गर्नमा महत्वपूर्ण शर्तको (हुने पनि भन्ने शर्त नभएता पनि) रूपमा लिईनु पर्दछ ।

तसर्थ, संशोधित प्रणालीले मुल वाटो सम्बन्धि आधारलाई एउटा महत्वपूर्ण आधारको रूपमा समावेश गरेको छ र यसलाई २ प्रतिशत भार दिएको छ ।

मुल वाटोको उपयुक्त परिभाषाको ज्ञानका साथै गौरेटो वाटोको विस्तृत नक्सा अध्ययन सहित सर्वेक्षणकालि प्रस्तावित नदी तर्ने ठाउँ मुल वाटोमा पर्ने वा पर्दैन भन्ने कुरा निधो गर्नु पर्दछ ।

एकीकृत ग्रामीण विकास कार्यक्रम क्षेत्र भित्र परेमा : एकीकृत ग्रामीण विकास कार्यक्रमहरूले (ए.ग्रा. वि. का.) ज्यादै ठूलो क्षेत्रफल ढाकेको हुनाले पुलको निर्माणले एकीकृत ग्रामीण विकास कार्यक्रम बीच हुने गहनतम अन्तर सम्बन्धको ठीक ठीक स्वभाव तथा लाभ ठम्याउन ज्यादै कठिन भएता पनि, यस्तो सम्बन्ध बांही हुन्छ भन्ने कुरा इन्कार गर्न सकिन्न । त्यसकारण, सर्वेक्षणकालि तीन ओटा संभावित उचरहरू (ए.ग्रा. वि. का. भएको । वा दुई वर्ष भित्र यस्तो ए.ग्रा. वि. का. लागु हुने । वा हुंदैन भएको) भन्ने सरल उचरहरू मध्ये वास्तविक जुन हो त्यो रेकर्ड गर्नु पर्दछ । सर्वेक्षण कालि, यस हेतु, हाल (२०३७) स्थापना भएको स्थानिय विकास मन्त्रालय अन्तर्गत एकीकृत ग्रामीण विकास केन्द्रोय समन्वय कार्यालय, श्रीमल्ल, काठमाडौंवाट यी उचरहरू सजिलैसंग पत्रा ल्याउन सक्नेछ ।

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२.३. पूर्व उपलब्ध हुन सक्ने तथ्यांकहरूको संकलन :

सर्वेक्षण भ्रमण भन्दा पहिले सर्वेक्षणकालि अध्ययनका लागि आवश्यक आधार-भूत पूर्व उपलब्ध तथ्यांकहरू संकलन गरि सक्नु पर्दछ । यस सर्वेक्षणका लागि पूर्व उपलब्ध हुन सक्ने तथ्यांकहरू निम्न प्रकारका छन् :

- सभै अफ इण्डियाद्वारा तयार पारिएको १" = १ माइल जनाउने सम्बन्धित क्षेत्रको टोपोग्राफिकल नक्सा । फौलो पुल शाखा कार्यालयमा प्रायः जसो सम्पूर्ण मुलुककै १" = १ माइल जनाउने नक्साहरू उपलब्ध छन् । यस्ता आवश्यक नक्सा सजिलोसंग ठम्याउनका लागि संसूचक नक्सा (इन्डेक्स म्याप) हेर्नु पर्दछ ।

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सर्वे क्षेत्रको आवश्यक नक्सासिट प्राप्त भएपछि यसको १ वा २ प्रति फोटो कपी (प्रतिलिपि) निकाली फिल्डको प्रयोगका लागि छुटाई राख्नु पर्दछ ।

- अंचलको र संभव भए, त्यस क्षेत्रको जिल्लाको नक्सा टोपोग्राफिकल सर्वे विभाग श्री ५ को सरकार, वानेश्वर, काठमाडौंवाट संकलन गरिनु पर्दछ । सर्वेक्षण गर्ने क्षेत्र वारेको प्राथमिक जानकारी वटुलाका लागि र सर्वेक्षणकर्ता लाई सर्वेक्षण क्षेत्रका नाउंहरू र त्यस वरिपरिका ठाउंहरूसित परिचित गराउन यी नक्साहरू अत्यन्त उपयोगी सिद्ध हुनेछन् ।

- जनसंख्या सम्बन्धी तथ्यांक केन्द्रीय तथ्यांक विभागको सन् १९७१ को जनगणना तथ्यांकमा गृह तथा पंचायत मन्त्रालयले सन् १९७६ मा जिल्ला तथा गाउंका सिमानाहरू परिवर्तन अनुसार मिलाईएको जनसंख्या तथ्यांकलाई वार्षिक २.२ प्रतिशतको दरले वृद्धि गरी निकालिनु पर्दछ । एक पटक यो अंक प्राप्त भएपछि, त्यसपछिका वर्षहरूका लागि जनसंख्याको प्रक्षेपण निम्नलिखित फार्मुलाको आधारमा गरिनु पर्दछ :

$$पी (एन्) = पी (१ + आर) एन्$$

$$पी (एन्) = (एन्) वर्ष पछिको जनसंख्या$$

$$पी = १९७६ को गृ.पं.मं.द्वारा संशोधित जनसंख्या अंक +$$

$$आर = जनसंख्या वृद्धि दर (वार्षिक २.२ प्रतिशतका दरले)$$

$$एन् = १९७६ देखि सम्बन्धित वर्ष सम्मको वर्षहरूको संख्या$$

+ १९८१ को केन्द्रीय तथ्यांक विभागको जनसंख्या तथ्यांक उपलब्ध भएपछि जनसंख्या अनुमानका लागि उक्त तथ्यांकनै उपयोग गर्नु पर्नेछ :

- स्थानिय कृषि उत्पादनको अनुमान गर्न, खाद्य तथा कृषि विभाग, बजार सेवा, काठमाडौंवाट प्रकाशित "नेपालको कृषि सम्बन्धी तथ्यांक" उपयोग गरिनु पर्दछ । अहिले १९७७ को प्रकाशन मात्र प्राप्त छ, तथापि सकेसम्म नयां प्रकाशन उपयोग गरिनु पर्दछ ।

- प्रमुख स्थानिय नियतिहरूको मूल्य अनुमान गर्नका लागि, काच कृषि तथा सिंघाई मन्त्रालय काठमाडौंवाट प्रकाशित त्रैमासिक प्रकाशन, 'कृषि बजार सूचना' वाट आवश्यक वस्तुहरूको जिल्ला अनुसारको औसत खुद्रा मूल्य लिइनु पर्दछ ।

अध्ययन सम्बन्धी अरु थम जानकारीका लागि, निम्नलिखित प्रतिवेदनहरू हेर्नु उपयुक्त हुनेछ :

- दश ओटा पद यात्री फोर्लुंगे पुलहरूको सर्वेक्षण र प्राथमिकता मूल्यांकन वारेको अन्तिम प्रतिवेदन, इष्ट कन्सल्टिंग इन्जिनियर्स, काठमाडौं, नोभेम्बर १९८०.
- पद यात्री फोर्लुंगे पुल - परियोजना पत्र (३६७-०२१६) अगष्ट ३१, १९७६ यूएसएआइडी - नेपाल, काठमाडौं ।

२.४. स्थल निर्माण नक्साको अध्ययन :

समे अफ इण्डियाद्वारा तयार पारिएको १" = १ माइलको टोपोग्राफिकल नक्सा पद यात्री फोर्लुंगे पुलहरूको स्थल सर्वेक्षण अध्ययनका लागि अत्यन्त उपयुक्त नक्सा हो ।

यी नक्साहरू फोर्लुंगे पुल शाखाको डिजाइन कार्यालयमा उपलब्ध छन् तापनि यदि कुनै निर्दिष्ट नक्सा वा नक्साहरू उपलब्ध नभएको खण्डमा, सम्पर्क गर्नु पर्ने अर्को ठाउँ शाही नेपाली सेना वा श्री ५ को सरकारको समे विभागको टोपोग्राफिकल शाखा हो, जहाँवाट यी नक्साहरू सापटी लिन सकिन्छ । यस नक्साको फोटोकपी बनाउनु पर्दछ र प्रस्तावित पुल वन्ने ठाउँ निर चिन्ह लगाउनु पर्दछ ।

यस नक्सामा गोरेटो वाटोहरू राम्ररी देखाइएका छन् यिनीहरूलाई वडा सावधानी पूर्वक हेर्नु पर्दछ र प्रस्तावित पुल मुल वाटो भित्र पर्दछ पदेन राम्ररी छुट्याउनु पर्दछ । नदीले दुई जिल्लाहरूको सिमाना छुट्याएको छ कि केन भन्ने पनि हेर्नु पर्दछ र यदि यस्ता छ भने ती जिल्लाहरूको नाउं टिप्नु पर्दछ । क्षेत्र - प्रमण

परिच्छेद - २

भन्दा अगावैसर्वेक्षण क्षेत्र वारै सामान्य तर आवश्यक जानकारी हासिल गर्न, पुस्तावित नदी तर्ने ठाउँ वरिपरिका गाउँ पंचायतहरूको नामको मोटामीटी तवरमा सूची तयार पार्ने टोपोग्राफिकल सर्वे विभागबाट प्राप्त जिल्ला वा अंचलका नक्साहरू उपयोग गरिनु पर्दछ ।

यो पूर्व संकलित जानकारी ठीक छ, क्षेत्र भनि फिल्डमा जांचका लागि यस प्रकार चिन्ह लगाइएको नक्साको प्रतिलिपि (फोटो कपि) क्षेत्रमै लिएर जानु पर्दछ ।

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स्थलगत सर्भेक्षण अध्ययनका लागि निर्देशनहरू :

३.१. सवारी (ट्राफिक गणना) :

जम्मा सवारीको परिमाण अनुमान गर्न प्रस्तावित स्थलमा सवारी (ट्राफिक) गणना गरिने छ । फोलुगे पुलका धेरै जसो प्राविधिक स्थल सर्भेक्षणहरू सुक्खा मौसममा (ह्रिउंदमा) गरिने भएको र सामाजिक - आर्थिक सर्भेक्षण पनि संगसंगै गर्नु पर्ने भएकोले, धेरै जस्तो स्थलहरूमा सवारी गणना सुक्खा मौसममा मात्र गरिने हुन्छ ।

यी सर्भेक्षणहरू सामान्यतया विहान ५ देखि सांफ ७ वजे सम्म लगातार ३ दिन सम्म प्रस्तावित पुल नगिचै परम्परागत नदी तर्ने ठाउँमा गरिनु पर्दछ । यस्ता सवारी गणना सम्बन्धि सर्भेक्षणहरू गर्न ट्राफिक सर्भेमा प्रयोग गर्ने अन्तरवार्ता तालिका (क) प्रयोग गर्नु पर्दछ । अन्तरवार्ता तालिका (क) (५) को फुट-नोटहरूमा दिइएका कुराहरूको कडाई साथ पालन गर्नु पर्दछ ।

नदीको प्रत्येक किनारामा दुई दुई जवानलाई (जम्मा ४ जना गणकहरू) एक तर्फि सवारी (ट्राफिक) गणना गर्न लगाउनु होस् । सवारी तथा यातायात गणना को पहिलो दिनभरि नै यी गणकहरूलाई राम्ररी तालिम दिनु होस् र सुम रिवेक्षण गर्नु होस् । आवश्यक देखियो भने, सर्भेक्षणको दोश्रो दिन पनि उनीहरूले गरेको कामको सुम रिवेक्षण गर्नु होस् । मालसामान जोसार्ने जनावरहरू जस्तै भेडा - बाख्रा अथवा खच्चर - रांगो आदिको पनि गिन्ती गर्नु होस् र तालिका (क) को फुट - नोटमा दिए बमोजिम त्यसलाई भरियाको वरावरीमा परिवर्तन गर्नु होस् ।

प्रत्येक दिनको अन्त्यमा सवारी (ट्राफिक) को परिमाण जम्मा गरेर तालिका (क) को प्रत्येक पन्ना पूरा गर्नु होस् । सबै खाली ठाउँहरू पूर्णरूपमा भरिएका छन् वा केनन् राम्ररी हेर्नु होस् ।

(५) हेर्नु होस्, यस पुस्तिकाको परिशिष्ट १, पृष्ठ ३३, ३४

तीन दिनको गणना पछि औसत दैनिक (स्थानिय देखि बाहेक) वाह्य सवारी कति भयो त्यो निकाल्नु होस् । यस संख्याले सुख्खा मौसमको वा बढी बल्तीको (पिकसिजन) मौसममा हुने गैर स्थानिय औसत दैनिक सवारीलाई जनाउने क् । यस अध्ययनका लागि स्थानिय सवारीको संख्या आवश्यक हैन, तर शिदिक प्रयोजनका साथै भावी सन्दर्भका लागि पनि यसको रेकर्ड गरिनु उपयुक्त देखिन्छ ।

अन्तरवार्ता तालिका (ख) (द)को प्रश्न नं. २ प्रयोग गरेर वर्षात र सुख्खा वा बढी बल्तीको मौसमको औसत दैनिक गैर स्थानिय सवारी (ट्राफिक) मूल्यांकन गरिनु पर्दछ । समयको कठिनाईले गर्दा, वर्षात र सुख्खा वा बढी बल्तीको मौसमको लागि सवारी (ट्राफिक) अनुमान माफीहरू, ढुंगा मलाउनेहरूसित लिइएको गहन स्थानिय अन्तरवार्ताका साथै सर्वेक्षणकर्ताको क्षेत्रगत अनुभवको आधारबाट गर्नु पर्दछ ।

सवारी या यातायात गणना बढी बल्तीवाला मौसममा (पिकसिजन) प-यो भने बांकी रहन गएको सुख्खा मौसम र वर्षातको मौसमका लागि औसत दैनिक सवारी को (ट्राफिक) मूल्यांकन स्थानिय अन्तरवार्ता र सर्वेक्षणकर्ताको निजी क्षेत्रगत अनुभवको आधारमा गर्नु पर्दछ ।

२४

३.२. सामाजिक - आर्थिक अन्तरवार्ता तालिकाको प्रयोग :

यो अन्तरवार्ता तालिकालाई अन्तरवार्ता तालिका (ख) को रूपमा राखिस्को क् । यसको नमूना यस पुस्तिकाको परिशिष्ट - १ मा दिइस्को क् ।

प्रश्न संख्याहरू, सजिलो पार्नेको लागि, आधार संख्याहरूलाई संकेत तथा प्रतिनिधित्व गर्ने गरी मिलाएर राखिस्का क् । उदाहरणको रूपमा, प्रश्न सं. ५ ले स्थानिय प्रभावित जनसंख्या वारेको आधार सं. ५ लाई प्रतिनिधित्व गर्दछ भने, त्यसै गरी, प्रश्न सं. १० ले परियोजनाको लागि भएको स्थानिय प्रयास वारेको आधार सं. १० लाई प्रतिनिधित्व गर्दछ, आदि ।

(द) हेर्नु होस् यस पुस्तिकाको परिशिष्ट १, पृष्ठ ३५, ३६

अन्तर्खार्ता फाराम (क) प्रयोग गर्दा निम्नलिखित निर्देशनहरू पालन गर्नु पर्दछ । यी निर्देशनहरू आधारक्रम अनुसार तल वर्णन गरिएका छन् :

आधार १ : पुलको ठीक तर्फी लागतको अनुमान पुलको विस्तृत डिजाइन पूरा भई सकेपछि मात्र तयार गर्न सकिने भएकोले फोर्लुगे पुल शाखाको डिजाइन कार्यालयबाट उक्त लागत अनुमान तयार भई नसकुन्जेल यस आधारलाई त्यसिकै राख्ने । तर कुनै त्यस्तै अवस्थाहरूमा, विस्तृत डिजाइन तयार हुनु भन्दा अगावै केही पुल परियोजनाहरूको प्राथमिकता मूल्यांकन आवश्यक पर्न गयो भने, मौटामोटी लागत अनुमान लगाउनका लागि देहायको प्रक्रिया अपनाउनु पर्दछ ।

- (१) प्रस्तावित नदी तर्फी ठाउँको मौटामोटी दुरी (स्मान) निश्चित गर्ने ।
- (२) फोर्लुगे पुलको किसिम छनौट गर्ने (सस्पेन्डेड वा सस्पेन्शन) ।
- (३) फोर्लुगे पुल शाखाको पहिले नै निर्माण भएका ५ वा ६ वटा बुनिएका (सस्पेन्डेड वा सस्पेन्शन) पुलहरूको लागत (परिवहन तर्फी वाहेकको कुल तर्फी) निकाल्ने ।
- (४) दुरी (स्मान) हरू र निर्माण लागतको आधारमा ग्राफ तयार गर्ने ।
- (५) यस ग्राफबाट छनौट गरिएको दुरीको (स्मान) लागि हुन आउने निर्माण लागत निकाल्ने ।
- (६) आधारको गणना गर्नका लागि यस लागत अंकको प्रयोग गर्ने ।

लागत आधारको मूल्यमानको सिमा क्षेत्र, १६८० को मूल्यको आधारमा, २ लाख देखि २० लाख सम्म मानिएको छ । माथिल्लो र तल्लो दुवै मूल्य, महंगीको वृद्धि दरको आधारमा प्रत्येक वर्ष संशोधन गरिनु पर्दछ । मूल्य वृद्धिको (महंगी) प्रतिशत विगत पाँच वर्ष भित्र निर्माण गरिएका पुलहरूको लागतमा भएको वृद्धि दरको आधारमा पत्तो लगाउनु पर्छ । यी तथ्यांकहरू फोर्लुगे पुल शाखाको डिजाइन कार्यालय वाट प्राप्त गर्नु पर्छ ।

यदि वर्तमान निर्माण तर्ज यस आधारकी तौ शिफ्टको अधिकतम तर्ज (२० लाख) भन्दा बढी भयो भने यस आधारकी नकारात्मक बंक वाउने ह तर त्यस्तो अवस्थामा शुन बंक लिने निर्णय गरिएको ह ।

आ. र. २ : यो प्रश्नावली नदी तार्ने कामका सम्बन्धित माफीहरू, ढुंगा चलाउनेहरू र अन्य व्यक्तिहरूको बढीमा ५ जना सम्मको समूहलाई प्रयोग गरिनु पर्छ किन भने यी मा.।सहरू अन्य जानकारी दिन उत्सुक स्थानिय व्यक्तिहरू भन्दा यस सम्बन्धमा स्पष्टतः बढी जानकारी हुने गर्दछन् ।

घाँत्रको स्थानिय जलवायुको अवस्था अनुसार सुस्का मौसम (हिउद) सामान्य तथा: ७ देखि ६ महिना सम्म रहन्छ । तथापि, यस पुस्तिकामा व्यावहारिक प्रयोजन कालागि, सम्पूर्ण देशका लागि ८ महिना सुस्का मौसमको रूपमा लिईएको ह ।
सर्वेक्षणको प्रयोजनका लागि, कार्तिक (अक्टोबर) देखि जेष्ठ (मे) सम्म ८ महिना सुस्का मौसम र आषाढ (जून) देखि आश्विन (सेप्टेम्बर) सम्म ४ महिना वर्षातिको मौसमको रूपमा लिईएकां ह ।

स्थानिय र गैर स्थानिय सवारी (ट्राफिक), सुस्का मौसम, बढी चल्तीको मौसम (जुन बेला तर्ने ठाउँमा सवारी ज्यादा धेरै हुन्छ), वर्षात मौसम र अंसत दैनिक सवारी इत्यादि कुराहरू के हुन मन्ने वारे सम्बन्धीत जानकारी अन्तरवार्ता लिनु भन्दा पहिले उपरोक्त समूहलाई स्पष्ट रूपमा व्याख्या गरी दिनु पर्दछ ।

अन्तरवार्ता लिईने समूहले माथि उल्लेखित कुराहरूवारे एक पटक पूर्ण रूपमा बुझे पछि, अन्तरवार्ता तालिका (स) को सवारी सम्बन्धी प्रश्नावली प्रश्न नं. २ क्लफल्का लागि समूह समदा राखिन्छ । सामूहिक रायमा पुग्नु भन्दा पहिले सामान्यतया वास लाग्दो क्लफल हुने गर्दछ । यदी उषरहरू एक अर्कासित केन्द्र खांदो छन् भने कुरो सर्वेक्षणकबलि महसूस गर्छ भने र पहिलो दुई दिनको सर्वेक्षणको अवाधिमा घाँत्रमा प्राप्त भएको वास्तविक गणना गरीएको सवारी तथ्यांक भन्दा ज्यादा फरक देखियो भने, प्रश्नहरूलाई एक पटक फेरि सम्झाई दिनु पर्नेछ । सामूहिक राय(निबोध)

मा सर्वजना आस्पृहि सर्वज्ञाणकर्त्तारि आफ्नो क्षेत्रगत अनुभवको आधारमा मूल्यांकन गरेर प्राप्त भएको उत्तर रेकर्ड गर्नु पर्दछ ।

वर्षाको कुनै खास अवधिमा स्थानिय कारणावस (महिना वा दिनहरूमा) असाधारण रूपले ज्यादा ठूलो सवारी (ट्राफिक देखा पर्छ भने, यी महिना र दिनहरू र त्यसको औसत दैनिक सवारीको तुलना रेकर्ड राख्नु पर्छ (अध्ययनमा उच्च सवारीको मौसम (महिना वा दिनहरू) भनि जनाईएको छ) । उच्च सवारीको (पिक सिजन) मौसम भन्नाले सुरक्षा मौसमको सवारी भन्दा यसको सवारी संख्या डेढ गुना बढी हुनु पर्दछ ।

औसत दैनिक सवारी अन्तर्गत जनावरहरूवाट हुने हुवानिलाई (यदि त्यस्तो छ भने) भरियामा परिवर्तन गरेर राख्नु नितान्त जरूरी छ । यो परिवर्तन गर्ने तरिका कार्य पत्र सं. २६ पृष्ठ ५४ मा दिइएको छ ।

आधार ३ देखि ८ : सवारी गणना गर्ने पहिलो दुई दिन भित्र, सर्वज्ञाणकर्त्तारि आफ्नो निर्जी क्षेत्रगत अवलोकनको आधारमा त्यस क्षेत्रका जानिकार व्यक्तिहरूलाई ठाम्याउनु पर्दछ । यी व्यक्तिहरू सामान्यतया ग्रामीण सामाजिक कार्यकर्त्तारिहरू, स्कूल शिक्षकहरू, स्थानिय पसलैहरू, स्थानिय पंचायतका कार्यकर्त्तारिहरू, आदि हुन्छन् । सर्वज्ञाणको तेश्रो दिन यी व्यक्तिहरूलाई उपयुक्त ठाउँ र समयमा अन्तरवार्ताका लागि आमन्त्रित गरिनु पर्दछ । भाग लिने समूहमा ५ जना भन्दा बढी मानिस हुनु हुन्न । तर, सामूहिक राय उपलब्ध गर्दा अन्तरवार्तामा खुला क्लफललाई प्रोत्साहित गरिनु पर्दछ । उपयुक्त र बुद्धिमत्तापूर्ण सम्बन्धित टीका टिप्पणीहरू पर्यवेक्षकहरूवाट नै आरमा पनि त्यसलाई स्थान दिनु पर्दछ ।

प्रश्न ३ देखि ८ सम्मका उत्तरहरू सर्वज्ञाणकर्त्तारि प्रश्नावली फाराममा निर्धारित स्थानमा भर्नु पर्दछ र यसो गर्दा यस परिच्छेदमा तोकिए अनुसार समय समयमा आफ्नो निर्णय प्रयोग गर्नु पर्दछ ।

परिच्छेद - ३

आधार ६ र १० : यी आधारहरूको माप स्था निय जानकारीका साथ सर्वज्ञाणकर्ता को व्यक्तिगत निर्णयको आधारमा क्षेत्रमा संकलन गरिएको जानकारीका मेल खाने किसिमबाट गरिनु पर्दछ ।

आधार ११, १२ र १३ : यी आधारहरू स्वभावतः आधारभूत रूपमा वस्तुगत छन् । यी आधारहरूले खोजका धेरै जसो अथवा प्रायः सबै जानकारीहरू क्षेत्रगत सर्वज्ञाण भन्दा पहिले नै निर्धारित गर्न सकिन्छ र गरिनु पर्दछ तर यसको सत्यता जांच, रूजु र सच्याउने काम भने क्षेत्रगत सर्वज्ञाणको दौरानमा गर्नु पर्नेछ ।

३.३. क्षेत्रगत जांच :

सर्वज्ञाणको अन्तिम दिनमा, सामान्यत तेश्रो दिनमा, सबै संकलन गरिएका क्षेत्रगत तथ्यांकहरू पूर्ण रूपले जांचिनु पर्दछ ।

सबभन्दा पहिलो हेर्नु पर्ने कुरा के हो भने, अन्तरवार्ता फारामले खोजका सबै क्षेत्रगत जानकारीहरू जम्मा भयो वा भएन । कुनै जानकारी कुटेको छ कि भनि सर्वज्ञाणकर्ताले राम्ररी हेर्नु पर्नेछ ।

दोश्रो कुरो, क्षेत्रमा नोट गरिएको जानकारी एक अर्कासित मेल खाने नखाने र अन्तर विरोधी छन् वा छैनन् हेर्नु पर्दछ । यदि कुनै विरोधाभास छ भने त्यसलाई रातो मसीले चिन्ह लगाउनु पर्दछ र अर्को दिन वा सोहि दिन त्यसलाई क्षेत्रमा जांचेर सच्याउनु पर्नेछ ।

* * *

मूल्यांकन प्रक्रिया र प्रतिवेदन प्रस्तुतीकरण :४.१. मूल्यांकन (-याकिंडो) प्रक्रियाको सैद्धान्तिक व्याख्या :

(१) मूल्यांकन प्रक्रियामा पांच अंगहरू छन् :

- (१) आधारहरू अथवा क्राईटेरियाहरू
- (२) सम्बन्धित मापन इकाईहरू
- (३) प्रत्येक आधारको मापन इकाईहरूको मूल्यमानको अधिकतम र न्यूनतम सिमा क्षेत्र
- (४) साफा मापन गर्ने स्केल
- (५) सम्पूर्ण अंकमा प्रत्येक आधारको सापेक्षिक महत्व निर्धारण गर्ने भारहरू

मापन इकाईहरू, तिनको मूल्यमानको सिमा क्षेत्र तथा साफा मापन गर्ने स्केल इत्यादि ती साधनहरू हुन जसद्वारा प्रत्येक आधार वा क्राईटेरियालाई साफा हरांकमा परिवर्तित गर्न सकिन्छ र अन्तिम अंकका लागि सबै अंकहरूलाई एकसाथ जोड्न सकिन्छ ।

प्रत्येक आधार अथवा क्राईटेरियाको भारित अंक प्राप्त गर्नको लागि सर्वेक्षण को अवधिमा प्राप्त गरिएका क्षेत्रगत वास्तविक मूल्यलाई आधार सिमा क्षेत्रका मूल्यहरूसँग तुलना गरिन्छ, अनि तिनलाई प्रतिशतमा बदलिइन्छ (साफा मापन गर्ने स्केल) र त्यसमि आधार भारले त्यसलाई अन्त्यमा गुणन गरिन्छ ।

वास्तविक पाइएको मूल्यवाट सिमा क्षेत्रको न्यूनतम मूल्यलाई घटाएर आएको अंकलाई सिमा क्षेत्रको न्यूनतम र अधिकतम मूल्य बीचको फरकले भाग दिएर साफा मापन गर्ने स्केलमा प्रतिशतको रूपमा परिणित गरिन्छ । सर्व सम्बन्धि क्राईटेरियाका सम्बन्धमा (उच्च लागतको पुललाई कम महत्व दिनु उचित भएकोले) परिवर्तन गर्ने उपयुक्त प्रक्रियाको ठीक उल्टो गर्नु पर्ने हुन्छ र कुनै पनि सास पुलको सर्वलाई सिमा

परिच्छेद - ४

क्षेत्रको अधिकतम मूल्यवाट घटाउनु पर्दछ र त्यसवाट आएको अंकलाई सिमा क्षेत्रको अधिकतम र न्यूनतम मूल्यहरू बीचको फरकले भाग गरी आएको अंकलाई प्रतिशत (साक्षात् मापन गर्ने स्थल) को रूपमा परिवर्तन गर्नु पर्नेछ ।

४.२. कार्य पत्रहरू :

सर्वेक्षणको दौरानमा संकलित सबै जानकारीहरूलाई (मूल्यांकन गर्ने प्रक्रिया लाई सुनियोजित तथा व्यवस्थित गराउनकालाई) निर्धारित फारामहरूमा (जसलाई यस पुस्तिकामा कार्य पत्र भनिएको छ) चढाउनु पर्नेछ ।

यस कार्य पत्रले सर्वेक्षणकर्तालाई एकम छि अर्को गरी क्रमवद्ध तरिकाले प्रत्येक आधारको अंक गणना सजिलोसँग गर्न सक्षम तुल्याउने छ । यसले सिलचिलावद्ध गणना गर्ने तरिका बसाल्ने छ र सर्वेक्षणद्वारा निर्धारण गरिने सबै प्रस्तावित पुल स्थलहरूका परिणाममा एक रूपता ल्याउने छ । उपयोगमा ल्याइने कार्य पत्रहरूको नमूना यस पुस्तिकाको परिशिष्ट २ मा दिइएको छ ।

माथि परिच्छेद ४.१ मा व्याख्या गरिएको मूल्यांकन प्रक्रियामा आधारित क्रमवद्ध गणना गर्ने विधि प्रत्येक आधारका लागि कार्य पत्रमा विस्तृत रूपमा देखाइएको छ । कार्य पत्रहरू स्वयंभू स्पष्ट छन् र आवश्यक व्याख्याहरू फुटनोटहरूमा दिइएका छन् । आवश्यक परेमा, प्रत्येक आधारको राम्रो ज्ञानका लागि परिच्छेद २.२ हेर्नु होस् । कार्य पत्रमा, प्रत्येक आधारको अन्त्यमा, केही खाली ठाउँ छाडिएको छ, जसमा सर्वेक्षणकर्ताले प्रत्येक आधारसित सम्बन्धित केही विशेष वा असाधारण अवस्थाहरूलाई (यदि यस्तो भएमा) व्याख्या गर्न सक्नेछ ।

४.३. कार्य पत्र पूरा गर्नका लागि सामान्य निर्देशनहरू :

कार्य पत्र पूरा गर्नका लागि र अस्पष्टगत प्राप्तिका पुग्नाका लागि केहि सामान्य निर्देशनहरू तल दिइएका छन् :

- पूरा भएका दुबै क्षेत्रगत अन्तरवार्ता फारामहरू (क) र (ख) संकलन गर्ने ।

- क्षेत्रमा गरिएका गणनाहरू, खासगरी स्वारी गणना, पुनः भेक गरौं हेर्ने ।
- यस पुस्तिकाको परिच्छेद २, ३ मा उल्लेखित सबै आवश्यक पर्ने पूर्व उपलब्ध तथ्यांकहरू जम्मा गर्ने ।
- कार्य पत्रमा दिइएको प्रक्रिया अनुसरण गरी प्रत्येक आधारका लागि अंक गणना गरी निकाल्ने । प्रत्येक आधारका लागि अंक निकालि सकेपछि त्यसलाई पुनः एकमल्ट जांच गर्ने । अंकहरूलाई दशमलव पछि दुई स्थान सम्म मात्र गणना गर्ने ।
- अन्तिम अंकमा पुग्नुका लागि अन्तिम प्राप्त्यांक गणना गर्ने कार्य पत्र (पृष्ठ ५१) भर्ने ।
- अन्तिम प्राप्त्यांक अत्यन्त निम्न अथवा अत्यन्त उच्च छ भन्ने लागेमा सबै गणनाहरू एक पल्ट फेरि दोहो-याएर जांचे र गणना गर्दा कहिँ कतै कुनै गलती हुन गएको छ कि सो हेर्ने र सच्याउने ।

४.४. प्रतिवेदन प्रस्तुतीकरण :

अन्तमा सर्वेक्षणकर्ता मूल्यांकन प्रक्रियाबाट संतुष्ट भयो भने सबै आवश्यक कागजात (दस्तावेज) भएको सट्टा प्रतिवेदन तयार गरि (पूरा भएका अन्तरवार्ता फाराम, कार्य पत्रहरू, नक्साहरू आदि) फोर्लुंगे पुल शाखाको डिजाइन कार्यालयमा टाँस गरिएको र प्रति बुझाउनु पर्ने छ ।

फोर्लुंगे पुल शाखाका विभिन्न टोलीहरूद्वारा वर्ण भरिमा गरिएका सबै सर्वेक्षणहरूका यस्ता प्रतिवेदनहरू जम्मा गरेर फोर्लुंगे पुल शाखाको डिजाइन कार्यालयले निर्माणको प्राथमिकताको आधारमा फोर्लुंगे पुलहरूको सट्टा मूल्यांकन सूची तयार गर्नेछ ।

* * *

नोट :

१. माथिको तालिकामा दिइएको पहिलो प्रश्नको उत्तर सकिन्छ भन्नेबायो भने, त्यो यात्रिलाई "स्थानिय" मान्ने, सकिन्न बायो भने "वाह्य" ।
२. स्थानिय क्षेत्र भन्नाले, प्रस्तावित पुल देखि १० कि. मि. को हिंडाई भित्र पर्ने क्षेत्रहरू पर्ने छन् । पहाडमा हिंड्या साधारण मानिसले दिनभरी (१० घण्टा) हिंड्यो भने सालाखाला २० कि. मि. को हिंडाई हिंड्नु भन्ने अनुमान गरिएको छ । त्यसकारण एक दिनमा आवत जावत गर्दा, कुनै पनि व्यक्तिले १० कि. मि. को दूरी तय गर्ने भयो ।
३. ट्राफिक सर्भे गर्दा विहान ५ वजे देखि वैलुकि ७ वजे सम्म घाट तर्ने सम्पूर्ण यात्रिहरू तथा भारी बोक्ने जनावरहरूको संख्या ३ दिन सम्म लगातार गणना गर्नु पर्नेछ । यसका लागि ४ जना गणकलाई नदीको प्रत्येक किनारामा २ - २ जवान गरी ट्राफिक गणना गर्न राख्ने (फुटनोट ६ पनि राम्ररी हेर्नु होला) र यीनिहरूलाई सर्भेकाबारे सर्भेको कम्तीमा पहिला दुई दिन राम्रोसँग निरीक्षण गर्ने ।
४. कुनै यात्रिले जवाफ दिएन भने, "जवाफ नदिएको" भनेर उल्लेख गर्ने ।
५. माथिको तालिकाको पहिलो प्रश्नको जवाफ यात्रिले सकिन्छ भनेर दियो भने दोश्रो प्रश्न पनि गर्ने । उसको गाउँ र बाई नम्बरवाट स्थानिय प्रभावित क्षेत्रको कुनै भाग यो पनि रहेछ भन्ने पत्तो लाग्ने छ ।
६. भारी बोक्ने जनावरहरूको लागि छोटकरीमा "भा.ज." भनेर क्रमसंख्याको क्लममा लेख्ने । भा.ज. कुन प्रकारको हो र कतिवटा छन् त्यो नोट गर्ने । भा.ज. लाई यात्रिहरूमा (हिसावको लागि) परिणत गर्न २ बोका वा भैंडा र १ खच्चर वा रांगो बराबर १ यात्रि मान्ने ।

परिशिष्ट - १

७. ट्राफिक सर्वे गर्ने उपरोक्त प्रत्येक पानामा, मिति, पाना नं. र ट्राफिक गणना गरौंको समय अनिवार्य झमले लेस्ने ।
८. ट्राफिक गणना गर्ने वस्ने स्थान नदीको दायांमा पर्छ वा बायांमा पर्छ त्यो पक्ष लगाउन, नदी बगेको तर्फ फर्केर वस्दा, आफ्नो दायां पट्टि दायां किनार र बायां पट्टि बायां किनार पर्दछन् ।
९. नदीको दुवै तर्फ वसेर ट्राफिक गणना गर्ने हुंदा, प्रत्येक तर्फ वस्ने टोलीले एक तर्फि (आउने वा जाने) ट्राफिक मात्र गणना गर्ने ।

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परिशिष्ट - १

२.१. यो घाटमा सबभन्दा बढि मानिसहरू बल्ने महिना कुन कुन हुन र ती महिनाहरूमा सालासाला प्रतिदिन कति यात्रीहरू तथा भारी बोक्ने जनावरहरू तर्ने गर्दछन् ।

क्रम संख्या	मन्हा । दिनहरू	दैनिक औसत	
		यात्रीहरू	भा. ज.
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२.२. यो घाटवाट प्रतिदिन कति यात्रीहरू सालासाला आवत जावत गर्छन् ?

हिउँदमा _____	दैनिक औसत यात्रीहरू	स्थानियौं	वाह्यौं
वर्षायाममा _____	दैनिक औसत यात्रीहरू	स्थानिय	वाह्य

+ नोट : पुल तर्ने ठाउँवाट एक दिनमा आवत जावत गर्न सकिने सबै ठाउँ वाट आएका यात्रीहरू स्थानिय यात्री (लोकल) मानिने छन् र त्यस भन्दा टाढाका यात्रीहरूलाई वाह्य यात्री (नन्-लोकल) मानिने छन् ।

२.३. यो घाटवाट प्रतिदिन कति भारी बोक्ने जनावरहरू (भा. ज.) सालासाला तर्ने गर्दछन् :

हिउँदमा _____	दैनिक औसत जनावरहरू (भा. ज.)
वर्षायाममा _____	दैनिक औसत जनावरहरू (भा. ज.)

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प्रश्न नं. ३, ४, ५, ६, ७ र ८ का तल दिईएका प्रश्नहरू, गाउँका पंच मला-
दमी, सामाजिक कार्यकर्ता, शिक्षक, पसलेहरू तथा स्थानिय जानकार
व्यक्तिहरूको सानो समूह (जम्मा ५ जना सम्म) लाई साधेर उनीहरूको
सामुहिक भनाई वा विचारलाई (ग्रुप ओपिनियन) सफाकले पुस्ता वित
खालि ठाउँहरूमा भर्ने। प्रश्न नं. ३ र ४ प्रयोग गर्नु भन्दा अघि, प्रश्न
नं. ५ प्रयोग गरी स्थानिय प्रभावित क्षेत्र र तिन्को गाउँ पंचायतहरूको
नाम पछा लगाउनु अनिवार्य छ ।

३. स्थानिय उत्पादनका साधानहरू :

३.१. पुस्ता वित पुल नजिकको सबभन्दा बढी चल्ने प्रमुख बजार कुन हो ?

बजारको नाम : _____

स्थान _____ दायां किनार बायां किनार

बजार रहेको गाउँ पंचायतको नाम : _____

३.२. यो घाटवाट उफे बजार रके दिनमा पुग्न सकिन्छ ?

सकिन्छ सकिंदैन

३.३. सकिंदैन भने, त्यहां पुग्न सरासर हिंडुदा कति दिन लाग्छ ? _____ दिन

३.४. यो प्रश्न भर्नु अगाडी प्रश्न नं. ५ को ५.१ प्रश्नको तालिका भरी सकनु पर्नेछ । अब तलको तालिकामा प्रश्न नं. ५.१ को तालिकामा दिईएको गाउँ पंचायत वा वार्ड नम्बरहरू मध्ये, प्रश्न नं. ३.१ को बजार रहेको पल्लो पट्टीकागाउँ पंचायत वा वार्डहरूको नाम मात्र भर्नु पर्नेछ ।

गाउँ पंचायतको नाम वार्ड नम्बर र त्यस सम्बन्धित गाउँ पंचायत

१.	_____	_____
२.	_____	_____
३.	_____	_____
४.	_____	_____
५.	_____	_____
६.	_____	_____

परिशिष्ट - १

३.५. माथिका गाउँ पंचायत र वार्ड नम्बरहरूमा हुने प्रमुख साधान्न बालिहरू कुन कुन हुन् ?

१ _____ २ _____ ३ _____ ४ _____ ५ _____

४. प्रमुख स्थानिय निर्यातहरू :

४.१. माथि प्रश्न ३.४ मा लेखिएका पंचायत वा वार्डहरूबाट निकासि गरिने मुख्य मुख्य स्थानिय वस्तुहरू + कुन कुन हुन् ?

निकासि वस्तुहरू	प्रतिवर्ष कति निकासि हुन्छ (स्थानिय नापमा)	मूल्य प्रति	प्रतिवर्ष ++ (टनमा)
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+ जनावरहरू प्रमुख स्थानिय निर्यातमा पर्ने भए त्यो पनि लिने ।

++ स्थानिय नापलाई टनमा परिणत गर्ने । पुस्तिकाको अंतमा दिएको परिवर्तन गर्ने तालिका प्रयोगमा ल्याउनु होस् । त्यस्तो परिणत गर्ने काम, सर्पे पछि, कार्य पत्र भर्दा गरे पनि हुन्छ ।

५. प्रस्तावित पुलबाट प्रभावित हुन सक्ने स्थानिय जनसंख्या :

५.१. प्रस्तावित पुल बनाउने ठाउँबाट एक दिनमा पुरै आवत जावत गर्न सकिने गाउँ पंचायतका नामहरू दिनु होस् । साथै जिल्लाको नाम पनि दिनुहोस् ।

यदि कुनै गाउँ पंचायतको पुरै भाग एक दिनको आवत जावतले पुग्नु सकिने भए, त्यस्ता गाउँ पंचायतको कुन कुन वार्डहरू पुरै आवत जावत गर्न सकिन्छ त्यस्ता वार्ड नम्बरहरू र त्यस सम्बन्धित गाउँ पंचायतको नाम दिनु होस् । नोट गरेका प्रत्येक गाउँ पंचायतहरू र वार्ड नम्बरहरू नदीको दायाँ किनारमा क्त वा बायाँमा तल दिईएको तालिकाको तोकिएको कालममा भर्नु होस् ।

क्रम संख्या	गाउँ पंचायत	वार्ड नम्बर र त्यस सम्बन्धित गाउँ पंचायत	स्थान		जिल्ला
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तलको तालिकामा स्वभन्दा पछिल्लो पल्ट प्रकाशित भएको जनसंख्याको तथ्यांक + वाट प्रश्न नं. ५.१ को तालिकामा उल्लेख भएका प्रत्येक गाउँ पंचायत र वार्डहरू + + समेतको जनसंख्या भर्नु होस् ।

परिशिष्ट - १

क्रम संख्या	दायां किनारा		वायां किनारा	
	गाउँ पंचायत वार्ड नम्बर	जनसंख्या	गाउँ पंचायत वार्ड नम्बर	जनसंख्या
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दायां वायां दुबै किनारको गरी

जम्मा हुन आउने जनसंख्या _____ (र)

+ जनसंख्या तथ्यांक (सेन्सस) लिइको वर्ष कुन हो नोट गर्नु होस् ।

+ प्रभावित वार्डको जनसंख्या पनि लिनु होस्, यदि पुरै गाउँ पंचायत प्रभावित हैन भने ।

५.२. यस पुस्तावित पुल देखि ये नदीको मास्तिर वा तलतिर एक दिनको वाटो भित्र पर्ने अरु कुन पुलहरू छन् ?

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हैनन्

कृन् भने सर्वदाकले आफुसंग नक्सामा उक्त पुलहरू भएको ठाउँमा चिन्ह लगाउने र ती स्थानहरूको नाम तलको तालिकामा गर्ने ।

क्रम संख्या	त्यहि नदीमा अरु पुलहरू भएको स्थानहरूको नाम	
	माथितिर (उंभो)	तलतिर (उंभो)
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५.४. प्रश्न नं. ५.२ मा लेखिका गाउँ पंचायत तथा वार्डहरू मध्ये कुन कुन गाउँ पंचायत वा वार्ड नम्बरहरूलाई प्रश्न ५.३ मा भनिएका पुलहरूले सेवा पु-याउने रहेकुर, ती गाउँ पंचायत र वार्ड नम्बरहरू जनसंख्या सहित (प्रश्न ५.२ वाटै) तलको तालिकामा भर्नु होस् :

क्रम संख्या	दायां किनार		बायां किनारा		सेवा पु-याउने पुलको नाम
	गाउँ पंचायत वार्डहरू	जनसंख्या	गाउँ पंचायत वार्डहरू	जनसंख्या	
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परिशिष्ट - १

अरु पुलकले (माथिको तालिका वमोजिम) प्रभावित पार्ने (दायां + वायां) को जम्मा जम्मी जनसंख्या _____ (बि)

५.५. अब प्रस्तावित पुलले प्रभावित पार्ने सक्ने स्थानिय जनसंख्या निकाल, प्रश्न नं. ५.२ मा देखाईएको जम्मा जम्मी जनसंख्यावाट प्र.नं. ५.४ मा (माथि) देखाईएको जनसंख्या घटाउनु पर्छ । याने
(ए) - (बि) = _____

६. प्रस्तावित पुलको प्रभावित क्षेत्र भित्र स्वास्थ्य सेवाहरू पार्ने परमा

६.१. प्रस्तावित पुल देखि एक दिनको आवत जावत गर्ने क्षेत्र भित्र कुनै, अस्पताल, स्वास्थ्य चौकी वा आयुर्वेदीक क्लिनिक क्न् :

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क्न् भने तिनको स्थिति, गाउँ पंचायतको नाम तथा दुरी इत्यादि तलको तालिकामा पार्ने :

क्रम संख्या	स्वास्थ्य सेवाको किसिम	दायां वायां	गाउँ पंचायत	कति पल्ट आवतजावत गर्न सकिन्छ	दुरी कि. मि. + +
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+ प्रस्तावित पुलको ठाउँबाट उक्त स्वास्थ्य सेवा भएको ठाउँमा एक दिनमा कति पल्ट आवत जावत गर्न सकिन्छ । यस्तो यति पल्ट भन्ने उच्चर यस कालममा पर्ने ।

++ अंक १० लाई उच्चरमा आएको यति पल्ट भन्ने अंकले भाग गर्दा आएको अंक पछिल्लो कालममा (दूरी कि. मि.) मा पर्ने ।

नोट : माथि बताए अनुसार हिसाव गरि निकालिएको दूरी, स्वास्थ्य चौकी वा आयुर्वेदिक क्लिनिकको लागि ६ कि. मि. भन्दा बढी र अस्पतालका लागि १० कि. मि. भन्दा बढी आयो भने, त्यस्ता स्वास्थ्य सेवाहरूको नम्बर (हिड्न सक्ने निर्धारित दूरी भन्दा बढी भएकोले) लिइने छैन ।

७. प्रस्तावित पुलको प्रभावित क्षेत्र भित्र शैक्षिक सेवाहरू पर्ने भएमा :

७.१. प्रस्तावित पुल देखि एक दिनको आवत जावत गर्ने क्षेत्र भित्र कुनै माध्यमिक, निम्न माध्यमिक वा प्राथमिक स्कूलहरू छन् :

छन् छैनन्

छन् भने तिनको स्थिति, गाउँ पंचायतको नाम तथा दूरी इत्यादि तलको तालिकामा पर्ने :

क्रम	शिक्षा सेवाको किसिम	दायां वायां	गाउँ पंचायत	कति पल्ट आवत जावत गर्न सकिन्छ	दुरी ++ कि. मि.
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+ प्रस्तावित पुलको ठाउँवाट उक्त शैक्षिक सेवा भएको ठाउँमा एक दिनमा कति पल्ट आवत जावत गर्न सकिन्छ । यस्तो यति पल्ट भन्ने उत्तर यस कालममा गर्ने ।

++ अंक १० लाई उच्चमा आएको यति पल्ट भन्ने अंकले भाग गर्दा बाँस्को अंक पछिल्लो कालममा (दुरी कि. मि.) मा गर्ने ।

नोट : माथि वतार अनुसार हिसाव गरि निकालिएको दुरी, माध्यमिक स्कूलको लागि ८ कि. मि., निम्न माध्यमिक स्कूलको लागि ६ कि. मि. र प्राथमिक स्कूलको लागि ४ कि. मि. भन्दा बढी भएमा त्यस्ता शिक्षा सेवाहरूको नम्बर (हिड्न सक्ने निर्धारित भन्दा बढी भएकोले) लिइने छैन ।

८. प्रस्तावित पुलको प्रभावित क्षेत्र भित्र प्रशासनिक सुविधाहरू प्राप्त गराउने
खालका कार्यालयहरू (प्रशासनिक केन्द्रहरू) भएमा :

८.१. प्रस्तावित पुल देखि एक दिनको आवत जावत गर्ने क्षेत्र भित्र कुनै प्रशासनिक सुविधाहरू प्राप्त गराउने खालका कार्यालयहरू कुनै भने तिनको स्थिति, गाउँ पंचायतको नाम र दुरी इत्यादि तलको तालिकामा गर्ने ।

क्रम संख्या	प्रशासनिक केन्द्रको किसिम + + +	वायां दायां	गाउँ पंचायत	कति पल्ट + आवत जावत गर्न सकिन्छ	दुरी + + कि. मि.
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+ प्रस्तावित पुलको ठाउँबाट उक्त प्रशासनिक केन्द्रहरू भएको ठाउँमा एक दिनमा कति पल्ट आवत जावत गर्न सकिन्छ । यस्तो यती पल्ट भन्ने उत्तर यस कालममा गर्ने ।

+ + अंक १० लाई उत्तरमा आएको यति पल्ट भन्ने अंकले भाग गर्दा आएको अंक पछिल्लो कालममा (दुरी कि. मि.) मा गर्ने ।

परिशिष्ट - १

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यस क्राइटरियाका लागि पुस्तिकाको परिच्छेद १ को सारांश पत्रमा उल्लेखित कार्यालयहरू भए मात्र लिने ।

नोट : माथि बताए अनुसार निकालिएको दुरी, ८ कि. मि. भन्दा बढी भएमा त्यस्ता प्रशासनिक कार्यालयहरूको नम्बर (निर्धारित दुरी भन्दा बढी भएकोले) लिईने छैन ।

६. नदी तर्दा हुने जोखिमहरू:

६.१. यो घाटमा हाल सम्म प्रचलित गर्ने तरिकाबाट विगत वर्षहरूमा के कस्ता दुर्घटनाहरू कति पल्ट भए त्यसबारे पुरा विवरण दिनु होस् । यो विवरण स्थानिय अनुमती व्यक्तिहरू र माफ्ती हुंकाको ठेकेदारहरू सँग सोधेर भर्नु होस् ।

६.२. नदी पार गर्दा दुर्घटना भएको भए :

वर्ष	भएका व्यक्तिहरूको संख्या

परिशिष्ट - १

१०.२. प्रश्न १०.१ अनुसार उपलब्ध स्थानिय विवरणमा स्थानिय जनताले पुल मांगको लागि फोर्लो पुल डिविजन वा स्थानिय विकास विभाग वा सम्बन्धित अरु कार्यालयहरूमा वक्त वक्तमा दिइएका निवेदनहरू कन् भने सर्किटको सो अफिस रिकर्ड खोजि, विवरणहरू भिडाई हेरी आफ्नो मंतव्य तलको खालि ठाउँमा लेख्ने ।

१०.३. अन्त्यमा हाल प्रचलित तर्ज साधन (त्यस्तो केही भए) साधारणतया, स्थानिय हिल्डै पुलहरू, जुगाहरू, धिलिङ्ग, इत्यादि स्थानिय जनताले बनाएका भए, त्यस्तो साधन निर्माण गर्दा तथा त्यसको सालाना मर्मत सुधार कसरी हुने गर्दछ त्यस वारे स्थानिय जानकारी अनुसार सर्किट टोलीले अध्ययन गरी आफ्नो ठोस राय तलको खालि ठाउँमा लेख्ने ।

१०.४. सर्भे गर्ने वेलासा प्रयोगमा आई रहेको तर्ज साधनको अवस्था वारे सर्किट टोलीले हेरी त्यसवारे छोटकरी विवरण तथा राय तलको खालि ठाउँमा लेख्ने ।

१०.५. माथिका पृष्ठ १०.१ देखि १०.४ को अध्ययन गरी सर्पिलाकले आफुना अनुभवको आधारमा माथिका विवरणहरूमा मेल खाने किसिमले यस क्राइटेरियाको निचोड तलको वार विकल्प मध्ये एकमा चिनो लगाएर दिने ।

निकै न धेरै धेरै
धेरै कम शुन्य

११. नदीको प्रकार (स्वरूप) :

११.१. सर्पिलाकले प्रस्तावित पुलबन्ने ठाउँमा नदीको स्वरूप + कस्तो छ त्यो अध्ययन गरी उक्त नदी निकै ठूलो, मफौला खालको वा सानो कस्तो हो त्यसवारे तल चिनो लगाउने ।

निकै ठूलो मफौला खालको
सानो

+ नदीको स्वरूप वारे साधारण विवरण तल दिईन्छ, विस्तृत विवरणका लागि म्यानुयलको सेक्सन २.२ पेज १८ हेर्नु होला ।

निकै ठूलो नदी : जुन नदी (प्रस्तावित पुल बनाउने ठाउँ निर) वर्ष भरिनेहिँडेर तर्न सकिँदैन ।

मफौला खालको नदी : जुन नदी (प्रस्तावित पुल बनाउने ठाउँ निर) कुनै कुनै ठाउँमा हिँडंदमा निकै अप्ठ्यारो साथ हिँडेर तर्न सकिन्छ वा स्थानिय अस्थाई हिँडंदै पुल रहेछ भने त्यस्तावाट तर्न सकिन्छ ।

परिशिष्ट - १

साना नदी : जुन नदी (प्रस्तावित पुल बनाउने ठाउँ निर) हिउँदमा सजिलै
साँ हिँडेर तर्न सकिन्छ ।

१२. प्रस्तावित पुल मुल वाटोमा परेमा :

१२.१. यदि प्रस्तावित पुल हाल भईरहेको मुल वाटोमा + पर्ने भए, सो कुरा
सर्पेकाकले तल नोट गर्ने । यसको लागि, उक्त क्षेत्रको नक्सा व्यापक
रूपमा अध्ययन गरी नक्सावाट देखिएको कुरालाई फिल्टरमा चेक गरी
निधो गर्नु पर्दछ ।

मुल वाटो साधारण गोरेटो

+ मुल वाटोको परिभाषाको लागि यस म्यानुयलको सेक्सन २.२
पेज १८ हेर्नु होला ।

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१३. प्रस्तावित पुल कुनै एकीकृत ग्रामीण विकास आयोजनाको क्षेत्र भित्र पर्छ वा
पर्दैन :

१३.१. प्रस्तावित पुल देशमा संचालन भईरहेका एकीकृत ग्रामीण विकास
(ए.गा.वि.) आयोजनाहरू मध्ये कुनै एकको तोकिएको भौगोलिक
क्षेत्र भित्र पर्दछ कि पर्दैन ? यो प्रश्न हालसालै (२०३७ साल) हुलेको
स्थानिय विकास मन्त्रालयको ए.गा.वि.को मुख्य कार्यालयमा गई
सोध्ने ।

पर्छ (योजना संचालन भै रहेछ)

२ वर्ष भित्र पर्ने छ (दुई वर्ष भित्र योजना संचालनहुनेछ)

पर्ने छैन (यस्तो योजना नै छैन)

* * *

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अन्तिम प्राप्त्यांक गणना गर्ने कार्यपत्र +

परिशिष्ट - २

कार्यपत्रहरूको नमूना

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पुलको नाम _____

पुल नं. _____

नदी _____

स्थान _____

क्राँटेरियाहरू । आधारहरू

आधारको भार भारमान मूल्य

१. लागत खर्च	०.२०	_____
२. वाह्य यात्रीहरूको सवारो संख्या	०.१५	_____
३. स्थानिय उत्पादनका सायान्नहरू	०.१०	_____
४. प्रमुख स्थानिय निर्यातहरू	०.०५	_____
(क) आर्थिक आधारहरूका जम्मा प्राप्त्य अंक	०.५०	_____
५. स्थानिय प्रभावित जनसंख्या	०.१०	_____
६. प्राप्त्य स्वास्थ्य सुविधाहरू	०.०६	_____
७. प्राप्त्य शिक्षा सुविधाहरू	०.०६	_____
८. प्राप्त्य प्रशासनिक सुविधाहरू	०.०८	_____
(ख) सामाजिक आधारहरूको जम्मा प्राप्त्य अंक	०.३०	_____
९. नदी तर्दा हुने जोखिम	०.०४	_____
१०. परियोजनाका लागि भएको स्थानिय सहयोग तथा प्रयास	०.०४	_____
११. नदीको प्रकार	०.०८	_____
१२. मुल बाटो पर्ने भए	०.०२	_____
१३. एकीकृत ग्रामीण विकास योजना क्षेत्रमा पर्नेभए	०.०२	_____
(ग) अरु आधारहरूको जम्मा प्राप्त्य अंक	०.२०	_____
कूल जम्मा (क + ख + ग)	१.००	_____

५४

+ होक क्राँटेरियाका अरु विभिन्न कार्यपत्रहरू (वर्कसिटहरू) पुरा भईसकेमाहि अन्तिम प्राप्त्यांक गणना गर्ने यो कार्यपत्र (वर्कसिट) प्रयोगमा ल्याउने ।

परिशिष्ट - २

कार्य पत्र नं. १

क्राईटरिया नं. १ : लागत र्खी +

(क) कूल अनुमानित लागत र्खी रु. _____ (ए)

(ख) कूल ढुवानी लागत र्खी रु. _____ (बि)

(ग) ढुवानी वाहेकको लागत र्खी रु. _____ (सि)

(घ) मूल्यमानको सिमा क्षेत्र :

(१६८० को मूल्य अनुसार) + + रु. २,००,००० देखि २०,००,००० सम्म

(ङ) साफा मापन गर्ने स्केल (सा. मा. स्के) + + + $\frac{२०,००,००० - (सि)}{२०,००,००० - २,००,०००} \times १००$

(च) आधार भार (आ. भा.) = ०.२०

(छ) भारमान मूल्य (भा. मू.) = (आ. भा.) \times (सा. मा. स्के) =

५२

+ अन्तखाता तालिका (ख) को पु. नं. १ वाट प्राप्त लागत र्खी रकम, आर्थिक लागत र्खी हो । ढुवानी र्खीमा भरिया र्खी लगायत सम्पूर्ण परिवहन र्खीहरू पर्दछन् ।

+ + मुद्रास्फितिको कारणले गर्दा आवश्यक भएको कुनै पनि वेला मूल्यमानको सिमा क्षेत्रमा हेरफेर गर्नु पर्दछ । फोर्लुंगे पुल डिविजनको डिजाइन कार्यालयवाट भविष्यको मुद्रास्फितिको अनुमानित रेट लिनु पर्दछ ।

+ + + सा. मा. स्के. को नतिजा कुनै वेला ऋणात्मक (नेगेटीभ) भएमा शून्य लिने ।

परिशिष्ट - २

कार्य पत्र सं. २

क्राईटेरिया नं. २ : वाह्य यात्रीरूकी सवारी संख्या +

(क) सवारीकी मौसमी अन्तर ++ दिनरू

बढी चल्तीकी मौसम _____ (य)

सुस्वा मौसम (ह्लिंद) _____ (२४५ - य)

वर्णा मौसम _____ १२०

जम्मा ३६५ दिनरू

(ख) वास्तविक सवारी गणना (बढी चल्ती वा सुस्वा मौसमीकी)

	मिति	यात्रुरू	भारी बौकेका जनावररू	समतुल्य+++ यात्रुरू	कूल जम्मा
	(१)	(२)	(३)	(४)	(५) = (२)+(४)
पहिलो दिन	_____	_____	_____	_____	_____
दोश्रो दिन	_____	_____	_____	_____	_____
तेश्रो दिन	_____	_____	_____	_____	_____

३ दिनकी कूल सवारी संख्या = _____ (र)

(ग) बढी चल्ती वा सुस्वा मौसमीकी बी. दे. स.

(सवारी गणना वंक अनुसार) _____ $\frac{(र)}{३}$ = _____ (बि)

(घ) बढी चल्ती वा सुस्वा मौसमीकी बी. दे. स.

(अन्तरवार्ता वंक अनुसार) _____ $\frac{(र)}{३}$ = _____ (सि)

(ङ) वर्णा मौसमीकी बी. दे. स.

(अन्तरवार्ता वंक अनुसार) _____ $\frac{(र)}{३}$ = _____ (डि)

परिशिष्ट - २

कार्य पत्र सं. २.३

(व) वार्षिक औसत दैनिक सवारी संख्या (बा. औ. द. स.) + + + +

(१) (य) × (बि) वा (सि) =

(२) [२४५ - (य)] × (सि) वा (बि) =

(३) १२० × डि = _____

जम्मा वार्षिक सवारी _____ (ई)

बा. औ. द. स. = $\frac{\text{जम्मा वार्षिक सवारी}}{३६५} = \frac{(ई)}{३६५} = \text{_____} \text{ (एफ)}$

(क) मूल्यमानको सिमा क्षेत्र : ० देखि ५०० सम्म (बा. औ. द. स.)

(ज) साफ्ता मापन गर्ने स्केल (सा. मा. स्के) = $\frac{\text{एफ}}{५००} = \frac{०}{५००} \times १०० = \text{_____}$

(फ) आधार भार (आ. मा.) = ०.१५

(य) भारमान मूल्य (भा. मू.) = (आ. मा.) × (सा. मा. स्के.) =

५४ + यस वारैको अंक अन्तर्वाता तालिका (क) र अन्तर्वाता तालिका (ख) को पु. नं. २ वाट लिने । द्विन्दमा भन्दा छेठ गुणा सवारी बढी भएमा मात्र त्यसलाई बढी चल्तीको मौसम मान्ने ।

+ + धेरै "सुख्खा मौसम" भित्र नै "बढी चल्तीको मौसम" पर्ने गर्दछ, त्यस कारण सुख्खा मौसमको अर्थ "बढी चल्तीको मौसम" वाहेकको "वांकी मौसम" हो । बढी चल्तीको मौसम, सुख्खा मौसम र वर्षा मौसम गरेर सबैको जम्मा ३६५ दिन हुनु पर्छ ।

+ + + भारी बोकेका जनावरलाई सवारी यात्रीमा बदल्नको निमित्त दुई(बोका वा भेंडालाई) एक यात्रु समान र एक(सच्चर वा भेंसीलाई) एक यात्रु समान सम्झनु पर्छ ।

+ + + बढी चल्तीको मौसमको औ. द. स. लाई बढी चल्तीको हुन आउने दिनहरूले गुणन गर्ने, त्यस्तै सुख्खा मौसमको औ. द. स. लाई सुख्खा मौसमका दिनहरूले र वर्षा मौसमको औ. द. स. लाई वर्षा मौसमका दिनहरूले गुणन गरेर आएको गुणन फलहरूलाई जोडेर ३६५ ले भाग गरेपछि बा. औ. द. स. प्राप्त हुनेछ ।

क्राईटेरिया नं. ३ : स्थानिय उत्पादनका साधान्तरू :

	नाम	स्थान
(क)	प्रभाव क्षेत्र भित्र पर्ने मुख्य बजार केन्द्र + _____	दायां । वायां किनार
(ख)	प्रभाव क्षेत्र भित्र उत्पादित आधारभूत स्थानिय साधान्तरू बालिहरू _____	दायां । वायां किनार
(ग)	जिल्ला भित्र पर्ने फसल योग्य जग्गाको क्षेत्रफल + + _____	(वर्ष) (जिल्ला)

बालिहरू	क्षेत्रफल (हेक्टरमा)	प्रत्येक बालिको भाग (प्रतिशतमा)
(१)	(२)	(३)
१ _____	_____	_____
२ _____	_____	_____
३ _____	_____	_____
४ _____	_____	_____
५ _____	_____	_____
६ _____	_____	_____
७ अन्य _____	_____	_____
जम्मा _____ (र)		१००.०० (बि)

- (घ) जिल्लाको कुल क्षेत्रफल + + + = _____ हेक्टरमा (सि)
- (ङ) जिल्लाको कुल आवादी जग्गाको क्षेत्रफल + + + _____ हेक्टरमा (डि)
- (च) आवादी जग्गाको क्षेत्रफलको अनुपात = $\frac{(डि)}{(सि)} \times १००$ — प्रतिशतमा (ई)
- (छ) जिल्ला भित्र पर्ने फसल योग्य जग्गा _____ (र)
र आवादी जग्गा विचको अनुपात = $\frac{(र)}{(डि)}$ = _____ (रफ)
- (ज) कृषि प्रभाव क्षेत्रको अनुमानित क्षेत्रफल = ६,००० हेक्टर

परिशिष्ट - २

कार्य पत्र सं. ५

क्रा. डेटेरिया नं. ५ : स्थानिय प्रभावित जनसंख्या

(क) प्रभाव क्षेत्र भित्रको स्थानिय प्रभावित जनसंख्या (वर्ष _____ को जनगणना अनुसार)

(ख) ए - बि = _____ (सि)⁺

(ग) वृद्धि दर = २.२ प्र.स.प्रति वर्ष

(घ) वर्ष संख्या _____ (एन) (जनगणना भएको वर्षलाई ++ आधार वर्ष मान्ने)

(ङ) प्रभाव क्षेत्र भित्रको वर्तमान स्थानिय

जनसंख्या = (सि) × (१ + ०.०२२)^(एन) = _____ (डि)

(च) मूल्यमानको सिमा क्षेत्र = ५,००० देखि ४०,०००

५८

(छ) साफा मापन गर्ने स्केल (सा. मा. स्के) = $\frac{(डि) - ५,०००}{४०,००० - ५,०००} \times १०० =$ _____

(ज) आधार भार (आ. भा.) = ०.१०

(झ) भारमान मूल्य (भा. मू.) = (आ. भा.) × (सा. मा. स्के) =

+ अन्तरवार्ता तालिका (क) को प्र. नं. ५.५ मुताविक लिने ।

++ जनगणना वर्ष सम्बन्धी अरु विवरणको लागि यस पुस्तिकाको परिच्छेद २ को पेज १५ हेर्नुहोस् ।

क्राईटरिया नं. ६ : प्राप्य स्वास्थ्य सुविधाहरू

- (क) पुल बन्ने थलोवाट १० किलोमिटरको हिंडाईको दूरी भित्र अवस्थित स्वास्थ्य सुविधाहरू + (अस्पताल, स्वास्थ्य चौकी, आयुर्वेदिक क्लिनिक)

सि. नं.	स्वास्थ्य सुविधाको प्रकार	वायां । दायां	दूरी (कि. मि. मा)
१	_____	_____	_____
२	_____	_____	_____
३	_____	_____	_____
४	_____	_____	_____
५	_____	_____	_____

- (ख) नदीको दुवै तिर अनुमानित हिंडाई सिमा भित्र (अस्पतालको लागि १० कि. मि., स्वास्थ्य चौकी तथा आयुर्वेदिक क्लिनिकको लागि ६ कि. मि.) उही प्रकारको स्वास्थ्य सुविधाहरू अवस्थित भएमा त्यस्ता सुविधाहरूलाई नलिने र अन्य बांकी प्रकारका स्वास्थ्य सुविधाहरू तलको तालिकामा भर्ने । ++

सि. नं.	स्वास्थ्य सेवाको प्रकार	वायां । दायां
१	_____	_____
२	_____	_____
३	_____	_____

- (ग) साफा मापन गर्ने स्केल (सा. मा. स्के) = ० वा १०० (माथि (ख) मा उल्लेखित प्रत्येक अवस्थित सुविधाको लागि सा. मा. स्के. १०० लिने अन्यथा कुनै पनि नभए ० लिने _____ (र)

परिशिष्ट - २

कार्य पत्र नं. ६, १

(घ) आचार भार (आ. भा.)

१. अस्पतालको लागि	०.०३ लिने
२. स्वास्थ्य वीकीको लागि	०.०२ लिने
३. आयुर्वेदिक क्लिनिकको लागि	०.०५ लिने

(ङ) भारमान मूल्य (ना. मू.) = (आ. भा.) × (सा. मा. स्के)

१. अस्पताल भरमा	०.०३ × (र) = _____
२. स्वास्थ्य वीकी भरमा	०.०२ × (र) = _____
३. आयुर्वेदिक क्लिनिक भरमा	०.०५ × (र) = _____

जम्मा

६०

+ अन्तरवार्ता तालिका (क) को प्र. नं. ६ वाट प्राप्त जानकारी लिने ।

+ + अनुमानित हिंडाई सिमा भित्र पर्ने गरी नदीको एकैतिर एक भन्दा बढी उही प्रकारको स्वास्थ्य सुविधाहरू भरमा, यौटालाई मात्र लिने ।

परिशिष्ट - २

कार्य पत्र सं. ७.१

(घ) आधार भार (आ. भा.)

१. माध्यमिक विद्यालयकी लागि ०.०३ लिने
२. निम्न माध्यमिक विद्यालयकी लागि ०.०२ लिने
३. प्राथमिक विद्यालयकी लागि ०.०१ लिने

(ङ०) नारमान मूल्य (भा. मू.) = (आ. भा.) × (सा. मा. स्के)

१. माध्यमिक विद्यालय भरमा $०.०३ \times (र) =$ _____
२. निम्न माध्यमिक विद्यालय भरमा $०.०२ \times (र) =$ _____
३. प्राथमिक विद्यालय भरमा $०.०१ \times (र) =$ _____

जम्मा

६२

+ यी जानकारी अन्तरवार्ता तालिका (ख) को प्र. नं. ७ वाट लिने ।

+ + नदीको एकैतिर अनुमानित हिंडाई सिमा भित्र एक भन्दा बढी उही प्रकारको शिक्षा सुविधाहरू भरमा यीटालाई मात्र लिने ।

परिशिष्ट - २

कार्य पत्र सं. ८

क्राईटेरिया नं. ८ : प्राप्य प्रशासनिक सुविधाहरू

(क) पुल बन्ने थलोवाट ८ कि. मि. को हिंडाईको दूरी भित्र अवस्थित प्रशासनिक सुविधाहरू +

<u>सि. नं.</u>	<u>प्र. सु. का. प्रकार</u>	<u>वायां । दायां</u>	<u>दूरी कि. मि. मा</u>
१	_____	_____	_____
२	_____	_____	_____
३	_____	_____	_____
४	_____	_____	_____
५	_____	_____	_____
६	_____	_____	_____
७	_____	_____	_____

६३

(ख) नदीको दुवै तिर अनुमानित हिंडाई सिमा (८ कि. मि.) भित्र ठीक उस्तै प्रकारको प्रशासनिक सुविधाहरू रहेकन् भने त्यस्ता सुविधाहरूलाई नलिने र अन्य वांकि प्रकारका प्र. सुविधाहरूलाई तलको तालिकामा उल्लेख गर्ने ।

<u>सि. नं.</u>	<u>प्र. सु. का. प्रकार</u>	<u>वायां । दायां</u>
१	_____	_____
२	_____	_____
३	_____	_____
४	_____	_____
५	_____	_____

(ग) साफ्ट मापन गर्ने स्केल (सा. मा. स्के) ० वा १०० माथि (ख) मा उल्लेखित प्रत्येक निम्न सुविधाहरूको लागि सा. मा. स्के. १०० लिने अन्यथा कुनै पनि नभएमा ० लिने _____ (र)

परिशिष्ट - २

कार्य पत्र नं. १

१. कृषिसहायक कार्यालयहरू
२. वैकिडो संस्थाहरू
३. अदालतहरू तथा मालपोत कार्यालयहरू, घरेलु उद्योगहरू
४. हुलाक
५. अन्य सरकारी कार्यालयहरू

(घ) आधार भार (आ. भा.)

१. कृषि सहायक कार्यालयहरूको लागि	०.०२ लिने
२. वैकिडो संस्थाहरूको लागि	०.०२ लिने
३. अदालतहरू वा मालपोत कार्यालयहरू वा घरेलु उद्योगको लागि	०.०२ लिने
४. हुलाकको लागि	०.०१ लिने
५. अन्य सरकारी कार्यालयहरूको लागि	०.०१ लिने

६४

(ङ) भारमान मूल्य (भा. मू.) = (आ. भा.) × (सा. मा. स्के.)

१. कृषि सहायक कार्यालयहरूमा	०.०२ × (ए)	_____
२. वैकिडो संस्थाहरू भरमा	०.०२ × (ए)	_____
३. अदालतहरू वा मालपोत कार्यालयहरू वा घरेलु उद्योगहरू भरमा	०.०२ × (ए)	_____
४. हुलाक भरमा	०.०१ × (ए)	_____
५. अन्य सरकारी कार्यालयहरू भरमा	०.०१ × (ए)	_____

जम्मा

+ यस वारे जानकारी अन्तर्खार्ता तालिका (स) को प्र. नं. ८ वाट लिने ।

+ + - नदीको एकै तिर अनुमानित हिंडाई सिमा भित्र ठीक उही प्रकारको
पुशासनिक सुविधाहरू एक भन्दा बढी हुनु भने यीट मात्र लिने ।

- नदीले दुई विलालाई कुट्याईएको हुने, हुलाक तथा वैकिडो सुविधाहरूलाई
मात्र लिने ।

क्राईटेरिया नं. ६ : नदी तटा हुने जोखिम

(क) नदी पार गर्ने हाल उपलब्ध सुविधाहरू प्रयोग गर्दा, जोखिमको मात्रा कति कति तयसवारी निम्न चार विकल्प मध्ये एकलाई लिने +

१. उच्च
२. मध्यम
३. निम्न
४. शुन्य

(ख) साफ्ट मापन गर्ने स्केल (सा. मा. स्के.) = ० देखि १०० (निम्नानुसार संलग्न जोखिमको मात्रामा आधारित)

१. उच्च भए १००
२. मध्यम भए ५०
३. निम्न भए २५
४. शुन्य भए ०

(ग) आधार भार (आ. भा.) = ०.०४

(घ) भारमान मूल्य (भा. मू.) = (आ. भा.) × (सा. मा. स्के.) =

+ यो जानकारी अन्तरवार्ता तालिका (ख) को प्र. नं. ६ बाट लिने।

परिशिष्ट - २

कार्य पत्र सं. १०

क्रा.स्टीरिया नं. १० : परियोजनाका लागि भरकी स्थानिय सहयोग तथा प्रयास

(क) परियोजनाको लागि भरकी स्थानिय सहयोगको मात्रा नाप गर्न निम्न मध्ये एकलाई लिने +

१. उच्च

२. मध्यम

३. निम्न

४. शुन्य

(ल) साफा मापन गर्ने स्केल (सा. मा. स्के.) = ० देखि १०० (परियोजनाको लागि प्राप्त निम्न बमोजिमको स्थानिय सहयोगमा आधारित)

१. उच्च भर १००

२. मध्यम भर ५०

३. निम्न भर २५

४. शुन्य भर ०

(ग) आधार भार (आ. भा.) = ०.०४

(घ) भारमान मूल्य (भा. मू.) = (आ. भा.) × (सा. मा. स्के.) =

+ यो जानकारी अन्तरवार्ता तालिका (ल) को प्र. नं. १० बाट लिने ।

परिशिष्ट - २
कार्य पत्र सं. ११

क्राईटरिया न. ११ : नदीको प्रकार

(क) नदीको प्रकार निम्न मध्येबाट सट्टालाई लिने +

१. ठूलो

२. मझौला

३. सानो

(ख) साफा मापन गर्ने स्केल (सा. मा. स्के.) २० देखि १०० (निम्न अनुसार नदीको प्रकारमा आधारित)

१. ठूला नदी भर १००

२. मझौला नदी भर ६०

३. सानो नदी भर २०

(ग) आधार भार (आ. भा.) = ०.०८

(घ) भारमान मूल्य (भा. मू.) = (आ. भा.) × (सा. मा. स्के.) =

+ यो जानकारी अन्तर्गत तालिका (ख) को पृ. नं. ११ बाट लिने ।

परिशिष्ट - २

कार्य पत्र सं. १२

क्रा.श्रे.रिया नं. १२ : मूल वाटोमा पर्ने भए

(क) विद्यमान नदी वा झोला पार गर्ने वाटो मुल वाटोमा पर्ने वा पर्दैन दर्शाउने*

१. पर्ने

२. पर्दैन

(ख) साफा मापन गर्ने स्केल (सा. मा. स्के.) = ० वा १०० (निम्नानुसार)

१. मूल वाटोमा पर्ने भए - १००

२. मूल वाटोमा पर्ने नभए - ०

(ग) आधार भार (आ. भा.) = ०.०२

(घ) भारमान मूल्य (भा. मू.) = (आ. भा.) × (सा. मा. स्के.) =

+ अन्तर्वाता तालिका (ख) को प्र. नं. १२ वाट यसवारे जानकारी लिने ।

परिशिष्ट - २
कार्य पत्र सं. १३

क्राईटेरिया नं. १३ : एकीकृत ग्रामीण विकास योजना क्षेत्रमा पर्ने भए

(क) प्रस्तावित पुल बन्ने थलो त्यस क्षेत्र भित्र पर्छ पदेन दशाडिने, जहाँ कुनै सांठित एकीकृत ग्रामीण विकास योजना : +

१. कार्यान्वयन भइरहेको छ
२. आगामी २ वर्ष भित्र कार्यान्वयन गर्ने योजना छ
३. एकीकृत ग्रामीण विकास सम्बन्धि कुनै योजना नै भएको छैन

(ख) साफ्टा मापन गर्ने स्केल (सा. मा. स्के.) = ० देखि १०० (निम्नानुसार)

१. ए. ग्रा. वि. योजना कार्यान्वयन भइरहेको छ भने - १००
२. ए. ग्रा. वि. योजना आगामी २ वर्ष भित्र कार्यान्वयन गर्ने योजना रहेको छ भने - ५०
३. ए. ग्रा. वि. कार्यक्रम योजना नै छैन भने - ०

(ग) आधार भार (बा. भा.) = ०.०२

(घ) भारमान मूल्य (भा. मू.) = (बा. भा.) × (सा. मा. स्के.) =

+ यो जानकारी अन्तर्गत तालिका (ख) को पु. नं. १३ बाट गर्ने ।

परिवर्तन गर्ने तालिका

जमिनको नाप (पाहाड पर्वतमा)

१ मुरी माटो	=	१२७.६८ वर्ग मिटर
२ मुरी माटो	=	१ रोपनी
१ रोपनी	=	५०८.७६ वर्ग मिटर
१ हेक्टर	=	१०,००० वर्ग मिटर

तौल आयतनको नाप

		<u>धान (मासि)</u>
१ मुरी	=	७२.५८ के. जि.
१ पाथि	=	३.६२६ के. जि.
१ माना	=	४५४ ग्राम

तौल (वजन) को नाप

१ मन	=	३७.३२ के. जि.
१ मन	=	४० सेर
१ सेर	=	०.६३३ के. जि.
१ धानी	=	२.२७ के. जि.
१ टन	=	१००० के. जि.

गहुं

१ मुरी	=	६३.२६ के. जि.
१ पाथि	=	३.१६३ के. जि.
१ माना	=	३६५ ग्राम

आयतन (भोलम) को नाप

१ मुरी	=	०.०८७ घन मिटर
१ मुरी	=	६०.६२ लिटर
१ मुरी	=	२० पाथि
१ पाथि	=	०.००४३ घन मिटर
१ पाथि	=	८ माना

मकै

१ मुरी	=	६३.१२ के. जि.
१ पाथि	=	३.१५६ के. जि.
१ माना	=	३५६ ग्राम

