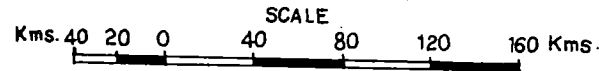# Chapter 2

IMPACT IN NUWAKOT

2.0   INTRODUCTION

2.0.0   We have taken in this study a consideration of the
impact of IRDP in five test villages selected from five
different districts.   In terms of our twelve agro-climatic
zones depicted on page 3 of Chapter 1 one district is located
in Zone IV, two districts are located in each of zone V and VI.
A study of the impact of foreign-aided IRDP in a village in the
district of Nuwakot is taken in this Chapter.   The other villages
will be taken up in the following chapters.   This district belongs
to Bagmati zone which again is a part of the Central Development
Region.   We take up the consideration of another district, namely,
Rasuwa in the next Chapter.   Both these districts belong to the
same Bagmati zone.   The Nuwakot test village falls in agro-
-climatic zone V.   These two districts are the only two districts
of the eight districts of the zone benefiting from the Rasuwa-
Nuwakot Integrated Rural Development Project.   This project is
the oldest of all foreign-aided IRDP's of Nepal and was put into
effect in the financial year 1976-77.   The actual beginning took
place in May, 1976.   One reason given for experimenting in
Nuwakot and Rasuwa in 1976 is that the hill conditions of these
two districts exhaust all varieties of hills of Nepal.   Another
reason for giving priority to Nuwakot was that a tolerable
infrastructure of roads was already there in the district.   Although,
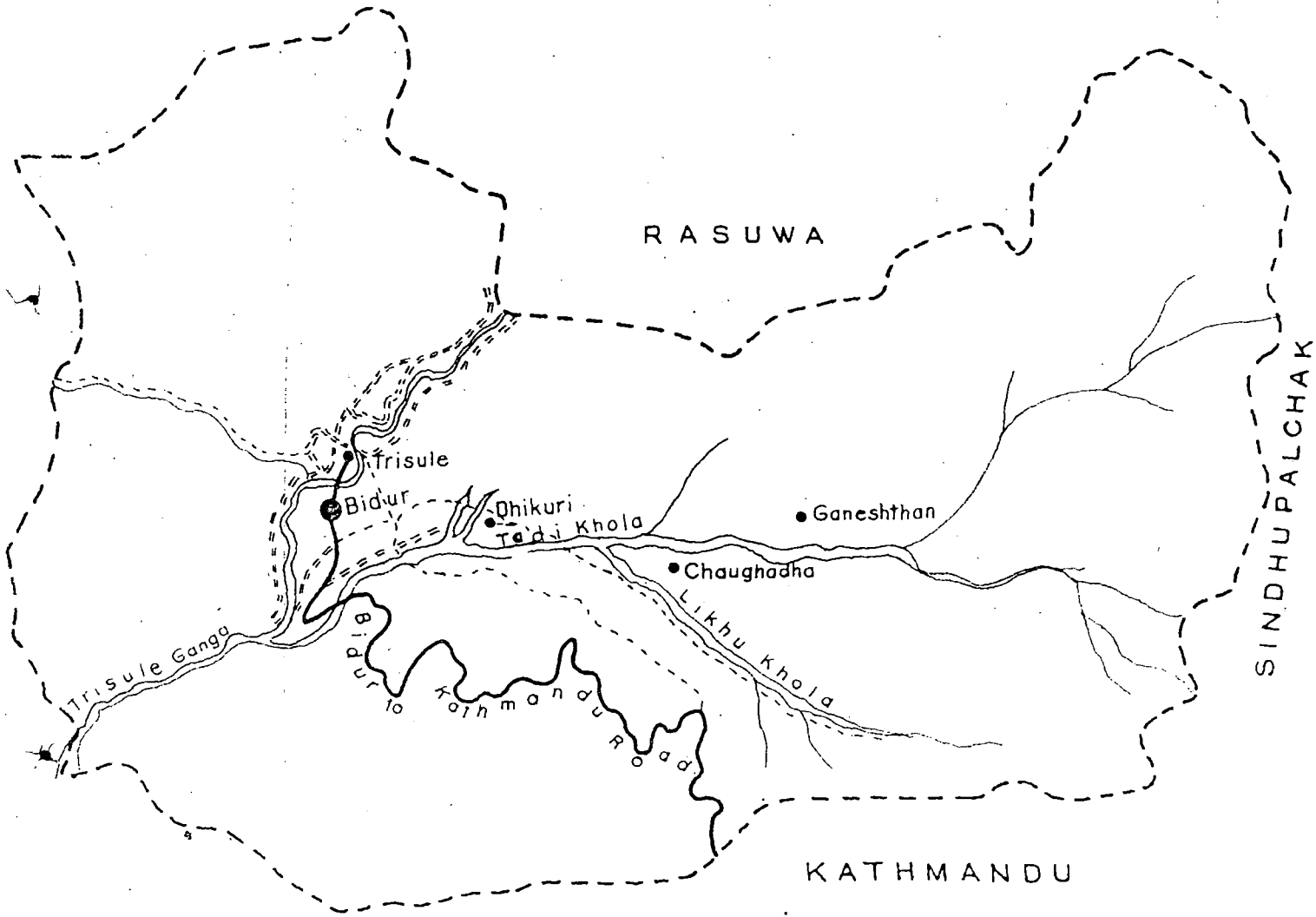
NEPAL

LEGEND
- International boundary
- Zonal boundary
- District boundary
- Regional Development Boundary
- O ... Zonal Head Quarter
- • ... District Head Quarter

SCALE
Kms. 40 20 0 40 80 120 160 Kms.

CHINA

INDIA

as we point out in the first Chapter, the setting up of roads
alone cannot bring the poor workers or producers to the fold
of productivity, the idea that we initiate and promote growth
of new productive activities along the areas which have already
been served by good roads has a certain tenability. At the same
time if the incidence of one infrastructural facility be a ground
bringing another infrastructural facility to the place, the place
will go on receiving facilities after facilities till it is
super-developed leaving vast areas depressed. As a matter of
fact this happened in the largest of the South Asian countries,
despite the fact the regions which have been the recipients of a
wide variety of infrastructural facilities have not been the
regions which have been the most productive from the point of
view of agro-climatic endowments.

2.0.1   Strictly, however, from the point of view of agro-
-climatic characteristics the district of Nuwakot has vast
productive agro-climatic resources. The district has an
alteration of valleys and hills. Both the valleys and hill
sides are good for cultivation. Although the valleys on the
average has a height of 500 metres from the mean sea level,
they are more less plain. On the hill sides farmers have no
difficulty to have terrace farming especially upto another
500 metres from the level of the valleys. But higher up the
pattern of croping has to change. Most of the areas are at

NUWAKOT DISTRICT

RASUWA

SINDHUPALCHAK

Trisule

Bidur

Dhikuri

Tadi Khola

Ganeshthan

Chaughadha

Likhu Khola

Trisule Ganga

Bidur to Kathmandu Road

KATHMANDU

Scale

0   5   10   15 K.m.

District boundary ----
National Highway ----
Metal Road ====
Un metal Road - - -
River
Head Qrs. & Villege

any rate below 2000 metres. The district is located between
27°48' and 28°06' North latitudes and between 84°58' and 85°35'
East longitudes. The maximum average temperature of the
district is 26.6° celsius and the average minimum temperature is
16.3° celsius. The average annual rainfall is 143.1 centimetres.
The district Nuwakot meets the district of Kathmandu in the
South-East and the district of Sindhupalchak in the east. Four
important rivers water this district. They are Trishuli, Tadi,
Likhu and Samari.

2.0.2   During the period of Indian collaboration a big hydel
plant was set up on the river Trishuli. The plant has since
been a source of supply of electricity to the Kathmandu valley.
The town of Trisuli grew up at the time of construction of the
plant. That was again the time when a motorable road from
Trishuli town to Kathmandu was built up. Buses ply regularly
between Trishuli and Kathmandu. A road was constructed in the
early eighties connecting Trishuli and Ganesh Himal via Dhunche
the headquarter of the Rasuwa district. The construction of
this road along an old track was undertaken by the Government of
Nepal from out of their own funds with the dual objective of
connecting the two districts by a metalled road and allowing the
western tourists a trekking route. Groups of foreign tourists
enjoy trekking on this road with the help of porters, who carry
their tents, foods and belongings and guides. One of the

National Parks of Nepal, namely, Langtang National Park with
its tourist lodges is situated on this road very near
Dhunche.

2.1 DESIGN OF SAMPLING

2.1.0   The headquarter of the Rasuwa-Nuwakot IRDP was
Kathmandu at the time of this survey in 1985. The headquarter
later moved to Betrawati in the district of Rasuwa. According
to information obtained at the office of the Coordinator of
this project it transpired that the village panchayat of
Chaughada was a panchayat where IRDP authorities did pay
special advertence. Our decision to take a sample from one
of the four villages of this panchayat was based on this
information. Out of the four villages we selected the central
village named Chaughada. Here within this village we took a
random spot in the centre and round this spot we surveyed 48
households. The village had at the time of survey only 109
households. Thus our sample made up 44 per cent of the parent
population. When the sample constitutes such a great percentage
of the parent population any possible objection to the sampling
design is ruled out. As we set out in the first Chapter, we
compare the use of basic resources in an IRDP benefited village
with that in a village which either did not receive any comparable
benefit or received only a small amount of such benefits. That is
to say, we compare a test population with a control population.

This may also be viewed as a comparison of the centre with the periphery.

2.1.1   As for the control population or the periphery, we have taken a sample similarly from the Ganesthan village of the panchayat by the same name. The village had 160 households. We surveyed 50 households and so our sample made up 31 per cent of the parent population. The percentage here also is much more than 10 per cent. So the sample of Ganesthan also does not suffer from any limitation that might stand on its claim to represent the village without wide limits of errors.

2.1.2   Our village Chaughada is situated in the valley between the rivers Likhu and Tadi. Likhu is on the west of Chaughada and Tadi on the north. The village of Ganesthan is located on the hills to the north-east of River Tadi. During the dry season people either of Ganesthan or of Chaughada have to go via Chaughada to Trishuli by goods carrying trucks. But during the rainy season when the river Tadi is full the people of Ganesthan go straight to Dhikure to catch a truck for Trishuli. There is no good road between Chaughada and Trishuli. Trishuli is to the west of Chaughada and is the only gateway of Kathmandu to the people of Chaughada. Trucks take about two hours to reach Trishuli in dry months. During the rainy season the goods carrying trucks via Trishuli stop at Dhikure and do not come up

to Chaughada. During that season the people of Chaughada
could not go to Trishuli. But with the installation of the
suspension bridge with the IRDP funds they can not only go to
the market town of Dhikure but can also visit Trishuli if a
returning truck is available in Dhikure. On the whole, roads
and transport have been in bad shape till the time of this
survey despite the suspension bridge set up on the Tadi.

2.2 NATURE OF BENEFITS GIVEN

2.2.0   Till the time of the survey at least a total of
N Rs.169.5 million were spent in the two districts of Rasuwa
and Nuwakot. The items on which they were spent are :
(1) agricultural development, (2) livestock development,
(3) irrigation development, (4) forestry development, (5) credit,
(6) erosion control, (7) infrastructure and local development
(including the construction and development of tracks trails,
bridges, drinking water supply and hill irrigation, (8) health
services, (9) education services, (10) cooperative development,
(11) cottage industry improvement, (12) warehouse construction,
(13) Panchayat development, (14) project coordinator's office
and (15) technical assistance (meaning only UNDP assistance).
Of the total of N Rs.169.5 million N Rs. 38 million was provided
as loan by the Agricultural Development Bank of Nepal to farmers
in the project areas.

2.2.1   The village Chaughada and the villages around Chaughada,
however, have been the special beneficiaries of a network of
irrigation in the valley bounded by the Tadi and Likhu rivers.
This network was undertaken under Gadkhar Irrigation Scheme.   Water
is carried to the plains of the valley from the Likhu river some
kilometres away from the valley.   The network was built by a
contractor under the supervision of the Irrigation Department.
The subsequent breaks in canal linings and structures pointed to
low quality of cement being used.   The maintenance is the charge
of the Department of Irrigation aided at one time by a contractor.
Although the river Lekhu is a perennial river, its flow of water
is thin in winter.   Irrigation water is not available for using
lands of valley plains throughout the year.   Although there are
a number of problems in effecting an optimal use of the irrigation
water available from the Lekhu, the Gadkhar Irrigation Scheme is a
basis for agricultural development in the valley plains and at the
same time admits of continuous improvement through planning in
stages.

2.2.2   Although one or two householders got loans for cottage
industries, they failed to undertake production.   The Agricultural
Input Corporation was engaged at the time of the survey in
completing the construction of a warehouse for grains out of the
funds of the Rasuwa-Nuwakot IRDP.   The Sajha built up a still
larger warehouse in the valley out of the IRDP funds.   An enduring
suspension bridge, as has been mentioned in the preceding paragraph,

was also built on the river Tadi entirely out of IRDP funds.
A service centre for unmetalled roads is run by the Government
of Nepal to repair such roads from the funds of the IRDP. A
net work of drinking water supply was laid by the Department of
Health and a veterinary hospital was set up by the Animal Husbandry
Department of the Government of Nepal. An agricultural extension
office under a Junior Technical Officer which is maintained by the
Department of Agriculture also receives some funds from the IRDP.
IRDP also gave grants to the local Hat-Bazar Committee to build a
market shed. The market shed, however, remained unused presumably
because most people outside the valley prefer to shop in Dhikure.
At least 9.13 million Nepali Rs. were spent on these items till the
time of our survey. Except the network of irrigation, some benefits
of most items are shared by villages outside the valley. However,
all these spendings are made within the valley and they make up
5.4 per cent of the all expenditure made by the Rasuwa-Nuwakot
IRDP till the time of our survey. We have to add that the estimates
of expenses made for the entire valley were collected from the
panchayat of the valley known as Cheughada panchayat. This
panchayat collected the details on the occasion of the visit
of the king just about a month before we surveyed. The king was
here to inaugurate some of the IRD projects completed here. The
panchayat collected the accounts for submission to the members
of the royal team as well as to invited national and foreign
guests. Since the king did not visit other four centres we studied,

officials there were unable to give us these kinds of data for
respective areas. But even in the Chaughada valley the relevant
village panchayat failed to include some items spent through
regular government departments out of IRDP funds. Besides, loans
given by Sajha and the Agricultural Development Bank and the
subsidies on the inputs sold by Sajha were also funded by the IRDP.
These were also left out of the accounts given by the panchayat.
So the expenses made by the IRDP for this valley would be much
above 5.4 per cent, as mentioned a little while ago in this
paragraph, of all expenses made by Rasuwa-Nuwakot IRDP till the
date of survey. It is indeed possible that, if we include what is
left out, this percentage may well rise to 10 at the time of our
survey. At any rate, there is little doubt that the valley remained
the most prestigious centre of all the centres of activity of the
Rasuwa-Nuwakot IRDP.

2.2.3   The flat plains of the valley of Chaughada have two
levels or, to use a local name, two _tars_. One of the _tars_ is at
a higher plane and is named Gadkhar. The other _tar_ is at a level
below nearly 10 metres and called Padawa. At one time what is now
the command area of the irrigation scheme was included in a large
Rana Estate. Quarter of a century ago the pattern of cropping
was different. Horticulture was the basic enterprise on the
higher _tar_. Maize, millets and pulses were the other crops
raised. On the eve of the launching of the IRDP here some paddy

was cultivated near the river beds. The irrigation network set
up by the IRDP enabled the farmers to raise widely paddy, wheat,
maize, oilseeds, potatoes and pulses.

2.2.4   In the case of this periphery of Ganesthan it is
necessary to add that the village has also been receiving some
benefits of the IRDP during the last six years. These benefits
came in from of loans and subsidies from Sajha and the Agricultural
Development Bank and other services from centres or agencies located
in the Chaughada valley. They do not have benefits of any
irrigation network. On the whole, the village is exposed to
less benefits. In the absence of a more suitable periphery we
take the village as the periphery of Chaughada.

2.3 IMPACT ON GENERAL INDICATORS

2.3.0   We shall, in this section, look for some general
indicators that might throw off some indirect evidence of an
impact on employment and income. The basis for this searth is,
however, some limited set of data. We shall, for example, estimate
a rate of immigration on the basis of births and deaths and age
distribution of the population samples. Indeed several methods
are conceivable to estimate a rate of immigration from this set
of limited data. None of the methods are perfect or good
substitutes of methods using wider set of required data. But even
an imperfect estimate of the rate of immigration is better than
no estimate at all.

2.3.1   While the average family size is 5.4 in Chaughada,
the figure is 6.2 in Ganeshsthan.   Although bigamy is legally
banned, it is almost equally present in both villages.   The data
do not confirm that in any of these villages some of the males,
on ground of poverty or on any other ground, had to remain without
marrying after 31 years of age.   While both the villages have four
bigamous adult males, the average are of bigamous males is not the
same in each village.   The maximum age of the bigamous male in
Chaughada is 35; while all the bigamous males of Ganeshsthan are
above 52.   Therefore, the full capacity of the Chaughada bigamous
males to contribute to the amount of population is not fully used.
The full Capacity, on the other hand, of the bigamous males of
Ganeshsthan is nearly fully used.   One manifestation of this is
that the number of bachelors waiting for marriage is eight in
Ganeshsthan and four in Chaughada.

2.3.2   Including even a widow or widower as a couple, the
average number of couples in Chaughada is 1.31 and Ganesthan 1.44.
The number of widows or widowers in Chaughada and Ganesthan are
6 and 18 respectively.   However, the average number of couples in
Ganesthan is 1.10 times that of Chaughada, whereas the family size
of Ganesthan is 1.5 times that of Chaughada.   It appears just a
few more joint families live in Ganesthan for the purpose of
joint family cultivation.   It also appears that because of these
families the average size of farms is higher in Ganesthan than
in Chaughada.

2.3.3   A comparison of the percentage of unmarried boys in
the age-group 15-35 between Chaughada and Ganesthan in Table 2.1
helps us to find that the difference is not statistically
significant.

Table 2.1

Proportion of Unmarried Boys in the Age-group 15-35

Sample	Total no. of boys in the age-group 15-35	No. of unmarried boys in the age-group 15-35	Proportion of unmarried boys in the age-group 15-35
Chaughada	38	17	.45
Ganesthan	41	16	.39

Yet there is some superficial difference that may hint at the
possibility of more employment for the boys in the Chaughada
sample.

2.3.4   A table for comparing the proportion of unmarried girls
in the same age-group has to be constructed with sufficient care.
The reason is that the married girls who live in the concerned
village at the time of the survey did not all live in the same
village before marriage. At the same time the girls who lived
in the village concerned before they were married off may now live
in different villages with their husbands. We have to estimate
the number of females of the age-group which would have existed
if the girls who have been married off are taken into account.
What we do for the purpose is to use the sex-ratio in age-group

0-15 to find the number of females in the age-group 15-35.
The results aresummarised in Table 2.2. We find that this
superficial difference in the proportion of unmarried girls

Table 2.2

Proportion of Unmarried Girls in the Age-Group 15-35

Sample	Total no. of girls in the age-group 15-35	No. of unmarried girls in the age-group 15-35	Proportion of Unmarried girls in the age-group 15-35
Chaughada	29	9	.28
Ganesthan	31	10	.32

show that development resulting from IRDP has had little bearing
on the proportion of unmarried boys or girls in Chaughada. We
concede that the age interval is rather vast to measure the impact
in the course of the last six years since the beginning of the
IRDP activities. At the same time a lower age-interval will make
the relevant size of the same in the age-group still lower.

2.3.5   Our returns on deaths and births during the last five
years from the date of survey say that in Chaughada 54 persons were
born and 10 persons died. Logically we assume that infant mortality
was rather high so that of the ten deaths five may be assumed to
have taken place in the group upto 5 years. According to the data
we collected Chaughada should have (54-5) or 49 persons in the
age group upto 5 years. But our computed table on the basis of

returns on the household schedule says that this group has 57 persons. That is to say, Chaughada sample has 8 persons more in the age group upto 5 than expected on the basis of our recorded births and deaths. Similar computation arrived at for Ganeshsthan leads to the finding that 15 persons may be the new entrants into that segment of village population that is now in the age-group upto 5 years. To have some further work-out let us assume that the recorded births and deaths are correct and that what we find as surplus in the age group upto 5 years are now entrants into this age group of the village concerned. We make another assumption on the basis of some actual cases. The number of immigrants in the rest of the population is half the number of immigrants in the age group upto 5 years. So in Ganeshsthan the total number of immigrants is 22 of which 15 are in the age group upto 5 years. So the rate of immigration of Ganeshsthan for five years is 22/296 or 7.4 p.c. Similarly the rate of immigration for a period of five years in Chaughada is 12/247 or 4.9 per cent. The combined rate of immigration to Chaughada is and Ganeshsthan is 34/543 or 6.3 p.c. for a period of for a period of five years. The annual rate of immigration for these two places taken together is 1.26. We have observed that those who are attracted to earn labour income in the Chaughada valley have their shelters outside the valley in the periphery villages like Ganeshsthan. It is possible that similar migration took place in other periphery villages with

the centre of activity in the Chaughada valley as a whole.
This steady annual rate of immigration, therefore, in the areas
around the valley proves that IRDP activity has expanded the
level of incomes earned in Chaughada irrespective of whether
some the earners live quite away from the centre of Chaughada.
of

2.3.6   A rough measure of the net increase of population in
the two villages in the course of the last five years is obtained
by the difference in the births and deaths. The figures for
Chaughada and Ganeshsthan are 44 and 53 respectively. If they
are divided by the present population minus this increase then
the percentage increase per annum stands at 4.09 and 4.0 p.c.
for Chaughada and Ganeshsthan respectively. If the rate of
growth of population is roughly taken as 4 per cent per annum
and if our method of computing the annual rate of immigration
at 1.26 per cent is tenable then the rate of growth of the
settlement is seen to be 5.26 per annum.

2.3.7   It cannot, therefore, be overemphasized that the
immediate impact of development efforts is an upsurge in natural
growth of population. This rate of growth of population is a
little more than the rate of natural growth of population for
the whole of Nepal as recorded in the Census of 1981 (2.66 p.c.).
This discrepancy may be more than what is caused by the
fluctuation as a result of sampling.

2.4 IMPACT ON EMPLOYMENT

2.4.0   Taking good employment as employment for 150 days or more per year, 57 per cent of adults of Chaughada village enjoy good employment. The percentage of the people of Ganeshthan the periphery enjoying good employment amounts to 56, very nearly the same figure. It might appear a little odd that employment in the centre is nearly the same as in the periphery. But we have already noticed that the people staying in the periphery area including the people who specifically migrated into the periphery as a result of the increased activity in the centre come to work in the centre. The rate of good employment for both samples taken together stands at 56.4 per cent. On the basis of data from Tables 2.3 to 2.5 we find that even in the case of adult males the difference in the percentage is not statistically significant.

Table 2.3

Good Employment of Adults

Sample	Percentage of adults in good employment
Chaughada	57
Ganesthan	56

Table 2.4

Good Employment of Adult Males

Sample	Percentage of adult males in good employment
Chaughada	82
Ganesthan	75

Table 2.5

Good Employment of Adult Females

Sample	Percentage of adult females in good employment
Chaughada	31
Ganesthan	38

2.4.1   The analysis in the preceding paragraph is more or less supported by the data of Table 2.6. The only striking point is that although the percentage of adult females in good employment is higher in Ganesthan the periphery, the mean mandays of employment is higher in Chaughada the centre. This means that though relatively more female adults are employed in Ganesthan for more than 150 days in a year, there is preponderance of adult females in Chaughada with higher mandays above the cut-off mark. This table clearly shows that on surface the mean employment is higher in Chaughada for all the three categories of persons,

Table 2.6

Mean and Standard Deviation of Mandays Employed

Types of persons employed	Mean Mandays Employed		S.D. of Mandays Employed	
	Chaughada	Genesthan	Chaughada	Genesthan
Employed adults	176	164	84	79
Employed male adults	221	198	77	75
Employed female adults	131	128	67	66

namely, adults, male adults and female adults. On surface the maximum difference in employment is seen among the male adults. The difference, however, is statistically significant at 7.4 per cent only.

2.5 A MEASURE OF DISGUISED UNEMPLOYMENT

2.5.0   Our definition of employment is a very simple one. Any one who works even for a single day is employed. So except those who are fully engaged in studies or are too sick or infirm to undertake any work all above fifteen years are covered by this definition of work force. According to our definition, therefore, none above fifteen is unemployed. But we specify a category of disguisedly unemployed persons. We resort to a simple definition. We decide rather arbitrarily on the amount of mandays of employment that might be considered good enough for full employment. We try

successively three standards of full employment, namely, 300 days,
250 days and 200 days. We multiply the number of members of a
category (adults, adult males and adult females) into the mean
mandays of employment enjoyed by them. We divide the product by
the unit of full employment. The quotient gives us the number of
persons who enjoy this unit of full employment. We deduct this
quotient from the total number of persons in the category to get
the number of persons disguisedly unemployed. The various figures
are presented in Tables 2.7 to 2.15.

2.5.1   We have just seen that the difference in the mean of the
number of days of employment in the two samples is significant
for adult males. We find in this section that the difference in
the proportion of males disguisedly unemployed is significant at
5 per cent level of significance for table 2.11. The data
presented so far give support to a proposition that men are better
employed in the centre than in the periphery.

Table 2.7

Disguised unemployment of Adults
(with unit of full employment as 300 days)

Sample	Number of adults employed	Number of disguisedly unemployed
Chaughada	126	52
Ganesthan	147	67

Table 2.8

Disguised unemployed of Adults

(with unit of full employment as 250 days)

Sample	Number of adults employed	Number of disguisedly Unemployed
Chaughadha	126	37
Ganesthan	147	51

Table 2.9

Disguised Unemployed of Adults

(with unit of full employment as 200 days)

Sample	Number of adults employed	Number of disguised unemployed
Chaughada	126	15
Ganesthan	147	26

Table 2.10

Disguised Unemployment of Adult Males

(with unit of full employment as 300 days)

Sample	Number of Males employed	Number of Males disguisedly unemployed
Chaughada	65	17
Ganesthan	75	26

Table 2.11

Disguised Unemployment of Adult Males
(with unit of full employment as 250 days)

Sample	Number of Males employed	No. of Males disguisedly unemployed
Chaugadha	65	7
Ganesthan	75	16

Table 2.12

Disguised unemployment of Adult Males
(with unit of full employment as 200 days)

Samples	Number of Males employed	No. of Males Disguisedly unemployed
Chaugadha	65	Nil (Employment surplus)
Ganesthan	75	1

Table 2.13

Disguisedly unemployed of Adult Females
(with unit of full employment as 300 days)

Samples	Number of Females employed	No. of disguisedly unemployed
Chaughadha	61	34
Ganesthan	72	41

Table 2.14

Disguisedly Unemployed of Adult Females
(with unit of full employment as 250 days)

Samples	Number of Females employed	Number of females disguisedly unemployed
Chaugadha	61	29
Ganesthan	72	35

Table 2.15

Disguisedly Unemployed of Adult Females
(with unit of full employment as 200 days)

Samples	Number of Females employed	Number of females disguisedly unemployed
Chaugadha	61	21
Ganesthan	72	26

2.6 IMPACT ON INTENSIVE USE OF LABOUR POWER

2.6.0   An impact on employment will still be better measured
if we measure the intensive use of labour power both in the centre
and in the periphery. Tables 2.16 to 2.21 give the first view
of the intensity of use of labour.

Table 2.16

Labour Use Index of Employed Adults in Chaugacha Sample

Percentage of employed adults	Intensity of use (less than)
5	0.15
23	0.30
43	0.45
55	0.60
81	0.76
89	0.91
100	1.00

Table 2.17

Labour Use Index of Employed Male Adults in Chaugacha Sample

Percentage of employed male adults	Intensity of use (less than)
3.1	0.15
9.2	0.30
18.4	0.45
29.2	0.60
66.2	0.76
81.6	0.91
100.0	1.00

Table 2.18

Labour Use Index of Employed Female Adults in Chaugacha Sample

Percentage of Employed female adults	Intensity of use (less than)
6.6	0.15
37.7	0.30
68.8	0.45
81.9	0.60
95.7	0.76
100.0	1.00

Table 2.19

Labour Use Index of Employed Adults in Ganesthan Sample

Percentage of Employed adults	Intensity of use (less than)
6.8	0.15
28.6	0.30
43.6	0.45
60.6	0.60
83.1	0.76
98.7	0.91
100.0	1.00

Table 2.20

Labour Use Index of Employed Adult Males in Ganesthan Sample

Percentage of Employed Adult Males	Intensity of use (less than)
4.0	0.15
16.0	0.30
25.3	0.45
38.7	0.60
70.7	0.76
98.7	0.91
100.0	1.00

Table 2.21

Labour Use Index of Employed Adult Females in Ganesthan Sample

Percentage of employed female adults	Intensity of Use (less than)
9.7	0.15
41.7	0.30
62.5	0.45
83.3	0.60
97.2	0.76
99.2	0.91
100.0	1.00

2.6.1   One notices from the preceding tables that the percentage of employed adult males who succeed to make use of more than 60 per cent of their labour power is 71 in Chaugadha and 61 per cent in Ganesthan sample. But even this difference does not come out as statistically significant by testing a null hypothesis about the difference of the two proportions. However, there is a wide gap in the two samples in respect of percentage of persons who use more than 91 per cent of their labour powers. The difference here is statistically significant. So, on the whole, we are in a position to hold that Chaugadha labour powers are more intensively utilised than Ganesthan ones.

2.6.2   We give in Table 2.22 the required data for testing the significance of the difference of percentages of employed adult males using not more than 60 per cent of labour power of the two samples. Thus the number of persons using not more than 60 per cent of their labour power is treated as binomial variable and the hypothesis to be tested is

H_0 : P = 19/65 = .29 and q = .71. Under H_0

np = .29 X 75 = 21.75

npq = 21.75 X .71

$\qquad$ = 15.4425 $\qquad$ . . S.D. = 3.93

$\qquad$ X $\quad$ - 2 = 21.75 - 7.86 = 13.89

$\qquad$ X $\quad$ + 2 = 21.75 + 7.86 = 29.61

The experimental value here fall marginally outside the critical region. It stands to reason that if we succeeded to collect data from a village which was completely outside the influence of the benefits of the project than we might have found that the experimental value fell unambiguously in the critical region.

2.6.3   It would be of some interest if we make a comparison of the picture of the two samples combined with some data, not subject to the influence of any comparable project in 1979, in a village economy of the Indian Terai. We adjust the data of the village of the Indian Terai on the basis of the following assumptions :

(a) No new sources of productivity appeared in the village

(b) The net rate of migration from the village remained constant

(c) The rate of natural increase of population remained at the rate of 2 p.c. per annum as was noticed in 1979. The resulting position can be seen in table 2.23. Superficially, the percentage of the number of persons using more than 45 per cent of their labour power is higher in Chaughada--Ganesthan area than in Indian Terai of 1979. Using the preceding test we find, however, that the difference between the Terai village of India and the Chaughada area is not significant. Considering that

high hills of Nepal have much less natural endowments for agriculture than the Terai of West Bengal and that the sample of Terai was dominated by some regular employees it is difficult not to support what we have already concluded that the specific IRD project in Chaughada has succeeded to increase the intensity of use of the basic input of labour.

Table 2.22

Comparison of Use of Labour Power by Adult Males

Sample	No. of employed adult males using not more than 60 p.c. of labour power	No. of employed males using more than 60 per cent of labour power	Total
Chaughada	19	46	65
Ganesthan	29	46	75

Table 2.23

Comparison of Use of Labour Power by Employed Adults Between a Village of the Indian Terai and the Chaughada area

Sample	No. of persons using not more than 45 p.c. of their labour power	No. of persons using more than 45 p.c. of their labour power	Total
Chaughada-Ganesthan	118	155	273
Indian Terai	162	172	334

2.6.4   The upshot of discussions on the use of labour,
viewed from various aspects, is that there has been a decisive
expansion of the use of, and hence a decisive increase in
efficiency in the use of, labour as a result of the launching
of IRD activities in the valley that is represented by our
sample of the Chaughada village.

2.7 IMPACT ON LITERACY

2.7.0   It will certainly be interesting to see if six years
of development through IRDP has brought forth any impact on
the rate of literacy in Chaughada.   Any positive impact on
literacy might offer itself as an indirect evidence of increased
use of labour power and expansion of output.   Tables 2.24 to 2.27
present the present distribution of literates and non-literates
according to definition no.1 and definition no.2 both for
Chaughada and Genasthan.   We derive shorter tables 2.28 to
2.30.   The difference in the rate of literacy, as defined in
table 2.28, between two samples is statistically significant.
There is just a possibility that as a result of improvement in
income in Chaughada children who would have given up their
studies after primary education continue now their education
beyond the primary stage.

Table 2.24
Chaugadha
With 1 year or more of education by Age and Sex

Age Group	Male			Female			Total		
	Literate	Illiterate	Total	Literate	Illiterate	Total	Literate	Illiterate	Total
6-15	31	9	40	12	13	25	43	22	65
15-35	22	16	38	7	40	47	29	56	85
35-65	14	13	27	-	19	19	14	32	46
Above 65 years	2	3	5	-	1	1	2	4	6
Total	69	41	110	19	73	92	88	114	202

Table 2.25
Ganesthan
With 1 year or more of education by Age and Sex

Age Group	Male			Female			Total		
	Literate	Illiterate	Total	Literate	Illiterate	Total	Literate	Illiterate	Total
6-15	35	16	51	12	20	32	47	36	83
15-35	21	20	41	8	41	49	29	61	90
35-65	18	16	34	1	31	32	19	47	66
Above 65 years	1	2	3	-	3	3	1	5	6
Total	75	54	129	21	95	116	96	149	245

Table 2.26
Chaugacha
Literate with 6 years or more of education by Age and Sex

Age Group	Male			Female			Total		
	Literate	Illiterate	Total	Literate	Illiterate	Total	Literate	Illiterate	Total
11-15	11	5	16	2	9	11	13	14	27
15-35	12	26	38	1	46	47	13	72	85
35-65	3	24	27	-	19	19	3	43	46
Above 65 years	-	5	5	-	1	1	-	6	6
Total	26	60	86	3	75	78	29	135	164

Table 2.27
Ganesthan
Literate with 6 years or more of education by Age and Sex

Age Group	Male			Female			Total		
	Literate	Illiterate	Total	Literate	Illiterate	Total	Literate	Illiterate	Total
11-15	7	12	19	2	15	17	9	27	36
15-35	9	32	41	3	46	49	12	78	90
35-65	-	34	34	-	32	32	-	66	66
Above 65 years	-	3	3	-	3	3	-	6	6
Total	16	81	97	5	96	101	21	177	198

Table 2.28

Literates with Six Years or More of Education in the Age Group 11-15

Sample	No. of persons in the age group 11-15	No. of literates with 6 years or more in the same age-group
Chaugadha	27	13
Ganesthan	36	9

Table 2.29

Literates with One Year or More of Education in the age-group 6-15

Sample	No. of persons in the age-group 6-15	No. of literates with one year or more of education in the same age-group
Chaugadha	65	43
Ganesthan	83	47

Table 2.30

Literates with One Year or More But Less than Six Years of education in the age-group 6-15

Sample	No. of persons in the age-group 6-15	No. of literates with one year or more of education in the age-group 6-15
Chaugadha	65	30
Ganesthan	83	38

2.7.1   The difference in the rate of literacy, according to
the definition used in table 2.29, between the two samples is not
statistically significant. This merely points to the possibility
that Gamesthan may have fared nearly as well in respect of primary
education as a secondary consequence of some increase in cincome.
So we isolate in table 2.30 what we may view as full receipients
of primary education. Here we find that on surface there is no
difference, between the centre and the periphery, in the proposi-
tion of receipients of primary education. We must add that our
view of table 2.30 is not cent per cent fullproof as the age-group
is not 6-12.

2.7.2   On the basis of the indirect evidences hinted at in the
preceding paragraphs it is possible to contemplate that even in the
periphery some increase in income has taken place. But in the
centre income has expanded to a decisively higher level.

2.8 IMPACT ON AGRICULTURAL OUTPUT

2.8.0   We tabulate the data, in table 2.31, for comparing the
impact of the IRD programmes on the amount of agricultural output
(in Nepali .000 Rs.) in the test population with that in the
control population. Our definition of the mean agricultural output
per Nepali Bigha has been a little different from tables 2.32 and
2.33. The definition used in table 2.31 is made to look after the
needs of statistical testing. The difference in agricultural output

Table 2.31

Agricultural Output Per Nepali Bigha in ('000 Nepali Rs.)

Sample	Agricultural Output per Nepali Bigha in '000 N Rs.		Size of Sample
	Mean	S.D.	
Chaugadha	15.3	7.2	46
Ganesthan	9.5	4.4	49

between the centre and periphery as seen in table 2.31 is
statistically significant at the 5 per cent level of significance.
This upsurge in agricultural output has come about as a result of
concentrated activities in the Chaugadha area.

2.9   INPUTS ON THE FARMS

2.9.0   Since the farms on the Chaugadha valley are smaller than
those on the periphery, some of them hire the services of the
implements from others.   On this count on average cost on the
item of depreciation is lower in Chaugadha than in Ganesthan.
But to compensate for this shortage of implements they relatively
spend more on bullock days.   The total annual cost on fixed capital,
as we can see from the relevant tables, is thus more in Chaugadha
than in Ganesthan.   Chaugadha also uses more of seeds, organic
manures and chemical fertilisers.   One input, viz., the irrigation
water is used in Chaugadha but not used in Ganesthan.   Ganesthan
is dependent on rain water.

Table 2.32
Cost and Agricultural Output [Chaugadha]

Farm Size in (Nepali Bigha)	Number of Farms	Amount of Land (Bigha)	Output per Bigha (in Rs.)	Cost per Bigha on (in Nepalese Rs.)								Mandays	
				Depreciation	Hired Plough day	Fixed Capital	Seeds	Irrigation	Organic manure	Chemical fertilisers	Insecticides	Household	Hired
Upto 0.50	13	4.80	12911	170	329	499	164	18	206	535	46	3237	600
0.50-1.00	22	15.51	16587	179	342	521	279	46	462	639	46	2638	877
1.00-1.50	8	9.53	9107	209	189	398	221	16	212	578	9	2445	746
1.50-3.50	3	5.29	20149	519	19	528	223	262	618	1356	49	2626	416
3.50-7.50	-	-	-	-	-	-	-	-	-	-	-	-	-
7.50+	-	-	-	-	-	-	-	-	-	-	-	-	-
	46	35.13	14592	237	250	487	239	31	382	716	36	2666	723

Table 2.33
Cost and Agricultural Output [Ganesthan]

Farm Size in (Nepali Bigha)	Number of Farms	Amount of Land (Bigha)	Output per Bigha (in Rs.)	Cost per Bigha on (in Nepalese Rs.)								Mandays	
				Depreciation	Hired Plough day	Fixed Capital	Seeds	Irrigation	Organic manure	Chemical fertilisers	Insecticides	Household	Hired
Upto 0.50	13	4.02	11894	104	241	425	215	-	161	613	52	2158	8.7
0.50-1.00	14	10.03	8466	134	221	355	152	-	162	378	16	1586	264
1.00-1.50	8	10.64	7556	222	150	372	146	-	270	374	22	1330	517
1.50-3.50	13	31.11	9789	343	133	476	159	-	330	556	23	1192	395
3.50-7.50	1	4.12	9016	590	-	590	146	-	583	425	-	896	1214
7.50+	-	-	-	-	-	-	-	-	-	-	-	-	-
	49	59.92	9259	293	149	442	158	-	299	489	22	1324	431

Table 2.34

Purchase of Seeds from Agricultural Input Corporation

Item	Chaugadha		Ganesthan	
	No. of households	Total Amount in Nepalese Rs.	No. of households	Total Amount in Nepalese Rs.
Seeds	14	3319	10	2025

Table 2.35

Loans and Purchases from Sajha

Items	Chaugadha		Ganesthan	
	No. of households	Total Amount in Nepalese Rs.	No. of households	Total Amount in Nepalese Rs.
Loand	3	16300	Nil	Nil
Inorganic fertilizers	43	25153	45	22805
Insecticides	25	1231	28	1258

Table 2.36

Receipt of A id from Agricultural Development Bank (Nepal)

Sample	Total Amount in Nepalese Rs.	Number of households	Purpose of credit
Chaugadha	46060	14	Buffalo, Ox, Fertilizers fan
Ganesthan	20310	5	Farm, fertilizers, Gobar gas.

2.9.1   One good reason for increase in agriculture output in

Chaugadha is the irrigation water supplied by the Gadkhar irrigation

scheme.   Although the difficulties inherent in the implementation

of the Gadkhar irrigation still waits for further improvement,
the earlier exposure of the whole valley (the area being 105
hectares or 154.38 Nepali bighas) through the IRDP to the
irrigation and of the farmers to use of better inputs have made
Chaugadha farmers some of the best farmers in the century.

2.9.2   We get a view from tables 2.34 to 2.36 some assistance
the farmers of the two sample received in respect of loans and
subsidised purchases of inputs. The farmers, to be sure,
purchased some of their inputs from the private sources also.

2.10   INTENSITY OF USE OF LAND

2.10.0   The table 2.37 shows us the indices of the intensity
of the use of land according to two different measures. The
first measure is the ratio of the gross cultivated land to the
net cultivable land. On this measure the index of the intensity
of the use of land is 32 points higher. The second measure is
non-conventional and is specific to the crops now being grown in
the centre and the periphery. The total gross cultivable land
is taken as 3.5 times the net cultivable area. The idea behind the
total gross cultivable land being 3.5 times the net cultivable
land is that 3.5 crops can be raised from a plot, assuming that
all paddy is HYV paddy. The second measure is then the ratio of
total gross cultivated land to the gross cultivable land. The
index on the basis of this measure gives Chaugadha just nine

points more. According to the first measure thus the increase
in intensity of use is 18.6 per cent of points, while the
increase according to the second method is 18.4 per cent of
points. We must hasten to add that the index measures merely
the progress of the area towards being fully used throughout
the area.

2.10.1   The tables 2.38 to 2.40 go to show to us education
plays its part in better management of farms. It is undoubtedly
true that the better managed farms usually succeed to give their
family members better education. But once some scheme is found to
educate farmers, they will undoubtedly contribute to efficient
management of the farms they will operate.

Table 2.37

Measurement of Intensity of Use of Land

Type of intensity of use of land	Chaugadha	Ganesthan
Intensity of use of land according to definition no.1	2.04	1.72
Intensity of use of land according to definition no.2	.58	.49

Table 2.38

Influence of Education on Yield

Education	Rate of Return	
	Chaugadha	Ganesthan
Illiterate	2.71	2.83
Above one year Education	3.14	3.23

Table 2.39

Average farm size of Education Groups
of Farms

Education in years	Average farm size	
	Chaugadha	Ganesthan
Illiterate	.72	1.04
Above one year of Education	.80	1.49

Table 2.40

Influence of Education on Output

Education in Years	Output per Nepali Bigha (in Nepali Rs.)	
	Chaugadha	Ganesthan
Illiterate	9114	7573
Above one year of Education	19516	10457

2.11 IMPACT ON INCOME

2.11.0   There can be little doubt, as we see from table 2.41,
that mean per capita annual income in the household is higher in
Chaugadha, the centre, that in Ganesthan, the periphery. The
difference in this kind of mean income in the two samples is also
statistically significant at 5 per cent level of significance.
Thus not only in respect of agricultural output but also in respect
of income as a whole Chaugadha has registered a decisive increase
as a result of IRDP activities. Agricultural output has increased
as a result of the IRDP package deal of inputs with the Gadkhar
irrigation scheme. The enhanced agricultural output has given
the people of Chaugadha opportunities to trade in agricultural
crops like paddy, wheat etc. There is wholesale business in grain
also in the area. Not only traders themselves but also paid
workers work under them for several months.

Table 2.41

Per Capita Annual Income in the Household

Sample	No. of households	Per capita annual income in the household	
		Arithmatic mean	Standard deviation
Chaugadha	48	2188	821
Ganesthan	50	1600	964

2.11.1   There is thus a perceptible change in the sources of
income.   We can see from table 2.43 that 88.15 per cent of the
village income is earned in Ganesthan from agriculture.   We
have seen before in this chapter that agricultural output in
Chaugadha is decisively higher than in Ganesthan.   So when we
notice that only 61.34 per cent of the village income of Chaugadha
comes from agriculture, we are free to conclude that non-agricultural
income based on agriculture has also increased in Chaugadha.

Table 2.42

Absolute Poverty in Chaugadha and Ganesthan

Per Capita annual income in the household(Rs.)	Households			
	Chaugadha		Ganesthan	
	Number	P.C.	Number	P.C.
Below 1,000	-	-	14	28
1000-3000	44	92	33	66

Table 2.43

Distribution of Income Among Occupations

Occupations	Percentage of Village Income earned	
	Chaugadha	Ganesthan
Farming	61.34	88.15
Agricultural labour	6.48	7.07
Non-agricultural labour	15.34	4.28
Salary earners	4.19	-
Business	12.65	0.50
Total	100	100

2.11.2   What we see in table 2.45 supports what we conclude in the preceding paragraph. In each of the five occupations Chaugadha has a higher per earner income. The growth in agriculture has boosted income in the strictly non-agricultural sector. Here the non-agricultural sector mainly means trade in agricultural crops.

Table 2.44

Distribution of Working Force Among Occupations

Occupations	Percentage of Village Working Force	
	Chaugadha	Ganesthan
Farming	59.74	81.28
Agricultural labour	15.58	12.30
Non-agricultural labour	14.29	5.88
Salary earners	3.25	-
Business	7.14	.54
Total	100	100

Table 2.45

Annual Income Per Earner

Occupation	Income per Earner	
	Chaugadha	Ganesthan
Farming	4217	2911
Agricultural labour	1708	1543
Non-Agricultural labour	4409	1955
Salary earner	5300	-
Business	7273	2500
Total	4107	2684

2.11.3   Another aspect which should be consistent with all
what say in the preceding paragraphs is that with a decisive
increase in income as a result of expansion of agricultural
production there has resulted a reduction in inequality in
incomes, as evidenced by a smaller standard deviation of income
distribution of Chaugadha.   Generally with increase in incomes
in a community there is often increase in inequality of incomes.
The increase in inequality does not mean that absolute poverty
has not declined. In fact, increase in inequality can take place
with some growth of the income of the segment of the poor but with
a higher rate of growth of income of the segment of thenot poor.

2.11.4   A reduction in inequality may take place if the rate of
growth of the poor is more than the rate of growth of the not
poor.   On comparing the lowest and the highest per capita annual
incomes in the household in Chaugadha and in its periphery it is
found that the income of the lowest household has increased by 48
per cent and that of the highest man by nearly 13 per cent.   This,
indeed, is remarkable.

2.11.5   We see from table 2.42 that at least 28 per cent of
people of Chaugadha have left the level of extreme poverty of
having the per capita income less than Rs.1,000 per annum.   So
both absolute as well as relative poverty declined in Chaugadha.

2.12 CONCLUSION

2.12.0   The IRDP package deal here has succeeded in a
substantial way. The mean days of employment is higher for
all categories of workers. In the second place, in some respects
Chaugacha's labour power has been used more intensively. Thirdly
the agricultural output has increased mainly as a result of the
local irrigation scheme and use of other inputs on relatively
wider scale. Fourthly, total income was supplemented mainly
through agriculture-based trade. Finally, and that is the beauty
of development in Chaugacha, the inequality in incomes declined
because the rate of the growth of the poor has exceeded the rate
of the growth of the not poor.