

RASUWA DISTRICT

Economic Performance of Rasuwa District

Introduction

This section briefly describes the economic performance of Rasuwa, dealing mainly with the crop, livestock, tourism, horticulture, and forest sectors. The performances of these sectors were examined by using the historical data available from different sources. These data on the major economic activities presented in this section provide the basis for projecting the baseline trend to be described in the subsequent section. The overall performance of Rasuwa's economy has, until very recently, depended heavily on the performance of the crop sector. Given the limited agricultural area, as well as the area under irrigation, the performance of the crop sector depends to a large extent upon the vagaries of the monsoons. The historical data on cropped area, food yield, and cash crops, together with the fertiliser use rate, are described below.

Crop Area

Paddy, maize, millet, and wheat are the principal food crops grown in the district. Potatoes had traditionally been one of the principal cash crops in Rasuwa, presently accounting for about 30 per cent of the total cropped area. Table 5.1 presents the historical data on the area under these crops over the period from 1975-1990. The overall picture shows an increasing trend in the area under all crops with the highest average annual rate of increase over this period being observed for paddy (13.2%), followed by potatoes (10.4%). The lowest growth rate is that of wheat (3.2%). Considerable variations in the cropped area are, however, discernible with the highest degree of variability being observed in the case of paddy and potatoes as indicated by their coefficient of variation. The drastic reduction in the area under all crops, particularly paddy and maize which are both monsoon crops, during the period from 1980-1983 can be attributed mainly to the bad monsoons in these years. The area under all crops increased considerably in 1984. For example, between the years 1983 and 1984, the area under paddy increased six fold potatoes three fold, and under other crops two foldtimes.

It should be noted that oilseed cultivation was completely stopped after 1982, according to the data collected by DFAMS. The crop composition also changed considerably, along with the expansion in cropped area, over the period. For example, the share of potatoes in the total cropped area increased from 19.5 per

cent in 1975 to about 30 per cent in 1990. A similar increase in the relative share of maize can also be observed. The relative shares of both maize and wheat, however, declined over this period.

It is important to note that there is considerable uncertainty regarding the statistics collected by DFAMS. These time-series' data should, therefore, be treated cautiously. The overall trend in cropped area based on the historical data suggests relatively higher annual growth rates for most crops which cannot be applied directly to project the future trend. Experiences and review of other information reveal that cropping intensity and expansion in the area under cultivation in most hill districts has crossed the limit of sustainability. Further expansion of cropped area in most hill and mountain districts, therefore, seemingly has to be limited in order to avoid a high degree of environmental degradation. A semilog regression model was fitted to the historical data in order to forecast the cropped area and the estimated results are given in Table 5.2. Most of the time trend coefficients are statistically significant at a five per cent level.

Crop Yield

Despite the expansion of Rasuwa's cropped area, the productivity of most crops, except potatoes, declined over the period from 1975-1990. Therefore, any increase in food production in the district in the past should be attributed mainly to expansion in cropped area rather than improvement in crop productivity. The historical data on crop yields and their average growth rate are given in Table 5.3. As can be observed, the negative trend in crop productivity is relatively more pronounced in the case of millet and maize than with other cereal crops. The yield of potatoes, the crop that expanded most rapidly over the period, however, increased by an average annual rate of 3.16 per cent. Considerable variations in per hectare yield of almost all crops are visible, with the highest degree of fluctuation being observed in potato yields, followed by maize, as indicated by the estimated coefficient of variation. Given the limited irrigation facilities, the vagaries of the cyclical monsoon are perhaps the principal reason for such fluctuating trends in crop productivity.

Fertiliser Use

Given the past expansion in cropped area, one of the principal constraints to increasing productivity in Rasuwa, as in most mountain districts of Nepal, is the unavailability of plant nutrients, particularly chemical fertilisers. Although the actual use of fertiliser by crop in the district is not known, the historical fertiliser sale data collected by the Agricultural Inputs' Corporation (AIC) can provide an indication of the extent of fertiliser availability per hectare of cropped area in Rasuwa. The time-series' data on fertiliser sales over the 1982-1991 period and the estimated sale rate per hectare of cropped area (5 crops) in the district are given in Table 5.4. The

available data indicate that fertiliser sales in the district increased from 78 MT in 1982 to 257 MT in 1991, an average annual growth rate of nine per cent. Since the cropped area also increased rapidly, the fertiliser sale per hectare of cropped area showed a marginal increment (less than one %) over the period. The average fertiliser sale per cropped area is estimated to be 30 kg, indicating the low level of fertiliser availability in the district. Our estimates, based on the crop specific fertiliser use rate reported in the Irrigation Master Plan, indicate a shortage of fertiliser supply in the district. In order to forecast the fertiliser supply in the district, a double log linear trend equation was fitted to the historical data on fertiliser sales. The results are presented below.

$$\text{Log (Fertiliser Sale)} = 4.32 + 0.56 \text{ Log(Time)}$$

(sse=0.07)

$R^2=0.86$

Livestock

As in most hill and mountain districts of Nepal, livestock are an indispensable component of the farming system in Rasuwa. The historical data on the livestock population and livestock products (meat, milk, etc) collected by DFAMS over the period from 1984-1988 are given in Table 5.5. The overall picture shows an increasing trend in all types of livestock population, with the highest average annual growth rate (over 20%) being observed in the case of milch animals (cows and buffaloes). Although the shares of milch buffaloes (milch cows) in the total buffalo (cow) population increased along with the growth in the buffalo population, the relative share of milch cows (16%) and milch buffaloes (26%) in 1988 were still very low. The existence of a relatively large number of unproductive animals might suggest excessive pressure on forest and other land resources. The total cattle and buffalo populations in the district in 1988 were 23,795 and 11,042 respectively. Among the small animals, the goat population registered the highest growth rate (16%), while the sheep population increased by an average annual rate of six per cent. The time-series' data on livestock products over the same period are also given in Table 5.5.

Land Use Changes

Rasuwa district has a total land area of 1,51,179 hectares. The detailed breakdown of land use statistics for 1978 collected by the LRMP was updated and projected using simple assumptions regarding the magnitude and the direction of the inter-class land transfers. As indicated in the methodological framework of the study, the land use changes in most districts of Nepal are primarily the result of deforestation that was assumed to take place at the annual rate of one per cent in the mid-hill region over the past decade (Master Plan). It was further assumed that the

deforested area is first converted to shrubland, then to grassland, and eventually to agricultural land. Table 5.6 presents the projected land use changes in Rasuwa district over the period from 1978-1990 by region. It should be noted that the area under the Langtang National Park (LNP), which covers about 65 per cent of the district's total area, was excluded while projecting the land use changes in the district, considering that the area under the LNP will remain unchanged over time.

The overall land use distribution in the district shows that over 97 per cent of the total natural forests and 75 per cent of the total cultivated land in the district lie in the high mountains. The natural forests in the mid-mountains are immature with low crown densities and are covered by hardwood species. The natural forests in the high-mountain region are of predominantly of mixed species, with maturity class M and density class 2, while all the national forests in the mid-mountains are accessible, only 45 per cent and 14 per cent respectively of the natural forests in the high mountains and the high Himal are accessible, according to the estimate of the Forestry Sector Master Plan. As can be observed from Table 5.6, all the accessible areas are projected to decline at the rate of one per cent per annum over the period. Since 50 per cent of the deforested area is assumed to have been converted into shrubland, the area under shrubland in the district is more expansive than the other land categories such as grassland, non-cultivated inclusions, and agricultural land. The details are given in Table 5.6.

Tourism

Rasuwa district has potential for tourism development. Langtang National Park, the second biggest national park in the country, is one of the major tourist spots in Rasuwa district. A number of other places like Gosaikunda, Rasuwagadhi, Tatopani, and the beautiful Himalayan peaks situated within this district are important from the tourism point of view. All these factors, together with its varied culture as well as its distinct religious and cultural heritage, have helped to promote tourism activities in the district. Tourism is, therefore, becoming one of the major sources of employment and income for a significant proportion of the local population. Portering in the Langtang National Park (LNP) is the most important source of off-farm employment, followed by agricultural labour and cottage industries.

Trekkers visiting the Langtang National Park (LNP) are of three types, i.e., agency-organised groups; individual trekkers with porters and other support staff; and individual trekkers without porters. Table 5.7 presents the historical data on the number of trekking tourists visiting the Langtang National Park by category over the period from 1983-1987

It can be observed from Table 5.7 that about two-thirds of the tourists fall under the agency-organised group category, 26 per cent under the 'individual trekkers with

guides-cum-porters' category, and the rest under the 'individuals without guides' category. The average annual growth rate of all types of tourist flow over the period is 22 per cent.

Available information (APROSC 1989) indicates that the first category, of 'agency-organised trekking group,' normally consists of 12 members. Each group consists of four employees (one *sardar*, two porters, two kitchen boys, and one cook), all hired outside the district. The APROSC study further indicates that about 25 per cent of the second category of trekkers normally hire porters in Rasuwa district, and it is only this type of trekker that has contributed to the generation of seasonal employment in the district. The details on the assumptions and methods used to forecast tourism flow, local employment, and income generation from tourism in Rasuwa are summarised in the subsequent section.

Horticulture

Rasuwa district is believed to have considerable potential for horticultural development. The district's land area, 98 per cent of which lies in the temperate to alpine zone, is quite suitable for growing fruits. Land in Rasuwa is predominantly marginal and vulnerable to erosion and landslides. Suitable fruit crops, if properly planted and managed, can have a positive effect on these marginal lands.

As a result of the favourable agroclimatic conditions and the district's close proximity to Kathmandu by motorable road, horticultural activities, particularly fruit cultivation, is gradually increasing over time. Apples, pears, walnuts, peaches, citrus fruits, guavas, mangoes, etc are grown in Rasuwa. The available data on the area where different kinds of fruit are cultivated, and which lies mostly in the high mountain region of the district, are given in Table 5.8.

Apples are the predominant fruit crop. In 1990, they accounted for over 40 per cent of the total fruit area in the district, with the remaining area being covered by pears (19.8%), peaches (13%), walnuts (9%), and other fruits (17%). Between 1990 and 1991, the area under apple cultivation increased by 4.3 per cent, which is relatively higher than other types of fruit (Table 5.8). Apple cultivation in the district began after the establishment of the horticultural station in 1971 in Dhunche. The predominant varieties of apples grown in Rasuwa are *Red Delicious* and *Golden Royal*, whereas the *Pharping Naspatti* and *Shelled* varieties are the main varieties of pears and walnuts respectively.

Table 5.9 presents the average cost of fruit cultivation with special reference to apples. Similarly, the average yield and benefit (gross) of different types of fruit are given in Table 5.10. The estimated cost of cultivation is far below the gross return per hectare, indicating that apple cultivation can be a viable economic enterprise

in Rasuwa. Besides, apples grown in Rasuwa (which are marketed in Kathmandu) fetch a relatively high price compared to apples grown in Helumbu and Daman.

Despite the favourable climate and high returns, the nature of cultivation in Rasuwa remains subsistence-oriented. The few orchards in the district lack improved management practices (pruning and fertiliser application, etc). The mortality rate, as reported in the Horticultural Master Plan, is quite high (32.75) due to the lack of care and the need to grow cereals. Some of the institutions that are involved in horticultural development in the district are the Horticultural Farm at Dhunche (which covers about 25 hectares of orchard and one nursery), the Agricultural Development Office (ADB), and the Agricultural Inputs' Corporation (AIC). Some of the major constraints that have severely limited horticultural growth include the lack of storage and processing facilities, lack of transportation, lack of high quality saplings and seeds, and the damage caused by wild animals of Langtang National Park. Finally, in order to project the horticultural income, the area under major fruits, particularly apples, peaches, walnuts, and other fruits, was assumed to grow at an annual rate of one per cent.

Economic and Natural Resource Conditions: Baseline Scenario

Crop Area and Yield

The cultivated area of Rasuwa is far less than in the other districts of Bagmati Zone. Potatoes, as a principal crop, account for more than 80 per cent of the cultivated land in Rasuwa based on the data series used in the study. The area under paddy, wheat, and millet account for less than 1,000 ha each, whereas the area under maize is about 1,500 ha. Oilseeds are not grown in the district.

The results of the area forecasted for different crops, based on the semilog time trend fitted to the historical data series, are given in Table 5.11. Similarly, Table 5.12 provides the respective crop yield projections based on the assumption of non-constant crop prices and variable inputs.

The area forecasted for crops over time indicates almost negligible growth rates in Rasuwa. The highest positive growth rate is for paddy (2.2%), followed by potatoes (1.6%), and the lowest for wheat (0.80%). The total cropped area in the district also does not appear to change much over time (1.3%). Given the existence of marginal lands, vulnerable to landslides and soil erosion, further expansion in the cultivated area of the district seems to be limited. On the other hand, the prospect for increasing the cropping intensity of the district also seems to be limited, given the current state of technology and infrastructure (e.g., irrigation and fertiliser constraints).

Available data indicate that only 14 per cent of the district's cultivated land is under year-round (5%) and monsoon irrigation (9%), and the potential area that can be brought under irrigation is estimated to be 836 hectares. The year-round irrigated area is assumed to grow over time at two per cent per annum (Table 5.11).

Another main constraint in increasing both the cropping intensity and crop yield is the supply of chemical fertilisers. Fertiliser sales are expected to grow at about five per cent, based on the time trend equation fitted to the historical fertiliser sale figure in the district provided by the AIC. The projected sale of fertiliser in the district is far below the projected demand for fertiliser in the district, in contrast to other districts of Bagmati Zone where projected supply far exceeds demand.

Table 5.12 provides the forecasted yields of five crops in Rasuwa, based on the assumption that the crop technology will remain the same over time. The forecasted crop yields are not encouraging. All crops considered show marginally increasing or stagnant yield trends over time. The highest positive growth rate is for paddy (0.52%) and the lowest is for millet (0.1%).

Crop Production

Crop output is determined by the area and yield results discussed above. Table 5.13 indicates that the resulting production growths for all crops are positive, with the highest growth observed in the case of paddy (2.8%), followed by potatoes (1.6%), and the lowest for millet (0.8%). The higher (lower) positive growth observed in production is the result of rapid (marginal) increase in the area rather than yield changes.

Gross Margin

Table 5.14 presents the projected gross margins and cultivation cost per hectare of cultivated crops. It should be noted that the gross margins calculated for the five crops also include the value of crop residues. The results show positive gross margins for all crops, except for wheat and millet. Maize and paddy per hectare gross margins show a relatively higher growth trend (25% and 39%) despite their low per hectare returns. Potatoes appear to be the most profitable crop in terms of returns. The potato gross margin, which is currently estimated at Rs 25,000 per hectare, is expected to grow at the rate of eight per cent per annum. The results also indicate that while the wheat gross margin consistently decreases over time at the rate of 1.65 per cent, the millet per hectare gross margin will improve.

Livestock

The livestock sector gross margins were also projected on the basis of livestock population and product projections. Table 5.15 indicates that the average annual

growth rate of LSU in the district is less than one per cent. It should be noted that the average growth rate generated by the model is lower than the historical growth trend reported in the previous section. This is simply because of the fact that the livestock population, particularly the grazing animals, is assumed to be driven by the land use changes in the district, as indicated in the methodology. The average LSU holding per households declines over time, because the number of households increases over time at a faster rate than the increase in LSU.

According to the results derived from the model, the availability of bullock pairdays in the district does not appear to be a constraining factor. But the manure demand exceeds the manure supply over time. This might suggest that the present dose of organic manure is likely to decline over time. This, in addition to the shortage of chemical fertilisers based on past trends, will have negative effects on crop productivity.

Milk, ghee, meat, and wool are the main livestock products. The average yield per head of animal, derived from the historical data on different types of livestock population and their respective products, was assumed to remain constant over time, and the average yield figures were applied to forecasted livestock products over time. Table 5.16 presents the projected trends for different types of livestock products in the district. It should be noted that the average annual growth rates of all livestock products, except for chicken meat, are less than one per cent.

The forecasted gross margin per LSU is given in Table 5.17, along with the raising cost per animal. The results indicate that the total gross margin from buffaloes is among the highest, followed by sheep and goats. The total gross margin from buffalo meat (milk+ghee) is expected to grow at the annual rate of 15.8 per cent (11%). The details are given in Table 5.17.

Food Availability and Demand

The total cereal availability (edible form) in the district was derived by subtracting different waste, loss, and seed allowances from the total production of the four cereal grains (rice, wheat, maize, and millet). Subsequently, the per capita availability was calculated. A similar exercise was carried out to obtain the per capita domestic supply of vegetables (potato only), meat (mutton, buffalo, pork, and chicken), oils and fats (oilseeds are not produced in Rasuwa), and milk. The forecasted per capita availability for each of these food items is given in Table 5.18. Similarly, the forecasted per capita demand for these food categories and the total food balance situation in the district over time are given in Tables 5.19 and 5.20.

The results indicate a declining trend in the per capita availability of all types of food except for vegetables (Table 5.18). This indicates that the population growth in the district exceeds the growth in net food production over the projected period. The

projected food balance situation given in Table 5.20 indicates that there is a net deficit in cereal grains, meat, and oils and fat over time in Rasuwa district, but this deficit is compensated by the large surplus of potatoes and milk.

Land Use

Land use types are agricultural land, forest land, grassland, non-cultivated inclusions, and others. The manner in which land use changes occur over time in the district has already been described earlier. Table 5.21 presents the changes in land use over time in Rasuwa.

The results show a declining trend in the area under natural forests, as well as a result of the net decline in accessible forests which are assumed to be deforested at the rate of one per cent per annum. The natural forests in the mid-mountains are accessible, while only 45 and 14 per cent respectively of the natural forests in the high mountains and high Himal are accessible. The deforested accessible forests are assumed to be converted to shrubland, grassland, and agricultural land, depending upon the direction and magnitude of inter-class and transfers. The results show that shrubland and cultivated areas increase marginally over time.

As in Kabhre and Sindhu districts, significant discrepancy exists between the cultivated area reported in the LRMP and the area estimated from DFAMS data. In the absence of time-series' data on the cultivated area, DFAMS' data on the cropped area was used and the net cultivated area in the district was derived as the sum of non-competing crops (paddy and maize).

Forest Products

Fuelwood, fodder, and timber are the main forest products for which the demand and supply projections were made on the basis of constant yield assumptions.

Fuelwood

Fuelwood is assumed to come from different sources, namely, accessible forests, shrubland, grassland, non-cultivated inclusions, and farmland. Forests under the Langtang National Park were not considered while estimating fuelwood or fodder supply, as these land resources vary as indicated earlier (Chapter 2). Under constant yield assumptions, the forecasted growth in the supply of fuelwood from these sources depends primarily on the projected changes in these land resources over time. Similarly, the projected demand for fuelwood under the constant per capita fuelwood consumption increases over time, along with population growth.

The forecasted changes, in the supply of fuelwood from different sources are given in Table 5.22, and it can be observed that currently about 70 per cent of the total

fuelwood supply in the district is estimated to come from accessible forests, 20 per cent from shrub and grasslands, and the rest from non-cultivated inclusions and farmland. This clearly indicates that forests are the major sources of fuelwood and the contribution of farmlands to the total fuelwood supply is negligible (less than 4%). Over time, the share of forests in the supply of fuelwood from the accessible forest area declines, whereas the share of shrubland increases slightly. On the whole, the projected supply of fuelwood in the district decreases at an annual rate of less than one per cent (0.44%) (Table 5.23).

Despite the declining trend in fuelwood supply, Rasuwa has considerable fuelwood surplus over the projected time period. Currently, fuelwood supply exceeds the demand by almost two-fold, but this excess supply, however, deteriorates marginally over time as a result of the positive growth in fuelwood demand caused by the positive population growth rate (1.86% per annum).

Fodder

Under the constant yield assumption, fodder supply in the district changes over time along with the changes in land use. Table 5.24 shows that only 17 per cent of the district fodder supply is estimated to come from farmland and the remaining from forests (26%), grassland (37%), and shrubland (20%). Over time the share of forests declines and the shares of shrubland, grassland, and farmland increase marginally due to changes in land use. On the whole, the projected supply of fodder in the district (Table 5.25) also continues to exceed the projected fodder requirement by a considerable amount. Put differently, although the fodder requirement of the district increases at a relatively higher rate than the fodder supply, the district fodder supply is found to be sufficient to meet the fodder requirement for the period considered.

The grasslands located inside the Langtang National Park are open for seasonal grazing and were included in the estimation of fodder supply. This source contributes nearly 30 per cent to the total fodder supply. Even if this class of land is assumed to be inaccessible, fodder supply would still exceed the requirement by about 32 per cent of the district.

Timber

Table 5.26 shows that Rasuwa district has surplus timber, as is the case for both fuelwood and fodder. Forests are the only source of timber and, at present, the timber supply exceeds the timber demand by two and a half fold.

Labour supply in the district is determined by the size of the active population and the normal duration of work. The normal duration of work as reported by NRB for the mountain region is 240 mandays available per active member of the household. This constant period of work was applied to the projected active population (Table 5.27) to forecast the total supply of labour (mandays) in the district. While the number of labour days utilised in the crop and livestock sectors was generated by the model, labour spent on other non-agricultural activities was projected by using the information collected by Nepal Rastra Bank.

The forecasted labour supply and labour use situation in the district is given in Table 5.28. In 1990-1991, over 82 per cent of the labour force in the district was gainfully employed. Since the projected labour supply in the district increased at a faster rate than the labour use, the employment rate declined marginally over time. About two-thirds of the labour force are depicted as being employed in the agricultural sector and the rest in the non-agricultural sector. It should also be noted that although the employment generated by tourism activities in the district is negligible, its future trend (growth) is quite encouraging and it is one area where policy intervention appears to be important.

Horticulture

Rasuwa district has considerable potential for horticultural development, given the favourable agroclimatic conditions and infrastructure. As described earlier horticultural activities, particularly fruit crops, were incorporated into the model to capture the income generated from this sector.

Based on the available information on the area under different fruits (apples, walnuts, peaches, and other fruits), their cultivation costs and yields, and gross margins for these fruits were projected over time. The areas under all fruits, adjusted to a mortality rate of 37.2 per cent, are projected to grow at the rate of one per cent per annum (Table 5.29). Table 5.30 shows fruit production by type. Similarly Table 5.31 shows the per hectare costs and gross margins for different fruits.

The results indicate positive gross margins for all fruits. The highest gross margin per hectare is for apples (Rs 57,680) and the lowest for peaches (Rs 12,208). On the whole, the estimated per hectare gross margins of fruit crops were found to be substantially higher than for cereal crops. The projected gross margins per hectare for all fruits show an increasing trend over time, with walnuts registering a relatively higher rate of growth (10.3%) than other types of fruit (7-8%).

Tourism

Rasuwa district has potential for mountain tourism, as mentioned earlier. The Langtang National Park (LNP), which covers a large part of Rasuwa, and a number of other important tourist spots in the district, have attracted many tourists. Tourism is a major off-farm source of employment and income in the district.

In order to project the number of tourists visiting the district, the total number of trekking tourists visiting Nepal were first projected by using the historical data reported in the Tourism Statistics of Nepal, and also the number of tourists visiting the LNP was assumed to be a fixed proportion (11%) of the total number of trekking tourists that visit Nepal. Table 5.32 shows that the forecasted flow of tourists visiting LNP will increase from 8,742 in 1991 to 18,580 by 1998, with an average annual rate of 11.4 per cent.

Assuming that one tourist hires on an average 1.04 porters and that only 60 per cent of the porters are hired locally, the total number of porters gainfully employed in tourism was also projected (Banskota and Upadhyay 1989). Further, assuming that the porter wage is thrice the agricultural wage, the total porter income was also forecasted. The results indicate that whereas local porter employment in the tourism sector will follow the same growth trend as tourist flow, porter income is expected to grow rapidly at the rate of 19.2 per cent per annum. Another important source of income from tourism in the district is tourists' expenses on local food and lodging which were also projected on the basis of estimates (Banskota and Upadhyay 1989). The results indicate that in 1990-91 about 95 per cent of the total income from tourism is accounted for by the local food and lodging expenses of tourists and the rest by porter income. On the whole, the total income from tourism is projected to reach Rs 92.92 million by the year 1998 from Rs 42.39 million in 1991, at an average growth rate of about 12 per cent per annum (Table 5.32).

Trade

Food

The extent to which many food items are exported (imported) in the district was determined by the magnitude of food surplus (deficit) generated by the model, based on the food demand estimate and supply forecasts, as indicated earlier. Rasuwa district has considerable surpluses of potatoes and milk and deficits in other food groups (cereals, meat, oils and fats). But since the potato and milk surplus is large enough to offset the magnitude of deficit in other food items, the district has net food exports in terms of value. Table 5.33 shows that the total value of food exports from Rasuwa will increase from Rs 4.95 million in 1991 to Rs 9.12 million in 1998, with an annual growth rate of about nine per cent. The per

capita value of aggregate food export in the district is forecasted to increase by seven per cent.

Non-Food

Import demand for non-food items is assumed to be influenced by population growth, income growth, and income elasticity for non-food demands as specified in Chapter 2. The average monthly expenditure on non-food items reported by NRB for the mountain regions was first adjusted to reflect the situation in the base year (1991). The projected growth rate of import demand was then applied to this base value of non-food import to project the total value of non-food imports in the district. Table 5.33 shows that non-food imports in Rasuwa are expected to increase from Rs 42.6 million in 1991 to Rs 49 million in 1998, at the rate of two per cent per annum. The per capita value of non-food imports, however, remains almost stagnant despite the growth in population.

Income

Income is determined endogenously by the model. Gross margins of the crop (including horticulture) and livestock sectors and income accruing from different employment activities were added to derive the aggregate income for Rasuwa. The forecasted nominal and real incomes of different sectors are given in Tables 5.34 and 5.35 and the income shares of different sources are given in Table 5.36.

The per capita nominal income for Rasuwa was Rs 4,102 in 1991, and it is expected to grow at an average annual rate of 10.6 over the projected period. The contribution of the crop sector to the total income is among the highest (39%), followed by tourism (28%), horticulture (18%), and livestock (10%). The income share of the crop sector remains more or less constant over time. The income shares of the livestock and tourism sectors, however, increase while those of horticulture and other off-farm activities decline over time. As a result, the real per capita income estimated by using the price index at 1991 constant prices shows a marginally declining trend over time.

Environment: Sustainability and Carrying Capacity

The performance of the district in terms of some selected sustainability indicators, such as population density, agriculture-forest land ratio, and so on can be judged from the results given in Table 5.37. The density of both the human and livestock populations per hectare of cultivated land in the district is much more pronounced than the density per hectare of accessible forest area, primarily because of the limited area under cultivation compared to the accessible forest area in the district. As indicated earlier, the cultivated land in the district, which was derived as the sum

of the area under non-competing crops using the DFAMS data, is 49 per cent lower than the figure obtained from the LRMP statistics.

The population density per hectare of cultivated land is currently 13 persons, and this pressure increases marginally over time due to the increase in population. Stated differently, the per capita cultivated land in the district, which is currently 0.079 of a hectare, is expected to decline marginally over time. Population pressure on accessible forests in Rasuwa is very low at 2.2 persons per hectare in 1991 and an estimated three persons in 1998. The density of livestock population per hectare of forest and grassland is also very low compared to the density per cultivated land.

The Wyatt-Smith estimate indicates that 3.5 hectares of accessible unmanaged forest are required to support one hectare of cultivated land in the present context of the hill farming system. The ratio between cultivated land and forest area in Rasuwa is currently 5.7, and this is fairly high compared to the 3.5 estimate. This clearly indicates that Rasuwa district is in a relatively better position compared to Kavre and Sindhuraj in terms of the natural resource base, despite the relative scarcity of cultivated area. The carrying capacity of land in terms of food, fuelwood, and fodder was separately calculated on a per hectare basis.

Implications for Food

Assuming that 2,410 calories are required by an adult, the carrying capacity of one hectare of cropland was calculated. Table 5.38 shows that the per hectare calorie supply in Rasuwa in 1990/1991 was 3,756,000 and this is about 97 per cent of the calorie demand per hectare. The carrying capacity of cropland decreases marginally over time because the per hectare of cropland can support about 5.2 adults, whereas the demand pressure (i.e., load per ha) is 5.3 adult persons, about three per cent greater. This indicates that a little over one hectare of cropped area is required to support the calorie requirements of one household, assuming that the average size is 6.5 persons per household.

Implications for Fuelwood

The carrying capacities of both aggregate land and forest land in terms of fuelwood were estimated and the results are given in Tables 5.39 and 5.40. The results indicate that, in Rasuwa, the carrying capacity of aggregate land from which fuelwood is supplied is about 77 per cent higher than the existing demand pressure. The 1991 figures show that, one hectare of land can support 1.4 persons' fuelwood need, whereas the demand pressure is only 0.47 persons' fuelwood need per hectare. This indicates that the present stock of fuelwood that can be sustainably harvested from different fuelwood sources in the district is 1.77 times greater than

the fuelwood requirement of the district. The carrying capacity of the district in terms of fuelwood declines over time at the rate of 2.27 per cent per annum because the per hectare demand increases at a higher rate than the projected demand pressure. The carrying capacity of forest in terms of fuelwood, as reported in Table 5.40 further, indicates that forests can support over 50 per cent of the total fuelwood requirements of the district, although this proportion declines over time at the rate of about two per cent per annum as a result of decline in the accessible forest area.

Implications for Fodder

The estimated carrying capacity of Rasuwa's land resources from which fodder originates is also far greater than the existing fodder demand pressure. Table 5.41 shows that the per hectare fodder supply is currently 1.91 times greater than the per hectare fodder demand. Although the carrying capacity declines marginally over time, Rasuwa district is expected to have a large fodder surplus over the projected period. More specifically, the base trend in 1991 shows one hectare of land from which fodder originates can support less than one LSU (i.e., 0.9), whereas the stocking rate is only 0.47 LSU per hectare.

Table 5.42 also shows the estimated carrying capacity of forest land in terms of fodder. The results indicate that the estimated carrying capacity of forest land is currently 0.86 per hectare, whereas the demand pressure (i.e., load) is 1.72 LSU per hectare. This indicates that about 50 per cent of the current fodder demand can be supported by forest land, although its capacity to meet the fodder demand shows a declining trend over time as a result of decline in the accessible forest area.

Policy Scenarios and Impact Analysis

Introduction

The policy scenario discussion on Rasuwa district will be confined to two sectors, namely, tourism and horticulture. Tourism provides income and employment to a large number of people in the district. Horticulture is a growing enterprise in the district with many households cultivating apples, walnuts, peaches, and other types of fruit. The role of the agricultural sector in the district is small compared to other districts of the Bagmati Zone, primarily due to the lack of suitable cultivable land. The potential to increase agricultural land or productivity of the existing crops (paddy, maize, and millet) are also fairly limited, given the harsh topography and climatic conditions of the district. Potatoes have potential for development and the impact of developing potato cultivation in the district will primarily be increased productivity, as the scope for increasing the land under potatoes is fairly limited.

In addition, the impact of the potato policy has already been examined in the context of other districts to provide an idea of the impact of the policy.

Policy Alternatives

Tourism

Langtang National Park is located in Rasuwa district. Even though the park covers parts of Nuwakot and Sindhupalchok districts, Rasuwa district encompasses a large area of the National Park. The main tourist destinations, namely, Langtang Valley and Gosaikunda are both located within Rasuwa. As a result, most of the tourism activities generated by the National Park are confined to Rasuwa district.

The tourism policy was evaluated in terms of two policy scenarios. First, it was assumed that the number of tourists visiting Langtang National Park will increase by 25 per cent. The second policy scenario examined assumes an increase in the number of days spent by visitors in the Park by one day from the current four days' assumption, and the number of trekkers was assumed to remain the same as under the baseline scenario.

Horticulture

The present role of the horticultural sector in Rasuwa has already been highlighted in the previous section. The horticultural sector has a relatively good potential for further progress, hence a simple horticultural policy was examined. The horticultural policy involves an increase in the area under apples by 25 per cent in 1993. This policy assumes that apple production will start immediately after the area under apples is increased by 25 per cent. Of course, apple production will not start immediately after the area is increased, but the purpose of the exercise is to demonstrate the impact of such a policy. Under this policy, the cost of apple production, mortality rates, and other costs are all deducted, as reported by Shrestha (1992).

Impact Analysis

The impacts of the three policy alternatives will be analysed in terms of employment, income, trade, and the food situation in Rasuwa.

Employment

According to the baseline scenario, employment in Rasuwa is approximately 81 per cent but, as the population grows and the size of the labour force increases, the employment situation will deteriorate marginally over time (Table 5.43). Under the

horticultural policy, which consists of increasing the area under apples by 25 per cent, labour use in the district improves marginally. The same situation can be observed under the two tourism policies examined in the section. Between the two tourism-related policies, increasing the number of tour days by one additional day appears to have a stronger impact than increasing the tourist number in the long run, as indicated by the larger growth rate. However, none of the three policies examined appears to have a significant impact on improving labour use in Rasuwa compared to the baseline scenario (Table 5.43).

Tourism

First, the impact of the tourism policy on income from tourism will be discussed. As defined in the model, income from tourism is in the form of porter income and other local income in the form of lodging, food expenses, and other local purchases. For details refer to the previous section.

The results of the two tourism-related policies, as well as the baseline scenario with regard to income accruing from tourism, are given in Table 5.44. The projections of tourist flow to Langtang National Park under the baseline and policy scenarios are also given in Table 5.44. The tourist flow to Langtang National Park under the baseline scenario and under the 'increased tourist day' policy are the same, since under the policy scenario the same number of tourists was considered as under the baseline scenario. However, their stay was increased by one additional day from the present duration of four days.

The impacts of the two tourism-related policies on income are different. Under the 'increased tourist day' policy, the porter income changes as porters are hired for one additional day, but other local expenses also change. This happens because tourists visiting the Langtang National Park usually spend one night in a lodge and then move on to another place. This assumption may not be very accurate for tourists spending more nights in local lodges. However, a large majority prefer camping. If more nights are spent in local lodges, more local income will obviously be generated.

The impacts of the two policies on porter income are not different since the number of porter days is the same under both scenarios. However, the impacts on other types of local income are different, with the increased tourist number policy having a significant positive impact on local income than the increased tourist day policy. Besides the overall increase in local income, the increased tourist number policy has a better impact since the income accruing from tourism is obtained by a wider section of the compared population to the increased tourist day policy.

Horticulture

The impacts of all the policies on income were also examined. The results are given in Table 5.45 and are compared across other major income sources. The income shares of major sources are given in Table 5.45 and real incomes are given in Table 5.46.

The three major sources of income in Rasuwa at present consist of crop, tourism, and horticulture, as these account for over 70 per cent under the baseline scenario. Under the baseline trend, crop income (paddy, wheat, maize, millet, and potato) accounts for about 37-39 per cent only, followed by tourism between 29-31 per cent, and horticulture (16-18%).

Under the horticultural and 'increased tourist day' policies, the income shares of the three sources do not vary much. A few percentage point changes in the shares are noticeable under the 'increased tourist day' policy, as can be seen in Table 5.46, along with real per capita incomes estimated on the basis of the model.

The real per capita incomes are also observed to be highest under the 'increased tourist number' policy, but it can be seen that the real per capita incomes are declining gradually over time under all scenarios. The growth rates provide an idea of the projected changes in income over time in Rasuwa. It should be noticed that income from tourism is also in the form of park entrance fees. This income was not taken into account in the model since all types of income that accrue from this source are government revenue and are not a part of Rasuwa's income.

Conclusion

Rasuwa is an extremely poor district without the tourism and horticultural inputs. Agriculture cannot be considered as a long-term development alternative in Rasuwa, because the scope of expanding agricultural land in the district is severely limited by its topography. Furthermore, given the very small area under cultivation, developing an irrigation system in the district may not be cost-effective. Scope, however, exists for potato development, but this may primarily be in terms of productivity increase rather than area increase.

Tourism has potential for further development. Currently the impact of tourism is significant since it provides additional seasonal employment and also income. Increasing the tourist flow to Rasuwa is not an unrealistic policy since LNP is the most accessible part from the capital. New routes and facilities, if developed, can increase the duration of tourist stay inside the Park and this will further generate employment and income. Horticulture also has potential for further development. The apple policy was focussed on only one fruit, namely, apples. However,

Rasuwa has already started cultivating other fruits such as walnuts and peaches. Scope exists for expanding the areas under these fruits as well. The simulation exercise revealed that when only one fruit was considered, benefits accruing were not negligible. Further, the yield assumption made in the current exercise is small, and there is scope for improving fruit yield rates far above the existing rates. Additionally, with appropriate extension, input, and marketing facilities, it is possible to intercrop vegetables with fruits, thus generating more employment and income in Rasuwa.

Table 5.1: Area under Different Crops in Rasuwa

Year	Paddy	Maize	Wheat	Millet	Oilseeds	Potatoes
1975	200	1120	510	610	40	600
1976	220	1125	480	640	30	630
1977	200	1120	480	650	20	640
1978	130	1000	480	620	20	600
1979	130	1000	480	620	20	600
1980	240	620	470	610	20	350
1981	160	700	470	610	20	350
1982	150	700	400	500	0	500
1983	150	790	400	500	0	700
1984	830	1500	840	800	0	2200
1985	850	1300	850	900	0	2200
1986	1060	2090	400	890	0	2300
1987	1050	2090	1000	1220	0	2500
1988	1140	2390	1300	870	0	2310
Mean	465	1253	611	717	12	1177
Std. Dev.	396	545	265	189	13	846
Coef. Var	85	43	43	26	108	71

Table 5.2: Estimated Regression Results for Cropped Area: Rasuwa

Crops	Semi-log Equation	
Paddy	= -162.27+ 348.61 ln (time) (115.8)	R2=0.43
Maize	= 668.11 +305.17 ln (time) (189.01)	R2=0.20
Millet	= 305.42 +170.06 ln (time) (90.32)	R2=0.23
Wheat	= 485.1 +128.96 ln (time) (63.33)	R2=0.25
Potatoes	= 147.417+736.12 ln (time) (249.24)	R2=0.42

Note: Figures in parenthesis indicate the standard error of the estimates

Table 5.3: Crop Yields Over Time (kg/ha)

Year	Paddy	Maize	Millet	Wheat	Potato
1975	1950	1714	1196	1089	5000
1976	1950	1707	1208	980	5000
1977	2000	1366	958	1092	5000
1978	1462	1350	958	1097	5500
1979	1462	1210	958	1113	5583
1980	1625	1355	894	1000	7000
1981	2000	1200	894	1098	7514
1982	2000	1014	900	1000	9000
1983	1800	1101	1000	1000	7543
1984	1807	1200	917	1000	8000
1985	2353	1400	918	889	6000
1986	2160	1670	1000	910	6000
1987	2010	1584	900	1197	7500
1988	1912	1498	992	1034	7497
Mean	1892	1383	978	1035	6581
Std Dev	238	218	98	80	1249
Coef Var	12	15	10	8	18

Table 5.4: Fertiliser Sales Over Time in Rasuwa

Year	Sales (MT)	Sales Per Cropped ha
1982	78	35
1983	107	42
1984	169	27
1985	163	27
1986	142	21
1987	170	22
1988	213	27
1989	263	32
1990	347	37

Source: AIC

Table 5.5: Livestock Population and Product in Rasuwa

Year	1984	1985	1986	1987	1988
<u>Population</u>					
Pigs	264	277	281	285	288
Goat	10065	10448	18529	18350	18166
Sheep	8740	8974	11360	11270	11180
Cattle	15163	15375	24158	23975	23795
Buffaloes	6996	7176	11198	11120	11042
Milch Buff	1280	1313	2916	3066	2860
Milch Cow	1724	1748	4313	3968	3787
<u>Products</u>					
Milk-Buffer	850	872	1361	1458	1514
Milk-Cows	365	370	582	555	603
Goat Meat	36	37	66	65	64
Buffalo Meat	237	243	379	376	373
Mutton	33	34	43	43	43
Pork	4	4	4	4	4

Table 5.6: Land Use by Land Type in Rasuwa and Changes Over Time (ha)

	1978	1979	1980	1985	1986	1987	1988	1989	1990
Mid-mountains	4148	4148	4148	4148	4148	4148	4148	4148	4148
Natural Forests	217	215	213	202	200	198	196	194	192
Accessible	217	215	213	202	200	198	196	194	192
Forests	387	388	389	394	395	396	397	398	399
Shrublands	888	888	889	890	891	891	891	891	892
Grasslands	2644	2645	2645	2648	2649	2650	2650	2651	2651
Mapped Cultivated	983	983	983	984	985	985	985	985	985
Adjacent NCI									
Gross Cultivated	1661	1661	1662	1664	1664	1665	1665	1666	1666
NCI Within	327	327	327	327	327	327	327	327	327
Net Cultivated	1334	1334	1335	1337	1337	1338	1338	1339	1339
MM Calculated	4136	4136	4136	4135	4135	4135	4135	4135	4135
High Mountains	75161	75161	75161	75161	75161	75161	75161	75161	75161
Natural Forests	41343	41155	40968	40063	39887	39713	39541	39370	39201
Accessible Forests	18852	18664	18477	17572	17396	17222	17050	16879	16710
Shrublands	7163	7257	7351	7802	7891	7978	8064	8150	8234
Grasslands	9739	9767	9795	9931	9957	9984	10009	10035	10060
Mapped Cultivated	7738	7785	7841	8112	8165	8217	8269	8320	8371
Adjacent NCI	3066	3085	3104	3194	3212	3229	3246	3263	3280
Gross Cultivated	4671	4700	4737	4914	4953	4988	5023	5057	5090
NCI Within	801	801	801	801	801	801	801	801	801
Net Cultivated	3861	3899	3936	4117	4152	4187	4222	4256	4289
HM Calculated	65982	65964	65955	65909	65901	65892	65883	65875	65866
High Himal	71870	71870	71870	71870	71870	71870	71870	71870	71870
Natural Forests	1056	1045	1035	984	974	965	955	945	935
Accessible Forests	151	149	148	141	139	138	137	135	134
Shrublands	2124	2124	2124	2124	2124	2124	2124	2124	2124
Grasslands	13437	13437	13437	13437	13437	13437	13437	13437	13437
HH Calculated	16617	16606	16596	16545	16535	16526	16516	16506	16496
Rasuwa Total									
Forests	42616	42415	42216	41249	41062	40876	40692	40510	40329
Shrublands	9504	9596	9687	10130	10215	10300	10385	10468	10550
Grasslands	24064	24093	24121	24258	24285	24311	24338	24363	24389
Adjacent NCI	4049	4058	4087	4179	4196	4214	4231	4249	4266
NCIG	1128	1128	1128	1128	1128	1128	1128	1128	1128
Net Cultivated	5195	5233	5271	5454	5490	5525	5560	5594	5628
Rasuwa Calculated	86735	86706	86686	86590	86571	86553	86534	86516	86497
Residual	64444	64473	64493	64589	64608	64626	64645	64663	64682
Total Area	151179	151179	151179	151179	151179	151179	151179	151179	151179

**Table 5.7: Number of Trekkers
Who Visited Langtang National Park by Type**

Year	Type I	Type II	Type III	Total
1983	1249	499	125	1873
1984	1475	590	147	2212
1985	2095	838	209	3142
1986	2371	948	237	3556
1987	2779	1111	278	4168

Note: Type I, Type II, and Type III refer to agency organised trekker, individual trekker with guide-cum-porter, and individual trekker without guide respectively.

Source: APROSC (1989), Master Plan for Tourism Development

Table 5.8: Area under Different Kinds of Fruits

Fruits	1989/90	1990/91	% Change
Apple	341	356 (224)	4.3
Peach	109	110 (69)	0.9
Walnut	71	72 (45)	1.4
Pear	167	169 (105)	1.2
Other Fruits	139	144 (90)	3.5
Total	827	851 (533)	2.9

Figures in Parenthesis indicate the adjusted area using the mortality rate of 37 per cent as reported in Horticulture Master Plan.

Note: Other fruits include plums, citrus, guavas, apricots, jack fruits, pineapples, papayas, and bananas

Source: Fruit Development Division, Department of Horticulture

Table 5.9: Average Cost of Fruit Cultivation with Special Reference to Apple

	Quantity	Rs/hectare
Labours	230 md/ha	7200
Fertiliser	950/kg/ha	5722
Other Variable Costs		
Tools and implements		5112
Maintenance		200
Total variable cost		18,234

Source: Shrestha, K.B. (1991)

Note: No chemical fertilisers are used for fruit except under mixed cropping (vegetable+apple).

**Table 5.10: Per Hectare Yield and Benefit (Gross) of
Different Fruit Crops in Rasuwa**

	MT/ha	Total Income (Rs/ha)
Apple	7.46	74600
Pear	13.50	67500
Walnut	2.75	68750
Other Furits	10.35	n.a

Source: Shrestha, K.B. (1991)

Table 5.11: Forecasted Area under Different Crops (hectares)

Crops	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Paddy	804	825	845	864	882	899	915	931	2.20
Maize	1570	1589	1608	1626	1642	1658	1673	1688	1.08
Millet	777	787	797	806	815	823	831	839	1.14
Wheat	843	850	858	865	871	878	884	889	0.80
Potatoes	2358	2402	2444	2484	2522	2558	2592	2625	1.61
Horticultural area	535	539	542	546	549	553	556	560	0.64
Total Cropped Area	6886	6993	7095	7190	7282	7369	7452	7531	1.34
Total Cultivated Land	2909	2954	2996	3035	3074	3110	3145	3178	1.32
Area Under Irrigation (2% gr)	247	252	257	262	267	273	278	284	2.00
Total Fertiliser Sale in District	259	274	289	304	318	331	344	357	4.99

Table 5.12: Forecasted Yield Rates of Different Crops (kg/ha)

Crops	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Paddy	1993	1991	1987	1984	1981	1979	1977	1975	0.54
Maize	1419	1419	1418	1418	1417	1416	1416	1415	0.28
Wheat	1084	1083	1082	1080	1079	1078	1077	1076	0.48
Millet	986	986	986	986	986	986	986	985	0.09
Potatoes	6788	6786	6784	6780	6777	6775	6773	6771	0.36

Table 5.13: Forecasted Changes in Crop Production (MT)

Crops	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Paddy	1603	1643	1680	1715	1748	1779	1809	1838	2.75
Maize	2227	2255	2281	2304	2327	2348	2368	2388	1.36
Wheat	914	921	928	934	940	946	952	957	1.28
Millet	766	776	786	795	803	811	819	826	1.24
Potatoes	16003	16302	16581	16842	17092	17329	17554	17772	1.97

Table 5.14: Forecasted Revenue, Cost, and Gross Margins Per Hectare of Cultivated Lands under Different Crops (Rs/ha)

Crops	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Revenue (Rs.'000)									
Paddy	11.85	13.05	14.34	15.75	17.29	18.97	20.79	22.79	10.54
Maize	7.59	8.27	8.99	9.76	10.59	11.47	12.42	13.45	8.90
Wheat	6.60	7.04	7.51	8.01	8.54	9.11	9.71	10.36	7.24
Millet	5.66	6.29	6.99	7.75	8.57	9.48	10.46	11.54	10.92
Potatoes	39.12	41.92	44.92	48.16	51.65	55.41	59.47	63.85	7.65
Cost (Rs '000'):									
Paddy	9.72	10.41	11.15	11.94	12.79	13.69	14.66	15.70	7.08
Maize	7.12	7.62	8.16	8.73	9.34	10.00	10.70	11.45	7.02
Wheat	6.72	7.19	7.69	8.23	8.80	9.41	10.07	10.77	6.97
Millet	6.11	6.54	7.01	7.51	8.04	8.61	9.22	9.87	7.09
Potatoes	15.31	16.39	17.55	18.79	20.13	21.56	23.10	24.75	7.09
Per Hectare Gross Margin (Rs/ha)									
Paddy	2126	2637	3193	3813	4506	5277	6132	7086	25.62
Maize	470	645	830	1029	1244	1476	1724	1994	38.91
Wheat	-119	-148	-182	-220	-261	-307	-358	-413	1.65
Millet	-451	-249	-20	240	535	869	1245	1670	
Potatoes	23812	25527	27372	29364	31520	33854	36374	39106	8.02

Table 5.15: Forecasted Livestock Population

Livestock Type	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Cattle	24232	24439	24676	24915	25155	25398	25644	25891	0.95
Milch Cows	3877	3910	3948	3986	4025	4064	4103	4143	0.95
Bullocks	20355	20529	20728	20928	21131	21335	21541	21748	0.95
Buffalo-total	11057	11151	11259	11369	11479	11590	11702	11815	0.85
Milch Buffaloes	3173	3200	3231	3263	3294	3326	3358	3391	0.85
Sheep	11194	11282	11383	11485	11587	11691	11795	11900	0.78
Goats	18174	18324	18497	18670	18846	19023	19201	19381	0.81
Pigs	297	306	315	324	334	344	354	365	3.00
Chickens	12460	12834	13219	13615	14024	14444	14878	15324	3.00
Total LSU	28809	29053	29332	29614	29898	30185	30474	30766	0.89

Table 5.16: Forecasted Annual Production and Growth in Livestock Products (MT)

Livestock Type	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Milch Cows	378	381	385	388	392	396	400	403	0.95
Milch Buffaloes	605	610	616	622	628	634	640	646	0.85
Ghee	14	14	14	14	14	14	14	15	0.88
Net milk supply	688	694	700	707	714	721	728	735	0.89
Aggregate oils and fats	13.60	13.72	13.85	13.99	14.12	14.26	14.40	14.54	0.88
Buffalo meat (MT)	304.32	306.92	309.90	312.91	315.94	319.00	322.08	325.20	0.85
Goat and sheep meat (MT)	84.82	85.51	86.30	87.10	87.90	88.71	89.53	90.36	0.80
Chicken meat (MT)	16.45	16.94	17.45	17.97	18.51	19.07	19.64	20.23	3.00
Pork meat (MT)	2.79	2.87	2.96	3.05	3.14	3.23	3.33	3.43	3.00
Aggregate meat available (MT)	408.38	412.24	416.61	421.02	425.49	430.01	434.58	439.21	0.95
Wool Production (kg)	4927.27	4966.07	5010.47	5055.22	5100.34	5145.82	5191.67	5237.89	0.78

Table 5.17: Forecasted Cost and Returns from Livestock (Rs/animal)

Livestock Type	1991	1992	1993	1994	1995	1996	1997	1998
Buffaloes	4267	4968	5776	6699	7755	8961	10337	11905
Sheep and Goats	3173	3577	4043	4573	5178	5867	6650	7541
Pigs	45	52	60	69	79	91	105	120
Poultry	813	924	1051	1194	1357	1542	1751	1989
Cow (milk+Ghee)	2246	2503	2791	3111	3467	3862	4300	4786
Buffalo (milk+ghee)	4282	4754	5282	5867	6515	7233	8028	8909
Total Gross Margin From Livestock	14826	16778	19001	21514	24351	27555	31171	35251

Table 5.18: Forecasted Per Capita Food Supply (kg/adult)

Food-edible form	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Cereal grains-edible form	109.87	109.38	108.74	108.02	107.25	106.43	105.56	104.66	-0.23
Meat	11.11	11.00	10.91	10.83	10.74	10.66	10.58	10.50	-0.90
Milk	18.70	18.51	18.35	18.18	18.02	17.87	17.72	17.57	-0.95
Oils and Fats	0.37	0.37	0.36	0.36	0.36	0.35	0.35	0.35	-0.96
Vegetables	339.79	339.67	339.06	338.05	336.77	335.24	333.47	331.55	0.17

Table 5.19: Forecasted Per Capita Food Demand (kg/adult)

Food-edible form	1991	1992	1993	1994	1995	1996	1997	1998
Cereal Grains	113.90	113.18	113.31	113.43	113.55	113.65	113.75	113.84
Vegetables	317.86	317.74	317.74	317.33	316.63	315.65	314.40	313.01
Meat	3.37	3.18	3.18	3.19	3.19	3.20	3.20	3.21
Milk	22.40	21.92	21.87	21.83	21.80	21.77	21.75	21.73
Oils and Fats	2.25	2.15	2.15	2.15	2.15	2.15	2.15	2.16

Table 5.20: Forecasted Per Capita Food Balance Situation (kg/adult)

Food-edible form	1991	1992	1993	1994	1995	1996	1997	1998
Cereal Grains	-4.03	-3.81	-4.57	-5.41	-6.30	-7.23	-8.19	-9.18
Vegetable	21.93	21.93	21.31	20.72	20.14	19.59	19.07	18.54
Meat	7.74	7.82	7.73	7.64	7.55	7.46	7.38	7.29
Milk	-3.69	-3.41	-3.53	-3.65	-3.78	-3.90	-4.03	-4.16
Oils and Fats	-1.88	-1.78	-1.78	-1.79	-1.79	-1.80	-1.80	-1.81

Table 5.21: Forecasted Changes in Land Use (ha)

Land Type	1991	1992	1993	1994	1995	1996	1997	1998	Growth Rate
Forest s	40151	39630	39463	39298	39134	38972	38812	38653	-0.53
Shrublands	10842	10926	11010	11092	11174	11255	11335	11415	0.74
Grasslands	24414	24440	24466	24491	24516	24541	24565	24589	0.10
Adjacent NCI	4283	4299	4316	4332	4348	4365	4380	4396	0.38
NCIG	1128	1128	1128	1128	1128	1128	1128	1128	0.00
Net Cultivated	5662	5696	5729	5762	5794	5826	5858	5889	0.57
Residual	64699	65060	65068	65076	65084	65092	65100	65108	0.08
Rasuwa HH: Under Langtang									
Forests	17630	17630	17630	17630	17630	17630	17630	17630	
Shrublands	4950	4950	4950	4950	4950	4950	4950	4950	
Grasslands	15510	15510	15510	15510	15510	15510	15510	15510	
Other	59720	59720	59720	59720	59720	59720	59720	59720	
Total	97810	97810	97810	97810	97810	97810	97810	97810	
% Under Park	64.70	64.70	64.70	64.70	64.70	64.70	64.70	64.70	

Table 5.22: Forecasted Change in the Share of Fuelwood from Different Sources

Sources	1991	1992	1995	1998
Forests	69	68	67	66
Shrub and Grasslands	20	20	21	22
Adjacent NCI	8	8	8	9
Farm Land	3	4	4	3
Total Supply (air dried tonnes)	36,304	36,142	35,664	35,195

**Table 5.23: Forecasted Fuelwood Supply from
Different Sources (air dry tonne (ADT))**

Sources	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Forest: Hardwood (5 adtha)	6861.25	6792.63	6724.71	6657.46	6590.89	6524.98	6459.73	6395.13	-1.00
Conifers	2083.40	2062.57	2041.94	2021.52	2001.31	1981.30	1961.48	1941.87	-1.00
Mixed	15075.86	15015.10	15755.96	15598.39	15442.41	15287.98	15135.10	14983.75	-1.00
Total Fuelwood from Forest	25020.51	24770.30	24522.60	24277.38	24034.60	23794.26	23556.31	23320.75	-1.00
Shrubs	6015.28	6073.01	6130.17	6186.75	6242.77	6298.22	6353.13	6407.48	0.92
Grazing land	1097.73	1100.24	1102.73	1105.19	1107.62	1110.04	1112.42	1114.79	0.22
Adjacent NCI	2954.97	2966.51	2977.94	2989.25	3000.46	3011.55	3022.54	3033.41	0.38
Cultivated Area	198.17	199.35	200.51	201.65	202.79	203.92	205.03	206.13	0.57
Plantation	176.95	172.88	168.92	165.08	161.35	157.73	154.21	150.78	
Crop Residue	1016.97	1032.88	1047.89	1062.08	1075.55	1088.35	1100.57	1112.24	1.34
Total Fuelwood Supply (ADT)	36303.63	36142.30	35981.83	35822.31	35663.79	35506.34	35350.00	35194.79	-0.44
Per Capita ss from forest (kg)	987.37	964.67	942.60	921.17	900.35	880.11	860.47	841.38	-2.26
Total Demand adt	20516.544	20906.028	21300.534	21699.504	22102.938	22511.394	22923.756	23341.14	1.86
Deficit (-)	15787.0884	15236.2741	14681.3003	14122.8058	13560.8562	12994.9473	12426.2391	11853.6514	-3.92
Per ha Supply	0.77	0.77	0.77	0.76	0.76	0.75	0.75	0.74	-0.55

Table 5.24: Forecasted Change in Fodder Supply

Sources	1991	1992	1995	1998
Forests	26	26	25	24
Shrublands	20	20	20	21
Grasslands	38	38	38	38
Adjacent NCI	3	3	3	3
Farm Land	13	14	14	13
Total Supply (tonnes/TDN)	33,356	34,411	34,558	34,686

**Table 5.25: Forecasted Fodder Supply by Sources
(MT-total Digestible Nutrient (TDN))**

Sources	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Forests	9015.31	8825.16	8835.90	8747.55	8660.07	8573.47	8487.73	8402.86	-1.00
Shrubs	6712.71	6777.13	6840.91	6904.06	6966.57	7028.45	7089.72	7150.38	0.92
Grazing lands	13020.68	13039.88	13058.88	13077.68	13096.31	13114.74	13132.99	13151.06	0.14
Adjacent NCI	1027.81	1031.83	1035.81	1039.74	1043.64	1047.50	1051.32	1055.10	0.38
Risers and Bunds	396.35	398.69	401.01	403.31	405.58	407.83	410.06	412.26	0.57
Fallow Grazing	339.73	341.74	343.72	345.69	347.64	349.57	351.48	353.37	0.57
Tree Fodder	792.70	797.38	802.02	806.61	811.16	815.66	820.12	824.53	0.57
Crop Residue	3050.90	3098.64	3143.66	3186.24	3226.64	3265.06	3301.70	3336.71	1.34
Total Fodder Supply (TDN)	34356.18	34410.45	34461.91	34510.88	34557.60	34602.29	34645.12	34686.26	0.14

Table 5.26: Forecasted Timber Supply and Demand (cubic metres)

	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Total Supply	4852.80	4804.28	4756.23	4708.67	4661.58	4614.97	4568.82	4523.13	-1.00
Timber Demand	1838.40	1873.30	1908.65	1944.40	1980.55	2017.15	2054.10	2091.50	1.86

Table 5.27: Forecasted Population and Changes in the Size of Active Population

	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Active males	13164	13468	13778	14094	14418	14748	15062	15382	2.17
Active females	11902	12126	12353	12581	12811	13043	13278	13516	1.79
Total active	25067	25594	26130	26675	27228	27790	28340	28898	1.99
Total males	19319	19713	20113	20519	20932	21352	21765	22185	2.00
Total females	17449	17753	18060	18369	18679	18991	19317	19645	1.70
Total population	36768	37466	38173	38888	39611	40343	41082	41830	1.86

Table 5.28: Labour Use by Sector

Labour Use & Activity	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Labour Days Available	6267	6399	6533	6669	6807	6948	7085	7224	1.99
Labour Use on Crops	1158	1178	1197	1215	1231	1248	1263	1277	1.47
Livestock	2881	2905	2933	2961	2990	3018	3047	3077	0.89
Professionals	108	111	113	115	118	120	122	125	1.99
Office Workers	66	68	69	70	72	73	75	76	1.99
Sales and Services	162	166	169	173	176	180	184	187	1.99
Production Workers	120	123	125	128	131	133	136	139	1.99
Construction, etc	24	25	25	26	26	27	27	28	1.99
Tourism Labour	22	24	27	30	34	37	42	46	11.37
Horticultural Labour	166	167	168	169	170	171	173	174	0.64
General Labourers	451	461	470	480	490	500	510	520	1.99
Total Labour Use	5159	5227	5297	5368	5438	5509	5579	5649	1.27
Labour Use as % of Available	82.33	81.69	81.09	80.49	79.89	79.29	78.74	78.19	-0.70

Table 5.29: Forecasted Area under Horticulture (ha)

	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Area under Fruits (ha)	535	539	542	546	549	553	556	560	0.64
Area under Apples (ha)(net)	226	229	231	233	235	238	240	243	1.00
Area under Walnuts	45	46	46	47	47	48	48	49	1.00
Peaches	70	70	71	72	73	73	74	75	1.00
Other Fruits	194	194	194	194	194	194	194	194	0.00

Table 5.30: Forecasted Fruit Production by Type of Fruit (MT)

	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Apples	1471	1485	1500	1515	1530	1546	1561	1577	1.00
Walnuts	82	83	83	84	85	86	87	88	1.00
Peaches	332	335	338	342	345	349	352	356	1.00
Others	1358	1358	1358	1358	1358	1358	1358	1358	0.00

**Table 5.31: Forecasted Gross Margin and Gross Margin
Per Hectare by Type of Fruit**

	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Total Gross Margin (Rs '000)									
Apples	13060	14223	15492	16864	18349	19955	21691	23569	8.72
Walnuts	1470	1614	1769	1938	2120	2317	2530	2761	9.25
Peaches	851	958	1074	1200	1336	1484	1644	1817	
Others	12217	13178	14206	15306	16484	17743	19091	20533	7.61
Total Horticultural Income (Rs '000)	27587	29972	32541	35308	38288	41498	44956	48680	8.34
Gross Margin Per ha (Rs)									
Apples	57680	62243	67125	72349	77939	83920	90320	97167	7.64
Walnuts	32348	35157	38164	41380	44822	48505	52445	56662	8.17
Peaches	12208	13608	15106	16708	18423	20258	22221	24322	
Others	62974	67927	73227	78898	84967	91459	98407	105840	7.61

Table 5.32: Forecasted Tourist Flow, Employment and Income

	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Projected Tourists (#)	8742	9736	10844	12077	13450	14979	16683	18580	11.37
Porters Hired (mandays)	21821	24302	27065	30143	33571	37388	41640	46375	11.37
Porter's Income ('000)	2194	2615	3116	3713	4425	5273	6284	7489	19.17
Other Local Purchases ('000)	40198	44769	49860	55530	61844	68877	76709	85432	11.37
Local Income	42392	47384	52976	59243	66269	74150	82993	92920	11.85

Table 5.33: Forecasted Values of Food and Non-food Imports (Rs'000)

	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Growth Rate of Non-Food Imports	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	
Total Food Exports	5221	6588	6786	6949	7066	7141	7167	7113	4.52
Total N-Food Imports	42598	43488	44392	45309	46238	47182	48137	49107	2.06
Value of Total Imports	37377	36903	37606	38360	39172	40041	40970	41994	
Value: per capita food	142	176	178	179	178	177	174	170	2.61
Value: per capita non-food	1159	1161	1163	1165	1167	1170	1172	1174	0.20

Table 5.34: Forecasted Nominal Income by Source (Rs'000)

Source of Income	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Crops	58135	64200	70768	77913	85713	94227	103496	113635	11.07
Livestock	14826	16778	19001	21514	24351	27555	31171	35251	13.09
Professionals	1210	1235	1261	1288	1314	1341	1368	1395	1.99
Office Workers	687	701	716	731	746	761	777	792	1.99
Sales and Service Workers	1868	1907	1947	1988	2029	2071	2112	2154	1.99
Production Workers	883	902	921	940	959	979	998	1018	1.99
Construction, etc.	212	216	220	225	230	234	239	244	1.99
General Labourers	3016	3080	3145	3210	3277	3344	3410	3478	1.99
Tourism Income	42392	47384	52976	59243	66269	74150	82993	92920	11.85
Horticultural Income	27587	29972	32541	35308	38288	41498	44956	48680	8.34
Total Rasuwa Income	150817	166376	183496	202359	223177	246162	271521	299567	10.63
Per Capita Income	4102	4441	4807	5204	5634	6102	6609	7162	8.61
Income growth rate	0.00	8.26	8.25	8.25	8.27	8.30	8.32	8.36	

Table 5.35: Forecasted Real Income by Source (Rs'000)

Source of Income	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Deflator	1.10	1.21	1.32	1.45	1.59	1.73	1.89	2.07	9.49
Crops	52858	53153	53428	53708	54009	54330	54656	55008	1.44
Livestock	13480	13891	14345	14830	15344	15888	16461	17064	3.29
Professionals	1100	1023	952	888	828	773	722	675	-6.85
Office Workers	624	581	541	504	470	439	410	383	-6.85
Sales and Service Workers	1699	1579	1470	1370	1279	1194	1115	1043	-6.85
Production Workers	883	747	695	648	604	565	527	493	-6.85
Construction, etc.	192	179	166	155	145	135	126	118	-6.85
General Labourers	2743	2550	2374	2213	2065	1928	1801	1683	-6.85
Tourism Income	38544	39230	39995	40838	41757	42754	43828	44981	2.15
Horticultural Income	25083	24815	24568	24339	24126	23927	23741	23565	-1.05
Total Rasuwa Income	137126	137746	138535	139492	140628	141933	143388	145014	1.03
Per Capita Income	3729	3677	3629	3587	3550	3518	3490	3467	-0.81
Income Growth Rate	0.80	-1.42	-1.29	-1.16	-1.03	-0.90	-0.79	-0.67	

Table 5.36: Forecasted Income Shares by Source (%)

Sources	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Crops	38.55	38.59	38.57	38.50	38.41	38.28	38.12	37.93	0.40
Livestock	9.83	10.08	10.36	10.63	10.91	11.19	11.48	11.77	2.23
Professionals	0.80	0.74	0.69	0.64	0.59	0.54	0.50	0.47	-7.81
Office Workers	0.46	0.42	0.39	0.36	0.33	0.31	0.29	0.26	-7.81
Sales and Service Workers	1.24	1.15	1.06	0.98	0.91	0.84	0.78	0.72	-7.81
Production Workers	0.59	0.54	0.50	0.46	0.43	0.40	0.37	0.34	-7.81
Construction, etc.	0.14	0.13	0.12	0.11	0.10	0.10	0.09	0.08	-7.81
General Labourers	2.00	1.85	1.71	1.59	1.47	1.36	1.26	1.16	-7.81
Tourism	28.11	28.48	28.87	29.28	29.69	30.12	30.57	31.02	1.11
Horticulture	18.29	18.01	17.73	17.45	17.16	16.86	16.56	16.25	-2.08
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00

Table 5.37: Performance and Sustainability Indicators

Indicators	1991	1992	1993	1994	1995	1996	1997	1998	Growth
Per Capita Cultivated Land (ha/person)	0.079	0.079	0.078	0.078	0.078	0.077	0.077	0.076	-0.53
Per Capita Accessible Forest Land	0.455	0.442	0.430	0.418	0.406	0.394	0.383	0.373	-2.81
Cultivated Area-Forest Area Ratio	0.174	0.178	0.183	0.187	0.191	0.195	0.200	0.204	2.34
LSU per Cultivated Area	9.902	9.836	9.792	9.756	9.728	9.706	9.690	9.679	-0.42
LSU per Forest Area	1.722	1.754	1.788	1.824	1.860	1.897	1.934	1.973	1.91
LSU per Grazing Area	1.180	1.189	1.199	1.209	1.220	1.230	1.241	1.251	0.79

Table 5.38: Carrying Capacity of Agricultural Land in Terms of Calories

Capacity & Load	1991	1992	1993	1994	1995	1996	1997	1998
Calories (000)								
Per ha Calories Supply	3755.78	3759.07	3760.55	3761.46	3762.39	3763.33	3763.76	3764.59
Per ha Calories Demand	3862.02	3875.11	3891.96	3911.99	3934.83	3960.26	3987.84	4017.54
Supplies as % of Demand	97.25	97.01	96.62	96.15	95.62	95.03	94.38	93.70
Carrying Capita per ha.	5.19	5.20	5.20	5.20	5.20	5.20	5.20	5.20
Current Load	5.34	5.38	5.38	5.41	5.44	5.47	5.51	5.55

Table 5.39: Carrying Capacity of Land in Terms of Fuelwood

Capacity & Load	1991	1992	1993	1994	1995	1996	1997	1998
Fuelwood supply per ha	0.77	0.77	0.77	0.76	0.76	0.75	0.75	0.74
Per ha Demand	0.44	0.45	0.45	0.46	0.47	0.48	0.49	0.49
SS as % of DD	176.90	172.83	168.87	165.03	161.30	157.68	154.16	150.74
Carrying Capacity per ha	1.39	1.38	1.37	1.36	1.36	1.35	1.34	1.33
Current Load	0.78	0.80	0.81	0.83	0.84	0.86	0.87	0.88

Table 5.40: Carrying Capacity of Forest Land in Terms of Fuelwood

Capacity & Load	1991	1992	1993	1994	1995	1996	1997	1998
Per ha Demand	2.95	3.04	3.13	3.22	3.31	3.40	3.50	3.60
SS as % of Demand	115.73	112.44	109.25	106.17	103.19	100.31	97.52	94.82
Carrying Capacity per ha	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81
Current Load	5.02	5.17	5.32	5.47	5.63	5.79	5.96	6.13

Table 5.41: Carrying Capacity of Land in Terms of Fodder

Capacity & Load	1991	1992	1993	1994	1995	1996	1997	1998
Per ha Fodder Supply	0.56	0.56	0.57	0.57	0.57	0.57	0.57	0.57
Per ha Fodder Demand	0.29	0.30	0.30	0.30	0.31	0.31	0.31	0.32
SS as % Demand	191.21	189.90	188.37	186.85	185.32	183.80	182.28	180.77
Carrying Capacity per ha	0.90	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Current Load	0.47	0.48	0.48	0.49	0.49	0.50	0.50	0.51

Table 5.42: Carrying Capacity of Forest in Terms of Fodder

Capacity & Load	1991	1992	1993	1994	1995	1996	1997	1998
Per ha Fodder Supply	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54
Per ha Fodder Demand	1.07	1.09	1.12	1.14	1.16	1.18	1.21	1.23
SS as % Demand	50.17	49.26	48.30	47.36	46.44	45.54	44.66	43.79
Carrying Capacity per ha	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Current Load	1.72	1.75	1.79	1.82	1.86	1.90	1.93	1.97

Table 5.43: Impacts of Policy Alternatives on the Labour Use Situation in Rasuwa ('000 Mandays)

	1993	1994	1995	1996	1997	1998	Growth Rate
Baseline							
Tourism	27	30	34	37	42	46	11.37
Horticultural	168	169	170	171	173	174	0.64
Labour Use as % of Available	81.09	80.49	79.89	79.29	78.74	78.19	-0.70
Apples							
Tourism	27	30	34	37	42	46	11.37
Horticultural	185	185	186	186	186	187	1.56
Labour Use as % of Available	81.35	80.73	80.11	79.50	78.94	78.38	-0.67
Days							
Tourism	34	38	42	47	52	58	14.52
Horticultural	168	169	170	171	173	174	0.64
Labour Use as % of Available	81.19	80.60	80.01	79.42	78.89	78.35	-0.68
Numbers							
Tourism	34	30	34	37	42	46	11.37
Horticultural	168	169	170	171	173	174	0.64
Labour Use as % of Available	81.19	80.49	79.89	79.29	78.74	78.19	-0.70

Table 5.44: Impact of Tourism Policy Alternatives on Incomes from Tourism

	1993	1994	1995	1996	1997	1998	Growth Rate
Baseline							
Projected Tourist Flow	10844	12077	13450	14979	16683	18580	11.37
Porter Hired (mandays)	27065	30143	33571	37388	41640	46375	11.37
Porter Income ('000)	3116	3713	4425	5273	6284	7489	19.17
Other Local Purchase ('000)	49860	55530	61844	68877	76709	85432	11.37
Local People Tourism Income	52976	59243	66269	74150	82993	92920	11.85
Days							
Projected Tourist Flow	10844	12077	13450	14979	16683	18580	11.37
Porter Hired	33832	37679	41964	46735	52050	57969	14.52
Porter Income ('000)	3895	4642	5532	6592	7855	9361	22.54
Other Local Purchase ('000)	49860	55530	61844	68877	76709	85432	11.37
Local People Tourism Income	53755	60171	67376	75468	84564	94792	12.13
Numbers							
Projected Tourist Flow	13554	15096	16812	18724	20853	23225	14.52
Porter Hired	33832	37679	41964	46735	52050	57969	14.52
Porter Income ('000)	3895	4642	5532	6592	7855	9361	22.54
Other Local Purchase ('000)	62325	69412	77305	86096	95886	106789	14.52
Local People Tourism Income	66220	74054	82837	92687	103741	116150	15.01

Table 5.45: Share of Income Originating from Major Sources

	1993	1994	1995	1996	1997	1998
<u>Baseline</u>						
Crops	38.57	38.50	38.41	38.28	38.12	37.93
Tourism	28.87	29.28	29.69	30.12	30.57	31.02
Horticulture	17.73	17.45	17.16	16.86	16.56	16.25
<u>Apples</u>						
Crops	37.80	37.79	37.74	37.66	37.54	37.41
Tourism	28.30	28.73	29.18	29.64	30.11	30.59
Horticulture	19.36	18.98	18.59	18.20	17.81	17.41
<u>Days</u>						
Crops	38.40	38.33	38.22	38.07	37.90	37.70
Tourism	29.17	29.60	30.04	30.49	30.97	31.45
Horticulture	17.66	17.37	17.07	16.77	16.46	16.15
<u>Numbers</u>						
Crops	35.97	35.88	35.75	35.60	35.41	35.20
Tourism	33.66	34.10	34.55	35.02	35.50	35.98
Horticulture	16.54	16.26	15.97	15.68	15.38	15.08

Table 5.46: Impacts of Policy Alternatives on Real Income (Rs'000)

	1993	1994	1995	1996	1997	1998	Growth Rate
<u>Baseline</u>							
Crops	53428	53708	54009	54330	54656	55008	1.44
Tourism Income	39995	40838	41757	42754	43828	44981	2.15
Horticultural Income	24568	24339	24126	23927	23741	23565	-1.05
Total Rasuwa Income	138535	139492	140628	141933	143388	145014	1.03
Per Capita Income	3629	3587	3550	3518	3490	3467	-0.81
Income Growth Rate		-1.16	-1.03	-0.90	-0.79	-0.67	
<u>Apples</u>							
Crops	53428	53708	54009	54330	54656	55008	1.44
Tourism Income	39995	40838	41757	42754	43828	44981	2.15
Horticultural Income	27366	26977	26610	26261	25927	25608	-0.02
Total Rasuwa Income	141333	142131	143111	144267	145574	147057	1.21
Per Capita Income	3702	3655	3613	3576	3544	3516	-0.64
Income Growth Rate		-1.28	-1.15	-1.02	-0.91	-0.79	
<u>Days</u>							
Crops	53428	53708	54009	54330	54656	55008	1.44
Tourism Income	40584	41478	42455	43514	44657	45887	2.41
Horticultural Income	24568	24339	24126	23927	23741	23565	-1.05
Total Rasuwa Income	139123	140132	141325	142694	144217	145920	1.11
Per Capita Income	3645	3603	3568	3537	3510	3488	-0.73
Income Growth Rate		-1.13	-0.99	-0.86	-0.75	-0.63	
<u>Numbers</u>							
Crops	53428	53708	54009	54330	54656	55008	1.44
Tourism Income	49994	51048	52197	53442	54785	56226	5.04
Horticultural Income	24568	24339	24126	23927	23741	23565	-1.05
Total Rasuwa Income	148534	149702	151067	152622	154345	156259	1.98
Per Capita Income	3891	3850	3814	3783	3757	3736	0.12
Income Growth Rate		-1.07	-0.93	-0.80	-0.69	-0.57	