The Economic Journal of Nepal, Vol. 26, No. 4, Oct.-Dec. 2003 (Issue No. 104) © CEDECON-TU

Cash-Crop Farming in Nepal: A Case Study of Ginger Production in Rapti Zone

*Tej Bahadur K.C.**

Abstract

Although the area occupied by cash-crops is only a fraction of the land under food crops, it is a dominant agricultural activity in Nepal. Among many cash-crops, ginger is one of the important cash-crops in Nepalese agriculture. It is a source of living particularly in the hill region of the country. Moreover, it has become an important source of foreign currency as well. As the factors responsible for making other zones of Nepal rich or poor, low level of agriculture production, inadequate employment opportunities in farming sector, high growth rate of population and insufficient cash income per household are the main factors responsible for making Rapti Zone very poor. So far as the improvement of the zonal economy is concerned, the production of ginger seems one of the major solutions in the present day situation of Rapti Zone or to alleviate poverty in the concerned zone. The major findings suggest that if two new production systems, intercropping and retrieval of mother rhizomes, are applied in the ginger farming of Rapti Zone, the living condition of rural households will be much better as compared to the present one.

Introduction

Nepal being a highly rural and mountainous country is full of serious problems such as unemployment, low earnings, low savings, high illiteracy, lack of transport and communication facilities, under-utilizations of natural resources, exploitation by a few rich men, high birth rate, food problems, unhealthy manpower and so on. Rural sector of Nepal is regarded as the center of all these problems. About 85.8 percent of the people live in rural areas where high percentage (44 percent) of population falls under the line of poverty. In terms of regional disparity, rural mid and far western hills, where Rapti Zone lies, account for as high as 72 percent poverty incidence.

* Dr. K.C. is Lecturer at Department of Economics, Mahendra Multiple Campus (T.U.), Dang, Nepal.

Rapti Zone, which is comprised of five districts namely Rukum, Rolpa, Sallyan, Pyuthan and Dang, is one of the fourteen zones of Nepal with 94 percent of its population (1,209,804) residing in rural areas. Six percent of the population lives in two urban areas of Tulsipur and Tribhuvannagar in Dang district. About 57 percent of people in Rukum, Rolpa, Pyuthan and Sallyan and 46 percent in Dang were found to be under the poverty line in 1996. The percentage of the poors found in all districts of Rapti zone is above the national figure of 42 percent.

Major factors for the pervasive poverty in Rapti zone

The major factors responsible for pervasive poverty in Rapti zone can be observed as following:

Low level of Agriculture Production

Small and uneven landholding found in Rapti zone (per household landholding in Pyuthan district is 1.03 hectares and it is found less than one hectare in other districts) is one of the root causes for low level of agricultural production (Table 1).

Table 1. Distribution of land ownership and fragmentation pattern in Rapti Zone (in percent)

District	Total Owned Land (Ha.)	%	Per Household Land (Av. Ha.)	Average Number of Parcel
Dang	45,689.0	33.32	0.81	3.8
Sallyan	23,479.4	17.12	0.74	3.9
Pyuthan	34,182.3	24.93	1.03	4.9
Rolpa	21,178.2	15.44	0.64	5.5
Rukum	12,607.1	9.19	0.43	5.8
Rapti	1,37,136	100.00	0.73	4.9

Source: National Sample Census of Agriculture, 1991/92, Nepal, Rukum, Sallyan, Rolpa, Pyuthan, and Dang districts. CBS, Kathmandu, Nepal.

Inadequate employment opportunities in farming sector

According to the National Census of 2001, the percentage of population in Rapti zone is 5.6 of the national figure of 23,151,423. Similalry, the percentage of arable land in Rapti zone is observed to be 5.4 of the total area (Table 2).

Table 2. Arable Land, Population and Economically Active Population in Rapti Zone (2001)

District	Total Arable Land (Hect.)	Total Population	Per capita arable land	Usually Economically active Pop. (10 Years of age & above.	Skilled & Semi -skilled Agricu-ltural, Forestry & Fishery Workers	% of UEAP
Pyuthan	25,139.3	212,484	0.11	98,538	71,775	72.83
Rolpa	18,697.4	210,004	0.09	123,789	95,144	76.85
Rukum	10,843.6	188,438	0.06	86,271	67,813	78.60
Sallyan	20,790.7	213,500	0.10	33,046	25,554	77.32
Dang	51,074.5	462,380	0.11	198,698	106,039	53.36
Rapti	126,545.5	1,286,806	0.10	540,342	366,325	67.8
Nepal	2,324,330	23,151,423	0.10	9,900,198	5,901,384	59.6

Source: Statistical Year Book of Nepal, 1995, 1997, 1999, 2003. National Planning Commission Secretariat, CBS, Kathmandu.

High Growth Rate of Population

During the decades of 1971-1981, 1981-1991 and 1991-2001, the growth rates of population were found to be as high as 24.2 percent, 19.4 percent and 22.9 percent compared to the national average of 30.0 percent, 23.1 percent and 25.2 percent respectively (Table 3).

Table 3. Dynamics of population growth rate of Rapti Zone (1971-2001)

Census Year	Total Population of Nepal	Growth) Rate* (%	Total Population of Rapti Zone	Growth Rate* of Rapti Zone (%)
1971	11,555,983	-	705,813	-
1981	15,022,839	30.0	876,723	24.2
1991	18,491,097	23.1	1,046,842	19.4
2001	23,151,423	25.2	1,286,806	22.9

Note: *Growth Rate refers to Growth Rate of Population.
Source: Statistical Year Book of Nepal 1991, 1997 and 2003, CBS, Kathmandu.

Low Per Capita Income in the Districts

The annual per capita income of Pyuthan, Rukum, Dang, Rolpa and Sallyan calculated for 1998 were respectively reported as Rs. 6534, Rs. 6220, Rs. 5772, Rs. 5151 and Rs. 3640 which are much less compared to the districts under the special Program for poor districts (25 districts) in the country (Table 4).

Table 4. Per Capita Income in the Districts of Rapti zone, 1998

(Rs.)

District	Household size*	Per capita income	Income per household
Dang	5.6	5772▲	32323.2
Sallyan	5.61	3640+	20420.4
Pyuthan	5.29	6534▲	34564.9
Rolpa	5.45	5151+	28073.0
Rukum	5.62	6220+	34956.4
Rapti Zone	5.5	5463.40	30067.6

+ Data based on Table 2 of the Booklet named "Programme For Special Sector's Development", HMG, NPC, 1998.

▲ Data based on the Average per capita income of western Terai for Dang district and average per capita income of western Hill/Mountain for Pyuthan district (Nepal Living Standards Survey Report - 1996, Main Findings, Vol 2, CBS, Nepal, Table 1.1, p. 9).

Source: **National Population Census 2001*, CBS/N.

Ginger Production in Rapti zone

The available information indicates deteriorating economic situation in Rapti zone. In this situation, it is essential to find out such agro-industrial enterprise which the rural people can setup themselves and that might be helpful to improve the economy of the zone. Ginger production, among the major cash-crops, is seen as the topmost profitable agro-industrial enterprise for the upliftment of the zonal economy. It is traditionally one of the most common, very popular and informal cottage activities. More than 60 percent of the Rapti farmers depend on ginger as it provides more than 90 percent of cash income to these families (McCullough and Haggerty, 1989).

According to the National Sample Census of Agriculture, Nepal, 1991/92, ginger is seen as the topmost cash-crop in Rapti zone. It has occupied 315.5 hectares of land in the zone,

followed by Turmeric (152 hectares), Onion (118.3 hectares), Garlic (87.2 hectares), Chilli (77.0 hectares) and other cash-crops (49.2 hectares). As it does not require procurement of raw-materials from outside, it generates cash income to meet various requirements of rural people. No doubt, ginger production has been traditionally the most common, very popular and informal cottage activity in Rapti zone.

The ginger produced in Rapti zone, especially in Sallyan district, is reported to have reached the overseas countries due to its good quality, as compared to the ginger production in other districts of Nepal. After 1980/81, however, the export of raw and dry-ginger of Nepal is mostly limited to Indian markets (K.C., 2000: 89).

Major objectives and Hypothesis

The research work concentrated on fulfilling its two basic objectives: i) to examine the enhancement in income of rural households through the production of ginger in Rapti zone and ii) to analyze the major problems facing ginger production and recommend viable solutions to overcome them. The hypothesis developed for the study is: Ginger production has significantly increased the income of rural households and consequently raised their living condition. To fulfill the objectives and test the hypothesis as outlined above, the following methodology was used.

Methodology

1. Ginger production is chosen as special area to examine the enhancement in the income of rural households in Rapti zone.
2. Out of the five districts of Rapti zone, Sallyan, Rukum and Dang districts were selected for the field study. While selecting these districts, the following criteria were used.

a. Geographical/Physical basis

b. Number of households

3. One village development committee (VDC) from each selected district was randomly selected for field observation. The selected VDC was taken from the range of ginger producing VDCs. Also a fixed number of four wards were selected randomly out of nine wards for the household survey.
4. A total number of 300 households (100 households in each VDC) were selected randomly as sample households for detailed household interview.

The number of sample households selected for field survey purpose ranged from 23 percent for Dang district to as high as 43 percent for Sallyan district in average, with the overall average of 30 percent for Rapti zone study districts. In the micro sample, the sample range recorded at the higher level was between 43 to 47 percent for Ward No. 3 and ward No. 1 respectively of Kabhra VDC in Sallyan district. Similarly, the lower level range was 21 percent

and 23 percent for Ward No. 9 of Kholaga VDC in Rukum district and Ward No. 3 of Loharpani VDC in Dang district respectively.

In the course of the study, multivariate regression analysis is used to identify the effects of relative independent variables: Land preparation, sowing, weeding, seed and manure on the Real Total Production (RTP) of ginger in the selected three districts of Rapti zone. For this purpose, the following equation was estimated for Sallyan, Dang and Rukum and then for the combined values.

$$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5$$

Where, Y = RTP (Real total production of ginger) in Metric ton.

X_1 = cost applied in the preparation of land,

X_2 = cost used in the sowing of ginger,

X_3 = cost used in the weeding process,

X_4 = cost of seed,

X_5 = cost of manure used in the field.

For the testing of hypothesis, the Multivariate Regression Analysis was pre-tested and for this, the term "Real Total Production of Ginger" is taken as the dependent variable. For the study of Cash-Crop Farming in Nepal, secondary sources of published works were used. Various libraries, HMG departments and other institutions were visited for secondary data collection for this purpose.

Results

The above equation was estimated for Sallyan, Dang and Rukum districts individually and then for the combined observations by employing SPSS computer program. Values in parentheses indicate respective t-values.

a) For Sallyan District

Data on 100 observations obtained from Sallyan district were processed for this district and the equation obtained is as follows:

$$Y_b = -1.34 - 0.005X_1 + 0.004X_2 + 0.002X_3 + 1.696X_4 - 0.031X_5$$

(-2.858) (-1.349) (2.551) (2.196) (1.308) (-2.922)

$R^2 = .97352$, $R^2 = .97211$, $F = 691.21801$

Where, Yb = stands for the real total production of ginger for Sallyan district.

The above equation shows that land preparation and cost of manure are inversely related with the production of ginger while cost applied in sowing, weeding and cost of seed are directly related with the R.T.P.

The results suggest that for the better production of ginger, the cost on land preparation and manure used should be lowered down. The above obtained results are significant at about the 5% significance level for the variables weeding and sowing; significant about 20% level for the variables land preparation and cost of seed, and insignificant for the variable manuring.

b) For Dang District

Data on 100 observations obtained from Dang district were also processed for the district and the results obtained were as follows:

$$Y_D = -0.225 + 0.001X_1 + 0.005X_2 + 0.0001X_2 + 0.364X4 - 0.029X_2$$

(-.324) (.457) (6.724) (.109) (1.418) (-1.550)

$R^2 = .69474$, $R^2 = .67815$, $F = 41.87631$

Where, YD = stands for the R.T.P of Dang district.

The above equation shows that the R.T.P is inversely related with the cost of manure and directly associated with other remaining variables. The variables land preparation, weeding, seed and manure are statistically significant at certain levels but the variable sowing is totally insignificant for this district.

c) For Rukum District

Data on 100 observations obtained from Rukum district were also processed for this district and the results obtained were as follows:

$$Y_R = 1.245 + 0.058X_1 + 0.014X_2 - 0.027X_3 - 0.301X_5$$

(4.213) (7.109) (4.612) (-5.040) (-5.172)

$R^2 = .92889$, $R^2 = .92589$, $F = 310.23179$

Where, Y_R stands for the production of ginger in Rukum district.

The equation shows that R.T.P is directly associated with land preparation and sowing, and inversely associated with the variables weeding and manure.

d) For Combined Data Set

The three district data sets were combined and the results obtained after the processing of 300 households are as follows:

$$Y = -.78 + .0007X_1 + .003X_2 + .0002X_3 + .96X_4 + .009X_5$$

(-3.089) (.613) (15.864) (.561) (6.868) (1.400)

$R^2 = .93068$, $R^2 = .92949$, $F = 784.01077$

Where, Y is the combined production of ginger for the three districts. The equation shows that the explanatory variables are directly associated with the R.T.P of ginger.

From the processed data sheet, it could be seen that the two variables Cost for seed and cost for sowing are statistically insignificant but the remaining variables i.e. land preparation, costs in weeding and for the manure are statistically significant at certain levels.

The Position of Ginger Farming in Nepal and Rapti Zone

Ginger is grown successfully from the Terai (100m.) to mid-hills (1500m.). Sallyan, Palpa, Tanahu, Syangja, Kaski, Bhojpur and Ilam districts are the leading districts for ginger production in Nepal. Shurkhet, Dailekh, Jajarkot, Dang, Rukum, Arghakhanchi, Gulmi, Lamjung, Dhankuta, Sindhupalchok, Dhading and Shankhuwasabha are the extended districts for ginger cultivation. The area and production of ginger in Nepal were 9,189 hectares and 87909 mt. respectively for 2001/02 (MAC: 2001/02). The share of Rapti zone in the area covered for ginger production is seen quite large. It was found to be 422 hectares in 1976/77 and 527 hectares in 1982/83 (increased by about 25 percent). Likewise, it was 720 hectares (37 percent increment) for 1990/91. The record of its total area coverage is seen increasing. In 1993/94, it was 760 hectares and in 1995/96 it reached up to 1,075 hectares--an increase of 41 percent against the year, 1993/94 (K.C., 2000: 143). In 1997/098, the area covered by ginger production in Rapti Zone is seen to be 1164 hectares.

Thus, it can be said the Rapti zone might have enough marketable surplus to export. More than 9000 mt (estimated) of ginger was produced in Rapti Zone in 1990/91 (it was 8,454 mt. in 1993/94, 11,973 mt. in 1995/96 and 15827.5 mt. in 1997/98) and about 5500 mt. is marketed in a year. About 3200 mt. of ginger is sold in raw and 2300mt. in dry form. The researcher in the field found that the average marketable surplus of ginger in the sample households of Rapti zone was observed to be 80.1 percent (294.7mt.) of the total production and the remaining 19.9 percent was stored for seed. The average area of ginger production in the sample districts of Rukum, Sallyan and Dang is found to be 5.47, 11.45 and 8.19 hectares in 1992/93, 1993/94 and 1994/95 along with 75.74, 194.05 and 98.12 mt. of production respectively (K.C.: 2000: 174).

Major Findings

Ginger as the Most Profitable Cash-Crop in Rapti Zone

So far as the income from ginger production in Rapti zone is concerned, it is seen quite attractive. Due to both, highest number of average area occupied by ginger and highest amount of its production in cash-crop sector (oilseed, potato), ginger is seen as major cash-crop (Tobacco and Sugarcane are also included as major one) in Rapti zone. Ginger in Rapti zone has proved to be the most profitable crop per hectare with the income of Rs. 290,421.24 as compared to oilseed and potato (Table 5).

Table 5. Average Income from Major Cash-crops: Oilseed, Potato and Ginger in Rapti Zone (1993/94-1995/96)
(Area in hectare, Prod. in mt, Income in Rs.)

Major Cash-crops	Average Area	Average Production	Average Price/mt.	Average Income	Per Hectare Income
Oilseed Potato Ginger	17,616.7 5,270.0 876.7	11,283.3 43,843.3 9,405.7	22,200 8,460 27,070	25,04,89,260 37,09,14,318 25,46,12,299	14,218.85 70,382.22 2,90,421.24
Total	23,763.4	64,532.3	-	87,60,15,877	-
Total Average.	7,921.13	21,510.77	19,243.33	292,005,292.33	125,007.44

Source: 1. Table 2.2.2'a' of K.C. (2000).
2. Table 7.3 of K.C. (2000).
3. Statistical Year Book of Nepal 1997, Table-12.5, 12.6, pp. 351-352.

Furthermore, in comparison to summer, temporary and upland crops: Maize, Millet and Turmeric, Ginger is found to be quite profitable (with Net average income per hectare of Rs. 58,713.69) followed by Turmeric (Rs.1611.29/ha.). Maize and millet were found with negative earnings per hectare such as Rs.-2584.40 and Rs.-27,329.50 respectively (Table 6).

Due to the increased earnings from ginger production, rural households of Rapti zone are improving their living condition per year. The major findings suggest that if two new production systems, intercropping and retrieval of mother rhizomes, are applied in the ginger farming of Rapti zone, the living condition of rural households will be much better as compared to the present status.

Problems in the Ginger Farming in Rapti Zone

The following major problems identified by the sample households of Rapti zone and the researcher himself in the cultivation of ginger are presented in two categories: a) Before harvesting and b) After harvesting.

a) Problems before harvesting

Lack of sound commercial attitude among the producers; lack of knowledge for improved cultivation practice and storage; lack of knowledge about relationships among soil, varieties and fiber content; lack of credit facilities; lack of soil test; scarce mulching materials; influence of diseases and pests; and lack of co-ordination among support services and organizations are the major problems identified before harvesting.

b) Problems after harvesting

The problems after harvesting are: lack of assured markets (domestic and external); lack

Table 6. Average Income, Average Cost and Net Average Income per Hectare by District and by Different Crops (1992/93-1994/95)

(In RS.)

DISTRICT	MAIZE			MILLET			TURMERIC			GINGER		
Income	Average Cost	Average Income	Net average Income	Average Cost	Average Income	Net average Income	Average Cost	Average Income	Net average Income	Average Cost	Average Income	Net average
Sallyan	14,709.87	21,120.28	-6,410.41	4,403.03	34,451.12	-30, 048.09	72,237.27	70,752.82	+1,484.45	1,50,589.91	1,15,420.94	+35,168.97
Dang	12,393.16	10,139.82	+2,253.34	8,589.85	25,115.97	-16,526.12	39,902.49	38,164.35	+1,738.14	1,16,318.45	76,117.11	+40,201.34
Rukum	17,539.27	21,135.41	-3,596.14	3,990.25	39,404.53	-35,414.28	*	*	*	2,40,050.64	1,39,279.87	+1,00,770.77
Average	14,880.77	17,465.17	-2,584.40	5,661.04	32,990.54	-27,329.50	56,069.88	54,458.59	+1,611.29	1,68,986.33	1,10,272.64	+58,713.69

Note: (*) =Not Available.

(-) = Net Loss per Hectare.

(+) = Net Profit Per Hectare.

Source: Field Survey,1995

of ginger-based industries in Rapti zone and Nepal; no knowledge on alternative ginger products; lack of price information; Poor processing system and lack of drying technology; lack of transportation in Rapti zone; dominance of Indian merchants; and no organization and institutional support for marketing etc.

In order to overcome the problems felt in the production of ginger in Rapti zone, the following recommendations are made.

Recommendations
Institutional
a) Need for Research Institutions

Nepal Ginger Research Programme (NGRP) established in 1992 in Sallyan district is the central office for the research on ginger production in Nepal. However, the programme does not have any of its research branches. It is recommended that zonal office of NGRP in an appropriate place of Rapti zone and five of its district offices each in Rukum, Rolpa, Sallyan, Pyuthan and Dang districts should be established.

b) Need for Multi-Sectoral Offices for Ginger Development

In Rapti zone, ginger farming needs Multi-Sectoral offices (central, zonal and district-wise) for its development. One central office in Sallyan district for NGRP, one zonal office at Tulsipur, Dang and five district offices in the districts of Rapti zone are recommended for the following works: credit facilities; supply of improved varieties of seed; technical advice and support; supply of plant protection materials; regular visit to the farms in the district; training to the farmers on production, processing, packaging, selection, grading, classification and other activities required; and price information etc.

c) Need for an Association of Ginger Farmers (AGF)

An active association of ginger farmers is a felt-need in Rapti zone at local, district and zonal levels. The body of AGF at the local level in each district of Rapti zone should be formed by the ginger farmers living in concerned areas through election. The district level AGF in each district of Rapti zone should be formed through election of representatives sent by AGF at the local levels of the concerned district. Besides, the body of zonal level association of AGF should be formed through election of the representatives sent by district level associations established in different districts. The main functions of all these associations should be to develop the ginger farming by activating all the units being used in the production; try to manage a system for marketing and thereby to improve the zonal economy.

d) Necessity of Ginger-Based Industries

Increasingly the production of ginger from Rapti zone is flowing towards Indian markets without giving appropriate returns to the farmers. No ginger-based industry is established

Rapti zone and Nepal; no stable and reasonable price for ginger is received by the farmers; and there is lack of systematized markets. Due to all these facts, it is essential to setup different types of cottage, small-scale and large-scale ginger-based industries and develop a scientific marketing net-work for ginger in Rapti zone and Nepal.

Need for Inter-district Road Network

Rapti zone is not well-connected in road net-working. It has only Fair-Weather district roads connecting only with district headquarters of Sallyan, Rolpa, and Pyuthan and black-topped district road in Dang district. Ginger cultivation, scattered in the districts of Rapti zone, needs to be facilitated by adequate permanent inter-district road facilities for the export of raw and dry ginger for marketing.

Application of Inter-Cropping and Retrieval of Mother Rhizome System

The ginger farmers of Rapti zone are still unknown about the Inter-cropping and Retrieval of Mother rhizome system. So, it is essential to apply these two systems in the Ginger Farming of Rapti zone to benefit the farmers through increase in their income.

Declaration of Rapti Zone as "The Zone of Ginger Production"

Rapti zone should be declared as the "Zone of Ginger Production" in Nepal. The following points support this statement: 1) it is traditionally a most common cash-crop in Rapti zone, 2) it is very popular (reached upto overseas countries due to its less fibrous and good quality) in Nepal, specially the ginger from Sallyan district, 3) it is an informal cottage activity in zone, 4) according to the National Sample Census of Agriculture, Nepal, 1991/92, it leads the other cash-crops: such as turmeric, onion, garlic, chilli etc. as it has occupied 315.5 hectares of land in Rapti Zone, 5) more than 60 percent of Rapti farmers depend on ginger for cash income, and 6) Central Office of Ginger Research Programme has been established in this region (in Sallyan district) since 1992.

If the recommendations forwarded here are followed carefully and promptly by the concerned authorities, the extensive production of ginger in Rapti zone will help to increase income and improve living conditions of rural households and consequently help in the alleviation of pervasive poverty of Rapti zone.

References

CBS (1991). *Population Census 1991*. Central Bureau of Statistics, Ramshah Path, Kathmandu, Nepal.

CBS (1991). *Statistical Year Book of Nepal 1991*. Central Bureau of Statistics, Ramshah Path, Thapathali, Kathmandu.

CBS (1993). *National Sample Census of Agriculture, Nepal, 1991/92, Rukum District.* Central Bureau of Statistics, Kathmandu, Nepal.

CBS (1993). *National Sample Census of Agriculture, Nepal, 1991/92, Rolpa District.* Central Bureau of Statistics, Kathmandu, Nepal.

CBS (1993). *National Sample Census of Agriculture, Nepal, 1991/92, Sallyan District.* Central Bureau of Statistics, Kathmandu, Nepal.

CBS (1993). *National Sample Census of Agriculture, Nepal, 1991/92: Pyuthan District.* HMG, NPCS, Central Bureau of Statistics, Kathmandu, Nepal.

CBS (1993). *National Sample Census of Agriculture, Nepal, 1991/92: Dang District.* Central Bureau of Statistics, Kathmandu, Nepal.

CBS (1995). *Statistical Year Book of Nepal 1995.* His Majesty's Government, NPCS, Central Bureau of Statistics, Ramshah Path, Thapathali, Kathmandu.

CBS (1997). *Statistical Year Book of Nepal 1997.* His Majesty's Government, NPCS, Central Bureau of Statistics, Ramshah Path, Thapathali, Kathmandu.

CBS (1999). *Statistical Year Book of Nepal 1999.* Central Bureau of Statistics, Ramshah Path, Thapathali, Kathmandu.

CBS (2002). *Population Census 2001, National Report.* Central Bureau of Statistics, Thapathali, Kathmandu, Nepal.

CBS (2002/03). *Tathyanka Gatibidhi* Vol. 24, No. 2. Four monthly statistical bulletin published by Central Bureau of Statistics, Thapathali, Kathmandu, Nepal.

CBS (2003). *National Population Census 2001 Selected Data.* Central Bureau of Statistics, Thapathali, Kathmandu, Nepal.

CBS (2003). *Statistical Year Book of Nepal 2003.* Central Bureau of Statistics, Ramshah Path, Thapathali, Kathmandu.

GRP (1995/96). *Annual Report, 1995/96.* Nepal Agricultural Research Council (NARC), Ginger Research Programme (GRP), Kapurkot, Sallyan, Nepal.

K.C., Tej Bahadur (2000). "Cash-crop Farming in Nepal: A Case Study of Ginger Production in Rapti Zone," Ph.D. dissertation submitted to the Faculty of Humanities and Social Sciences, T.U., Nepal.

Ministry of Agriculture (1998/99). *Statistical Information on Nepalese Agriculture.* Ministry of Agriculture, Singh Durbar, Kathmandu, Nepal.

Ministry of Agriculture and Co-operatives (2001/02). *Statistical Information on Nepalese Agriculture 2001/02.* Ministry of Agriculture, Singh Durbar, Kathmandu, Nepal.

McCullough, Jim and Bob Haggerty (1989 May). "An Application of a Commodity System Assessment Methodology to Improve the Functioning of the Production and Marketing System for Ginger in Rapti Region of Nepal," Postharvest Institute for Perishables, University of Idaho, Moscow, Idaho 83843, USA.

NPC (1998). *Programme for Special Sector's Development* (in Nepali Language). HMG, National Planning Commission, HMG, Nepal, 1998.