

SPECIAL REPORT

FAO/WFP FOOD SECURITY ASSESSMENT MISSION TO NEPAL

25 July 2007



FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, ROME



WORLD FOOD PROGRAMME, ROME

This report has been prepared by Cheng Fang, Ramesh Sharma, and Raphy Favre (FAO); and Siemon Hollema (WFP), under the responsibility of the FAO and WFP Secretariats with information from official and other sources. Since conditions may change rapidly, please contact the undersigned for further information if required.

*Henri Josserand
Chief, GIEWS, FAO
Fax: 0039-06-5705-4495
E-mail: giews1@fao.org*

*Anthony Banbury
Regional Director, ODB. WFP
Fax: 0066-2-2881046
E-mail anthony.banbury@wfp.org*

Please note that this Special Report is also available on the Internet as part of the FAO World Wide Web www.fao.org at the following URL address: <http://www.fao.org/giews/>

The Special Alerts/Reports can also be received automatically by E-mail as soon as they are published, by subscribing to the GIEWS/Alerts report ListServ. To do so, please send an E-mail to the FAO-Mail-Server at the following address: mailserv@mailserv.fao.org, leaving the subject blank, with the following message:

subscribe GIEWSAlertsWorld-L

To be deleted from the list, send the message:

unsubscribe GIEWSAlertsWorld-L

Please note that it is now possible to subscribe to regional lists to only receive Special Reports/Alerts by region: Africa, Asia, Europe or Latin America (GIEWSAlertsAfrica-L, GIEWSAlertsAsia-L, GIEWSAlertsEurope-L and GIEWSAlertsLA-L). These lists can be subscribed to in the same way as the worldwide list.

TABLE OF CONTENTS

	<u>Page</u>
Mission Highlights.....	4
<u>INTRODUCTION</u>	4
1. <u>EXECUTIVE SUMMARY</u>	5
2. <u>SOCIO-ECONOMIC SETTING, FOOD SECURITY SITUATION AND AGRICULTURE OVERVIEW</u>	7
2.1 Socio-economic situation.....	7
2.2 Nepal's characteristics related to food security	8
2.3 Overview of Nepalese agriculture.....	10
3. <u>FOOD PRODUCTION AND AVAILABILITY, NATIONAL AND SUB-NATIONAL SITUATION</u> ... 13	
3.1 Food crop production in 2006	13
3.2 Main winter crop season in 2007	15
3.3 Aggregate crop production and food deficit in 2006/07: national and sub-national situation	16
4. <u>FOOD MARKET AND ACCESS, NATIONAL AND SUB-NATIONAL SITUATION</u>	21
4.1 Market prices and integration	21
4.2 Poverty and food security	24
4.3 Food consumption (caloric intake) and undernourishment	26
5. <u>NUTRITION AND HOUSEHOLD VULNERABILITY TO FOOD INSECURITY</u>	27
5.1 Nutrition status of vulnerable populations.....	27
5.2 Current vulnerability and coping status	30
5.3 Estimation of population in need and emergency food assistance requirements	33
5.4 Possible strategies for assistance	35
5.5 Recommendations	36
6. <u>AGRICULTURAL DEVELOPMENT CONSTRAINTS AND OPPORTUNITIES</u>	37
6.1 Overall policy environment	37
6.2 Low productivity and competitiveness	37
6.3 Constraints in major input sectors	38
6.4 Crop diversification and agri-business.....	43
6.5 Rural employment-generating programmes	43
7. <u>RECOMMENDATIONS</u>	44
7.1 Policy level.....	44
7.2 Strategies	44
7.3 Interventions	45
APPENDIX I Table A1 - Crop Calendar for Main Cereal Crops Cultivated in Nepal	47
APPENDIX II Map A1 - Two Principal Crops by District	48
APPENDIX III Table A2 - Per Capita Food Production and Changes by District	49
APPENDIX IV Table A3 - Nepal, Cereal Surplus/Deficit by District	50

Mission Highlights

- The Mission assessed the 2007 wheat as well as barley (minor crop) production, which were being harvested in many parts of the country in March and April. Wheat production increased by more than 7 percent due to favourable weather conditions and extra efforts made by farmers and government.
- Prolonged dry spells and floods in 2006 caused a significant reduction in rice production (Nepal's main cereal crop). National rice production decreased by 13 percent, and in some districts of the Eastern and Central regions reduction was from 20 percent to 50 percent.
- Total cereal output (including potatoes in cereal equivalent) in 2006/07 (November/October) is estimated at 6.35 million tonnes, 3.4 percent below the previous year. Total cereal deficit (including potatoes in cereal equivalent) in 2006/07 is estimated at 225 000 tonnes, compared to 23 000 tonnes in the previous year. A total of 42 out of the 75 districts are estimated to be food-deficit in 2006/07.
- With commercial imports (formal and informal) anticipated at 110 600 tonnes to cover some of the deficits in the urban areas and in the districts of the Terai, the food aid requirement is estimated at 114 4000 tonnes, including 1 400 tonnes in the Western Mountains, 19 200 tonnes in the Mid-Western Mountains, 31 000 tonnes in the Far-Western Mountains, and 62 800 tonnes in the Far-Western Hills. With food aid anticipated from the Nepal Food Corporation (NFC) and WFP at 101 800 tonnes, there remains an uncovered deficit of around 12 600 tonnes.
- Food security in the areas of the Terai has been severely affected by 2006 drought and floods. But lack of economic access to food is the core critical problem in the Hill and Mountain areas of the Far- and Mid-Western Regions because of very low purchasing power and extremely high market prices. Food deficits in these areas will not automatically lead to an increase in private imports, and are not expected to be fully met from either NFC or WFP due to very high transportation costs.
- Rural poverty is very high in rural Mid-Western (46.5 percent) and rural Far-Western regions (45.6 percent).
- Cereal markets in most of the Terai and Hill areas are integrated with Indian markets, with prices mainly determined by Indian markets. However, the rice prices in the Mountains are consistently much higher and food markets are highly isolated.
- Based on Mission estimates, the incidence of undernourishment, as measured by insufficient caloric intake, is very high at the national level at 40.7 percent, given a minimum caloric intake requirement of 2 124 kilocalories per day. It is as high as 50 percent in the Far-Western and Mid-Western rural regions.
- With chronic food insecurity in many parts of the country, substantial and widespread gains in food security are a precondition to achieving sustainable peace, and it is important to closely monitor vulnerability factors that could jeopardize the peace process.
- Poor performance and low agricultural productivity are the major causes of food insecurity in Nepal. The Mission reviewed broader policies in agriculture and made a number of recommendations towards addressing food shortages and chronic food insecurity in Nepal.

INTRODUCTION

At the request of the Ministry of Agriculture and Cooperatives of Nepal (MoAC), a joint FAO/WFP Food Security Assessment Mission visited the country from 20 March to 8 April 2007. The overall objective of the assessment was to have a better understanding of chronic and transitory (disaster-affected, short-term) food insecurity by assessing the 2007 winter cereal crops, current food availability, market access and food utilization situation in the country at national, sub-national and household levels so that appropriate actions can be taken by the government and the international community to minimize the impact of potential food insecurity.

The Mission held meetings with relevant institutions, including government, international agencies, donors, non-governmental organizations (NGOs) and the private sector, and reviewed available data and information on food security from different sources. Field trips covered 20 districts, located in four development regions and three ecological zones (Terai, Hills, and Mountains) with focus on the most food insecure areas in the Mid-Western Hills and Mountains (with chronic food insecurity) and in the Eastern and Central Terai (affected by droughts and floods in 2006).

The Mission observed crop-growing conditions and assessed the yields under different categories and assessed the impact of 2006 droughts and floods on food availability. Extensive interviews were conducted with farmers, millers, local government officers, agricultural research institutes, seed and fertilizer companies, and local NGOs regarding short- and long-term food production and supply problems.

The Mission visited customs points along the Indian border and interviewed officers, traders (grain, vegetables, livestock and inputs) in Kathmandu and local markets, millers and farmers in the fields to obtain first-hand information regarding formal and informal trade in food and agricultural inputs and their impact on food security.

Extensive interviews were also conducted with households to obtain information on food consumption, nutrition and health, and coping status (remittances, non-agriculture activities, changes in food consumption, assistance by government, WFP, NGOs, etc.). In addition, telephone interviews were conducted with government officials in districts that the Mission could not visit. Prior to its departure to rural Nepal, the Mission held debriefing sessions with government authorities and UN agencies in Kathmandu.

With assistance from the Household Survey Unit of the Central Bureau of Statistics (CBS), the Mission conducted household-level food consumption, poverty, under-nourishment analyses by using Nepal Living Standards Survey II (2003/04) data, which is the second multi-topic national household survey conducted by the CBS.

The FAO team comprised Dr Cheng Fang, Dr Ramesh Sharma and Mr Raphy Favre. The WFP team included Mr Siemon Hollema. Two FAO local consultants, Mr Rajendra Pratap Singh and Dr Govind Pandey, participated in the field trips and made contributions to the data collection and analysis. In addition, Mr Subhash Singh and Ms Kanta Kanal from WFP assisted in arranging field visits.

We would like to thank MoAC for its strong support to the Mission and CBS for its data support. We gratefully acknowledge the considerable assistance provided by Mr Ram Hari Gaihre, the CBS's Household Survey Section officer; and Mr Ravi Kumar Dangol and Ms Purna Laxmi Rajbhandari, of the Agribusiness Promotion Programme of MoAC.

This Mission was made possible through financial assistance by the Department for International Development (DFID). The views expressed in this report do not in any way reflect the official opinion by DFID, MoAC or CBS.

1. EXECUTIVE SUMMARY

Nepal is characterized by low levels of human development and incomes. According to the 2006 UNDP Human Development Report, Nepal ranks 138 among 177 nations in terms of the Human Development Index, and 156 in terms of GDP per capita in Purchasing Power Parity (PPP\$). Both indicators rank Nepal the lowest among its neighbours.

Nepal experienced a turbulent socio-economic situation during the 11-year insurgency, which cost an estimated 13 000 lives and inflicted considerable physical, psychological, social and economic damage. The historic agreement of November 2006 between the Seven Party Alliance (SPA) and the Nepal Communist Party (Maoists) paved the way for a promising opportunity to achieve lasting peace and to address the underlying causes of the conflict. It has also opened a window of opportunity for agricultural and rural development.

Agriculture is the mainstay of the economy, providing livelihood for more than 80 percent of the population and accounting for some 40 percent of Gross Domestic Product (GDP). Industrial activities are dominated by the processing of agricultural products including jute, sugarcane, tobacco and grains.

Nepal is vulnerable to several types of natural disasters such as droughts, floods, landslides, windstorms, hailstorms, cold waves, disease epidemics, glacial lake outburst flood (GLOF), fires and earthquakes. Drought, hailstorms, floods and landslides are by far the most serious ones and the most recurrent natural disasters, annually causing significant material and human losses.

The Mission assessed the 2007 wheat and barley production, which were being harvested in many parts of the country in March and April. Prospects for both crops are favourable and output is forecast at above average levels due to timely and sufficient rainfall during the winter season of 2006/07 and no significant

damages by hailstorms and other disasters. In aggregate, it is expected that total wheat and barley production will increase by more than 7 percent. However, local drought conditions and hailstorms have badly affected production in several areas in the Far- and Mid-Western Hills and Mountains.

In 2006, adverse climatic conditions significantly affected cereal production in Nepal, especially in the Eastern and Central Terai, which was badly affected by drought. Overall, paddy rice production, the most important crop in Nepal, is estimated to have declined by 13 percent nationally, and between 20 percent to 50 percent in some districts of the Eastern and Central regions. Total cereal production (rice, maize, millet, wheat and barley) in 2006 is estimated at 5.96 million tonnes, 4.5 percent below the previous year and 1.7 percent below the average of the previous five years. By region, 2006 aggregate cereal output is estimated to have declined by 16 percent in the Eastern Terai, 9 percent in the Central Terai, and 5.3 percent in the Western Mountains. The worst affected districts include Saptari (down by 30 percent) and Siraha (down by 28 percent) in Eastern Terai, and Mahottari (down by 21 percent), Dhanusha (down by 20 percent), Rautahat (down by 12 percent) and Sarlahi (down by 12 percent) in the Central Terai.

Cereal (including potato in cereal equivalent) deficit in 2006/07 (November/October) at the national level is estimated at 225 000 tonnes, compared to some 23 000 tonnes in the previous year. Commercial imports are anticipated at 110 600 tonnes to cover some deficit in urban areas and the Terai. The total food aid requirement is estimated at 114 400 tonnes, including 1 400 tonnes in Western Mountains, 19 200 tonnes in Mid-Western Mountains, 31 000 tonnes in Far-Western Mountains, and 62 800 tonnes in Far- Western Hills. The anticipated food aid imports by NFC and WFP of 101 800 tonnes will cover most of the remaining import deficit.

Lack of access to food is the core long-term food insecurity issue in the Hills and Mountains of the Far and Mid-Western Regions because of very low purchasing power and extremely high market prices. Food deficits in these areas will not lead to an increase in private imports, and are not expected to be met from either NFC or WFP due to very high transportation costs which prohibit sufficient quantities of food from being transported to these deficit areas.

Of the uncovered deficit of 114 400 tonnes, WFP is expected to provide 8 864 tonnes under its emergency operations, 33 517 tonnes under its country programme and 39 405 tonnes for food assistance to conflict-affected populations. NFC provided 38 000 tonnes in 2006, and subsidized distributions in 2007 are projected at around 20 000 tonnes.

In terms of size, the Central region has the largest deficits (281 000 tonnes in Central Hills and 113 000 tonnes in Central Terai) because of the highly urbanized capital region of the Kathmandu Valley located in this region. On a per capita basis, the food grain deficit areas are concentrated in the Far- Western Hills (142 kg/person), Far-West Mountains (143 kg/person), Mid-Western Mountains (158 kg/person), and Western Mountains (165 kg/person). Imports of food grains to these areas are mostly limited to subsidized rice distributions through NFC, food aid and small quantities carried by returning migrant workers. Local food production is therefore a key factor to achieving food security in these areas. Local crop failures due to drought, hailstorms or landslides can seriously affect food availability and cause acute food crises.

A total of 42 out of the 75 districts in Nepal are estimated to be food-deficit in 2006/07. Of these, there are 13 districts with per capita cereal production of less than 150 kg. By decreasing order of severity of food deficit, these districts are Kathmandu, Humla, Lalitpur, Bajura, Achham, Dolakha, Bhaktapur, Mahottari, Kalikot, Baitadi, Bajhang, Dolpa and Rautahat. There are a further 14 districts with per capita cereal production of between 150 kg to 180 kg, which is well below the national average and minimum requirement.

Cereal markets in most of the Terai and Hill areas are integrated with Indian markets, and the staple food prices are mainly determined by Indian markets. However, the rice prices in the Mountains are consistently much higher and food markets are highly isolated. The monthly prices for three years from May 2004 to April 2007 show that the rice price in the Mountain markets was on average 177 percent higher than the rice price in the Terai markets of the Mid-Western region and 123 percent higher than in the Eastern region.

Rural poverty is a key factor affecting food security in rural Mid-Western and rural Far-Western regions, with poverty incidence at 46.4 percent and 45.6 percent, respectively, according to estimates by CBS, WFP and World Bank. Based on the Mission's estimate, people living in the mountains spend (on average) more than 65 percent of their income on food, compared with a national average of 36.9 percent.

The incidence of undernourishment as measured by insufficient caloric intake is very high in Nepal. At national level, based on the Mission estimate, the proportion of undernourished population is estimated at 40.7 percent, with the minimum caloric intake requirement of 2 124 kilocalories per day set by the CBS. Not surprisingly, the Far-Western and Mid-Western rural region have a much lower mean dietary energy consumption (2 250 kcal and 2 310 kcal, respectively, compared to 2 405 kcal of national level) and thus the highest incidence of undernourishment (about 50 percent). Consistently, the share of population with severe deficiency in food energy intake as measured by the threshold level of 1 910 kcal/person/day and 1 810 kcal/person/day is also much higher compared to rural population of the Eastern, Central and Western regions.

The Mission is concerned about the very high levels of malnutrition in Nepal, especially in the Mountain and Hill areas of the Far- and Mid- Western regions, where generally more than 60 percent of children are stunted and 50 percent are underweight, and in the Terai where on average 17.7 percent of children under five suffer acute malnutrition.

Food insecurity in the surplus areas of the Terai and lower Hills is foremost an issue of economic access. Although the incidence of poverty in these areas is generally lower than in the Hills and Mountains of the Far- and Mid-West, the concentration of poverty (as measured by the number of poor people per square kilometre) is very high. Based on the Mission's observations, the income inequality is likely to be higher in the Terai than in the Hills and Mountains. Vulnerable communities such as Dalits, Adivasi Janajatis and Kamayas (bonded labourers) often struggle to access sufficient food. The result is that the Terai is characterized by very high wasting levels above emergency levels. Other factors responsible for high food insecurity and malnutrition in the Terai include: limited nutritional knowledge, inappropriate hygiene and caring practices and gender division within the household, which places women in a disadvantaged position.

An FAO report (2004) on vulnerable groups in Nepal identified a total vulnerable population of more than 9 million people based on their livelihood (marginal farmers, agricultural labourers, rural service castes, porters and urban poor). Marginal farm households in the Hills and Terai represent the largest vulnerable group, followed by rural service castes, agricultural labourers in the Terai, marginal farm households in the Mountains, porters and poor urban households. Within these livelihood classes, women, children, indigenous peoples and members of the lower caste groups (Dalit and Janajatis) are among the most food insecure.

Long-term food security in Nepal remains problematic. Agricultural production has not kept pace with the growth in population, and average yields are low compared to neighbouring countries. There is an urgent need for investment in seed research and supply, and in the expansion of irrigation facilities. Increased agricultural production generates strong backward and forward linkages in rural Nepal – leading to a variety of rural non-farm activities that are very promising, based on recent trends.

Immediate improvements in food security and employment conditions are key determinants for the success of the peace process. The Mission would like to stress that with chronic food insecurity in many part of the country, substantial and widespread gains in food security are a pre-condition to achieving sustainable peace. In addition, the Mission underlines the importance of closely monitoring vulnerability factors that could jeopardize the peace process.

2. SOCIO-ECONOMIC SETTING, FOOD SECURITY SITUATION AND AGRICULTURE OVERVIEW

2.1 Socio-economic situation

Nepal is a least developed country and the poorest nation in South Asia. According to the 2006 Human Development Report, Nepal ranks 138 among 177 nations on the Human Development Index. Its per capita Gross Domestic Product (GDP) is estimated at US\$232 (average of 2003 to 2005, in 2000 constant price), 44 percent below that of Bangladesh, 58 percent below India, 59 percent below Pakistan, 76 percent below Sri Lanka and Bhutan, and 83 percent below China (Table 1). Nepal has the lowest growth rate among its neighbouring countries. Annual per capita GDP growth is estimated at 2.0 percent from 1979/81 to 2003/05. The economic performance was even worse in the last several years, at -2.7 percent, 1.3 percent, 1.6 percent and 0.7 percent, respectively, from 2002 to 2005.

Table 1: Per capita real GDP and growth in South Asia and China

	Annual GDP per capita (constant US\$2 000)			Average annual per capita GDP growth rate		Annual per capita GDP growth rate (compared to the previous year)			
	1979-81	1989-91	2003-05	1979/81- 2003/05 %	1989/91- 2003/05 %	2002 %	2003 %	2004 %	2005 %
Bangladesh	251	281	416	2.1	2.8	2.4	3.3	4.3	4.0
Bhutan	273	466	964	5.4	5.3	8.2	6.8	7.2	2.6
China	185	399	1 327	8.6	9.0	8.4	9.3	9.4	9.5
India	223	312	549	3.8	4.1	2.1	6.8	6.8	7.7
Nepal	145	177	232	2.0	1.9	-2.7	1.3	1.6	0.7
Pakistan	326	462	569	2.4	1.5	0.8	2.5	3.9	5.2
Sri Lanka	456	574	961	3.1	3.8	2.5	4.7	4.2	4.4

Source: World Bank, WDI 2007.

Growth of the Nepalese economy is determined largely by the growth of its agricultural sector. Although the share of agriculture in total GDP has been declining over the years, it is still the single largest sector in the economy, accounting for 38 percent of GDP at present (Table 2). Out of the total population of 25.9 million (2005), some 80 percent reside in rural areas and pursue agricultural activities. In the non-agricultural sector, manufacturing, trade and commerce, transport and communication, finance, real estate and community and social services are important sub-sectors. The manufacturing sector is limited largely to low-end consumer items such as carpets, garments and handicrafts, and further development of this sector is constrained by Indian competition, poor infrastructure, a limited local market and the lack of direct sea access. Tourism, traditionally the largest component of the services sector, has fallen behind the finance and real-estate sectors since 2000, due to the impact of the conflict.

As a landlocked country with a low level of development and high dependence on imported capital goods and oil for energy, Nepal faces a chronic deficit in merchandise trade. However, since 2002 the current account has registered small surpluses due to increased remittances from Nepalese working abroad and continued inflows of foreign aid. During March 2005, the government estimated that more than half a million Nepalese were working abroad. Foreign aid has a significant influence on Nepal's development, with a share in public sector development expenditure of 60 percent.

Table 2: Nepal - Key economic indicators, 1998-2006

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Real GDP growth rate (%)	3.4	4.5	6.1	4.7	-0.6	3.3	3.8	2.7	1.9
Consumer price inflation	10.0	7.5	2.5	2.7	3.0	5.7	2.9	6.9	8.3
Exchange rate	66.0	68.2	71.1	74.9	77.9	76.1	73.7	71.4	72.8
Export f.o.b. (US\$ m) ^{1/}	474	602	804	737	567	663	773	903	818
Import c.i.f. (US\$ m) ^{2/}	1 246	1 422	1 573	1 473	1 420	1 754	1 908	2 277	2 344
Current-account balance (US\$ m)	-67	-257	-299	-339	-55.6	-120	-45	1	185
Agriculture, value added (% of GDP)	38.8	40.1	39.6	38.3	39.4	39.1	38.6	38.2	n. a.
Rural population (% of total population)	87.6	87.1	86.6	86.1	85.6	85.2	84.7	84.2	n. a.
Population (million)	21.8	22.4	22.9	23.2	23.7	24.2	24.7	25.3	25.9

Source: EIU and WDI.

^{1/} Free on board; ^{2/} Cost, insurance and freight.

2.2 Nepal's characteristics related to food security

Geography and agro-ecological settings

A landlocked country, Nepal is situated between India and China and covers an area of 147 480 km². Only about 17 percent of Nepal's total land area is suitable for agriculture; 2.5 million hectares with a cropping intensity varying from one to three crops per year. Altitude increases from south to north and

ranges from 70 m in the Eastern region (Kanchan Kalan) to 8 848 m (the highest point on earth) in the Himalayas. Differences in elevation result in diverse climatic belts, ranging from humid subtropical in the plains to alpine in the north. The country is subdivided into three major ecological regions. Twenty-three percent is occupied by the Terai plains in the southern belt, 42 percent by the Hills in the middle belt and the remaining 35 percent by the Mountains in the northern belt. These regions have distinct geological, soil, climatic and hydrological characteristics. As a result, land use patterns within these zones are distinctly different:

- The Terai consists of flat and fertile alluvial land that extends from the Indo-Gangetic plains. Altitude is from 70 m to 800 m. Thirty-eight percent of the total land area is cultivated. Since, technically, most of the Terai can be irrigated and crops can be cultivated all year round, it has greater potential for productivity growth than the other ecological regions. It is referred to as the "grain basket" of Nepal. Water resources, fertility and flat terrain permit the cultivation of a variety of crops such as paddy, wheat, maize, sugarcane, jute and vegetables.
- The Hills lie at an altitude between 800 m and 1 800 m and comprise steeply sloped lands with many small valleys. Only 10 percent of the land area is cultivated. This region comprises several attractive valleys and basins such as Kathmandu, Pokhara, Hetauda, Surkhet and several others, like the Dang valley. These valleys, especially the Kathmandu valley and Pokhara, support a relatively high percentage of the Hills population. Maize is the single most important crop in the Hills. Paddy is grown on irrigated land during the summer season.
- The Mountains lies generally above 1 800 m. Only 2 percent of the land is suitable for cultivation. Since this region is mostly steep, rugged and cold, it is sparsely populated. People's main occupation is raising livestock. Subsistence cultivation is practiced and only one crop per year or three crops in two years is possible. Vegetables are cultivated as cash crops in a few areas with access to markets. However, the vast majority of the Mountains are remote and access to markets and roads is limited.

Data related to crop cultivation and production at national level are collected by the Ministry of Agriculture on the basis of district boundaries which are delineated on administrative considerations. The 75 districts of Nepal are categorized in three ecological zones (Terai, Hills and Mountains) and five development regions. In terms of population, some 48.5 percent live in the Terai, 44.2 percent in the Hills and only 7.3 percent in the Mountains.

Climatic settings

Annual rainfall varies from about 250 mm in rain-shadow areas such as the Mustang valley to over 5 200 mm in Pokhara. Distinct wet and dry seasons alternate over the year. Over 80 percent of the annual rainfall occurs during the four months of the monsoon season, which lasts from June to September. During summer, the maximum temperature in the Terai is more than 40 °C while it is about 28 °C in the Hills. The snow line lies at about 5 000 m. Annual rainfall tends to decrease slightly from east to west and increase with elevation from south to north and on south eastern slopes, which act as a windward for monsoon winds. Rainfall decreases drastically across the Himalaya range, which extends into Tibet.

Western Nepal receives less rainfall than the eastern side and the monsoon rain tends to start later and retreat earlier. The Hills of the Eastern and Central development regions receive monsoon rain approximately one month before the Terai and the Hills of the Far- and Mid-Western development regions. Isohyets of 1 500 to 2 500 mm cover most of the Eastern region while those in the Far- and Mid-Western regions are between 1 000 to 1 500 mm. During the winter, however, rainfall is more reliable in the west than in the east, resulting in higher importance of winter crops in the western part of the country.

Political and social stability

Nepal has experienced a turbulent political situation following an 11-year insurgency that cost an estimated 13 000 lives and inflicted considerable physical, psychological, social and economic damage. The peace agreement of November 2006 between the Seven Party Alliance (SPA) and the Maoists paved the way for a promising opportunity to achieve lasting peace and address the underlying causes of the conflict. It is also providing an opportunity for agricultural and rural development.

Porous border with India and market linkages

Nepal is virtually an open economy vis-à-vis India. As a result of the long and porous border with India, and the Nepal-India Trade Treaty under which trade in primary agricultural products between Nepal and India is free of customs duty and quantitative restrictions. This relationship is seen by analysts both positively and negatively. In the context of agricultural development and food security in Nepal, the positive aspect is the guarantee of a large and growing Indian market for Nepalese agricultural products. The importance that India attaches to stability in cereal supply and prices is also seen positively because this contributes to similar stability in Nepal given strong integration between the two markets. On the negative side, it is very difficult for Nepal to set or influence the prices of tradables independent of those prevailing in India. This limits Nepal's policy choices. Also seen negatively is the worsening competitive position of Nepalese agriculture vis-à-vis India, in part due to high agricultural subsidies in the latter.

Natural hazards

Nepal is vulnerable to several types of natural disasters, including droughts, floods, landslides, windstorms, hailstorms, cold waves, disease epidemics, glacial lake outburst flood (GLOF), fires and earthquakes. Droughts, floods, hailstorms and landslides are by far the most serious and recurrent natural disasters and annually cause significant material and human losses. Based on official disaster statistics, floods and landslides from 1998 to 2002 occurred some 256 times on average in one year and affected on average 24 264 families annually. The middle Hills are mainly prone to landslides and hailstorms while the Terai region is prone to floods and fire. Windstorms, thunderbolts (lightening strikes) and heavy snowfall also affect many areas of the country on a regular basis, causing loss of human lives and considerable damage to the standing crops. While earthquakes are not frequent, Nepal has experienced several destructive earthquakes, with more than 11 000 people killed in four major earthquakes in the past century.

2.3 Overview of Nepalese agriculture

Crop calendar

Table A1 and Map A1 in Annexes I and II provide an overview of the main cropping patterns for cereals. On the whole, the availability of irrigation water is the main determinant of the choice of crops and the planting season. Thus, in the Terai in areas with reliable irrigation, three paddy crops can be grown (spring, summer and late summer), while two crops of paddy can be grown in the Hills (summer and spring). Maize can also have three planting seasons in some places in the Terai (spring, summer and winter) and two in the Hills (spring and summer). In the Hills, early maturing maize varieties offer greater crop rotation flexibility and opportunities for higher cropping intensity. Wheat and barley are planted between October and December while harvest starts in the Terai in spring and ends in the Mountains in early summer. Finally, millet is cultivated as a main summer crop in the Mountains and as a relay crop in the Hills (mostly after maize).

In the Hills, the lands/terraces located on the lower part of Hills slopes near the rivers are generally irrigated. In these areas, rice is the major crop in summer followed by wheat in winter (similar to that in the Terai) while on the rainfed upland areas, maize is the major crop. Therefore, the proportion of rice, maize and wheat at district level depends on the availability of irrigation facilities.

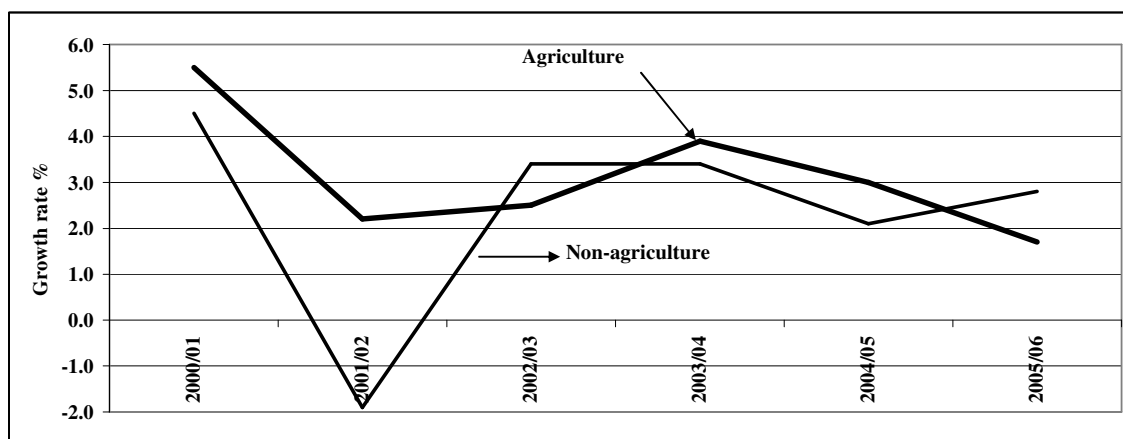
Overall aggregate performance

Agriculture is the mainstay of the economy, providing a livelihood for more than 80 percent of the population and accounting for 40 percent of the GDP. In comparison with many other countries of Asia, the structure of the Nepalese economy has not changed much – the share of agriculture in total GDP fell by only 5 percent over a period of about 15 years, from 44 percent in 1990-92 to 39 percent in 2003-05. Moreover, industrial activities are still dominated by the processing of agricultural products like jute, sugarcane, tobacco and cereals. As a result, agricultural performance is also a strong determinant of industrial GDP.

Figure 1 shows growth rates of real agricultural and real non-agricultural GDP for recent years. The average growth rate of agricultural GDP during the 2000/01 to 2005/06 period was 2.8 percent. This is indeed low and only slightly above the population growth rate. What is also equally striking is the very high degree of fluctuation from year to year. The growth rate was 5.5 percent in 2001/02 and only 2.2 percent in the next year. Likewise, it was 3.9 percent in 2003/04, only to slide back in the next year.

The performance in 2005/06 was the worst in recent years. The main reason for the poor performance was the adverse weather conditions that affected mainly paddy, wheat and barley, despite significant growth in cash crops like potato, jute, sugarcane and vegetables, as well as livestock products. Agricultural performance influences industrial GDP to some extent and this sector also suffered considerably.

Figure 1: Trends in the growth rate of real agricultural and real non-agricultural GDP



Source: Economic Survey, 2005/06, Nepal.

Although the focus of this analysis is on the most recent years, the fact remains that the functioning of normal economic activities began to deteriorate after 1996 due to the insurgency. Not only were production activities and markets disrupted, but also the delivery of vital development programmes suffered considerably and ceased in many areas. These negative effects accumulated over time, reducing the ability of the economy to withstand shocks.

The conflict not only stalled the creation of additional physical infrastructures, like irrigation, but also destroyed many existing infrastructures. Many agricultural service centres, responsible for the delivery of agricultural services in the villages, stopped functioning.

Cereals, pulses and oilseeds

The growth rate of cereal production, at 1.2 percent over the past five years, has remained frustratingly low and below the growth rate of the population. Moreover, cereal yields are low by regional standards. As a result, competitiveness in domestic markets is continually undermined, and import dependency is growing over time. The reasons for the low productive cereal sector are well known – limited irrigation and missing or inadequate agricultural inputs and product markets (like credit) lead to low adoption of modern technology.

Among cereals, **paddy** is the most important crop contributing to half of total cereal production and 16 percent of the total cultivated area. Over 70 percent of paddy is produced in the Terai. Paddy production has stagnated over the past five years, growing merely at 0.2 percent per annum. Average yield at 2.56 tonnes/ha is low by regional standards. Lack of year-round irrigation and technology are the main constraints to increasing paddy production.

Maize is the second most important cereal, contributing 25 percent of the total cereal production. Importantly, maize is the only cereal with production growth (3 percent per year) exceeding population growth during the past five years. Most of the increase is due to yield, suggesting growing adoption of hybrid varieties imported from India. Yet, yield levels remain relatively low at 2.09 tonnes/ha in 2006/07. Hybrid maize varieties are highly regarded by Nepalese farmers but availability of seeds is a major constraint. Most hybrids are informally imported from India but replacement rates are low. Hybrid varieties can be used only once and farmers have to buy them every year.

Wheat is the third most important cereal, contributing 20 percent of total cereal production in 2006/07. Over 60 percent of wheat is produced in the Terai. The growth of wheat production has been disappointing, averaging 1.7 percent per annum during 2002-2006. Average yield of 2.04 tonnes/ha is low by regional standards. Wheat yields suffer from the same factors as listed for paddy above, i.e. lack of

reliable irrigation, inclement weather and lack of improved technology. In the Far- and Mid-Western Terai, where winter rainfalls are more reliable, rainfed wheat yields tend to be higher.

Millet is a minor cereal, contributing only 4 percent to the overall cereal production in 2006/07. Production growth has virtually stagnated in the past five years (0.6 percent per annum).

Barley is a marginal cereal and in 2006/07 contributed to only 0.4 percent of total cereal production. Over 50 percent of barley is produced in the Mountains. Both area and production have decreased over the past five years: by 1.1 percent and 2 percent, respectively.

Pulses are an important source of protein in the Nepalese diet. The growth rate of production of pulses and oilseeds in recent years has fallen far below the rate of population growth. The production growth rate of pulses averaged 1.4 percent during the past five years. Lentils, which account for 60 percent of pulse production, grew at a rate of 1.4 percent. **Oilseeds** (mainly mustard) cover approximately 190 000 ha. Oilseed production has been sluggish, growing at 0.6 percent per annum during the past five years. Yields are very low, at about 740 kg/ha.

Cash crops and farm diversification

Cash crops, which include fruits, vegetables, potatoes and sugarcane, account for roughly 20 percent of the total cultivated area. Cash crops have significantly increased over the past five years with a 3 percent annual increase in area, led primarily by increasing demand. Fruit cultivation has significantly increased by 3.7 percent per annum over the past five years. Both tropical/semi-tropical and temperate fruits have achieved similar growth rates. The expansion of the cultivated area of temperate fruit over the past five years is remarkable given the lack of road connectivity, as these fruits are cultivated in remote Mountain areas.

The Nepal Living Standard Survey (NLSS) data show that farms were more diversified in 2003-04 than in 1995-96. The extent of diversification varies across ecological regions and farm sizes. Small farmers in the Mountains and small and medium farmers in the Western Hills were found to be most diversified among the different farm groups. Fruit and vegetable production has increased in importance for small and medium farmers in the Western Hills and Mountains and among small farmers in the Terai. Fruits and vegetables accounted for 15 percent of gross crop output in the Western Hills and Mountains, and 7-8 percent for medium and small farmers in the Eastern Hills.

Livestock sub-sector

The livestock sector contributes about 31 percent of the agricultural GDP, which is projected to rise to 45 percent by about 2015, the end of the Agriculture Perspective Plan. Within livestock, dairy accounts for 63 percent of the total value added, followed by meat (32 percent) and eggs (5 percent). Livestock and livestock products are not traded much and account for about 11 percent and 6 percent, respectively, of total agricultural exports and imports. According to the 2003/04 NLSS data, livestock accounts for about 20 percent of total agricultural income, after crops (50 percent).¹ However, livestock is important for farm households as livestock is an integral component of the mixed crop-livestock-forest farming system of Nepal and plays other important roles as an asset to mitigate short-term shocks such as droughts.

Commercial livestock production is expanding fairly rapidly in areas close to large population centres. The poultry industry has been a leading sub-sector in commercialization, with strong backward and forward linkages covering marketing activities, animal health and feeds. The commercial pig industry is small but expanding. The milk sub-sector has been doing well overall, with marked seasonal differences in production and supply. Seasonal surpluses are converted to ghee where milk collection is not possible.

Livestock rearing represents an important part of the livelihood strategy of rural Nepalese households. Virtually all farm households own livestock. According to the 2003/04 NLSS, between 1995-96 and 2003-04, there was a shift in the composition of livestock herds owned by farm households. Farms shifted into raising more poultry (up 18 percent) and small ruminants (sheep and goats, up 29 percent) and fewer cows (down 15 percent) and buffalos (down 10 percent).

¹ WB Report, Nepal Resilience Amidst Conflict – An Assessment of Poverty in Nepal, 1995-96 and 2003-04, Report No. 34834-NP, 2006.

According to the above survey, income from crop sales stagnated, while income from livestock rearing increased. Real income from livestock production grew 2.4 percent a year on average between 1995-96 and 2003-04. Growth in livestock income has helped to offset some of the decline in income from crop production. The survey also found that a larger number of livestock owners are selling livestock products and that a significantly larger proportion are now using veterinary services, indicating greater commercialization in the sector.

The livestock sub-sector suffers from low productivity due to poor genetic material, shortage of feeds, poor management, animal health and access to markets in the Hills and Mountains. The Study on Nepalese agriculture² shows that improved livestock breeds account for only 8 percent of cattle, 21 percent of buffalo, 6 percent of sheep, 14 percent of goats, 40-77 percent of pigs and 50 percent of poultry. These percentages are increasing as farmers introduce new animals and use improved semen, notably in accessible areas where there is a higher response to market signals. According to the 2002 ANZDEC study, the livestock sub-sector in Nepal suffers from a 34 percent deficit of Total Digestible Nutrients (TDN) and hence lack of feeds is a serious limiting factor.

3. FOOD PRODUCTION AND AVAILABILITY, NATIONAL AND SUB-NATIONAL SITUATION

3.1 Food crop production in 2006

Main summer crop season affected by adverse weather

For the 2006 summer crop, the main problem was the variation in the spatial and temporal patterns of rain. Although the monsoon started earlier than usual, rain intensity was weak with below normal precipitation and dry conditions in the districts of Saptari, Siraha, Dhanusa and Udayapur. During July, Eastern, Central and Western regions received 40 percent less than normal precipitation. The Far- and Mid-Western regions had above normal rainfall during this period.

August was a particularly dry month with the entire country facing a shortage of rain. Exceptions to this general pattern were areas in the Far- and Mid-Western regions which received more than 180 percent of normal rainfall. Heavy rainfall on 27 August caused floods and landslides in Western, Mid-Western and Far-Western districts of Banke, Bardiya, Nawalparasi, Jajarkot, Surkhet, Bajura, Achham, Doti, Baitadi and Darchula.

Precipitations for September and October of 2006 were about normal or above normal in most parts of Nepal.

Paddy, maize and millet production

Paddy was the crop most affected by last year's adverse climatic factors. Paddy is generally transplanted in June/July with the monsoon rains and harvested in October/November. A delay in the monsoon or a dry spell at planting time, as occurred in the summer of 2006, can significantly affect the area planted and production. Overall, paddy rice production declined by 13 percent compared to average. Water shortage during the transplanting season resulted in late planting and land left fallow, particularly in the Eastern Terai. Table 3 shows reductions in paddy production in the most affected districts (Table 4 shows estimates by sub-region).

² "The SPS Agreement: Trade in Live Animals and Animal Products", by S. Mahato, G. Gongol and B. Chaulagain in *Implications of the WTO Membership on the Nepalese Agriculture*, by R. Sharma, M. Karkee and L. Gautam (Editors), FAO, UNDP and MoAC, 2004, Kathmandu.

Table 3: Changes in paddy production in the most affected districts

Region/District	Changes in 2006 over the average of the previous five years (%)
Eastern Region	
Saptari	-46
Siraha	-38
Udayapur	-27
Bhojpur	-21
Central Region	
Sindhuli	-28
Kavre	-22
Dhanusha	-29
Mahottari	-38
Sarlahi	-21

Source: MoAC.

The floods that occurred on 27 August, and which mostly affected the districts of Banke and Bardiya, damaged farmers' land near river banks. However, as flood receded rapidly in these districts, many paddy fields did not suffer but instead benefited from the flood water, which contributed to some recovery from a dry summer. Yet Banke and Bardiya experienced paddy crop losses of 10 and 7 percent compared to the five-year average.

The prospect for spring paddy being planted on irrigated land in March-April 2007 is good due to above average access to irrigation water following good rainfall during the winter of 2006/07.

Overall, maize production was not negatively affected by the dry spell during the summer of 2006. Instead, production increased by 12.1 percent compared to the five-year average (Table 4). This outcome is explained by different crop calendars and land used for the maize crop:

- In the Eastern Hills, maize is planted on sloping rain-fed land, during the pre-monsoon rains, and is usually relayed with millet, potato and other crops, and harvested before the end of the monsoon rains. By June, the maize crop was already significantly developed and could better resist temporary lack of rainfall. Some 70 percent of maize is produced in the Hills.
- In the Terai and lower Hills, irrigated maize is planted in winter/spring in rotation with rice, while rain fed maize is planted in summer in rotation with winter crops (wheat, oilseeds or pulses). Only the latter category, which is a minor part of the maize crop grown in Nepal, was affected by last summer's dry spell. In Banke and Bardiya, rainfed maize is cultivated upland and therefore the flood damage on maize remained limited.

Millet is generally planted late in the Hills as a relay crop after maize and as a main crop in the Mountains and was therefore not affected by the dry spell of the summer of 2006, and production was average (Table 4).

Table 4: Nepal - Area, production and yield of the three main summer cereals by Region and Agro-ecological Zone, 2006

Region/Zone	Paddy			Maize			Millet		
	Area (ha)	Prod. (tonnes)	Yield (t/ha)	Area (ha)	Prod. (tonnes)	Yield (t/ha)	Area (ha)	Prod. (tonnes)	Yield (t/ha)
Eastern Mountains	25 260	43 604	1.73	39 065	69 448	1.78	14 245	15 175	1.07
Eastern Hills	78 882	176 791	2.24	141 779	271 603	1.92	49 079	52 188	1.06
Eastern Terai	326 702	863 942	2.64	47 900	111 750	2.33	6 225	6 255	1.00
Eastern Region	430 844	1 084 337	2.52	228 744	452 800	1.98	69 549	73 618	1.06
Central Mountains	17 605	42 206	2.40	28 740	62 397	2.17	24 125	24 195	1.00
Central Hills	87 907	278 666	3.17	138 098	292 542	2.12	37 351	40 316	1.08
Central Terai	295 400	789 777	2.67	42 129	106 636	2.53	4 288	4 350	1.01
Central Region	400 912	1 110 649	2.77	208 967	461 575	2.21	65 764	68 861	1.05
Western Mountains	0	0	-	691	1 145	1.66	7	7	1.00
Western Hills	128 393	306 707	2.39	198 695	452 301	2.28	94 454	106 546	1.13
Western Terai	183 370	430 455	2.35	11 810	29 042	2.46	750	730	0.97
Western Region	311 763	737 162	2.36	211 196	482 488	2.28	95 211	107 283	1.13
Mid-Western Mountains	6 790	11 844	1.74	9 252	13 690	1.48	8 397	8 355	0.99
Mid-Western Hills	46 011	116 898	2.54	104 174	198 662	1.91	12 339	13 936	1.13
Mid-Western Terai	99 541	265 976	2.67	44 100	92 385	2.09	135	135	1.00
Mid-Western Region	152 342	394 718	2.59	157 526	304 737	1.93	20 871	22 426	1.07
Far-Western Mountains	12 608	22 518	1.79	10 540	16 929	1.61	6 400	5 675	0.89
Far-Western Hills	26 517	54 790	2.07	21 028	37 003	1.76	6 963	6 570	0.94
Far-Western Terai	104 539	276 665	2.65	22 400	43 393	1.94	402	380	0.95
Far-Western Region	143 664	353 973	2.46	53 968	97 325	1.80	13 765	12 625	0.92
Mountains	62 263	120 172	1.93	88 288	163 609	1.85	53 174	53 407	1.00
Hills	367 710	933 852	2.54	603 774	1 252 111	2.00	200 186	219 556	1.00
Terai	1 009 552	2 626 815	2.60	168 339	383 205	2.27	11 800	11 850	1.00
Nepal	1 439 525	3 680 838	2.56	860 401	1 798 925	2.09	265 160	284 813	1.07

Source: MoAC.

Other crops

The impact of the 2006 summer dry spell and floods on pulses and oilseeds could not be assessed but it is likely that the impact was limited as these crops are mainly cultivated during the winter in the Terai or intercropped (pulses) during the summer season with maize in the Hills.

The impact of the 2006 summer dry spell and floods on cash crops could not be assessed, but it is likely that the impact was limited as cash crops are mainly cultivated on irrigated land. Furthermore, it is likely that the floods that affected Banke and Bardiya districts had limited impact as cash crops are generally grown during the winter in these areas.

Livestock

The impact of the winter 2005/06 drought and summer 2006 dry spell on livestock could not be assessed. Although there are anecdotal reports of losses of livestock in the Karnali region following the 2005/06 drought, the MoAC data suggests that the impact was marginal.

3.2 Main winter crop season in 2007

With average and above-average rainfall from October to December 2006, soil moisture was generally good for winter crop germination and growth. The levels of pests and diseases remained normal during the cropping season 2006/07. Yellow rust on winter wheat was reported in Taplejung and Tanahu districts. Yellow rust may possibly have affected those crops for which farmers used their own seeds for this winter cropping season. During the 2006/07 cropping season, the use of fertilizers and farmyard manure

remained average. In the Hills, supply was reported problematic mainly for vegetable producers while in the Mountains fertilizer use remained marginal and farmyard manure application was average.

The use of improved seeds remained average for paddy and maize while a shortage of high quality improved seeds was reported for wheat in the Hills due to lower than average yield on seed farms during the winter of 2005/06. A higher proportion of farmers used their own wheat seeds for the winter 2006/07 cropping season. The supply and distribution of improved seeds is anticipated to be normal for the 2007/08 crop season for all cereal crops.

Wheat and barley production

The prospects for wheat and barley crops are above average due to timely and sufficient rainfall in winter 2006/07. An increase of 7 percent in production is expected compared to the five-year average (Table 5). There are pockets of lower production in the food insecure Mid-Western Hills (Rukum, Rolpa, Pyuthan, Dailekh and Jajarkot districts) and in the Far-Western Hills (Bajura district).

Table 5: Area, production and yield of the two main winter cereals in 2006/07 by Region and Agro-ecological Zone and changes compared to five years average (2001/02 to 2005/06)

Region/Zone	Wheat			Barley			Total	Changes
	Area (ha)	Prod. (tonnes)	Yield (t/ha)	Area (ha)	Prod. (tonnes)	Yield (t/ha)	Prod. (tonnes)	%
Eastern Mountains	6 600	11 388	1.73	475	689	1.45	12 077	10.5
Eastern Hills	28 100	50 660	1.80	1 464	1 277	0.87	51 937	5.3
Eastern Terai	94 330	185 073	1.96	99	49	0.50	185 122	-1.8
Eastern Region	129 030	247 120	1.92	2 038	2 015	0.99	249 135	0.1
Central Mountains	14 815	25 593	1.73	496	627	1.26	26 220	7.0
Central Hills	52 340	117 434	2.24	1 607	1 853	1.15	119 287	5.1
Central Terai	147 275	328 909	2.23	477	679	1.42	329 588	4.3
Central Region	214 430	471 937	2.20	2 580	3 159	1.22	475 096	4.7
Western Mountains	940	1 534	1.63	618	834	1.35	2 368	-5.2
Western Hills	60 860	116 055	1.91	3 585	3 963	1.11	120 018	2.2
Western Terai	79 330	178 992	2.26	233	281	1.21	179 273	9.2
Western Region	141 130	296 581	2.10	4 435	5 078	1.14	301 659	6.2
Mid-Western Mountains	12 565	18 142	1.44	6 602	8 343	1.26	26 485	27.0
Mid-Western Hills	67 970	109 398	1.61	5 113	5 625	1.10	115 023	-6.0
Mid-Western Terai	44 950	108 388	2.41	51	86	1.69	108 474	20.4
Mid-Western Region	125 485	235 928	1.88	11 767	14 054	1.19	249 982	7.2
Far-Western Mountains	17 330	29 278	1.69	3 744	4 177	1.12	33 455	15.8
Far-Western Hills	36 400	60 495	1.66	1 213	1 879	1.55	62 374	20.9
Far-Western Terai	49 350	115 880	2.35	156	219	1.40	116 099	32.1
Far-Western Region	103 080	205 653	2.00	5 113	6 276	1.23	211 928	25.8
Mountains	52 250	85 934	1.64	11 935	14 670	1.23	100 604	12.3
Hills	245 670	454 042	1.85	12 982	14 598	1.12	468 640	3.2
Terai	415 235	917 242	2.21	1 017	1 314	1.29	918 556	8.5
Nepal	713 155	1 457 218	2.04	25 934	30 582	1.18	1 487 800	7.0

Source: Mission estimates.

3.3 Aggregate crop production and food deficit in 2006/07: national and sub-national situation

Table 6 shows the aggregate production situation for major food crops in 2006/07. It shows that the loss of major summer crop in 2006 is partly made up by the expected increase in 2007 winter crops. The total food crop production in cereal equivalent, including potato, is forecast at 6.35 million tonnes, 3.4 percent below the previous year's production and 1 percent lower compared to the average of the previous five years. Most reductions took place in Eastern Terai (14 percent), Central Terai (8 percent), and Western Mountains (5 percent), as noted earlier.

Table 6: Nepal – Major cereal production by Region and Zone, 2006/07

Region/Zone	Cereal production in 2006/07 (tonnes)							% of total production over	
	Rice ^{1/}	Maize	Millet	Wheat	Barley	Potato ^{2/}	Total	2005/06	Average
Eastern Mountain	28 343	69 448	15 175	11 388	689	22 944	147 986	99.9	105.7
Eastern Hills	114 914	271 603	52 188	50 660	1 277	51 724	542 366	96.3	102.9
Eastern Terai	561 562	111 750	6 255	185 073	49	68 001	932 690	84.2	85.8
Central Mountain	27 434	62, 397	24 195	25 593	627	17 776	158 022	99.4	102.1
Central Hills	181 133	292 542	40 316	117 434	1 853	62 680	695 958	99.1	100.3
Central Terai	513 355	106 636	4 350	328 909	679	59 287	1 013 217	94.8	91.8
Western Mountain	0	1 145	7	1 534	834	2 045	5 565	96.4	94.9
Western Hills	199 360	452 301	106 546	116 055	3 963	30 036	908 261	97.9	106.4
Western Terai	279 796	29 042	730	178 992	281	16 262	505 103	100.5	98.4
Mid-Western Mountain	7 699	13 690	8 355	18 142	8 343	8 124	64 352	112.9	110.4
Mid-Western Hills	75 984	198 662	13 936	109 398	5 625	15 377	418 983	102.9	106.4
Mid-Western Terai	172 884	92 385	135	108 388	86	14 090	387 968	94.5	102.2
Far-Western Mountain	14 637	16 929	5 675	29 278	4 177	3 636	74 332	108.2	106.6
Far-Western Hills	35 613	37 003	6 570	60 495	1 879	5 665	147 226	111.1	111.4
Far-Western Terai	179 832	43 393	380	115 880	219	11 000	350 704	110.4	115.1
Eastern Region	704 819	452 800	73 618	247 120	2 015	142 669	1 623 041	89.2	92.5
Central Region	721 922	461 575	68 861	471 937	3 159	139 744	1 867 198	96.8	95.7
Western Region	479 155	482 488	107 283	296 581	5 078	48 344	1 418 929	98.8	103.4
Mid-Western Region	256 566	304 737	22 426	235 928	14 054	37 592	871 303	99.6	104.8
Far-Western Region	230 082	97 325	12 625	205 653	6 276	20 301	572 261	110.3	113.0
NEPAL	2 392 545	1 798 925	284 813	1 457 218	30 582	388 649	6 352 732	96.6	99.0

Source: Estimated by this Mission.

^{1/} Milled rice (at milling rate of 65 percent).

^{2/} Cereal equivalent (at ratio of 20 percent).

With a steady growth in population and food requirements during the last two decades on the one hand, and slow and fluctuating growth in cereal production on the other, Nepal has been a net cereal importer for most years during in the last two decades.

The projected supply/demand balance for the marketing year 2006/07 at national level is summarized in Table 7. Table 8 presents the cereal self-sufficiency situation in 2006/07 by five development regions and 15 sub-regions.

The assumptions on consumption and utilization parameters are noted in Table 7. Total cereal (including potato in cereal equivalent) availability at the national level is estimated at 7.59 million tonnes, with 6.35 million tonnes of production and 1.24 million tonnes of opening stocks. Total cereal utilization is projected at 7.82 million tonnes. Cereal deficit at the national level is estimated at 225 000 tonnes, compared to 23 000 tonnes in the previous year.

It is very difficult to estimate commercial imports due to the long border and informal trade with India. However, the food deficits in urban/Central Hills (280 700 tonnes in Table 8), in Eastern Terai (7 100 tonnes), in Central Terai (113 100 tonnes), and in Western Terai (12 400 tonnes) are expected to be met to a large extent by commercial imports through formal and informal trade (more than 110 600 tonnes) and some 300 000 tonnes by domestic purchases.³

Due to the lack of purchasing power and food access (discussed in the following section), the cereal requirements of vulnerable groups will not be fully translated into demand. The total food aid requirement is estimated at 114 400 tonnes, including 1 400 tonnes in Western Mountains, 19 200 tonnes in Mid-

³ Cereal deficit of some vulnerable groups in Terai may not be translated into effective demand.

Western Mountains, 31 000 tonnes in Far-Western Mountains, and 62 800 tonnes in Far-Western Hills. Among them, the Nepal Food Corporation (NFC) supplied 38 000 tonnes in 2006, and is expected to provide around 20 000 tonnes in 2007. WFP is expected to provide 81 786 tonnes under its emergency programme, 33 517 tonnes under its country programme, and 39 405 tonnes for food assistance to conflict-affected people. Therefore, an uncovered deficit of around 12 614 tonnes remains.

Compared to total cereal production, per capita production in 2006/07 has declined more significantly from the average, as shown in Table 9 and Figure 2, reflecting the fast population growth. At the national average, per capita cereal output fell by 17 kg per person or 7.4 percent over the average of the previous five years. In terms of the size of the deficit, the highest deficits in 2006/07 are in the Central region (281 000 tonnes in Hills and 113 000 tonnes in Terai) as a result of a large total and urban population. However, on a per-capita basis, the food grain deficit areas are concentrated in the Hills and Mountains of the Far- and Mid-West. Five groups of regions are in severe cereal deficit. Besides the Central Hills (with per capita 146 kg) which includes the Kathmandu valley, the other four include the Far-West Hills (142 kg/person), Far-West Mountains (143 kg/person), Mid-West Mountains (158 kg/person), and Western Mountains (165 kg/person). Per capita cereal production is much lower than the national average (209 kg) and the minimum requirement (203 Kg).

Food deficit has been a long-term problem in Far- and Mid-West Hills and Mountains. The five-year average per capita food production by group and region (Table 9) show the same pattern as for 2006/07, i.e. food deficit is indeed a chronic food insecurity problem; production is grossly inadequate while economic access to food is limited by low purchasing power. Due to the mountainous terrain and limited or no road infrastructure in this area, markets are almost non-existent. As imports of food grains to these areas are mostly limited to subsidized rice distributions through NFC, food aid and small quantities carried by returning migrant labourers, local food production plays a critical role in the region's food security. Local crop failures due to drought, hailstorms or landslides can thus seriously affect food availability and be the cause of acute local food crises.

There are 13 districts with per capita cereal production less than 150 kg (Figure 3). From lowest to highest, the districts are Kathmandu, Humla, Lalitpur, Bajura, Achham, Dolakha, Bhaktapur, Mahottari, Kalikot, Baitadi, Bajhang, Dolpa, and Rautahat. There are a further 14 districts with per capita cereal production between 150 kg and 180 kg (Figure 4).

Table 7: Nepal – Cereal supply and demand balance by commodity, 2007 ('000 tonnes)

	Rice	Maize	Millet	Wheat	Barley	Potato ^{1/}	Total
Total availability	2 692.5	2 178.9	284.8	2 017.2	30.6	388.6	7 592.7
Opening stocks	300.0	380.0		560.0			1 240.0
Production	2 392.5	1 798.9	282.8	1 457.2	30.6	388.6	6 352.7
Total utilization	2 906.3	2 178.9	295.7	2 017.2	30.6	388.6	7 817.4
Food use ^{2/}	2 354.8	1 243.2	264.6	1 164.2	24.4	319.8	5 371.0
Seed use ^{3/}	514.6	17.2	2.7	85.6	3.1	29.9	190.0
Losses ^{4/}	2 392.5	179.9	28.5	145.7	3.1	38.9	635.3
Feed and other uses ^{5/}	9.4	310.0		61.8			381.2
Closing stock	300.0	380.0		560.0			1 240.0
Cross-commodity substitution	-48.6	48.6					
Import requirement	213.7		10.9				224.6
Anticipated commercial imports	105.7		4.9				110.6
Expected WFP food aid							81.8
Expected NFC food aid							20.0
Uncovered deficit							12.6

Source: Estimated by this Mission.

^{1/} In cereal equivalent (ratio=20 %); ^{2/} Based on per capita food use requirement of 203 kg (89 kg of rice, 47 kg of maize, 10 kg of millet, 44 kg of wheat, 1 kg of barley, and 12 kg of potato); ^{3/} Based on planting area; ^{4/} 10% of production, and ^{5/} 6% of production.

Table 8: Nepal – Cereal^{1/} balance by Group and Region, 2007 ('000 tonnes)

	Total production	Losses	Seed use	Food use	Feed and other	Total demand	Balance
By Group							
Eastern Mountain	148.0	14.8	4.7	87.2	8.9	115.6	32.4
Eastern Hills	542.4	54.2	14.0	362.6	32.5	463.4	79.0
Eastern Terai	932.7	93.3	29.0	761.5	56.0	939.7	-7.1
Central Mountain	158.0	15.8	4.7	124.2	9.5	154.1	3.9
Central Hills	696.0	69.6	17.0	848.3	41.8	976.7	-280.7
Central Terai	1 013.2	101.3	32.6	931.6	60.8	1 126.3	-113.1
Western Mountain	5.6	0.6	0.4	5.7	0.3	7.0	-1.4
Western Hills	908.3	90.8	19.8	617.4	54.5	782.5	125.7
Western Terai	505.1	50.5	17.6	419.1	30.3	517.5	-12.4
Mid-Western Mountain	64.4	6.4	3.8	69.5	3.9	83.5	-19.2
Mid-Western Hills	419.0	41.9	14.0	334.6	25.1	415.6	3.4
Mid-Western Terai	388.0	38.8	11.1	294.9	23.3	368.1	19.9
Far-Western Mountain	74.3	7.4	3.7	89.8	4.5	105.4	-31.0
Far-Western Hills	147.2	14.7	6.5	180.0	8.8	210.0	-62.8
Far-Western Terai	350.7	35.1	11.0	253.4	21.0	320.5	30.2
By Region							
Eastern Region	1 623.0	162.3	47.8	1 210.4	97.4	1 517.8	105.2
Central Region	1 867.2	186.7	54.3	1 903.0	112.0	2 256.1	-388.9
Western Region	1 418.9	141.9	37.8	1 040.1	85.1	1 304.9	114.0
Mid-Western Region	871.3	87.1	28.9	699.4	52.3	867.7	3.6
Far-Western Region	572.3	57.2	21.2	508.7	34.3	621.4	-49.1
Nepal	6 352.7	635.3	190.0	5 371.0	381.2	6 577.4	-224.6

Source: Estimated by this Mission.

^{1/} Including potato in cereal equivalent; other notations are the same as in Table 7.

Table 9: Nepal – Per capita cereal production^{1/} by Group and by Region

	2002/03 kg	2005/06 kg	2006/07 kg	2001/02 – 2005/06 ^{2/} kg	2006/07 over average %	2006/07 over 2005/06
By Group						
Eastern Mountain	287	303	299	292	102.6	98.8
Eastern Hills	276	280	265	268	99.0	95.0
Eastern Terai	277	264	216	269	80.2	82.0
Central Mountain	228	230	225	231	97.4	97.8
Central Hills	163	151	146	158	92.5	96.4
Central Terai	223	208	192	226	84.8	92.3
Western Mountain	208	175	165	185	89.0	94.0
Western Hills	245	272	262	257	102.2	96.5
Western Terai	226	217	212	234	90.5	97.7
Mid-Western Mountain	150	142	158	150	105.5	111.6
Mid-Western Hills	215	218	220	218	101.0	101.1
Mid-Western Terai	235	254	233	248	94.0	91.7
Far-Western Mountain	137	134	143	141	101.6	106.8
Far-Western Hills	130	130	142	134	106.0	109.1
Far-Western Terai	222	230	244	238	102.7	106.3
By Region						
Eastern Region	278	271	237	271	87.5	87.3
Central Region	197	184	173	196	88.5	94.2
Western Region	237	250	242	247	97.7	96.9
Mid-Western Region	216	225	219	223	98.1	97.3
Far-Western Region	176	183	197	186	105.8	107.9
Nepal	224	222	209	226	92.6	94.3

Source: Calculated by this Mission.

^{1/} Estimated based on: a) cereal production including potato in cereal equivalent, b) excluded losses and seed use, and c) population projected based on 2001 data and growth rate between 1991 and 2001.

^{2/} Five-year average for rice, wheat, maize, millet, barley and two-year average (2002/03 and 2005/06) for potato.

Figure 2: Per Capita Cereal Production (kg) by Region and Zone, 2001/02-2005-06

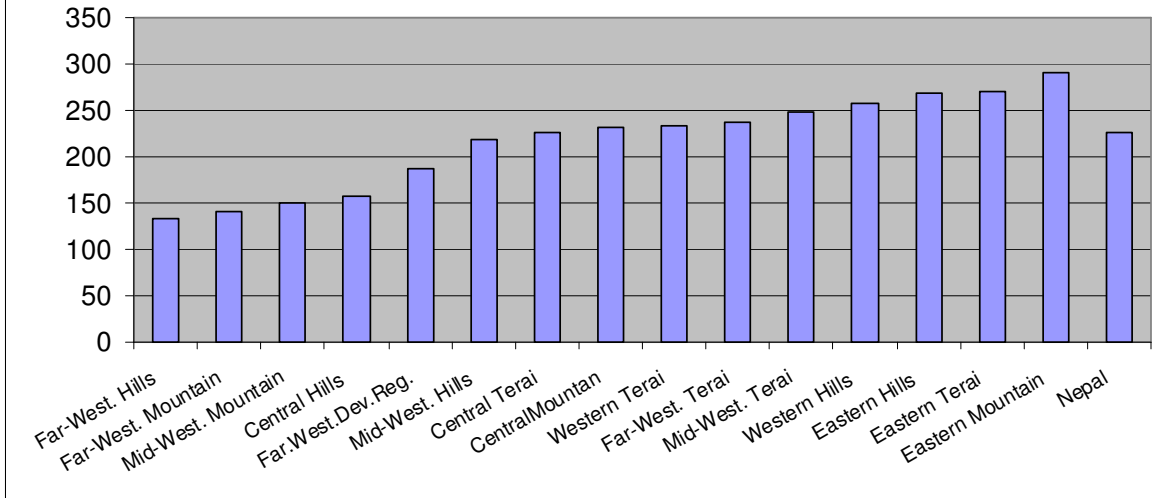
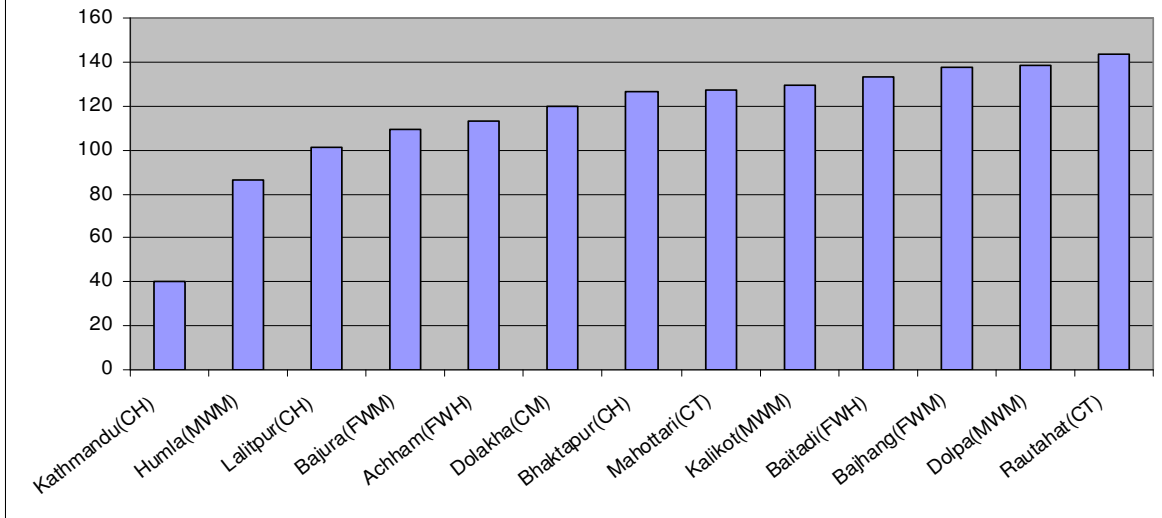
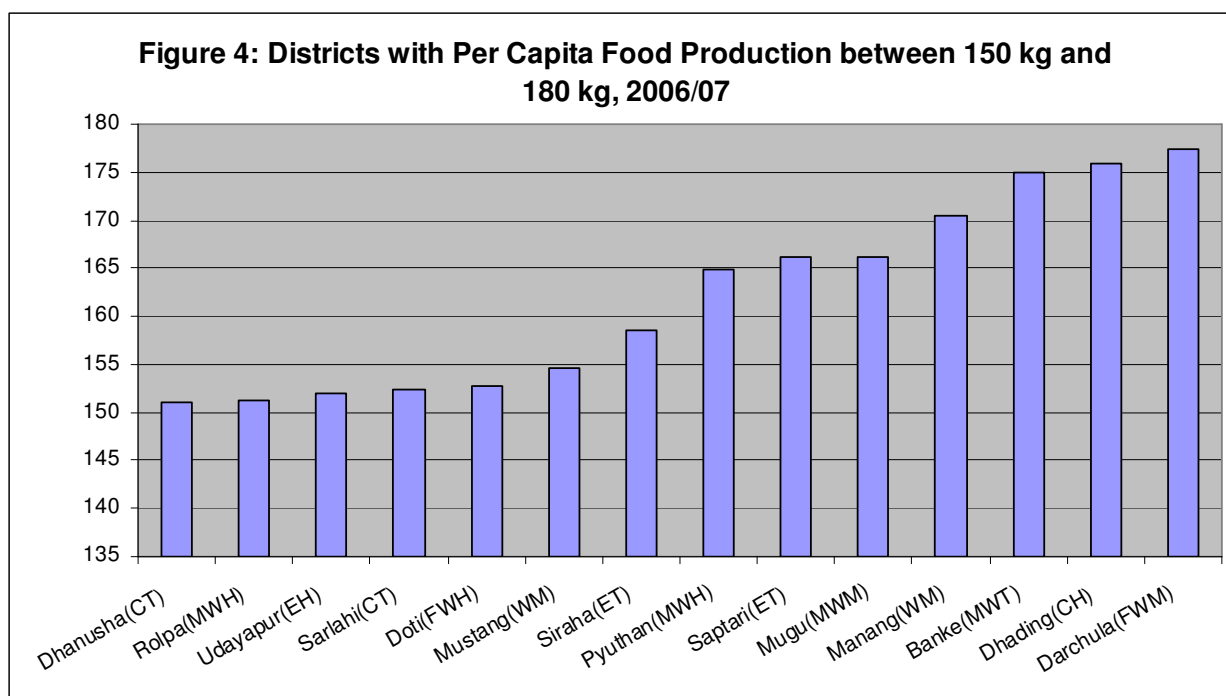


Figure 3: Districts with Per Capita Food Production Less than 150 kg, 2006/07





Source: Figures 2-4 are estimated by this Mission.

4. FOOD MARKET AND ACCESS, NATIONAL AND SUB-NATIONAL SITUATION

4.1 Market prices and integration

The role of trade policy in domestic cereal prices

Under the Nepal-India Trade Treaty, trade in primary agricultural products is free of customs duty on a reciprocal basis. There are no quantitative restrictions either. However, in the case of cereals and many other food and agricultural products, Nepal levies some taxes at the border. For 2006/07, there is an agricultural development duty of 8 percent and a 1.5 percent local development tax. In the case of cereals, the effective tax is much lower, some 5-6 percent rather than the 9.5 percent since the import valuation used is often lower than actual import price.

In the context of this report, the relevant issue is the role that these taxes play in influencing the prices and supply of cereals in Nepal particularly during the drought periods. Based on interviews with traders, the Mission confirmed that during drought periods, traders did not encounter any obstacles to restrict cereal imports from India, and thus markets were supplied with cereals as per demand.

As duties are fairly low, what would be more important than tariffs are trade facilitation measures in case of future food shortages. There are many such measures, ranging from reaching a political understanding with the government of India for facilitating this trade to simplifying customs and transport procedures and availing credit to traders. Traders interviewed were confident that given Nepal's needs in such events, relative to what is available in the Indian markets, supplying Nepal's markets with cereals should not be an issue. There are serious problems of course when it comes to access to food by vulnerable population groups, including in the Terai, and supplies to the Mountains regions. In both cases, markets are of limited value.

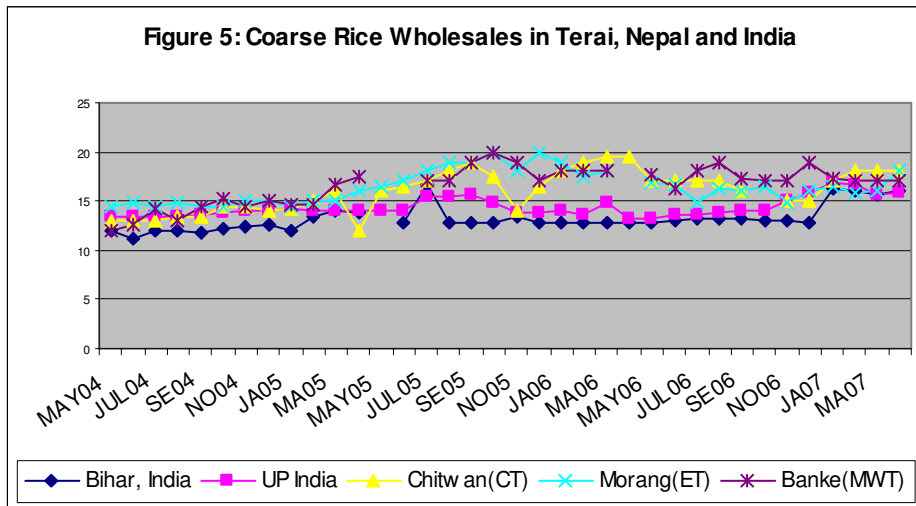


Figure 5 indicates that the monthly price of coarse rice, the major cereal staple in Nepal, has been relatively stable in recent years. The regional markets taken for the assessment in the Terai are Morang in the east, Chitwan in the centre, and Banke in the Mid-West, while Indian markets that were selected are in Bihar and Uttar Pradesh which have long borders with Nepal. The prices in Morang and Banke markets are relatively stable related to those in Indian markets, but with more variation, especially in Chitwan in the Central region, reflecting the local food supply and conflict situations.

Nepal has been a net importer (formal and informal trade) of rice in recent years. As indicated in the chart, the prices and market situation in the bordering Indian markets have a significant role in determining market price for crops in Nepal. The rice market system in the country is integrated in terms of association of price movements among the regional markets in Terai and with the adjoining Indian markets. The agricultural market study (WFP/FAO, 2006) also indicated that there is no strong relationship between the cost of production and market prices. These are foremost governed by Indian market prices, except for some specific varieties produced in Nepal.

Market integration/isolation among ecological zones

Figures 6 to 8 present the monthly average rice prices from 2004/05 to 2006/07 in three different development regions for a comparison of markets in Terai, Hills, and Mountains within the same region from south to north.

Two Figures in the Eastern region and Mid-Western region show a similar situation for prices in the three different ecological zones. The prices in Terai markets and Hills markets are very closely related for the whole three-year period. However, the rice prices in Mountains markets are consistently much higher, indicating the short supply and isolation of markets. Compared to the differences in the Eastern region and Mid-Western region, the rice price difference between Terai and Mountains in the Central region is much smaller, but the difference between Terai and Hills is large. On average during the three years, the rice price in mountain market is 177 percent over that in Terai markets in the Mid-Western region, 123 percent higher in the Eastern region, and 37 percent higher in the Central region. When comparing prices in Hills markets with prices in Terai markets, there is a 1 percent difference in the Mid-Western region, a 3 percent difference in the Eastern region, and an 18 percent difference in the Central region.

The higher rice prices are determined by the degree of the food deficit (as discussed in the section above) in the Mountain region and most of all by road conditions and transportation costs.

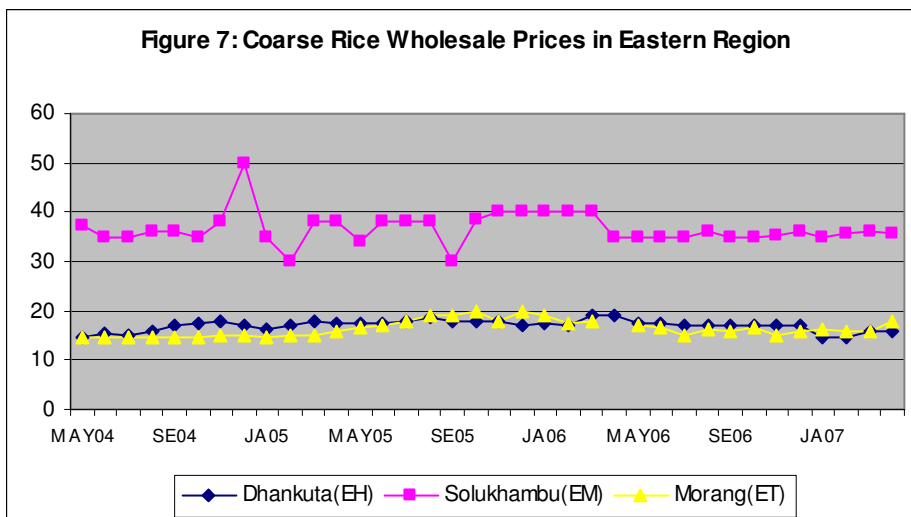
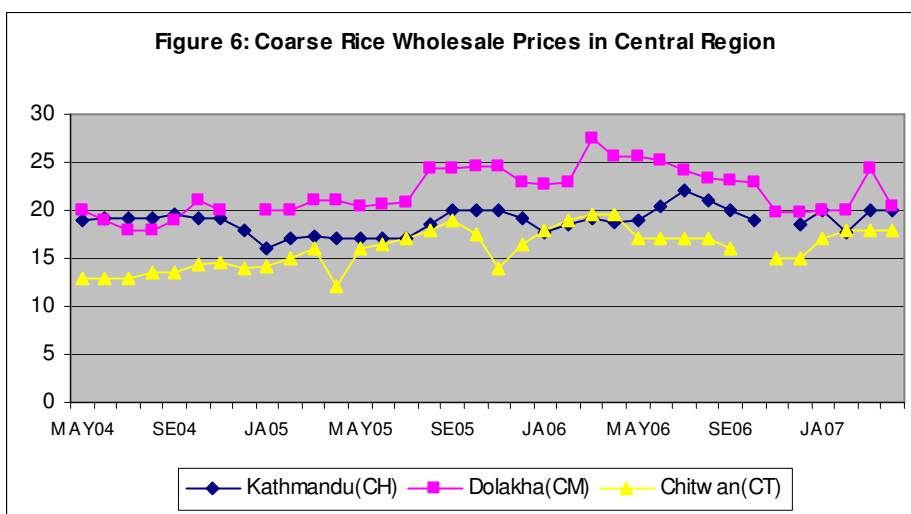
Access to infrastructure and services

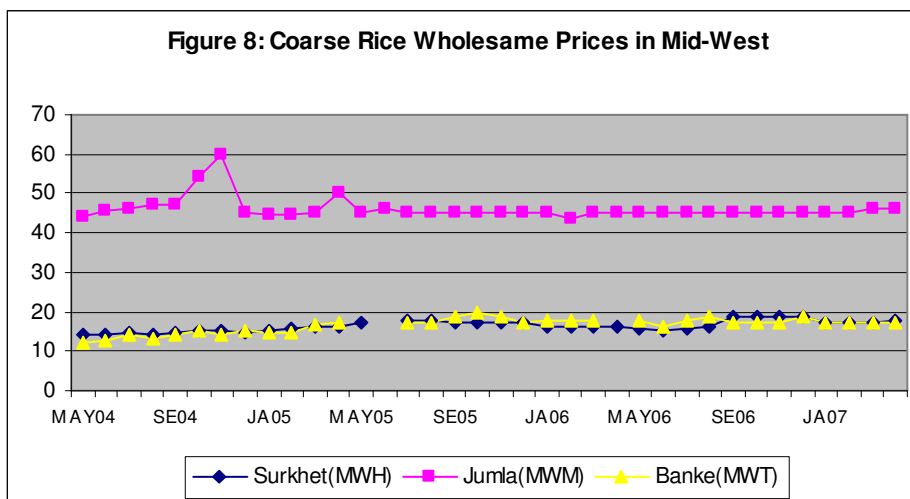
Communities in the Mountain region significantly lag behind the other regions regarding access to infrastructure and services. Even small, “local” markets are not easily accessible in the mountain communities. Nearly three-quarters of the mountain settlements reported having to walk 24 hours or more to reach the nearest all-weather road. That compares to only 5 percent of settlements in the Hills and zero percent in the Terai (WFP, 2000). For some communities in Humla, the nearest markets were as far as four to five days’ walking distance. The government is unable to provide subsidized food grain in this

region. Poor infrastructure and high transportation costs are the major causes of the high market prices and food insecurity.

Conflict-related factors affecting agricultural marketing

At present Nepal is facing an unprecedented crisis in its modern history. The armed rebellion started by the Communist Party of Nepal (Maoist) in February 1996 in the four Western Hill districts of Nepal later expanded all over the country. Agriculture is one of the sectors of the economy which is hard hit by the armed conflict in Nepal in terms of production, processing and marketing. The conflict has created significant problems in agricultural markets in both rural and urban areas (WFP/FAO, AMS Field Survey, 2006). Seventy-six percent of respondents reported specific problems related to the functioning of agricultural storage, transportation and marketing in their areas, due to blockades and strikes. Telecommunication and transport infrastructures (roads, bridges, civil aviation towers, suspension bridges, etc.) have been the major targets in the past decade. Both the security forces and the rebels have obstructed food marketing within their areas of influence.





Source: The data used in Figures 5-8 are from MoAC, Agribusiness Promotion Programme.

4.2 Poverty and food security

Based on 2003/04 NLSS data, per capita expenditure is estimated at US\$266 (current value) per year (Table 10). There is a big disparity in expenditures between urban and rural residents, with US\$158 in rural and US\$553 in urban areas. Poverty is significantly higher in rural areas compared to the cities. Annual per capital expenditure in the rural Far-West is extremely low (only US\$133). The study of Small Area Estimation (SAE) carried out by CBS, WFP and the World Bank indicates that 37 percent of the rural population is living below the poverty line of 7 696 rupees (or US\$101) per year, compared to 13 percent in urban areas. Based on the SAE, the proportion of population below the poverty line is much higher in the Mountains (42.5 percent) among three ecological zones (36.6 percent in Hills and 29.5 percent in Terai) and in the Far-West (45.6 percent) and Mid-West (46.5 percent) among the five development regions. People living in the Mountains spend more on food (65 percent) then those living in the Hills (55.4 percent) and Terai (51.7 percent).

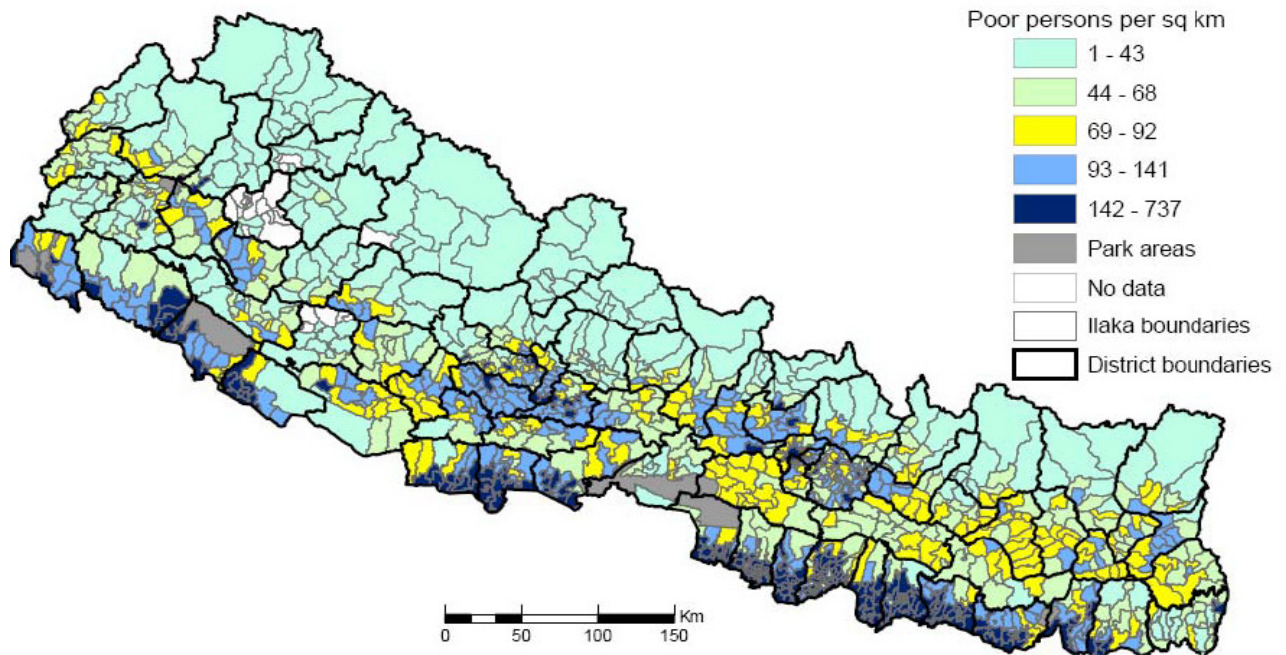
Table 10: Nepal - Per capita consumption expenditure and poverty incidence

	Annual per capita expenditure ^{1/}		Share of food expenditure ^{2/}	Poverty incidence ^{3/}
	In current NRs	In current US\$	%	%
Nepal	20273	266	36.9	33.5
Rural	11987	158	54.8	36.9
Urban	42052	553	23.5	13.2
Rural Mountains	11263	148	64.8	42.5
Rural Hills	12927	170	55.4	36.6
Rural Terai	11413	150	51.7	29.5
Rural East	11173	147	58.3	31.6
Rural Central	11516	151	53.7	26.5
Rural West	14854	195	53.7	34.5
Rural Mid-West	11899	156	53.8	46.4
Rural Far-West	10143	133	54.5	45.6

1/ and 2/ Calculated by this Mission based on NLSS 2003/04 data; 3/ Based on SAE by CBS, WFP and WB 2006.

Food insecurity in the surplus areas of the Terai and Lower Hills is foremost an issue of food access. Although the incidence of poverty in these areas is generally lower than in the Hills and Mountains of the Far- and Mid-West, the concentration of poverty (as measured by the number of poor people per square kilometre) is very high (see map that follows).

Poverty Density



Due to high poverty levels, people have limited purchasing power to buy food in the markets. Based on the Mission's observations, the income inequality is likely to be higher in the Terai than in the Hills and Mountains. Vulnerable communities such as Dalits, Adivasi Janajatis and Kamayas often struggle to access sufficient food. The result is that the Terai is characterized by very high wasting levels above emergency levels (see next section). Unfortunately, no disaggregated data are currently available that provide insight in the food security situation of marginalized communities in the Terai. Other important factors contributing to food insecurity and malnutrition in the Terai remains high include limited nutritional knowledge, inappropriate hygiene and caring practices, and the gender division within the household, which places women in a disadvantaged position.

Farm income is still a dominant source for the rural population, especially households living in the Mountains and households in lower income groups. According to 2003/04 NLSS data, 48 percent of household income comes from farm income, 28 percent from non-farm income, 11 percent from remittance, 10 percent from housing consumption and 4 percent from other sources (Table 11). However, for households living in the Mountains, 59 percent of household income is from agriculture only 19 percent from non-farm income and 9 percent from remittances. Similarly, the poorest and second poorest groups, based on consumption quintiles, are also highly dependent on farm income (62 percent and 58 percent, respectively), while remittances are lower (8 percent and 9 percent) compared to the national average.

Table 11: Shares of household income

	Farm income	Non-farm income	Remittances	Other^{1/}
Development Region				
East	53	26	11	11
Central	47	32	9	13
West	40	24	17	19
Mid West	52	30	8	11
Far West	54	21	11	14
Ecological Zone				
Mountains	59	19	9	13
Hills	45	28	11	17
Terai	49	28	12	11
Urban/Rural				
Urban	13	54	10	23
Rural	55	23	11	11
Consumption Quintile				
Poorest	62	23	8	7
Second	58	25	9	11
Third	56	24	10	10
Fourth	47	25	14	14
Richest	25	38	13	24
Nepal	48	28	11	14

Source: CBS (December 2004), Statistical Report Volume Two, Nepal Living Standards Survey 2003/04, p 39.

1/ Includes rental value of own house.

4.3 Food consumption (caloric intake) and undernourishment

Undernourishment refers to the condition of people whose dietary energy consumption is continuously below a minimum dietary energy requirement for maintaining a healthy life and carrying out light physical activity.

Table 12: Rural Nepal – Mean per capita dietary energy consumption and undernourishment incidence by group

	Mean per capita dietary energy consumption		Undernourishment incidence		
	Kcal/person/day	CV	Below 1 810 Kcal/person/day %	Below 1 910 Kcal/person/day %	Below 2 124 Kcal/person/day %
Nepal	2 405	0.776	22.5	28.6	40.7
Urban	2 419	0.788	22.7	28.8	40.5
Rural	2 400	0.771	22.4	28.5	40.8
Rural East	2 427	0.783	22.3	28.3	40.7
Rural Central	2 382	0.754	22.1	28.2	40.1
Rural West	2 534	0.718	17.3	21.6	33.0
Rural Mid-West	2 310	0.875	29.0	36.0	48.5
Rural Far-West	2 250	0.689	23.5	32.9	47.5
Rural Mountain	2 297	0.784	28.5	35.9	46.3
Rural Hill	2 402	0.782	25.1	31.1	41.8
Rural Terai	2 426	0.756	18.5	24.4	38.4

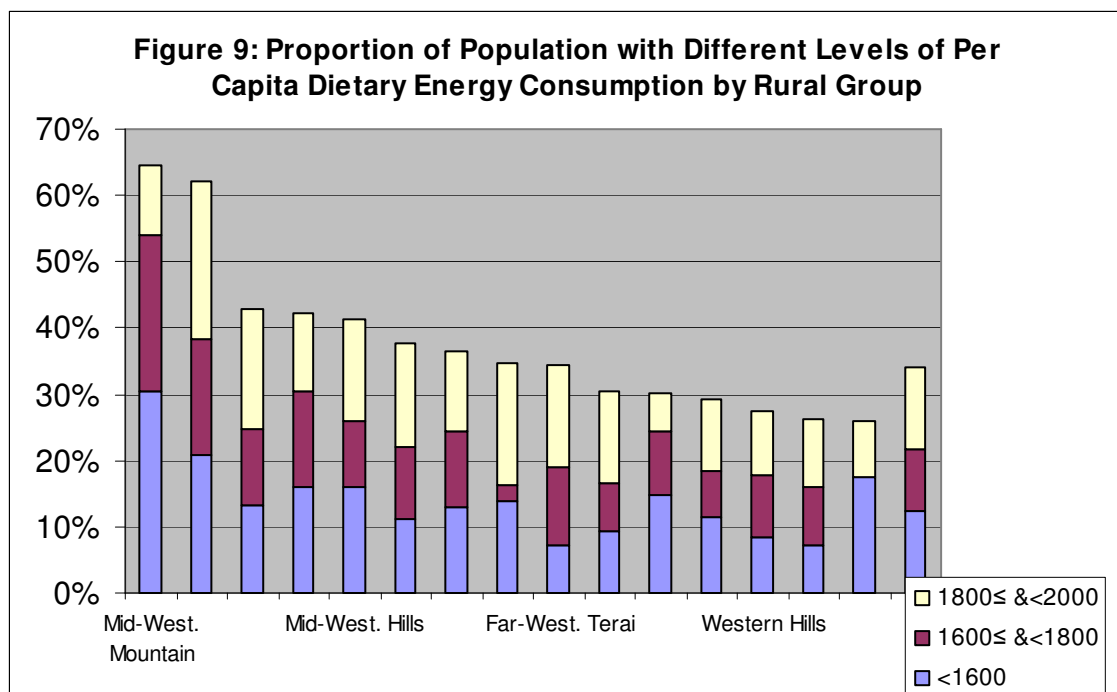
Source: Estimated by this Mission based on 2003/04 NLSS data.

With assistance from CBS, the Mission calculated the mean dietary energy consumption (DEC) and its coefficient of variation (CV) and undernourishment situation at national and sub-national levels by using NLSS 2003/04 data.

At national level, per capita mean dietary energy consumption is estimated at 2 405 kcal/per person/day (Table 12). The figure in 2003/04 varied considerably across different parts of the country, ranging from a low of 2 250 kcal in rural Far-Western region to 2 534 kcal in rural Western region. In terms of mean dietary energy consumption across the belts of Nepal, the Mountain belt has the lowest consumption level at 2 297, compared to 2 402 kcal in the Hills and 2 426 kcal in the Terai.

The proportion of undernourished population in Nepal depends on the criteria in defining the minimum requirement of dietary energy consumption (MRDEC). This report estimated the proportion by using three alternative criteria based on existing studies (2 124 kcal/person/day,⁴ 1 910 kcal/person/day,⁵ and 1 810 kcal/person/day⁶) and the results are also presented in Table 12. The results show a marked difference depending on which of the requirements is used. If the CBS criterion (2 124 kcal) is used, as many as 40.7 percent of the population in Nepal lives below the MRDEC in 2003/04. At the aggregate level, the proportion of undernourished population is highest in the Mid-Western region (48.5 percent), followed by the Far-Western region (47.5 percent), while the Western region has the lowest undernourishment (33 percent). Across the belts, the Mountains have the highest undernourishment, at 46.3 percent, compared with 41.8 percent in the Hills and 38.4 percent in the Terai belt.

Although the proportion under different MRDECs is sensitive to the selection of the criterion, it can be concluded that the shares of population under severe deficit of food energy intakes are very high in the Rural Mountains and Hills, especially in the Mid- and Far- Western regions. Figure 9 provides more detailed information about the population distribution with different food energy intake levels for 15 groups. The figures indicate that food consumption in the Mid-Western Mountains and Far-Western Hills are in a crisis situation with more than 30 percent and 20 percent, respectively, of the rural population consuming less than 1 600 kcal per day, which is substantially lower than the international minimum dietary energy consumption requirement.



Source: Estimated by this Mission.

5. NUTRITION AND HOUSEHOLD VULNERABILITY TO FOOD INSECURITY

5.1 Nutrition status of vulnerable populations

According to the WHO classification (WHO, 1997) for prevalence of malnutrition, the malnutrition situation in Nepal is at crisis level. During the period 1995-2002, Nepal ranked last among 177 countries (tied with Bangladesh) in terms of the proportion of children classified as underweight (UNDP, 2004). Nonetheless, aggregated malnutrition indicators at the national level show that the nutrition status of children has improved slightly over the past five years (2001-2006). Stunting levels decreased slightly from 51 percent to 49 percent and proportion of underweight from 48 percent to 39 percent. On the other hand, wasting, an indicator of acute malnutrition, increased from 10 to 13 percent (DHS, 2006).

⁴ Lee (Chungbuk National University, S Korea) and Gaihre (CBS in Nepal), 2006: Research Paper on Prevalence of Undernourishment in Nepal.

⁵ CBS, 2005: Poverty Trends in Nepal (1995-96 and 2003-04).

⁶ FAOSTAT, 2007.

Considerable geographic variation in the incidence of malnutrition can be observed. Detailed malnutrition maps were published by CBS/WFP/WB in September 2006 (see Maps 1-3). The highest incidence of stunting and underweight is found in the Mountains and Hills areas of the Far- and Mid-Western development region, where more than 60 percent of children are stunted and 50 percent are underweight. Limited availability of food and high poverty rates provide an explanation for these high stunting and underweight rates.

In the Terai, on average 17 percent of children suffer wasting. The percentage of affected children in the Far-Western and Central Terai is as high as 20 percent and 21 percent, respectively. Factors such as differences in the status of women in society, poor eating habits related to lack of knowledge about nutrition, poor caring and hygiene practices and a higher percentage of households without any access to land compared to the Hills and Mountain areas are possible explanations for these high levels of wasting in the Terai.

UNICEF and Action Contre La Faim (ACF) have conducted independent nutrition surveys in selected districts, including those affected by drought and adverse weather conditions. Preliminary results from a UNICEF survey show that in Bajura, 72 percent of children are stunted and 70 percent are underweight. For Jumla, the preliminary estimates are even worse, with 82.3 percent of children stunted and 77 percent underweight. Wasting levels recorded for these districts are very high, at 11.5 and 14.1 percent respectively. An ACF survey conducted in Bajhang in January 2007 estimates the chronic malnutrition rate at 59.2 percent.

Factors that contribute to this very poor malnutrition situation include:

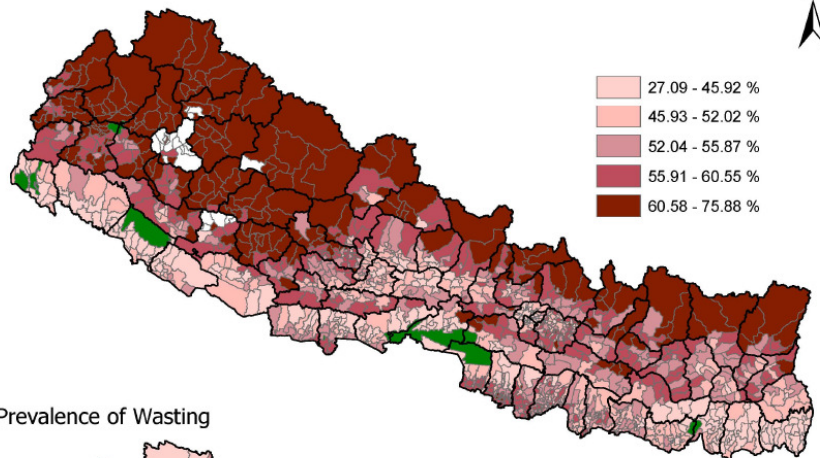
- Inability of households to acquire sufficient and nutritious food.
- Lack of general education and nutrition knowledge of care providers combined with improper hygiene and caring practices.
- Poor access to health services and the limited medical support available. (The Mission visited a sub-health post in Humla. This particular post receives medical supplies once a year and generally runs out of medicine after two months.)
- Two-thirds of households do not have toilet facilities (Comprehensive Food Security and Vulnerability Analysis - CFSVA).
- Access to safe water remains a concern. Forty-four percent of all households rely on public taps. In the Terai, 77 percent of households use tubewells or boreholes as their primary source of drinking water (CFSVA).

A WFP survey conducted in January 2007 in the drought-affected areas included mid-upper arm circumference (MUAC) measurements. The results indicate malnutrition rates of more than 53 percent and a further 24.1 percent of children at risk of becoming malnourished. This same survey also investigated consumption patterns of people in drought-affected and non-drought-affected areas in the Hills and Mountains of the Far- and Mid-West. It becomes clear that in general people in this area do not follow a diet that is rich in proteins, vitamins and minerals. Fish, meat, eggs and fresh fruit are rarely consumed. The survey shows that in areas affected by drought, consumption pattern sharply deteriorate. For example, lentils/pulses, traditionally part of the Nepali diet, were not consumed by more than 50 percent of households within seven days prior to the survey as compared to about 12 percent in non-drought-affected areas. A similar reduction in intake of green vegetables was observed.

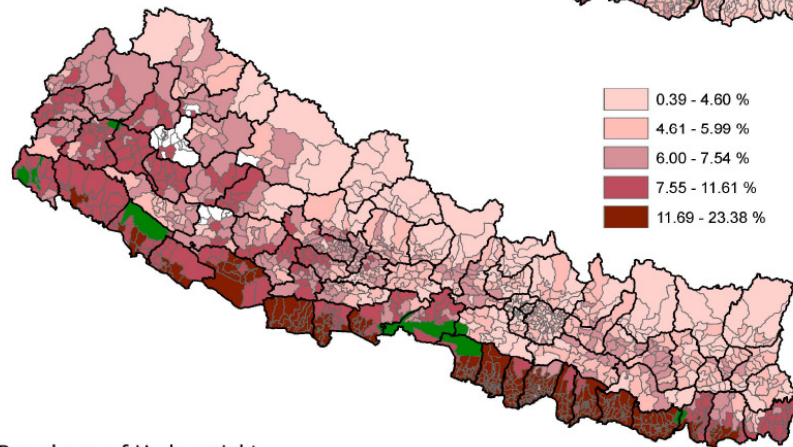
These figures indicate a high level of coping intensity and significant impact on health and nutrition in the localized areas that are affected by drought and other external shocks. Given that migration to India is often not a viable coping strategy, alternative income opportunities are non-existent and markets are not functioning in these areas, external support and income transfers in the form of food aid can be justified. Immediate food aid will secure the families' food needs, prevent further deterioration in their livelihoods and reduce long-term suffering.

Nepal Malnutrition Maps

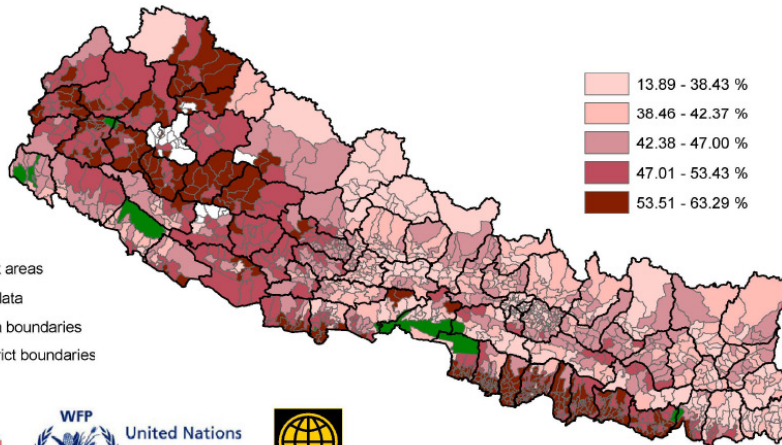
Map 1: Prevalence of Stunting







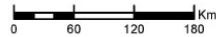
Map 2: Prevalence of Wasting



Map 3: Prevalence of Underweight



-  Park areas
-  No data
-  Ilaka boundaries
-  District boundaries



5.2 Current vulnerability and coping status

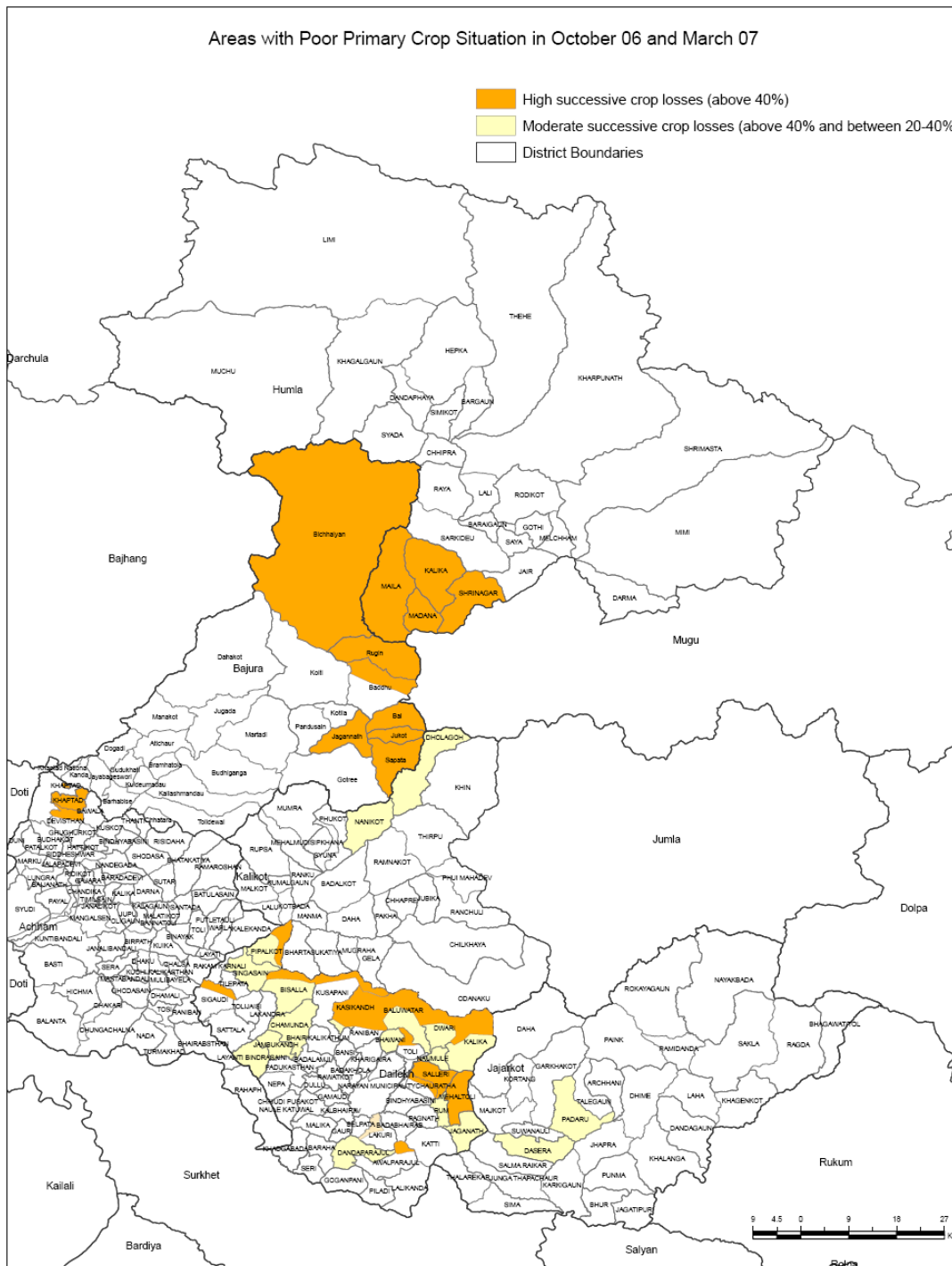
Area and population groups affected or likely to be affected by extreme weather conditions

Although the overall winter crop production has been positive, there remain several areas in the Far- and Mid-West of Nepal which have been severely affected by drought, hailstorm, late snowfall, excessive rainfall and/or pests. Due to these factors, local production was severely affected, with consequent implications for household food security. The WFP Food Security Monitoring and Analysis System has identified areas of concern. They include the southern part of Baitadi, Bajura, the southern tip of Humla, and the northern parts of Kalikot Dailekh and Jajarkot. Detailed wheat crop situation maps for East and West Nepal were published in Issue 5 of the WFP Crop Situation Updates.

The map below combines the crop situation of the main summer crops (paddy, maize or millet) in October 2006 with the crop situation map for the main winter crop (wheat or barley) in March 2007 for areas with expectation of failed, very poor or poor crop production. The orange shaded areas show the condition of harvest loss estimations above 40 percent in both seasons. The yellow shaded areas indicate areas where during one season loss estimates were above 40 percent while in the other season they were between 20-40 percent. In other districts these conditions did not apply.

For an extended emergency operation, it is recommended that these areas be included where the local population has been confronted with subsequent harvest losses in addition to current highly food-insecure areas. A longer support operation would be preferable in which the key underlying factor of food insecurity – i.e. successive crop failure – in these communities would be mitigated through activities such as the construction or rehabilitation of irrigation facilities, introduction of rainwater harvesting techniques, improved water management, provision of appropriate seeds and the establishment of community seed banks.

CROP SITUATION OVERLAY



Impact of adverse weather conditions on livelihoods, nutrition and health

During January 2007, WFP undertook a household survey that provides insights into the effects of drought and other adverse weather conditions on the local food security situation in affected areas (see Emergency Update, February 2007). The fragile food security situation in many rural areas becomes immediately apparent when looking at the results of this survey. Almost 94 percent of households responded that external shocks (drought, hailstorms, lack of employment, illness, landslides and death of family member) immediately result in household food shortage.

Within drought-affected areas, more than 85 percent of households claimed that the food shortages were more severe than last year and that the majority of households within these areas have depleted most of their food stocks. The survey estimates that in drought-affected areas, average household food grain stocks would be depleted within 15 days as compared to 3 months in non-drought-affected areas.

The resilience of a household to external shocks, such as drought and other adverse weather conditions, depends on its socio-economic status. Poor and socially excluded groups will be less able to absorb shocks than well-positioned and better-off households. The Far- and Mid-West regions in Nepal are generally considered as the poorest parts of the country, which would indicate a limited resilience to external shocks and thus a higher incidence of households using irreversible and damaging coping strategies, such as extensive borrowing and sales of productive assets.

The survey shows that almost all households (96.6 percent) in the drought-affected areas shifted their consumption to less preferred and expensive food. More than three-quarters had to borrow money for consumption purposes and almost 73 percent reduced their food intake. More worrying is the fact that half of the affected population had no meal at all at least one day a week and almost 37 percent relied on the collection of wild foods as a source of food. More than half of the households have one or more family members who have migrated in search of jobs. Irreversible coping strategies were also widespread, with over one-third of the households selling agricultural and household assets. A very high number of households (18.5 percent) reported sale of land.

Government policies and distribution of subsidized foods in the hills and mountain areas

The tenth five-year plan (2002-2007) provides an overarching framework for the different government policies and programmes. The key objective of the plan is to address poverty and target specific vulnerable groups such as Dalits, people from remote areas and women. Strategic objectives of the plan include broad-based economic growth, social sector and infrastructure development, targeted assistance and good governance.

In addition to food that the private sector (including households themselves) moves to the deficit Hill and Mountain areas, three other source channels are important, or could become important in the coming years. These are the public sector (NFC), WFP and NGOs. These would also be the main sources for supplying these areas in the event of future production shortfalls; hence their capacity to upscale operations is important for food security.

For many years, NFC has been for many years distributing food to these areas, for which the government provides transport subsidies. These operations are expensive because of the high cost of transport – the cost of transporting rice by air, for example, is typically four times the price of rice in the Terai. Therefore, the budget for subsidies severely limits the amount of food that NFC can supply. Indeed, NFC's distribution to these areas amount to only 5-6 percent of the total deficits. Moreover, for a variety of reasons, NFC cereals do not necessarily reach the most needy households in the districts. In recent years, food distributions in remoter parts of the districts have been severely disrupted by the conflict situation, as food depots were closed. In 2006, NFC delivered approximately 38 000 tonnes of rice to the Hill and Mountain areas. Projected annual supply for 2007 is approximately 20 000 tonnes.

Ongoing food assistance programmes

Targeted food assistance programmes are implemented by the government with considerable financial and logistics support from WFP. The various modes of assistance include the following:

1. Provision of rural employment opportunities to the poor through the Rural Community Infrastructure Works Programme (RCIW). A total of 480 000 poor people benefit from food for work (FFW) projects each year, consisting of rural road construction and community-based projects such as irrigation and soil conservation structures, and income generation projects. FFW programmes cover 25 districts in Nepal. Due to funding constraints, some FFW activities have been rescheduled from the spring until the fall of 2007. Participants are targeted within a 2 km corridor from the planned rural road.
2. A Food for Education Programme directed at improving the nutritional status, school enrolment and attendance by children, particularly girls, by providing a mid-day meal and a take-home ration of oil for girl students. In total 3 600 schools across 18 districts are covered.
3. A Mother and Child Health initiative which aims to improve the health and nutritional status of pregnant and nursing mothers and their young children (aged 6 to 36 months) by providing essential nutritional food support in the form of a monthly take-home ration of fortified food. The programme now operates in 11 districts with average annual beneficiaries totalling 64 000.
4. Emergency assistance in natural disasters.

WFP currently provides emergency assistance to drought-affected communities in the Far- and Mid-Western areas of the country. So far, 375 000 households that had lost their harvest due to drought or other adverse weather conditions have benefited from a one-time support to carry them over to the next harvest. Given the repeated crop failure in several areas in the Far- and Mid-West, WFP is planning to extend its emergency assistance up to November 2007.

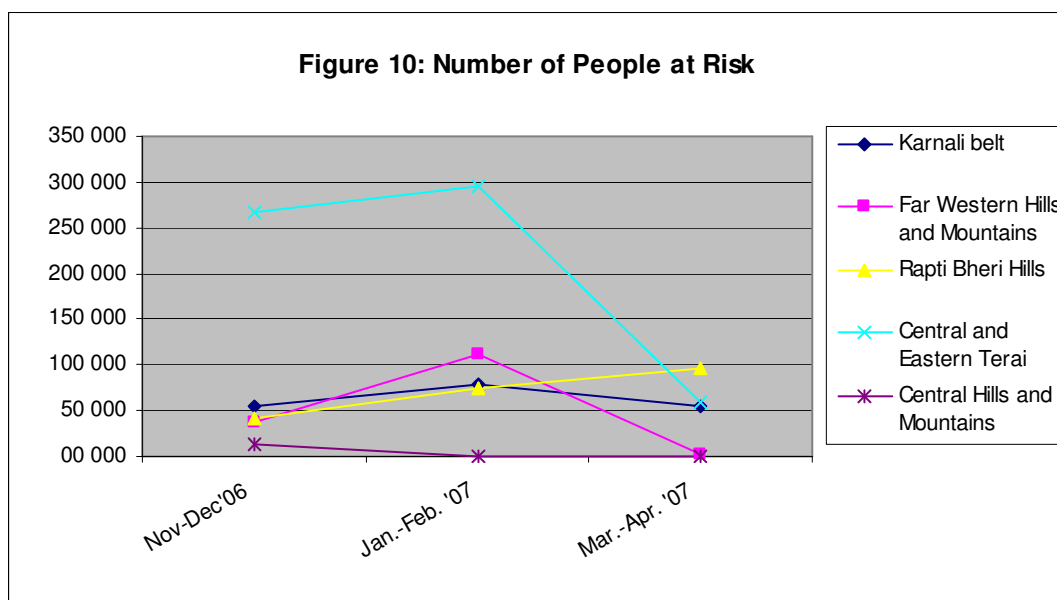
In addition, WFP Nepal is planning a protracted relief and recovery operation (PRRO) to provide food assistance to conflict-affected populations. The overall objective of the PRRO is to safeguard lives and livelihoods and contribute to peace and stability in Nepal during the post-conflict period by protecting and strengthening livelihoods and establishing conditions that promote the rehabilitation and restoration of self-reliance among food-insecure, conflict-affected populations. The PRRO aims to support 1 265 600 food-insecure beneficiaries.

5.3 Estimation of population in need and emergency food assistance requirements

Food security outlook

Food insecurity and hunger remain pervasive in Nepal, not only in food-deficit districts but also within marginalized communities in districts with surplus food production. Poverty intensity is high, and the success of the peace process – although some encouraging developments have taken place – remains uncertain. Agricultural productivity growth is limited, soil erosion is continuing and there are indications of climatic change towards more erratic weather conditions, with drought spells in one area combined with excessive rainfall in others. These factors point to worrying prospects for the food security situation in Nepal. An increase in agricultural productivity is a pre-requisite for development of the economy and therefore the central goal of the Agriculture Perspective Plan, which is officially the main framework for agricultural development. In addition, immediate improvements in the livelihoods of poor households are essential for the peace process to succeed. A longer-term support programme directed at the basic social and economic causes of the civil conflict is essential. High-visibility projects providing immediate assistance to poor and conflict-affected communities should be promoted and reintegration and reconciliation processes of ex-Maoist combatants and IDPS need to be supported.

Population affected and requiring assistance



Every year, the period from February to March – and even longer for communities at higher altitudes – is a season of severe hardship for many poor households. The main winter crops are in their growing stage and agricultural employment opportunities are very limited. Migration trends to urban centres and India tend to increase during this period. The intensity of household food insecurity is therefore much higher than during planting and harvesting periods. However, in the estimation of people at risk of food insecurity, these “normal” or chronically food-insecure households have not been included in the estimates below. These only include households whose food security status has deteriorated substantively because of an

external shock that affected the areas, e.g. drought, landslide, hailstorm. Table 13 shows the variation, as estimated by WFP's Food Security Monitoring and Analysis System, in the number of people at risk during the past six months. The number peaked during the February 2007 due to paddy crop failure in the Eastern Terai. Based on the latest field information from WFP's Food Security Monitoring and Analysis System, the Mission estimates that about 40 500 people in the Far- and Mid-West require immediate emergency assistance. Their food security situation is acute and their livelihoods are severely compromised due to crop failures caused by either drought or hailstorms in these areas. A further 172 000 people are currently at risk of food insecurity. The food security situation of these households requires close monitoring, and assistance may be required if traditional coping mechanisms are further compromised (see also Food Security Bulletin, Issue 17, forthcoming).

As the Mission recommended above, an extended emergency operation (EMOP) should target not only the areas currently classified as highly food-insecure but also include communities affected by subsequent crop losses through a more comprehensive FFW programme directed at mitigating the impacts of drought. These should include construction or repair of irrigation facilities, development of water harvesting facilities as well as provision of improved seed stocks.

Description of targeted population

Poor communities in the Far- and Mid-West should be targeted for external food assistance. These particular communities have suffered three subsequent crop losses due to drought. With yet another crop failure, they would most likely have been facing famine conditions had emergency food aid support not been provided over the past six months. The most vulnerable people within these drought-impacted communities are women, children and the elderly, who stay behind while the able-bodied men leave the villages in search of employment.

Quantification of the food gaps

The total food grain shortage is estimated at 225 000 tonnes. It is expected that about half of this shortage will be met by increased food grain imports (110 600 tonnes). The remaining gap of 114 400 tonnes should be met through food aid or government procurement. For 2007, the subsidized rice distributions to remote food-deficit districts are expected to amount to 20 000 tonnes.

Through an extension of WFP's drought emergency operation, the most critically food insecure can be assisted. Table 13 provides current estimates of the number of people facing acute food insecurity and the number of people at risk of deteriorating food security as a consequence of an external shock that affected the area. As explained above, it does not include households that are chronically food insecure. Based on previous drought emergency support provided, a two-month food ration is sufficient to assist the most vulnerable population in meeting their most immediate needs during the critical months of July and August and carry them through to the next main harvest in November. To support approximately 40 500 acute food-insecure people in the areas hardest hit by drought requires approximately 1 215 tonnes of food grains.

Longer-term support (four months) through FFW interventions to cover 69 400 beneficiaries requires approximately 4 164 tonnes of food grains. These interventions would be directed at mitigating the impact of drought (e.g. rehabilitation or construction of irrigation facilities) to areas continuously affected by drought as identified in the map on page 31, and focusing only on the worst-affected areas.

The remaining food assistance to people at risk of food insecurity (chronic and acute) due to cereal shortages can be covered through a combination of programme options recommended in 5.5.

Table 13: Number of people at risk

SN	District	Warning of deteriorating food insecurity	Acute food and livelihood crisis	Total population at risk
I. Carnali belt				
1	Kalikot	10 300	18 654	28 954
2	Jumla	-	-	-
3	Humla	15 000	-	15 000
4	Dolpa	6 036	-	6 036
5	Mugu	4 650	-	4 650
	Sub-total	35 986	18 654	54 640
II. Far Werstern Hills and Mountains				
6	Bajura	1 200	1 500	2 700
7	Achham	-	-	-
8	Bajhang	-	-	-
9	Baitadi	-	-	-
10	Darchula	-	-	-
	Sub-total	1 200	1 500	2 700
III. Rapti Bheri Hills				
11	Dailekh	14 324	-	14 324
12	Rukum	10 150	-	10 150
13	Jajarkot	52 080	20 370	72 450
	Sub-total	76 554	20 370	96 924
IV. Central and Eastern Terai				
14	Saptari	3 500	-	3 500
15	Siraha	5 000	-	5 000
16	Udayapur	49 538	-	49 538
	Sub-total	58 038	-	58 038
Grand total		171 778	40 524	212 302

Source: WFP Food Security Bulletin, Issue 17.

5.4 Possible strategies for assistance

Food assistance

An extension of the current EMOP in the Far- and Mid-Western regions is recommended to those areas that have been affected by drought in subsequent seasons and those that have been identified as being in a critically food-insecure phase. It is suggested that the modalities of the emergency operation could be modified and involve a somewhat longer period of assistance in which, through FFW activities, the underlying causes of food insecurity would be addressed. This would involve activities that are directed at construction or rehabilitation of irrigation facilities, rainfall water harvesting and improved water management, provision of improved seeds, and establishment of sanitation facilities.

The extended emergency operation would run from July to November and would be directed to the above identified areas. Estimated total tonnage requirement is 5 379 tonnes. This support would help the local population bridge the period until the next main harvest season in late October. The creation of local infrastructure would contribute to mitigating the impact of drought, thereby making the community more self-reliant and decreasing the need for future food aid support.

An immediate support programme is required to tackle the much larger problem of chronic food insecurity and the unacceptable high malnutrition rates. Persistently high levels of food insecurity may destabilize the peace process. It is therefore important that an immediate effort be set in place to improve household food security, poverty and the nutritional situation to prevent these basic causes of the conflict to destabilize the peace process. This would involve rehabilitation of critical infrastructure (irrigation, roads, bridges, health post, schools, etc.) through labour-intensive FFW programmes combined with basic awareness, vocational skills and nutrition training.

A longer-term programme directed at improving the nutrition situation is essential. This would involve a school feeding programme combined with nutrition education at primary schools and a mother and child health and nutrition programme directed at areas with high levels of wasted and underweight children, with lagging educational achievement indicators, such as girl enrolment and attendance.

Non-food assistance

Rehabilitation or construction of irrigation or water harvesting facilities requires establishing partnerships with technical agencies and investments in non-food items. The Mission witnessed the impact of new improved seeds provided as part of the WFP emergency support to the community in Sreenagar Village Development Committee (VDC) in Humla. Despite the drought condition prevailing in this VDC, the newly provided seeds are expected to give a much higher yield than the local seeds. Provision of improved seeds to drought-affected communities can therefore provide a demonstrable and longer-term impact and should be considered as part of the extended emergency assistance.

Logistics considerations

Logistically, Nepal is one of the most challenging countries in the world. Most districts do not have any motorable roads and for many areas in the Far- and Mid-Western regions the options for food delivery are limited to air or mule transport. Costs of operations are very high, and for this reason the focus should be on designing and implementing projects with a sustainable impact.

5.5 Recommendations

An extension of the current WFP emergency operation in the Far- and Mid-Western Region is recommended to those areas that have been affected by drought in subsequent seasons. This would target about 69 400 beneficiaries who have been severely affected by the continuing drought conditions in these areas as well as 40 500 people residing in other areas of the Far- and Mid-West who are currently confronted by severe food-insecurity conditions.

Total food aid requirements for four months of support are 5 379 tonnes. It is suggested that the modalities of the emergency operation would be modified to provide an extended period of assistance in which, through FFW activities, the underlying causes of food insecurity are addressed. This would involve activities that are directed at construction or rehabilitation of irrigation facilities, rainfall water harvesting and improved water management, provision of improved seeds, and establishment of sanitation facilities, amongst others.

An immediate support programme is required to tackle the much larger problem of chronic food insecurity and unacceptable high malnutrition rates. Persistent high levels of food insecurity may destabilize the peace process, and it is therefore important that an immediate effort be set in place to improve household food security, poverty and the nutrition situation to prevent these basic causes of the conflict to destabilize the peace process. This would involve rehabilitation of critical infrastructure (irrigation, roads, bridges, health post, schools, etc.) through labour-intensive FFW programmes combined with basic awareness, vocational and nutrition training. In addition, high-visibility projects providing an immediate assistance to poor and conflict affected communities should be promoted and reintegration and reconciliation processes of ex-Maoist combatants and IDPs need to be supported.

The Mission underlines the importance of closely monitoring vulnerability factors such as food insecurity, malnutrition, unemployment, land issues, migration and health care that could jeopardize the peace process, in order to address emerging issues with timely and targeted interventions.

A longer-term programme directed at improving the nutrition situation is essential. This would involve a school feeding programme combined with nutrition education at primary schools and a mother and child health and nutrition programme directed at areas with high levels of wasted and underweight children.

Regular crop monitoring is an essential element in monitoring the food security situation and designing timely and targeted interventions. This is because of the fragile food security situation, practice and importance of subsistence farming in rural communities, dependency on rainfall due to limited irrigation facilities and absence of markets in most of the high Hills and Mountain districts. In this regard, the crop monitoring system of MoAC should be strengthened.

The Mission recommends closer collaboration between WFP and NFC, particularly in improving the targeting mechanism used by the latter. WFP operates an extensive food security monitoring system that provides detailed information on food needs. In utilizing this information, NFC targeting could be improved, thereby ensuring that food reaches those most in need.

The Mission also recommends a further comprehensive study investigating seasonal migration patterns and its benefits as a coping strategy for contributing to achieving household food security during the lean periods.

6. AGRICULTURAL DEVELOPMENT CONSTRAINTS AND OPPORTUNITIES

6.1 Overall policy environment

Agricultural policy reforms implemented during the past ten years have led to a significant withdrawal of government involvement in pricing and marketing of agricultural products and inputs. The underlying reasoning is that agricultural support services are to be provided mainly by the private sector in partnership with the government, hence the concept of “public-private partnership”. Inputs and services like seeds and fertilizers as well as extension and animal health services are to be provided mainly by the private sector. A second important pillar of the policy environment being put in place is the organization of farmers into groups for a variety of purposes, such as for the delivery of credit and irrigation management. The Agricultural Perspective Plan (APP) places significant importance on commercialization of agriculture.

The importance of a pro-poor approach to agricultural development is being recognized. Pro-poor and Agriculture Programs was the heading of the chapter in the Budget Speech of July 2006, in which agricultural and poverty-related policies were addressed. In this policy statement, it was acknowledged that there is a widespread concern among people that the benefits of past economic reform programmes did not reach the poor. Pro-poor programmes and investment in rural areas were considered essential. Recently, the government also launched a new initiative called the One-Village-One-Product programme, under which public-private partnership will be exploited to raise production of selected commodities with adequate export potential. The products selected are mostly traditional fruits and speciality products popular in different areas of Nepal.

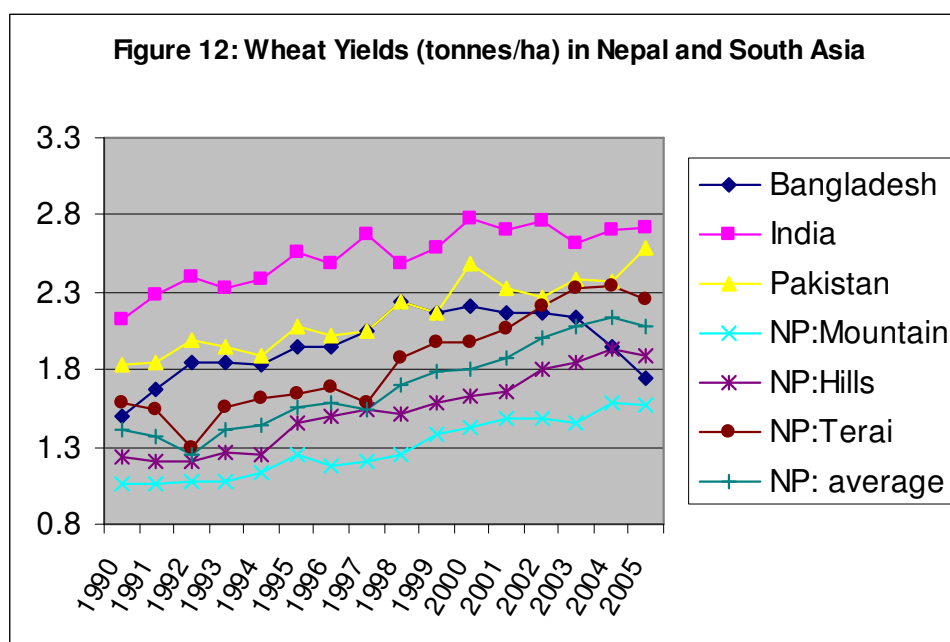
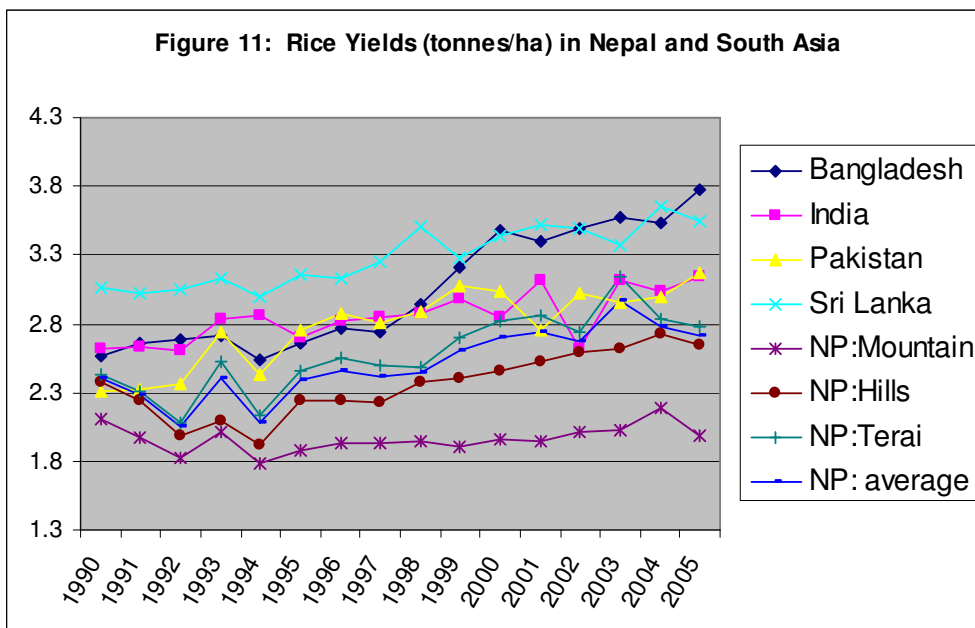
The sections that follow discuss issues on agricultural inputs and services, vital for the modernization of agriculture, commercialization and its pro-poor orientation. Efforts are made to relate the discussion to the recent drought, and to what may be done in these areas in the event of similar droughts in the future.

6.2 Low productivity and competitiveness

Low productivity and lack of competitiveness of agricultural products are the growing problems of poverty and food insecurity in Nepal. Comparisons between levels of rice and wheat productivities in the ecological zones of Nepal and neighbouring South Asian countries are presented in Figures 11 and 12. Although the rice yield in Nepal has been increasing gradually since 1990, the growth rate is much lower, compared to neighbouring countries. From 1990 to 2005, the rice yield increased by 13 percent in Nepal, compared to 47 percent in Bangladesh, 37 percent in Pakistan and 20 percent in India. As a result, the rice yield in Nepal is 7 percent, 8 percent, 11 percent and 22 percent below that of Pakistan, India, Sri Lanka, and Bangladesh, respectively, based on the average from 2001 to 2005. The Terai is the dominant rice producer of Nepal, with a higher growth and high level of yield relative to the Mountains and Hills zones. However, the rice yield in Terai is still lower than those of neighbouring countries.

Compared to rice, the wheat yield in Nepal has grown faster (47 percent increase from 1990 to 2005). However, the wheat yield in Nepal is much lower relative to India (25 percent lower) and Pakistan (15 percent lower) based on the five-year average from 2001 to 2005. The wheat yield per hectare in the Mountains and Hills in 2005 was 1.57 tonnes and 1.90 tonnes, respectively, compared to 2.25 tonnes in Terai.

Soil erosion is a common feature in the Hills and Mountains. Use of fertilizer and pesticides is limited and there is an urgent need for investment in seeds research and supply and in the coverage of irrigation facilities.



Source: Data for Bangladesh, India, Pakistan and Sri Lanka in Figures 11 and 12 are from FAOSTAT 2007; data for Nepal (average, Hills, Terai and Mountain) are calculated based on CBS data.

6.3 Constraints in major input sectors

Fertilizers

All fertilizers used in Nepal are imported. For many years, fertilizer prices were subsidized until subsidies were eliminated in 1999. One important reason for removing the subsidies was that the binding constraint to increase use of fertilizers in Nepal was not the price of fertilizer but the supply itself, which in turn is limited to the amount of subsidies. Two effects of the subsidy removal have been prominent: i) an increase in the overall supply of fertilizers, with declines in formal imports more than offset by increased informal imports from India; and ii) increases in fertilizer prices in Nepal, which is inevitable when subsidies are eliminated.

On the first point, the overall picture is not very clear because reliable statistics are lacking on the volume of informal imports. Formal trade, reported in government statistics, show total supply of about 150 000 tonnes in recent years, about 30 percent imported by the Agricultural Inputs Company and 70 percent by private traders. The overall picture based only on these data is indeed discouraging as fertilizer use per hectare shows a declining trend (from 26 kg in 2003/04 to 21 kg in 2005/06).⁷

The picture appears very different, however, when estimates of the informal imports are taken into account. Table 14 shows estimates of total supply of fertilizers from formal and informal sources, the latter based on household surveys of fertilizer use. The data show that there has been a rapid increase of fertilizer supply in Nepal, from 224 000 tonnes in 1997/98 to 488 000 tonnes by 2002/03. Informal sources accounted for 60 percent of the total supply in 1997/98 and 80 percent in 2002/03. These values translate into fertilizer consumption of about 35 kg/ha (nutrient basis) for 1997/98 and about 60 kg/ha (nutrient basis) for 2000/01. Similar survey data are not available for recent years. But it is generally held that the informal source continues to be significant even now.

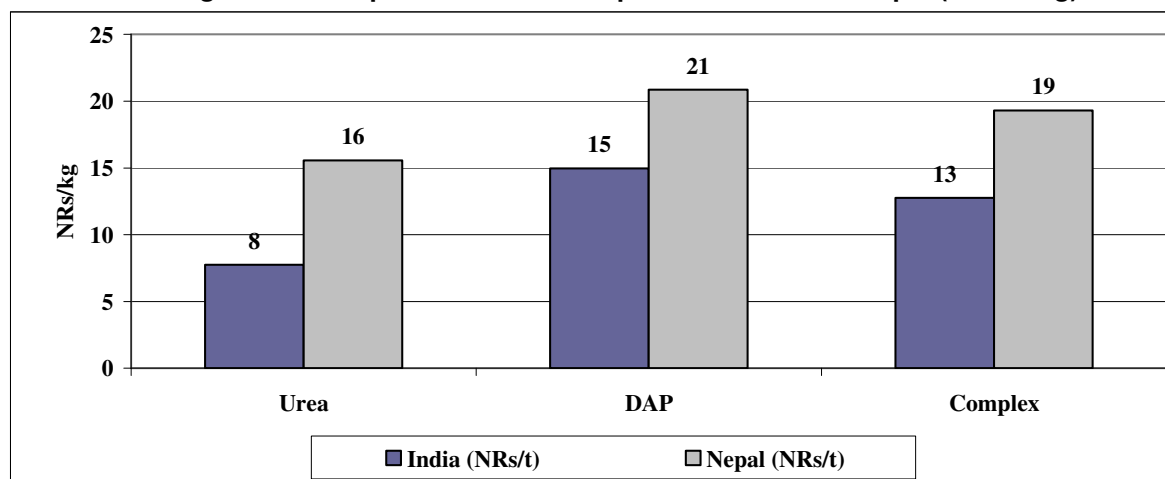
Table 14: Estimated total supply of fertilizers from formal and informal sources

Year	Formal sources	Informal sources	Total supplies
1997/98	89 000	135 000	224 000
1998/99	219 000	150 000	369 000
1999/00	154 000	233 000	387 000
2000/01	171 000	282 000	453 000
2001/02	147 000	278 000	425 000
2002/03	101 000	387 000	488 000

Source: Based on the data of the Asian Development Bank PPAR Report of the Second Agriculture Programme in Nepal, December 2004.

The main reason why informal trade accounts for such a large share of total supply is that fertilizers are subsidized in India; thus, following the removal of subsidies in Nepal, fertilizer prices in Nepal are much higher than in India, exactly double in the case of Urea (Figure 13).

Figure 13: Comparison of fertilizer prices in India and Nepal (in NRs/kg)



Source: Thapa (2006), "Constraints and Approach for Improving Fertilizer Supply for Meeting Domestic Demand", Policy Paper 30, Economic Policy Network.

There are some issues regarding the fertilizer sector. The most important is perhaps the issue of reliability of the informal source. As noted above, it is mainly the informal source that has boosted fertilizer use in Nepal to about 60 kg/ha (nutrient), compared to about 90 kg/ha (nutrient) in India. However, the export of fertilizer is restricted in India in view of the subsidies and so this source cannot be taken as reliable for Nepal. Informal imports at lower prices are blamed in Nepal for undermining formal imports by Nepal's private sector. In addition, there are also complaints that informal sector fertilizers are at times of lower or dubious quality due to adulteration of some kind. Lastly, Nepalese officials routinely hear complaints from farmers that fertilizers are much more expensive in Nepal relative to India and thus agricultural competitiveness is undermined.

⁷ These data were reported in *National Crop and Food Supply Assessment Mission Results*, December 2006, Ministry of Agriculture and Co-operatives, Nepal.

Informal imports – to the extent this is seen as a problem in Nepal – will shrink only when prices in India increase, following the reduction in fertilizer subsidies. In that event, it should not be a problem for Nepal's private sector to expand its fertilizer operations.

Finally, in the context of the drought and its aftermath, the main question asked is: what else could the government do? One response could be to take extra measures to facilitate private trade in the aftermath of the drought so that the typically extra demand for inputs that follows the next crop season is supplied smoothly. This is the time to provide some subsidies and other assistance for transporting fertilizers to the production areas in the Hills and Mountains, where the private sector does not reach. Lastly, the government could provide targeted price subsidies to poor and marginal farming groups in affected areas, which is a provision in the National Fertilizer Policy 2002.

Improved seeds

Unlike fertilizers, for which the overall supply and availability have improved in recent years, the situation in the seed sector is far from satisfactory. Although both government sources and various studies show that crop areas covered by improved seeds are very high, in the 80-90 percent range for cereals and vegetables, the problem of seed quality remains. The bulk of the seeds used are farmers' own seeds from previous harvests or acquired from neighbours. These may be improved or high-yielding variety (HYV) seeds at the outset, but several seasons their quality degenerates. Thus, the primary problem is replacement of these old "improved" seeds with fresh "improved" ones. A seed replacement rate of 25 percent is considered desirable, which implies that improved seeds are replaced every four years before seeds degenerate beyond value. In contrast, the actual replacement rate is widely held to be only about 5 percent for wheat and even lower for rice and maize, although the exact situation is not known because of lack of statistics. Research claims that cereal production in Nepal can be raised by 20 percent simply by upgrading the quality of seeds.

The government policy is one of encouraging private-sector involvement in seed production and supply, and indeed the Mission found private-sector participation to be quite visible, both in the Hills and the Terai. The amount of seeds distributed by this sector – numerous private agro-vets and seed operators – is not known but is considered to be substantive.

NSC is also an important actor in the seeds sector. The company distributes quality seeds through many dealers. In 2004/05, NSC sold about 510 tonnes of paddy seeds, 2 237 tonnes of wheat seeds and 1 543 tonnes of maize seeds. In the first eight months of 2005/06, the company distributed 130 tonnes, 2 810 tonnes and 6 tonnes of paddy, wheat and maize seeds, respectively – far below targets in the case of paddy and maize seeds. The reasons given for this less than satisfactory performance include failure to collect adequate seeds of good quality from farmers as per the contracts and the influx of low-quality seeds from India across the long and porous border, which discouraged private-sector activity. The amount supplied by the formal sector is very low. For example, according to an estimate ((Thapa et al, 2001)), supply by the formal sector amounted in 1999/2000 to as little as 1.7 percent of the national requirements for rice, 0.6 percent for maize and 11.3 percent for wheat.

The third important source of seed is imports from India. Seeds are brought by farmers and small traders across the porous border. These imports are not recorded and so it is not known how much seed is brought each season. However, there is consensus that this has been an important source of supply, especially around the border areas in the Terai. This is also the view of the Mission as observed during the field visits.

The government has taken the difficulties in the seeds sector seriously. A major programme being implemented is the District Seed Self-Sufficiency Programme (DISSPRO). DISSPRO was initiated by the District Agriculture Development Offices (DADOs), and encourages the production and marketing of good quality seeds by providing technical support to farmer groups. The programme covers 55 of the 75 districts in the country. This programme has been instrumental in spreading good-quality seeds through farmer-to-farmer informal exchange practice. Improved seeds are also informally imported from India and exchanged through informal farmer-to-farmer practice. These informal mechanisms supported by DISSPRO account for over 95 percent of the farmers' seed use.

The main problem in the seeds sector, faced by both the private agro-vets and seed operators, as well as by DISSPRO, is the binding constraint in the availability of breeding seeds for multiplication. Capacity in

government farms, the only official source for such seeds, is limited by the size of the farm and other resources.⁸

Additional issues in the seed sector

One issue is the reliability and quality of seeds imported from India. These seeds are imported informally and so their quality is not assured, although it was reported during the Mission that farmers have a way of ascertaining quality suppliers, based on experience. There is a feeling that this “source” is reliable, given that Nepal’s needs are small, relative to what is available in India. Reliability is questioned, however, because India does not encourage exports of seeds, and may restrict these exports. These seeds are technically unauthorized in Nepal because their phytosanitary standard is not verified. Indeed, seeds can be used only if they are certified by Nepal’s research system. From these standpoints, this source is fully unauthorized and these seeds are grown only because informal trade is possible.

A second issue is the dissemination of improved seeds to interiors, i.e. to villages that are distant from market centres and roads, and notably to the Hills and Mountains. Seed markets, unlike those of cereals and vegetables, need to be developed, which require appropriate incentives and supports to private operators, as well as laws and regulations. There is a need for upgrading community-based seed growers into formal “village seed enterprises”. This will require technical assistance, mini-processing plants and linkage with local traders to support such enterprises. Simplified certification mechanisms such as Quality Declared Seeds (QDS) could be an option to explore for village seed enterprise production. Addressing the supply of maize seeds (improved and hybrid) as well as distribution should be a priority in view of the close link between maize and household food security.

In the context of the drought during 2005 and 2006, Table 15 shows the Mission’s estimates of the supply of and demand for improved seeds. It shows that the supply of Foundation Seeds (FS) is sufficient to cover the need for improved rice and wheat seed in the country but insufficient to cover the maize seed needs (only 12 percent).⁹ For rice and wheat, despite sufficient overall supply, it was reported that seed growers do not receive the FS of the variety they prefer.

Table 15: Projected seed supply from Foundation Seed (FS) production planned during the cropping season 2006/07

Crops	Area cultivated 2006/07 (ha)	Seed rate (kg/ha)	Seed use (tonnes)	Seed requirement ^{1/} (tonnes)	FS supply ^{2/} (tonnes)	C1 seed supply (tonnes)	C2 seed supply (tonnes)	Improved seed supply (tonnes)	Proportion requirement covered (%)
Rice	1 439 525	55	79 174	19 793	27.60	1 380		69 000	349
Maize	860 401	20	17 208	4 302	4.80			504	12
Wheat	672 040	120	80 645	20 161	9.66	161	2 683	44 722	222

Source: Foundation seeds (FS): Seed Division DOA; C1, C2 and Improved Seeds are calculated on the basis of the average 2006/07 average crop yield.

1/ Considering an ideal replacement rate of 25 percent.

2/ 22 varieties of rice, 12 varieties of wheat and 10 varieties of maize.

Finally, the Mission also confirmed that availability of wheat seeds, and in particular varieties suitable for Hills and high Hills areas, was a particular and major problem for the 2006/07 wheat season due to the poor harvest of the previous season. As a result, there is a good chance that less area was planted with good-quality wheat in the affected areas, with consequent reductions in production. The continuous use of the old, degenerated and infested seeds of poor quality also resulted in disease epidemics in some Hills areas.

Agricultural credit

Availability of agricultural credit at reasonable rates is obviously essential for commercial agricultural production. Agricultural credit also plays an import role during droughts and other distress conditions as borrowing is an important coping mechanism. This is particularly a problem for vulnerable population

⁸ In contrast, for example, the situation is much better for vegetables in particular where seeds are imported on a large scale.

⁹ Note that Nepal does not produce hybrid maize varieties, which are in demand by farmers in the Terai and the Hills.

groups in view of their heavy reliance, even in normal times, on informal sources of credit characterized by high interest rates.

Rural credit availability from formal channels remains very limited in Nepal despite the presence of many rural finance institutions (RFIs) in Nepal as well as a legal and institutional framework in place for a substantial expansion of rural credit. The formal rural finance sector, supervised or registered with Nepal Rastra Bank or NRB (Central Bank of Nepal), includes over 300 rural branches of commercial banks, about 450 branches of the Agricultural Development Bank Nepal (ADBN), Small Farmers Development Bank with over 130 outlets, several development banks, over 30 savings and credit cooperative societies, and about 30 microfinance NGOs. In addition, the semiformal sector comprises government-sponsored rural credit programmes, over 1 500 savings and credit cooperative societies registered under the Cooperatives Act, and over 50 multisectoral NGOs. The informal sector comprises moneylenders, traders, friends, relatives, as well as thousands of community organizations. Many NGOs operating microfinance programmes also operate outside NRB supervision.

It was not possible to conclude – for lack of aggregate statistics on borrowing from formal sources during the drought period – whether various RFIs managed to expand lending during the drought months and afterwards.

Irrigation

According to the Budget Speech 2006/07, arrangements have been made to complete 64 medium-scale irrigation projects within three years. These projects were conceived to be operated and managed by farmers themselves. In addition, funds have been allocated in the next fiscal year to complete the construction of 40 irrigation projects that were already under way. Similarly, 50 medium-scale irrigation schemes will be initiated in 40 districts covering Western, Mid-Western and Far-Western development regions under the Irrigation and Water Resources Management Programme. Rs 704 million (or US\$10.83 million) has been allocated for both of these programs.

Performance of the shallow tubewell (STW) sub-sector in particular is critical during drought episodes because STWs not only provide reliable irrigation but also enable farmers to initiate alternative crops, such as vegetables. Moreover, STWs are more reach in of vulnerable households.

Subsidies on STWs were eliminated in 2000 as part of a Structural Adjustment Programme (SAP) loan, more or less at the same time when fertilizer subsidies were removed. This policy has been very controversial since then, with many experts arguing that this may not have been a well thought out measure given the critical role that STW expansion plays in meeting the goals of the APP. Statistics do show that the expansion of groundwater development, an APP priority area during the Ninth Plan period, was adversely affected by phasing out STW subsidies.

While the issue of subsidies for STWs continues to be debated, it is important to recognize the value of STWs during drought periods for marginal and small farmers. Many parts of the Terai are dry but are well endowed with groundwater that can be utilized by STWs. It is important that the government maintain a capability to upscale STW activity in a targeted manner (both areas and households) in response to drought. In the meantime, constraints to the expansion of STWs should be removed and innovative programmes initiated or upscaled to make water use more accessible to smaller farmers. The former would include, for example, connecting clusters of tubewell sites to rural electricity grids where feasible.

According to the Budget Speech 2006/07, in the next fiscal year, 480 STWs under Ground-Water Shallow Tube-Well Irrigation Program and 5,400 STWs under Community Ground-Water Irrigation Sector Project, covering 12 districts, will be installed. Likewise, 4 000 STWs will be installed in Banke, Dang, Kailali, Kanchanpur, Kapilvastu, Nawalparasi and Rupandehi on a trial basis under the cost-sharing scheme with farmers. A total of 9 880 STWs will be installed and an area of 24 700 hectares of additional land will have irrigation facilities with the implementation of this programme. A sum of Rs 336.8 million (or US\$5.18 million) has been allocated for this. At the same time, 37 deep tube-wells will be installed in the next fiscal year under the Groundwater Deep Tube-Well Programme, which will provide additional irrigation facilities on 1 600 hectares of land. Finally, due to the high demand charge of electricity used in shallow and deep tubewell operations, poor farmers are unable to benefit from these technologies. Accordingly, 50 percent of the cost of the demand charge is expected to be borne by the Government.

6.4 Crop diversification and agri-business

The diversity of climates and quality soil for fruit production are suitable for a wide variety of fruit species, from litchis to apples, to be grown in Nepal. With a total acreage of over 90,000 hectares, fruits are an important cash crop for Nepal. Fruit cultivation has significantly increased over the past five years, with a 3.7 percent annual growth rate. Both tropical/semi-tropical and temperate fruits have achieved a similar growth rate.

Tropical and semi-tropical fruits covers an area of approximately 72 500 hectares and occupy nearly 80 percent of the total fruit-cultivated area. Over 60 percent of tropical and semi-tropical fruits are grown in Central and Eastern regions with approximately similar distribution. Citrus crops occupy about 15 000 ha. Orange and sweet orange are the main citrus trees cultivated and represent, respectively, 60 percent and 30 percent of the total citrus cultivated area. Over 90 percent of the citrus production is concentrated in the Hills, mostly in the Western, Central and Eastern regions and as a result the production period is concentrated in one short season in December/January. Expansion of production in other areas and diversification of varieties could extend the production period. Other citrus species includes lime (16 percent) and lemon (8 percent). Other tropical and semi-tropical fruits cover much smaller areas and require irrigation systems.

Temperate fruits cover an area of nearly 20 000 hectares. The expansion of the cultivated area of temperate fruit over the past five years is remarkable, as these fruits are cultivated in remote Mountains areas where there is a lack of road connectivity. Increase in winter fruit production could positively impact on rural poverty in the Mountains as experienced in Northern Pakistan. Markets for winter fruits are vast in India and Bangladesh. Nearly 40 percent of temperate fruits are grown in Far- and Mid-Western regions and 25 percent in the Central region. Apple is the main winter fruit and represents 33 percent of the total temperate fruits-cultivated area. Over 40 percent of the apple-cultivated area lies in the Mid-West region, mainly in the Mountains districts. The new road to Jumla will soon provide a market outlet for apple production, and further apple development could potentially reduce rural poverty in Jumla district. Yields remain very low, with an average of only 8.8 tonnes/hectare. Most apples found in major markets in Nepal are from India or China. Pear is the second temperate fruit and covers 25 percent of the temperate fruits cultivated area. Pears are mainly cultivated in the Hills of the Eastern, Central and Western regions. Nepali pears are marketed in large urban markets. Other temperate fruits include peach (18 percent) and plum (12 percent). Grapes are not reported in Nepal but Indian grapes are seen in most market centres. Drier mountain regions could be suitable for high-quality grape production. Walnut is the main nut cultivated in Nepal and represents approximately 1 140 hectares (10 percent), found mainly in the Mid-West Mountains. Demand for walnuts is growing in India and Europe.

Despite promising growth in the past years in the fruit sector, the comparative advantage of Nepal's privileged ecological location has not yet been turned into competitive advantage as farming practices remain poor; most trees are not grafted, rootstock varieties are not used, varieties planted are of sub-optimal quality for export, trees are generally not pruned, orchards not fertilized and the distribution chain is sub-optimal. This results in biennial bearing, low productivity (average of 9.5 tonnes/hectare) and low quality of fruit on the market. Fruit markets in Nepal continue to be supplied with products from India and China. Yet there are substantial import substitution opportunities to start with and vast opportunities for export to neighbouring countries for future developments when the production, productivity and quality of fruits improve. Unlocking this potential would require good research and extension work and possibly plantation subsidy of high-quality seedlings from professional nurseries in the initial years. Some plant material such as root-stocks may need to be imported. Research linkages with countries benefiting from similar agro-ecological conditions and having successfully developed perennial horticulture crops, particularly northern Pakistan, would be advantageous. Some Himalayan valleys in Northern Pakistan have been successfully converted into high-value fruit orchards over the past two decades.

6.5 Rural employment-generating programmes

Nepal does not have a formal employment guarantee programme, as there is, for example, in India. However, several government programmes fit this category well. The most extensive of these is the FFW programme implemented by WFP. In the Budget Speech for 2006/07, the implementation of a Decentralized Rural Infrastructure Development and Livelihood Project was announced. This project will be implemented in 18 remote and conflict-affected districts. The project will entail the construction of 100 km of rural roads and 20 suspension bridges. A total of Rs 500 million (or US\$7.69 million) has been allocated for this programme. It was also said that income-generating activities would be supported to cover 18 700 farm families through Community Livestock Programmes targeted to Dalits and freed

bonded labourers in 22 districts which have a high density of such communities. The Poverty Alleviation Fund (PAF) is also to be augmented. The PAF was established as an autonomous institution through Poverty Alleviation Fund Ordinance 2004 to implement targeted programmes to improve the socio-economic situation of the lower-income population groups caught up in absolute poverty. For 2006/07, a total of Rs 1.25 billion (or US\$19.23 million) has been allocated to the Fund. The fund will be used to implement 667 income-generating programmes, 379 community infrastructure development programmes and 1 714 creative programmes in 1 200 VDCs of 25 districts. Districts include seven in Far-Western and ten in Mid-Western development regions that are identified as backward districts in terms of economic and human development. About 50 000 low-income households are expected to benefit from this programme.

7. RECOMMENDATIONS

7.1 Policy level

The confluence of high population growth, extremely limited scope for expansion of cultivated areas, under-developed irrigation infrastructures, continuing high level of dependence on agriculture for livelihood and almost stagnant productivity for staple crops have resulted in acute risks of nationwide food insecurity. There is a real urgency to make agriculture the highest Government priority and substantially increase investments in the sector to avert a looming food insecurity crisis in Nepal.

7.2 Strategies

The APP provides an agriculture strategy for Nepal. However, a number of key strategic issues were identified to better adapt to the current economic, social and political contexts.

- Ensure that agriculture strategies:
 - Recognize that the foremost comparative advantage of Nepal is its human capital in the form of skilful and entrepreneurial farmers. Focus should be placed on easing constraints which are limiting Nepali farmers to embrace higher productivity and market linkages.
 - Take into account previous evidence in Nepal that community participation and demand-driven approaches are the most efficient and conflict-resilient strategies. Reconciliation and peace building have to be matched by quick impacts, pro-poor and broad-based development approaches in order to ensure lasting results. Community participation is very high in infrastructure programmes (e.g. irrigation) and FFW can be used as an incentive to build local infrastructures. At this juncture, agriculture programming should be tight, with programmes capable of high social mobilization such as irrigation projects. The current institutional set-up between the Ministry of Irrigation and MoAC is not sufficiently conducive to achieve such desirable synergies.
- Exploit Nepal's broad range of ecological zones and its proximity to vast regional markets (India, China and Bangladesh):
 - The Mountains have a comparative advantage in animal production, livestock products, temperate fruits and nuts and medicinal plants/herbs.
 - The Hills benefit from a comparative advantage in a variety of crops, such as off-season vegetables, fruits, tea, coffee, spices, medicinal plants/herbs and seed production.
 - The Terai, despite similar agro-ecological conditions with northern India, have comparative advantages in tropical fruits, vegetables, oilseeds and cereals.
- Identify several commodities with the best development potential and concentrate efforts on the most promising options.
- Capitalize on research and experiences from regions with similar agro-ecological conditions, particularly in Northern India and Pakistan.
- Build partnership with private actors and NGOs as demonstrated by successful collaborative experience in several districts between DADO and NGOs.
- Adopt value-chain and market-oriented approaches to agriculture development, capitalizing on and learning from existing successes (e.g. Winrock).

7.3 **Interventions**

Operationalizing an agriculture strategy at this juncture requires practical interventions that take advantage of the fact that MoAC agriculture officers are now able to travel in rural areas of most districts of Nepal. Possible interventions have been categorized in three groups:

1. **Quick impact:** improvement in the living conditions of beneficiaries is expected after six months of project implementation. Quick impact projects would typically be implemented with grants allocated to the Transitional Government of Nepal or implementing agencies.
2. **Mid-term:** improvement in the living conditions of beneficiaries is expected between one and three years of project implementation. Mid-term projects would typically be implemented through technical assistance to the Government of Nepal.
3. **Long-term:** improvement in the living conditions of beneficiaries is expected between three and seven years of project implementation. Long-term projects would typically be implemented through loans to the Government of Nepal.

Quick impact

Recommended priority interventions include:

- Rehabilitate farmers' managed irrigation systems on a large scale: to reduce vulnerability to drought and flood and increase crop productivity. Focus should be on the rehabilitation of head-water infrastructures, while priority should be given to regions/districts prone to drought and other natural disasters.
- Implement FFW programs: to prevent harmful coping strategies of vulnerable population affected by drought and natural disasters and to create community rural infrastructures. Support land terracing that can provide access to new agricultural land for rural poor should be explored.
- Consolidate existing early warning systems through joint government and international agency participation and create emergency preparedness stocks (e.g. micro-irrigation equipment; pipe/sprinkler irrigation or traddle pump and cash crop seeds): to respond quickly to natural disasters and support livelihood recovery of affected households.
- Promote the utilization of adequate wheat seed storage at local level: to increase household capacity to store wheat seeds during monsoon and increase wheat production.
- Support cash crop development through marketing and value-chain approach: to increase farmers' income and market integration.
- Respond quickly and appropriately to emergency nutrition situation through Community-based Therapeutic Care (CTC), particularly in the Far- and Mid-West: to reduce very high level of wasting of children under five in districts affected by drought.
- Extend the current WFP emergency operation in the Far- and Mid-Western regions to those areas that have been affected by drought in subsequent seasons, targeting about 69 400 poor beneficiaries severely affected in these areas as well as 40 500 people residing in other areas of these regions and currently facing severe food insecurity conditions.
- Closely monitor food security and vulnerability factors that contribute to vulnerability and coping mechanisms: to respond quickly to current vulnerability and to develop a programme of interventions in the event of future production shocks; strengthen the capacities of the Government agencies (MoAC, DHM, and CBS) in early warning and vulnerability analysis; and strengthen cooperation and communication for information and implementation between UN agencies and government agencies.
- Suggest applying FAO/WFP's Integrated Food Security and Humanitarian Phase Classification (IPC) Framework, which provides details of the main phase categories: 1) Generally food-secure, 2) Chronically food-insecure, 3) Acute food and livelihood crisis, 4) Humanitarian emergency, and 5) Famine/Humanitarian catastrophe at the local level.

Mid-term interventions

Recommended priority interventions include:

- Establish a technical group on agriculture, supported by a lead technical agency, at highest level of the Nepal government: to create sufficient momentum in the agriculture sector and ensure the implementation of relevant policies and strategies.
- Upgrade community seed producers under the DISSPRO programme to "village seed enterprises" through technical assistance and matching grants: to insure supply and distribution of quality staple crop seeds and increase production.

- Upgrade wholesale agriculture market infrastructures: to remove major constraints on cash crop marketing.
- Conduct sectoral market research in Nepal and neighbouring countries (e.g. perennial horticulture, vegetables, spices, medicinal and stimulant plants, livestock products): to identify best cash crop opportunities for private- and public-sector investments.
- Conduct on-farm crop rotation experiments at different elevations which include fodder and cash crops: to increase cropping intensity and optimize crop rotation systems by agro-ecological zone.
- Implement an aggressive nutrition programme that may include mother and child care, food practices, health and clean water supply: to tackle the causes of very high chronic child malnutrition (stunting).
- Implement a longer-term programme aimed at improving the nutrition situation, including a school feeding programme combined with nutrition education at primary schools and a mother and child health and nutrition programme directed at areas with high levels of wasted and underweight children.
- Ensure a closer collaboration between WFP and NFC, particularly in improving the targeting mechanism used by NFC, based on experiences gained through WFP's food security monitoring system.
- Undertake a comprehensive study on seasonal migration and its benefits as a coping strategy.

Long- term interventions

Recommended priority interventions include:

- Expand year-round irrigation infrastructures and provide institutional support to water users associations to reduce vulnerability, increase crop intensity, diversity and yield and ultimately reduce poverty.
- Increase investments in South-North road corridors to create outlet for cash crops and improve road connectivity between various ecological zones.
- Promote high-value perennial fruit development through support to horticulture marketing clusters, establishment of nurseries, expansion of area under cultivation and promotion of best orchards management and integrated pest management practices. Such projects should capitalize on legume fodder opportunities as intercrop in existing and new orchards.
- Strengthen research in seed sector with focus on maize, soybean and vegetable and cash crop development for most promising commodities identified by agro-ecological zones and development regions.

APPENDIX I

Table A1: Crop Calendar for Main Cereal Crops Cultivated in Nepal

Crop	Ecological Zones	Irrigation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Season	
Paddy	Hills	Partially					TP	TP			H	H			Summer	
		Year-round			TP	TP			H	H					Spring	
	Terai	Rainfed							TP	TP		H	H	H		Summer
		Year-round			TP	TP				H	H	H				Spring
										TP	TP				H	H
Maize	Mountains	Irr./Rainfed			P	P				H	H	H			Summer	
	Hills	Rainfed			P	P				H	H				Summer	
		Irrigated		P	P				H	H					Spring	
	Terai	Rainfed				P	P			H	H				Summer	
		Year-round			P	P				H	H					Spring
				H	H								P	P	Winter	
Millet	Mountains	Rainfed				P	P					H	H		Summer	
	Hills	Rainfed						P	P			H	H		Summer	
Wheat	Mountains	Rainfed					H	H					P	P	Winter	
	Hills	Rainfed			H	H	H					P	P	P	Winter	
	Terai	Rainfed**			H	H						P	P		Winter	
Barley	Mountains	Rainfed				H	H						P	P	Winter	
	Hills	Rainfed			H	H						P	P	P	Winter	

P= Planting; TP= Trans-Planting; H= Harvesting.

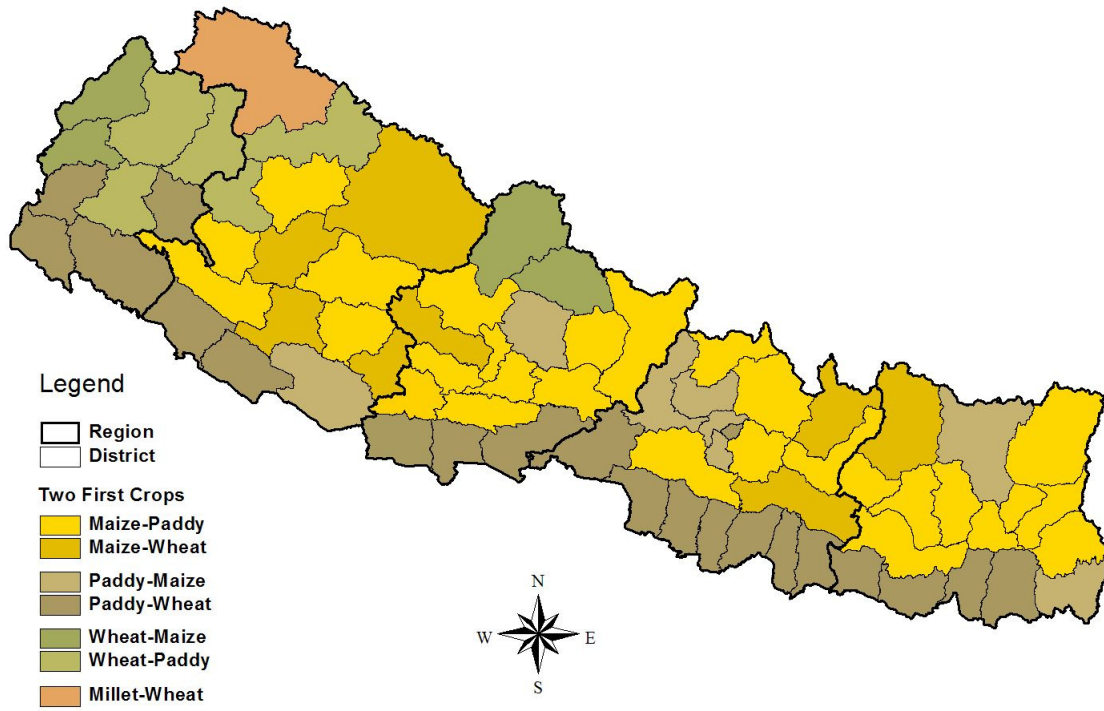
* Recent option adopted by some farmers in the Eastern region, allowing two paddy crops a year.

** Supplemental irrigation is practiced in the east.

Note that the ecological zones do not fully reflect existing cropping patterns and the cropping calendar represents the most common practices within each zone. For instance, the lower parts of the Hills have similar cropping options as the adjacent Terai.

Note that for paddy, maize and millet, the crop calendar is earlier in the Eastern region by approximately one month as compared to Far- and Mid-Western regions. Therefore, for the Eastern region the earlier dates presented in the crop calendar can be utilized while for the Far- and Mid-Western regions, the later dates are accurate. Wheat and barley are not affected.

Map A1: Two Principal Crops, by District



APPENDIX III

Table A2: Per Capita Food Production (kg)¹ and Changes, by District

District	2005/06 kg	2006/07 kg	2005/06 kg	2006/07 over Average %	2006/07 over 2005/06 %
Kathmandu(CH)	41.5	40.0	49.4	81.0%	96.4%
Humla(MWM)	91.2	86.5	97.0	89.2%	94.8%
Lalitpur(CH)	119.1	101.1	115.9	87.2%	84.8%
Bajura(FWM)	123.6	109.5	124.1	88.3%	88.6%
Achham(FWH)	100.2	113.4	110.7	102.5%	113.2%
Dolakha(CM)	122.3	119.8	126.4	94.8%	98.0%
Bhaktapur(CH)	125.4	126.6	137.9	91.8%	101.0%
Mahottari(CT)	150.0	126.9	168.7	75.2%	84.6%
Kalikot(MWM)	100.9	129.8	115.8	112.0%	128.6%
Baitadi(FWH)	110.8	133.1	115.1	115.6%	120.1%
Bajhang(FWM)	128.4	137.5	131.0	105.0%	107.1%
Dolpa(MWM)	132.5	138.4	124.3	111.3%	104.5%
Rautahat(CT)	149.4	143.8	176.4	81.5%	96.2%
Dhanusha(CT)	185.6	151.0	200.8	75.2%	81.3%
Rolpa(MWH)	158.2	151.3	164.5	92.0%	95.6%
Udayapur(EH)	191.5	151.9	180.0	84.4%	79.3%
Sarlahi(CT)	170.8	152.3	185.7	82.0%	89.1%
Doti(FWH)	145.0	152.7	142.1	107.5%	105.3%
Mustang(WM)	155.7	154.7	168.8	91.6%	99.3%
Siraha(ET)	225.5	158.5	234.3	67.6%	70.3%
Pyuthan(MWH)	172.2	164.8	180.1	91.5%	95.8%
Saptari(ET)	207.1	166.1	244.7	67.9%	80.2%
Mugu(MWM)	180.2	166.2	170.9	97.3%	92.2%
Manang(WM)	190.1	170.5	199.6	85.4%	89.7%
Banke(MWT)	204.7	174.9	188.6	92.7%	85.4%
Dhading(CH)	217.5	175.9	215.7	81.5%	80.9%
Darchula(FWM)	150.2	177.3	168.4	105.3%	118.1%
Makwanpur(CH)	176.1	185.8	179.4	103.6%	105.5%
Dadeldhura(FWH)	195.4	192.8	198.6	97.1%	98.7%
Gulmi(WH)	204.5	196.4	184.0	106.8%	96.1%
Nawalparasi(WT)	207.4	196.7	221.8	88.7%	94.9%
Sunsari(ET)	220.5	199.2	227.9	87.4%	90.3%
Arghakhanchi(WH)	198.7	199.7	210.3	95.0%	100.5%
Dailekh(MWH)	170.8	203.8	168.8	120.7%	119.3%
Sindhuli(CH)	203.1	204.3	202.3	101.0%	100.6%
Rupandehi(WT)	203.6	204.9	231.8	88.4%	100.6%
Jajarkot(MWH)	221.6	205.2	214.6	95.6%	92.6%
Kailali(FWT)	208.6	209.4	212.6	98.5%	100.3%
Palpa(WH)	219.2	210.7	224.5	93.9%	96.1%
Kaski(WH)	219.0	211.4	209.2	101.0%	96.5%
Baglung(WH)	222.4	214.4	218.9	98.0%	96.4%
Jumla(MWM)	197.4	214.7	212.9	100.8%	108.8%
Morang(ET)	268.0	218.9	269.4	81.2%	81.7%
Chitwan(CT)	202.3	221.9	249.2	89.1%	109.7%
Panchthar(EH)	243.9	227.6	238.0	95.6%	93.3%
Rasuwa(CM)	241.8	234.3	237.8	98.5%	96.9%
Rukum(MWH)	244.5	235.5	257.5	91.5%	96.3%
Kapilvastu(WT)	246.8	239.0	251.3	95.1%	96.8%
Ilam(EH)	251.3	241.8	252.5	95.7%	96.2%
Dang Deokhuri(MWT)	263.6	246.1	266.5	92.3%	93.4%
Kavrepalanchok(CH)	258.6	252.7	277.4	91.1%	97.7%
Parsa(CT)	278.0	259.9	287.3	90.4%	93.5%
Tanahu(WH)	266.7	259.9	259.8	100.0%	97.5%
Bardiya(MWT)	292.2	263.7	284.9	92.6%	90.3%
Nuwakot(CH)	276.3	265.4	283.9	93.5%	96.1%
Okhaldhunga(EH)	292.1	270.8	252.9	107.1%	92.7%
Surkhet(MWH)	252.1	275.3	241.2	114.1%	109.2%
Kanchanpur(FWT)	263.7	286.8	278.1	103.1%	108.8%
Solukhumbu(EM)	285.7	291.2	276.4	105.4%	101.9%
Sindhupalchok(CM)	300.3	293.9	299.8	98.0%	97.9%
Salyan(MWH)	298.6	296.4	296.3	100.0%	99.2%
Myagdi(WH)	309.0	296.9	261.2	113.7%	96.1%
Taplejung(EM)	306.7	298.0	295.5	100.8%	97.2%
Gorkha(WH)	306.9	299.7	286.3	104.7%	97.7%
Sankhuwasabha(EM)	311.3	300.9	298.6	100.8%	96.7%
Bara(CT)	327.0	301.5	330.2	91.3%	92.2%
Ramechhap(CH)	279.5	303.0	261.9	115.7%	108.4%
Khotang(EH)	316.5	307.4	303.7	101.2%	97.1%
Parbat(WH)	301.5	309.3	303.1	102.1%	102.6%
Jhapa(ET)	380.0	327.4	359.2	91.1%	86.2%
Bhojpur(EH)	323.9	337.0	346.0	97.4%	104.0%
Terhathum(EH)	343.0	352.9	331.5	106.5%	102.9%
Lamjung(WH)	405.7	355.3	333.8	106.4%	87.6%
Dhankuta(EH)	374.5	360.0	319.0	112.9%	96.1%
Syangja(WH)	407.2	398.5	375.5	106.1%	97.8%
Nepal	221.5	208.9	225.6	92.6%	94.3%

Source: calculated by this mission

Note: 1/ cereal equivalent, including potato; and waste and seeds excluded.

APPENDIX IV

Table A3: Nepal - Cereal Surplus/Deficit (tonnes) by District - 2006/07

Region/District	Total prod. ¹	Waste ²	Seeds ³	Food ⁴	Feed and other ⁵	Total demand	Balance (S-D)
Taplejung (EM)	49 503	4 950	1 567	29 285	2 970	38 773	10 730
Sankhuwasabha(EM)	58 873	5 887	1 675	34 613	3 532	45 707	13 166
Solukhumbu(EM)	38 687	3 869	1 489	23 233	2 321	30 912	7 775
Panchthar(EH)	58 046	5 805	2 161	44 665	3 483	56 113	1 932
Ilam(EH)	88 830	8 883	2 497	65 034	5 330	81 743	7 087
Terhathum(EH)	48 516	4 852	1 413	24 302	2 911	33 478	15 039
Dhankuta(EH)	73 566	7 357	1 481	36 497	4 414	49 749	23 817
Bhojpur(EH)	78 871	7 887	1 699	41 735	4 732	56 053	22 818
Khotang(EH)	84 390	8 439	1 837	48 950	5 063	64 289	20 101
Okhaldhunga(EH)	52 148	5 215	1 427	34 110	3 129	43 881	8 267
Udayapur(EH)	58 398	5 840	1 478	68 244	3 504	79 065	-20 668
Jhapa(ET)	281 768	28 177	7 547	152 558	16 906	205 188	76 580
Morang(ET)	241 272	24 127	6 475	195 392	14 476	240 471	801
Sunsari(ET)	170 917	17 092	5 048	151 649	10 255	184 043	-13 127
Saptari(ET)	124 917	12 492	5 567	130 603	7 495	156 157	-31 240
Siraha(ET)	119 546	11 955	4 410	132 171	7 173	155 708	-36 163
Dolakha(CM)	31 417	3 142	1 283	45 736	1 885	52 046	-20 629
Sindhupalchok(CM)	112 939	11 294	2 816	68 253	6 776	89 139	23 800
Rasuwa(CM)	13 736	1 374	580	10 208	824	12 986	750
Ramechhap(CH)	79 146	7 915	2 003	46 373	4 749	61 040	18 106
Sindhuli(CH)	74 346	7 435	1 661	64 841	4 461	78 396	-4051
Kavrepalanchok(CH)	123 933	12 393	3 504	86 778	7 436	110 111	13 822
Bhaktapur(CH)	38 102	3 810	893	53 545	2 286	60 534	-22 433
Lalitpur(CH)	45 758	4 576	1 054	80 597	2 746	88 972	-43 214
Kathmandu(CH)	65 198	6 520	1 571	289 461	3 912	301 463	-236 266
Nuwakot(CH)	96 077	9 608	2 151	64 489	5 765	82 012	14 065
Dhading(CH)	76 590	7 659	1 952	77 284	4 595	91 490	-14 900
Makwanpur(CH)	94 968	9 497	2 235	90 921	5 698	108 351	-13 383
Dhanusha(CT)	133 625	13 362	5 362	154 477	8 017	181 219	-47 594
Mahottari(CT)	93 972	9 397	4 095	128 706	5 638	147 836	-53 864
Sarlahi(CT)	130 501	13 050	4 864	150 094	7 830	175 838	-45 337
Rautahat(CT)	106 720	10 672	3 812	130 223	6 403	151 110	-44 391
Bara(CT)	230 770	23 077	6 844	135 215	13 846	178 982	51 788
Parsa(CT)	175 497	17 550	4 656	119 752	10 530	152 488	23 009
Chitwan(CT)	141 204	14 120	3 013	113 491	8 472	139 096	2 107
Manang(WM)	2 777	278	205	2 731	167	3 381	-604
Mustang(WM)	2 853	285	184	3 128	171	3 769	-916
Gorkha(WH)	106 207	10 621	2 151	63 279	6 372	82 423	23 784
Lamjung(WH)	78 071	7 807	1 774	39 136	4 684	53 402	24 669
Tanahu(WH)	101 986	10 199	1 574	70 471	6 119	88 362	13 624
Kaski(WH)	107 166	10 717	2 501	90 214	6 430	109 862	-2 696
Parbat(WH)	58 998	5 900	1 426	33 909	3 540	44 774	14 224
Syangja(WH)	149 958	14 996	2 485	67 490	8 997	93 968	55 990
Palpa(WH)	69 627	6 963	1 604	58 840	4 178	71 585	-1 957
Myagdi(WH)	42 017	4 202	1 119	25 090	2 521	32 932	9 085
Baglung(WH)	71 908	7 191	1 813	59 555	4 314	72 873	-965
Gulmi(WH)	70 945	7 094	1 698	64 230	4 257	77 279	-6 335
Arghakhanchi(WH)	52 146	5 215	1 635	46 038	3 129	56 016	-3 870

Table A3: Nepal - Cereal Surplus/Deficit (tonnes) by District - 2006/07 (cont.d)

Region/District	Total prod. ¹	Waste ²	Seeds ³	Food ⁴	Feed and other ⁵	Total demand	Balance (S-D)
Nawalparasi(WT)	147 873	14 787	4 297	132 898	8 872	160 855	-12 982
Rupandehi(WT)	200 915	20 092	7 021	172 216	12 055	211 384	-10 469
Kapilvastu(WT)	156 315	15 631	6 316	114 132	9 379	145 457	10 857
Dolpa(MWM)	5 264	526	221	6 624	316	7 687	-2 423
Mugu(MWM)	9 734	973	592	9 980	584	12 129	-2 395
Humla(MWM)	4 759	476	406	9 096	286	10 264	-5 505
Jumla(MWM)	25 010	2 501	1 356	20 003	1 501	25 360	-350
Kalikot(MWM)	18 185	1 819	1 182	23 756	1 091	27 848	-9 663
Rukum(MWH)	57 558	5 756	2 070	42 877	3 453	54 155	3 402
Rolpa(MWH)	40 762	4 076	1 824	46 780	2 446	55 126	-14 364
Pyuthan(MWH)	45 569	4 557	1 775	48 320	2 734	57 386	-11 817
Salyan(MWH)	80 204	8 020	2 549	47 699	4 812	63 081	17 124
Jajarkot(MWH)	35 505	3 551	1 373	30 256	2 130	37 310	-1 805
Dailekh(MWH)	58 607	5861	1 552	51 001	3 516	61 930	-3 323
Surkhet(MWH)	105 230	10 523	2 861	67 726	6 314	87 423	17 807
Dang Deokhuri(MWT)	152 052	15 205	3 642	109 876	9 123	137 847	14 205
Banke(MWT)	93 298	9 330	3 345	93 579	5 598	111 852	-18 554
Bardiya(MWT)	136 618	13 662	4 125	91 462	8 197	117 446	19 172
Bajura(FWM)	15 603	1 560	882	24 390	936	27 769	-12 165
Bajhang(FWM)	30 126	3 013	1 501	37 804	1 808	44 125	-13 999
Darchula(FWM)	28 253	2 825	1 320	27 596	1 695	33 436	-5 183
Achham(FWH)	33 461	3 346	1 356	51 460	2 008	58 170	-24 709
Doti(FWH)	42 159	4 216	2 047	47 729	2 530	56 521	-14 362
Baitadi(FWH)	39 858	3 986	1 663	52 188	2 391	60 228	-20 370
Dadeldhura(FWH)	31 748	3 175	1 396	28 622	1 905	35 098	-3 349
Kailali(FWT)	186 825	18 682	5 808	157 402	11 209	193 102	-6 278
Kanchanpur(FWT)	156 569	15 657	5 183	96 063	9 394	126 297	30 272
Nepal	6 352 732	635 273	189 952	5 370 981	381 164	6 577 371	-224 639

Source: Estimated by this Mission.

1/ Cereal equivalent including potato.

2/ 10% of production.

3/ Estimated based on area planted.

4/ 203 kg/person and 5/ 6% of production.