Study on the Agricultural Marketing Development
Project in the Kingdom of Nepal

Figures

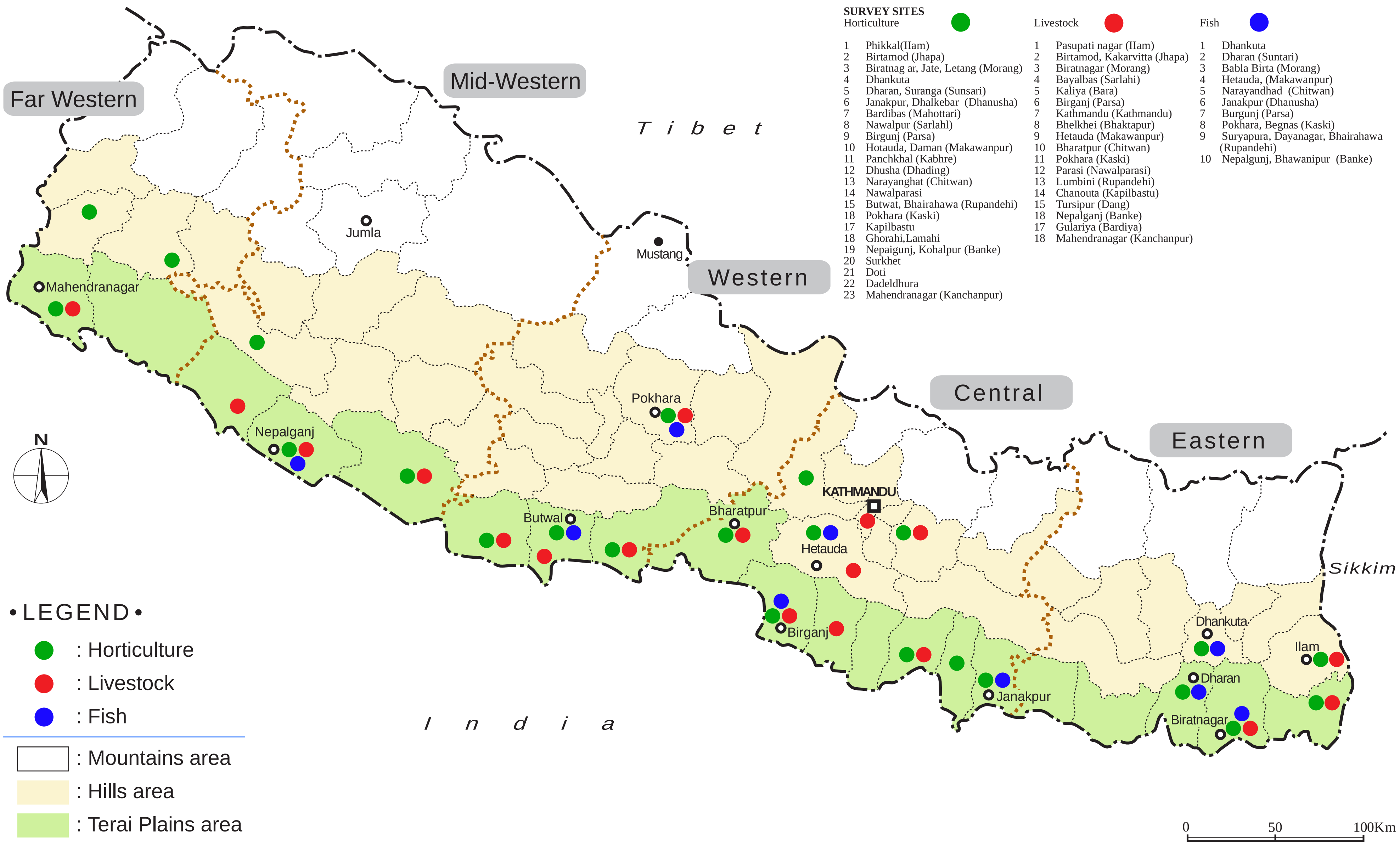

Figure 1-1 Interview survey sites visited by Study Team Members

STUDY ON THE AGRICULTURAL MARKETING DEVELOPMENT PROJECT
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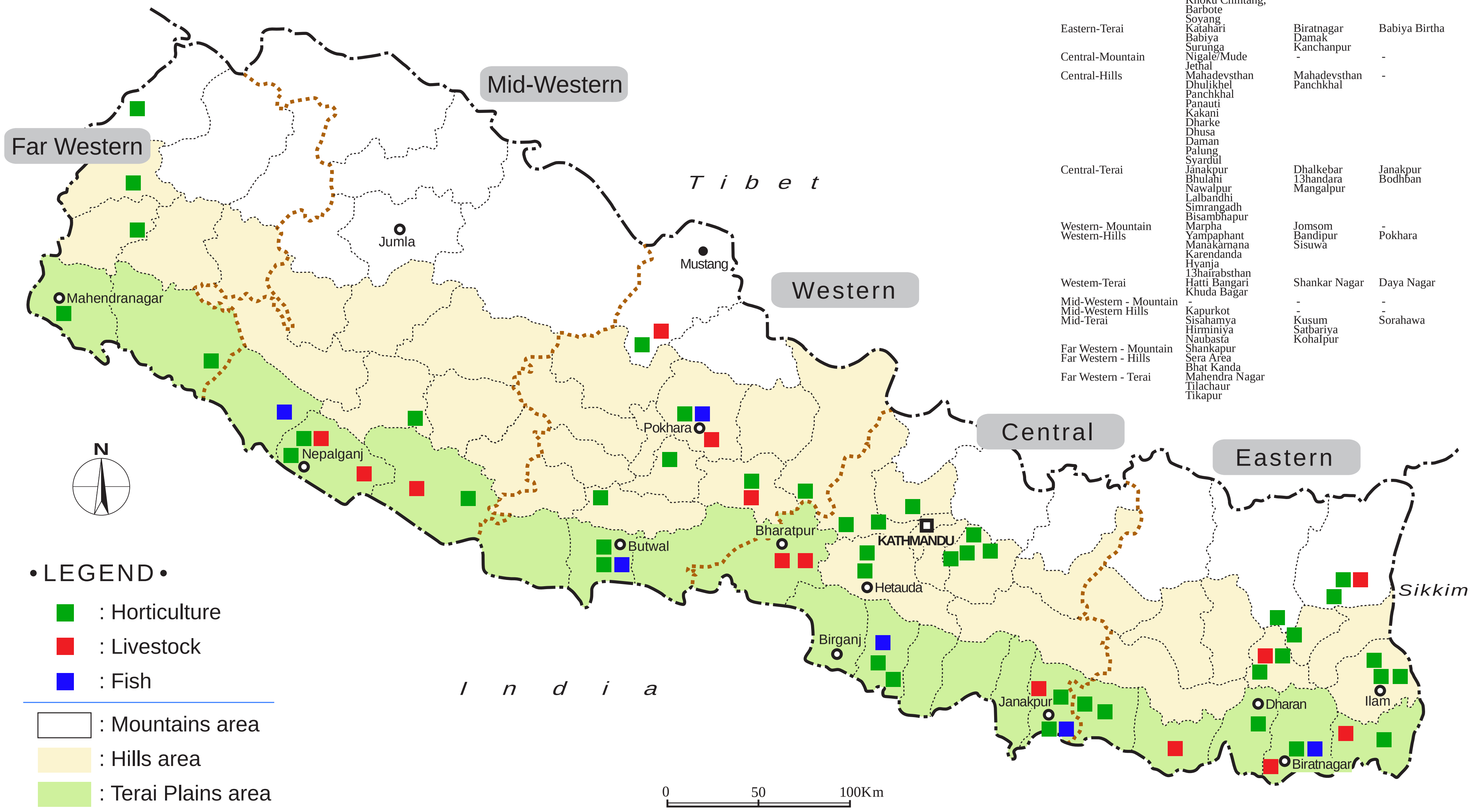
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)



Survey Sites Ecological Zones	Horticulture	Livestock	Fish
Eastern- Mountains	Mude Sanischare Hang Pang	Fundling	
Eastern Hills	Sindhuwa Basantapur Khoku Chintang, Barbote Soyang	Parewadin Fikkal	
Eastern-Terai	Katahari Babiya Surunga	Biratnagar Damak Kanchanpur	Babiya Birtha
Central-Mountain	Nigale/Mude Jethal	-	-
Central-Hills	Mahadevsthan Dhulikhel Panchkhal Panauti Kakani Dharke Dhusa Daman Palung Syardul	Mahadevsthan Panchkhal	-
Central-Terai	Janakpur Bhulahi Nawalpur Lalbandhi Simrangadh Bisambhapur	Dhalkebar 13handara Mangalpur	Janakpur Bodhban
Western- Mountain	Marpha	Jomsom	-
Western-Hills	Yampaphant Manakamana Karendanda Hyanja 13hairabsthan	Bandipur Sisuwa	Pokhara
Westem-Terai	Hatti Bangari Khuda Bagar	Shankar Nagar	Daya Nagar
Mid-Western - Mountain	-	-	-
Mid-Western Hills	Kapurkot	-	-
Mid-Terai	Sisahamya Hirminiya Naubasta	Kusum Satbariya Kohalpur	Sorahawa
Far Western - Mountain	Shankapur		
Far Western - Hills	Sera Area Bhat Kanda		
Far Western - Terai	Mahendra Nagar Tilachaur Tikapur		

Figure 1-2 Interview survey sites visited by Local Consultants

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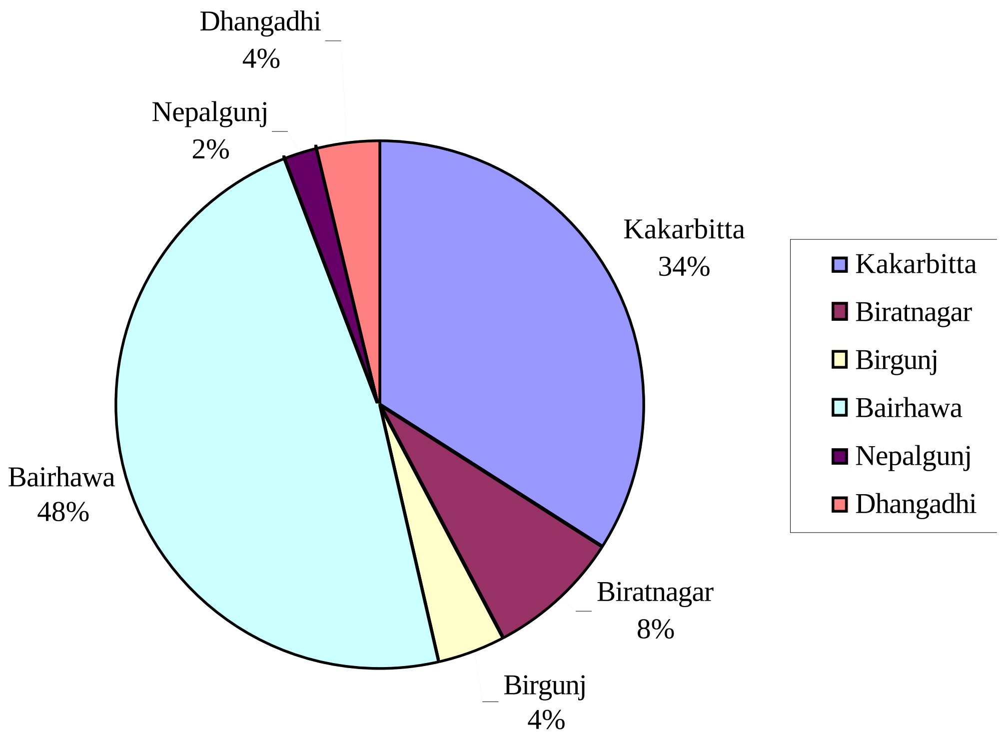


Fig.2-1 Vegetables imported from India in 99/00
(Total value Rs. 434million)

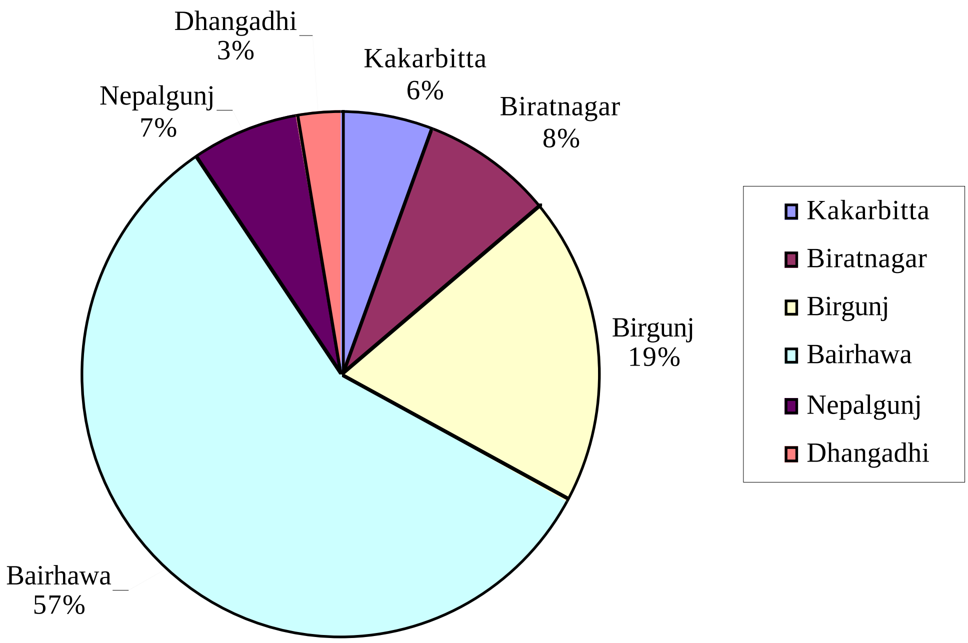


Fig. 2-2 Fruits imported from India in 99/00 (Total value Rs. 92 million)

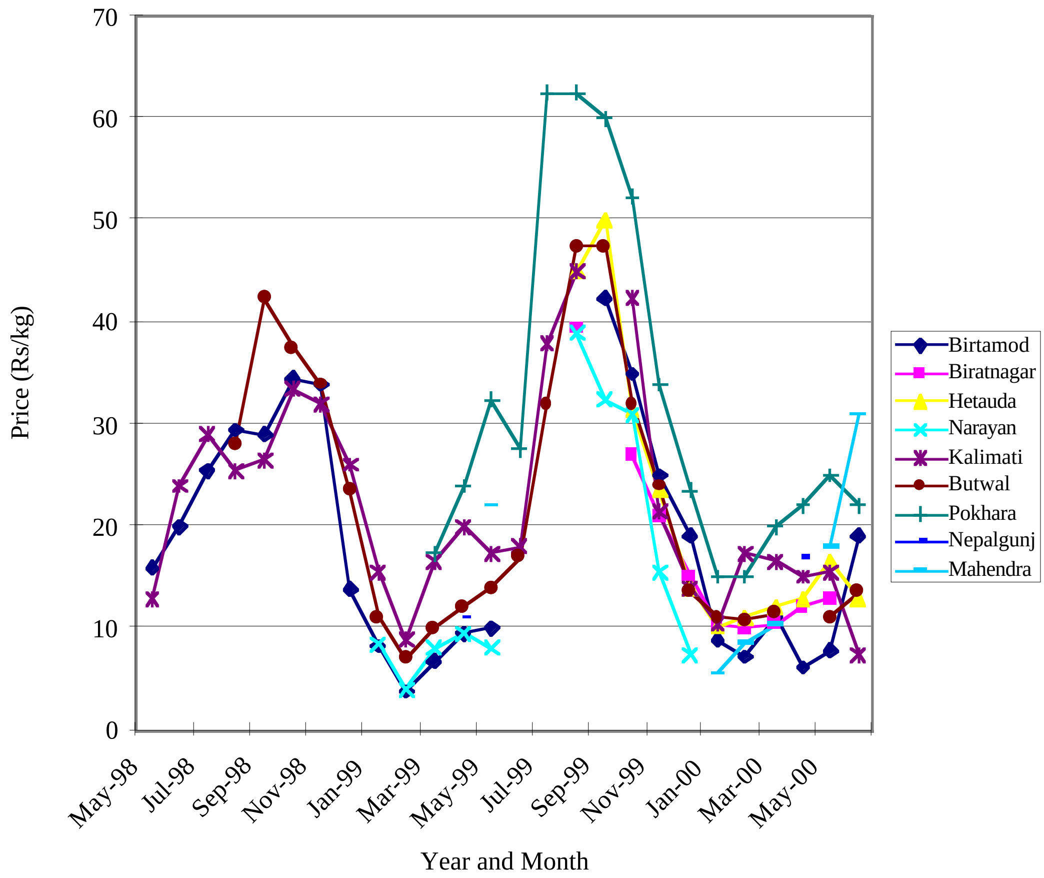


Fig. 2-3 Cauliflower, local Wholesale Price by Market

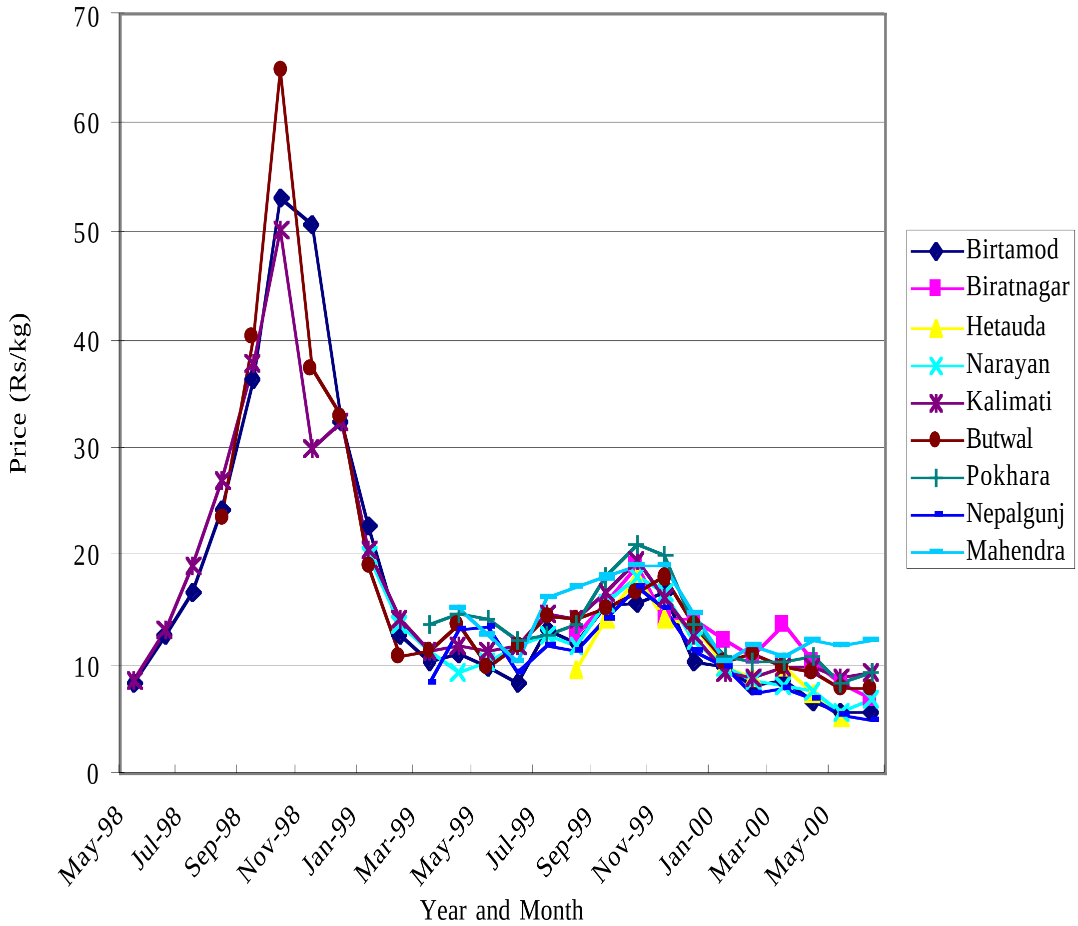
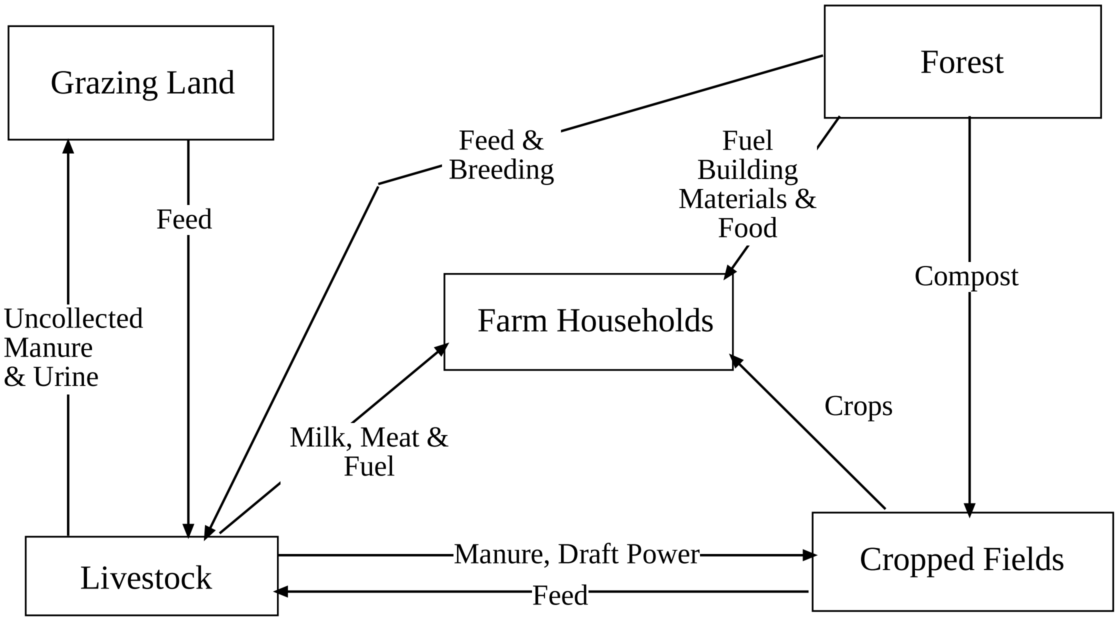


Fig. 2-4 Onion, local-Wholesale Price by Market



Source : Livestock M/P

Figure 2-5 Relationship between Livestock and Agriculture

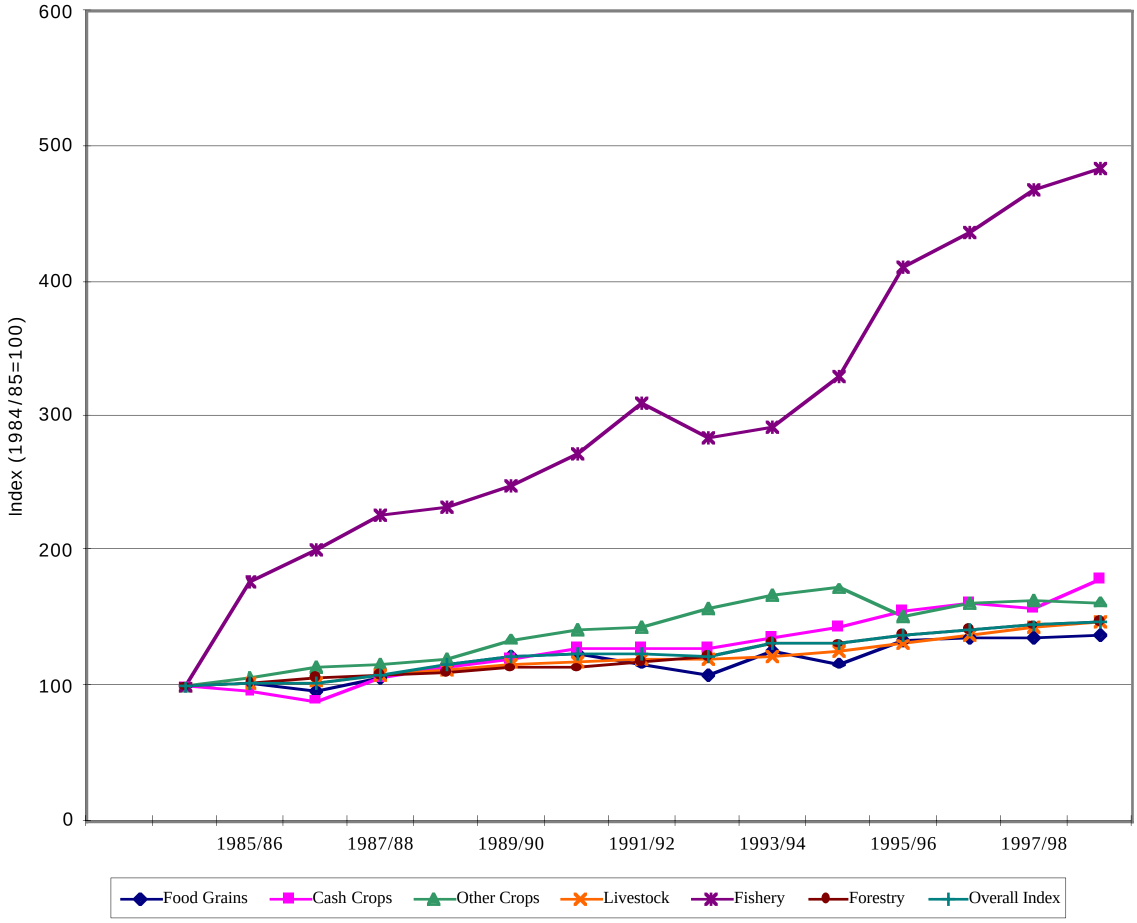


Figure 2-6 Production Index by Sector, 1984/85 to 1998/99

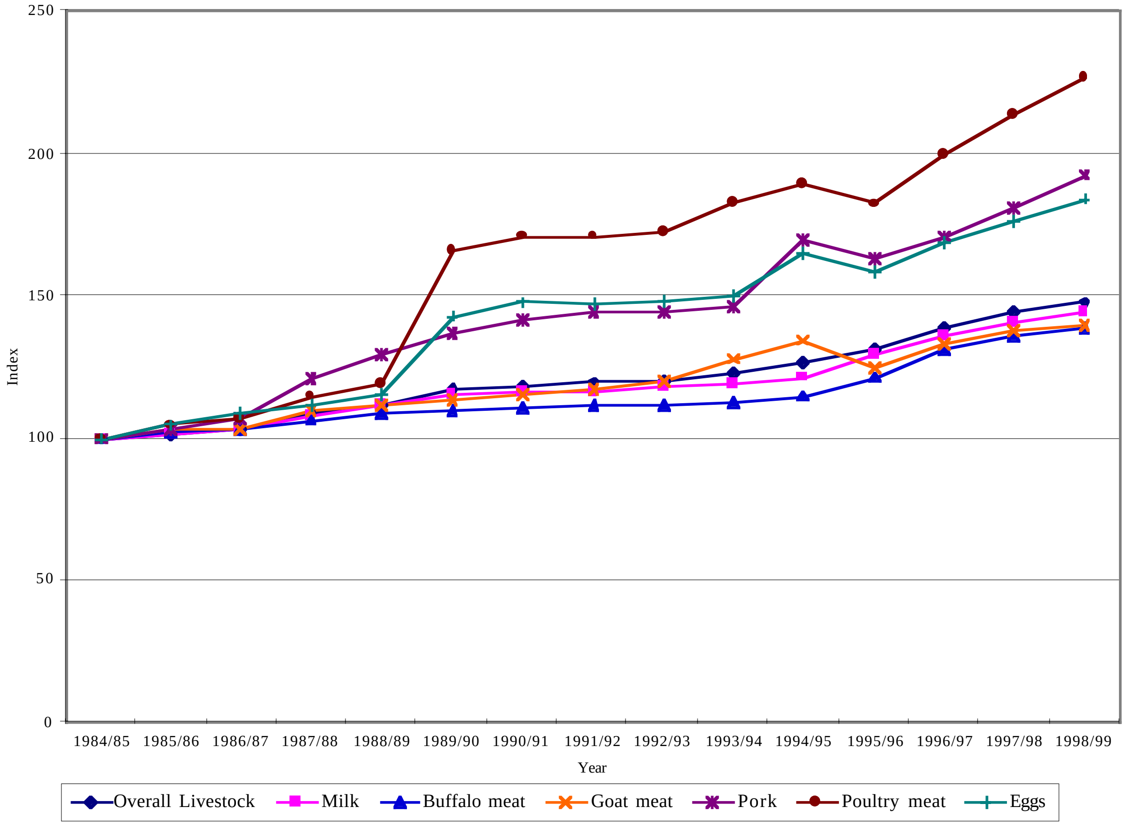
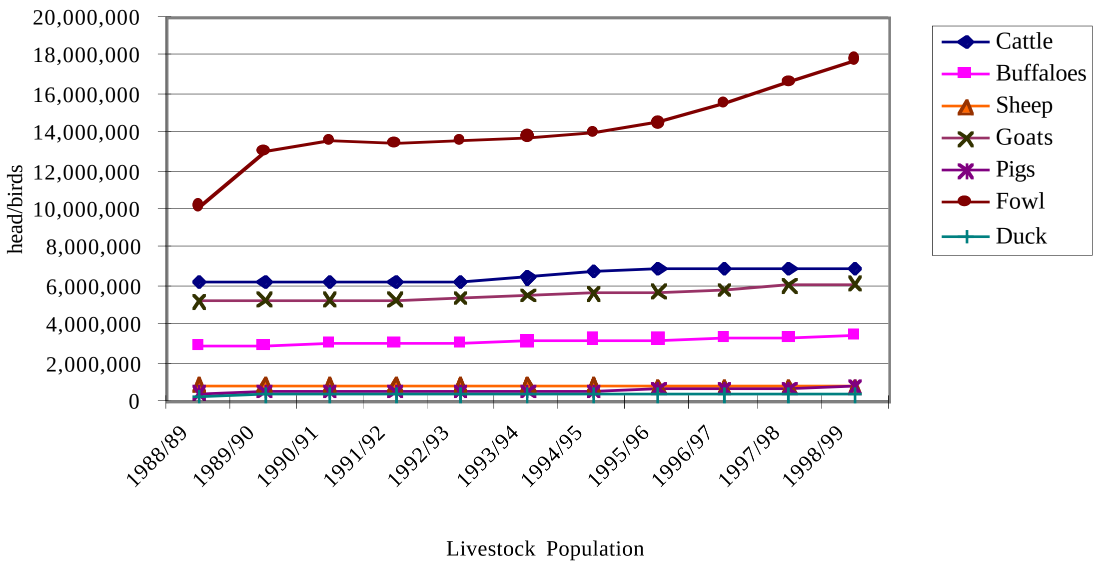


Figure 2-7 Production Index of Animal Products, 1984/85 to 1998/99



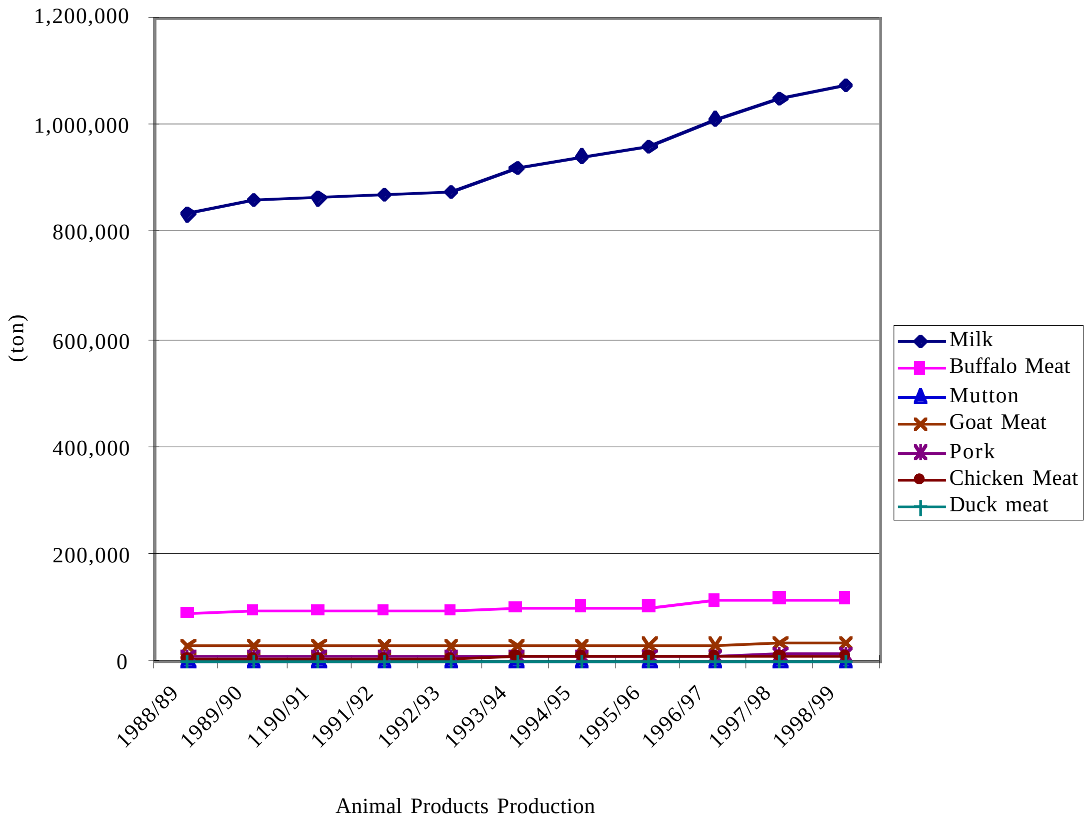


Figure 2-8 Livestock Population and Animal Products Production, 1989-1999

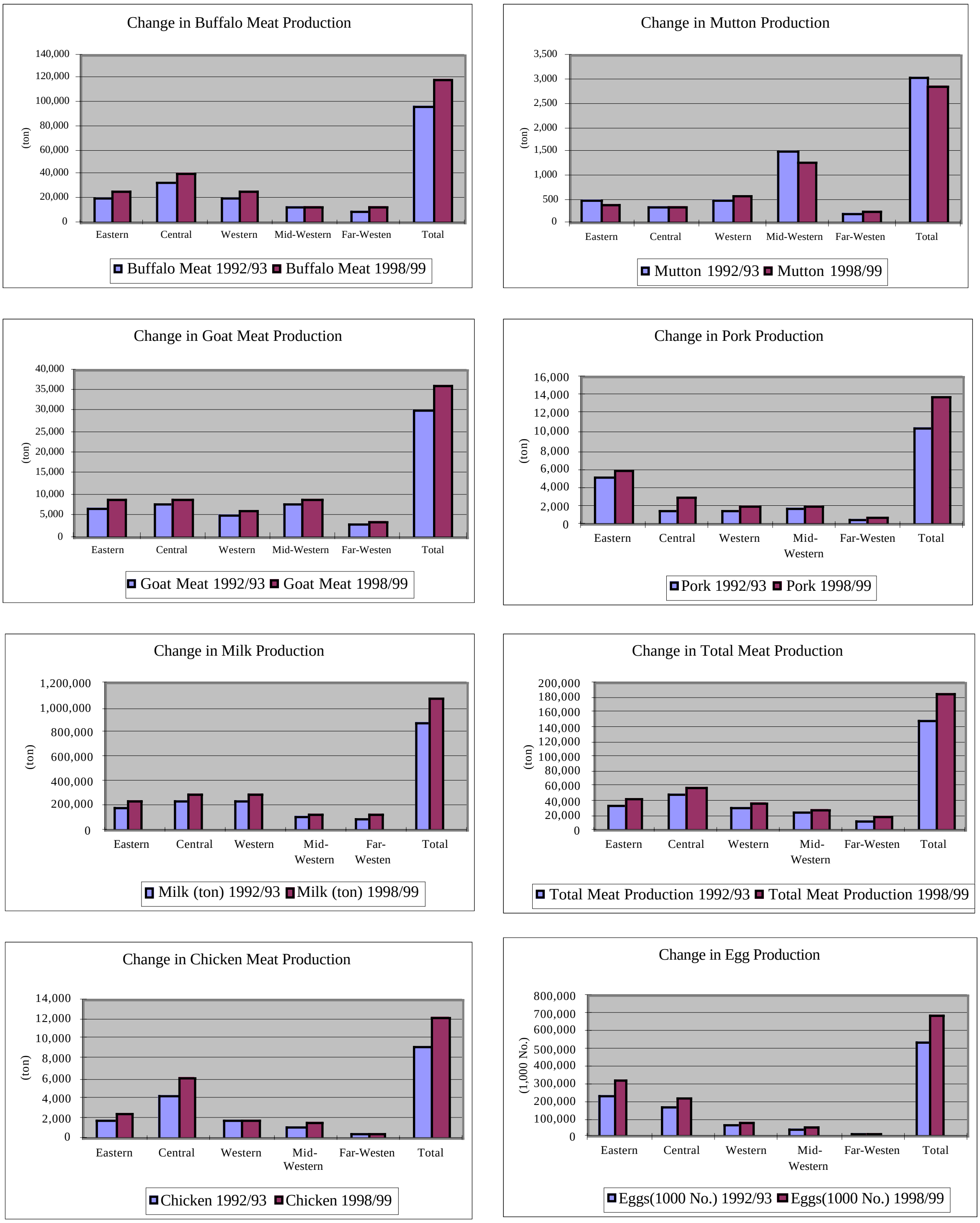


Figure 2-9 Change in Animal Products Production, 1992/93 to 1998/99

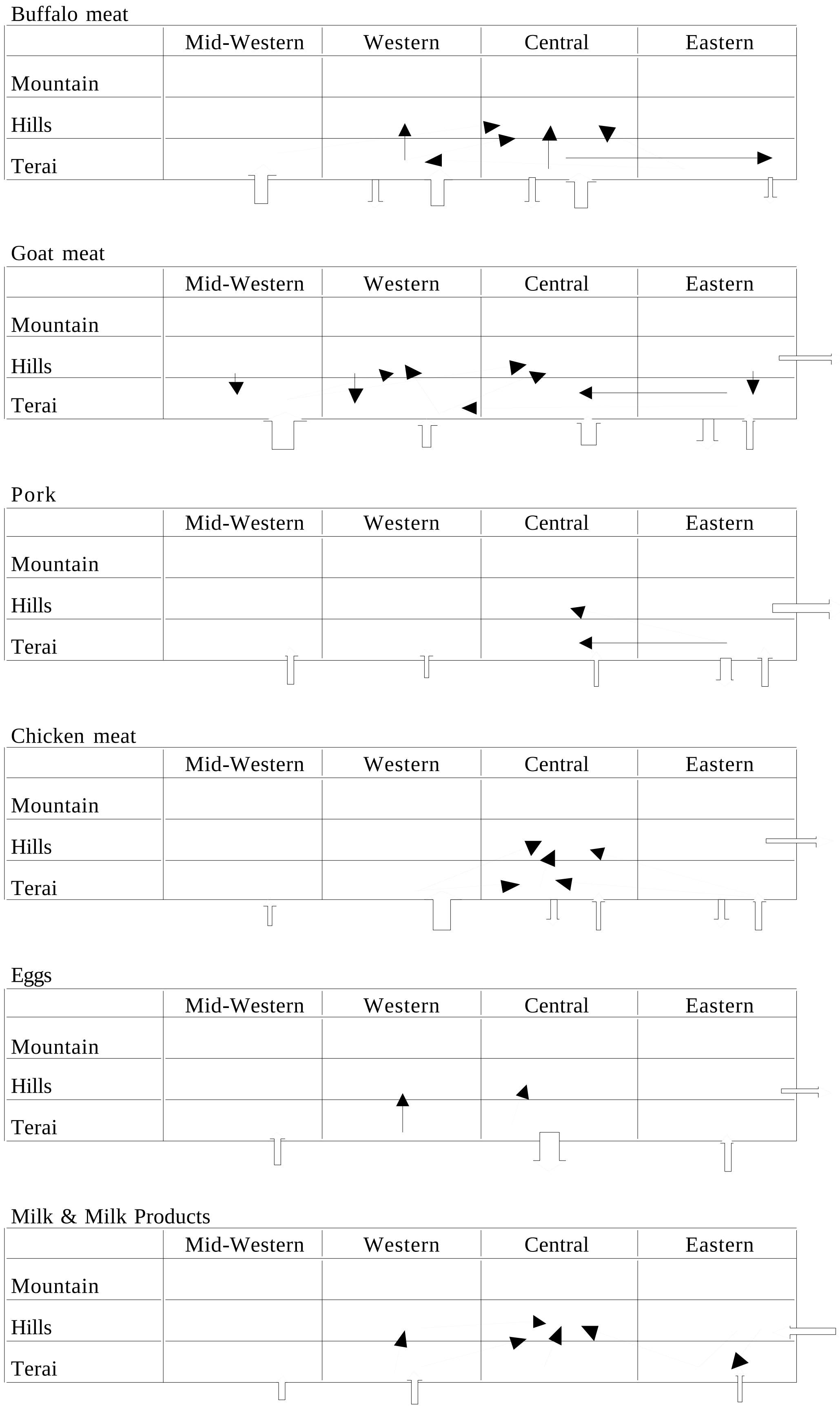


Figure 2-10 Distribution Pattern of Livestock among Development Areas

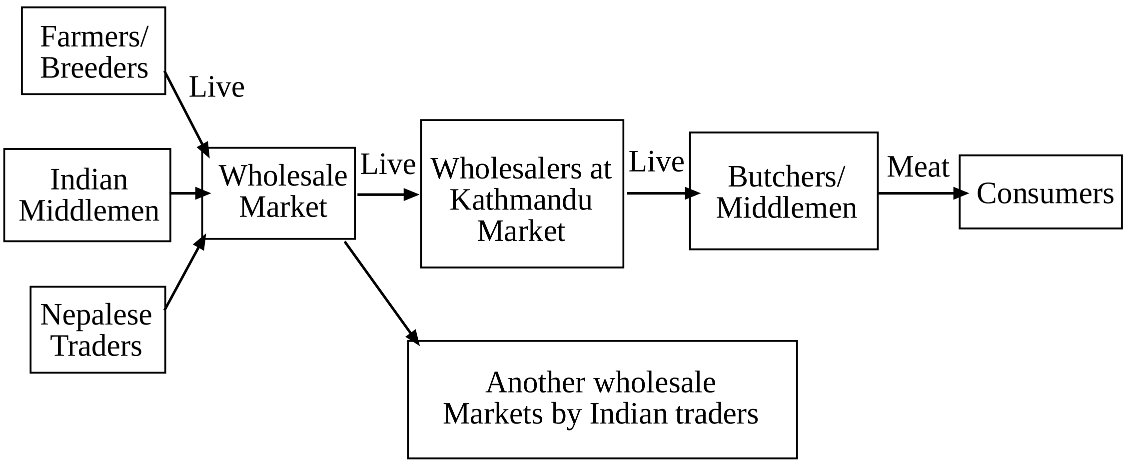
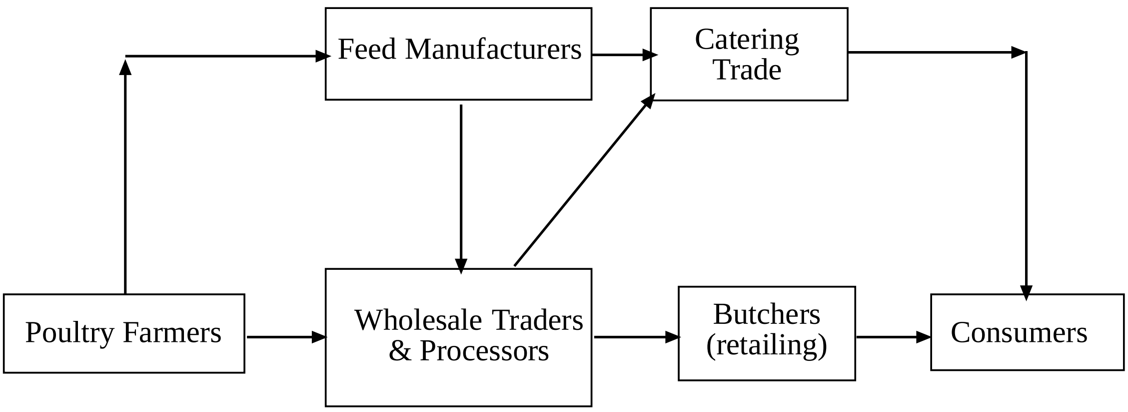


Figure 2-11 Flow Chart of Livestock Marketing at Jitpur Market



Source: TLDP

Figure 2-12 Flow Chart of Marketing of Chicken

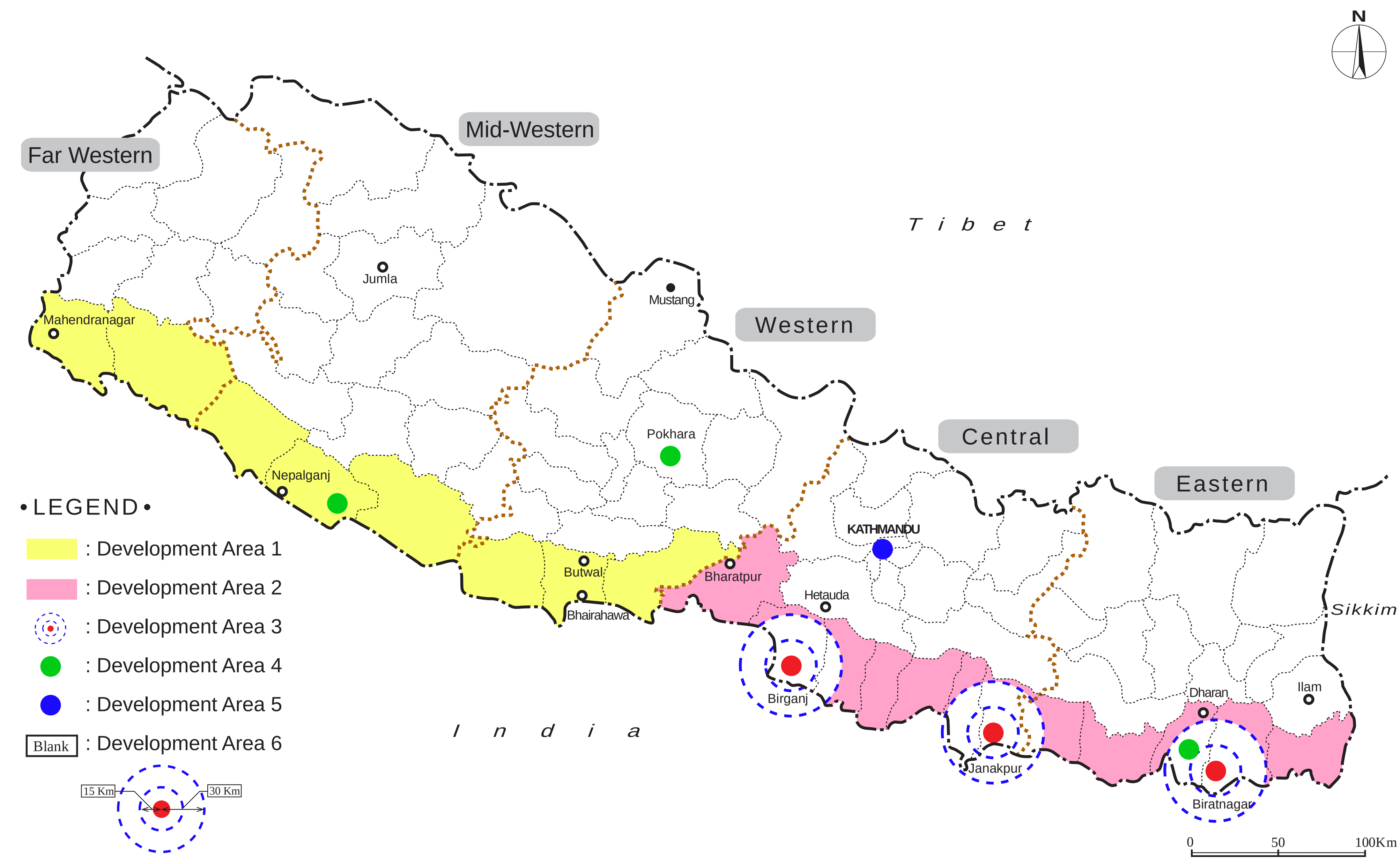


Fig 3-1 Fisheries Development Potential Area

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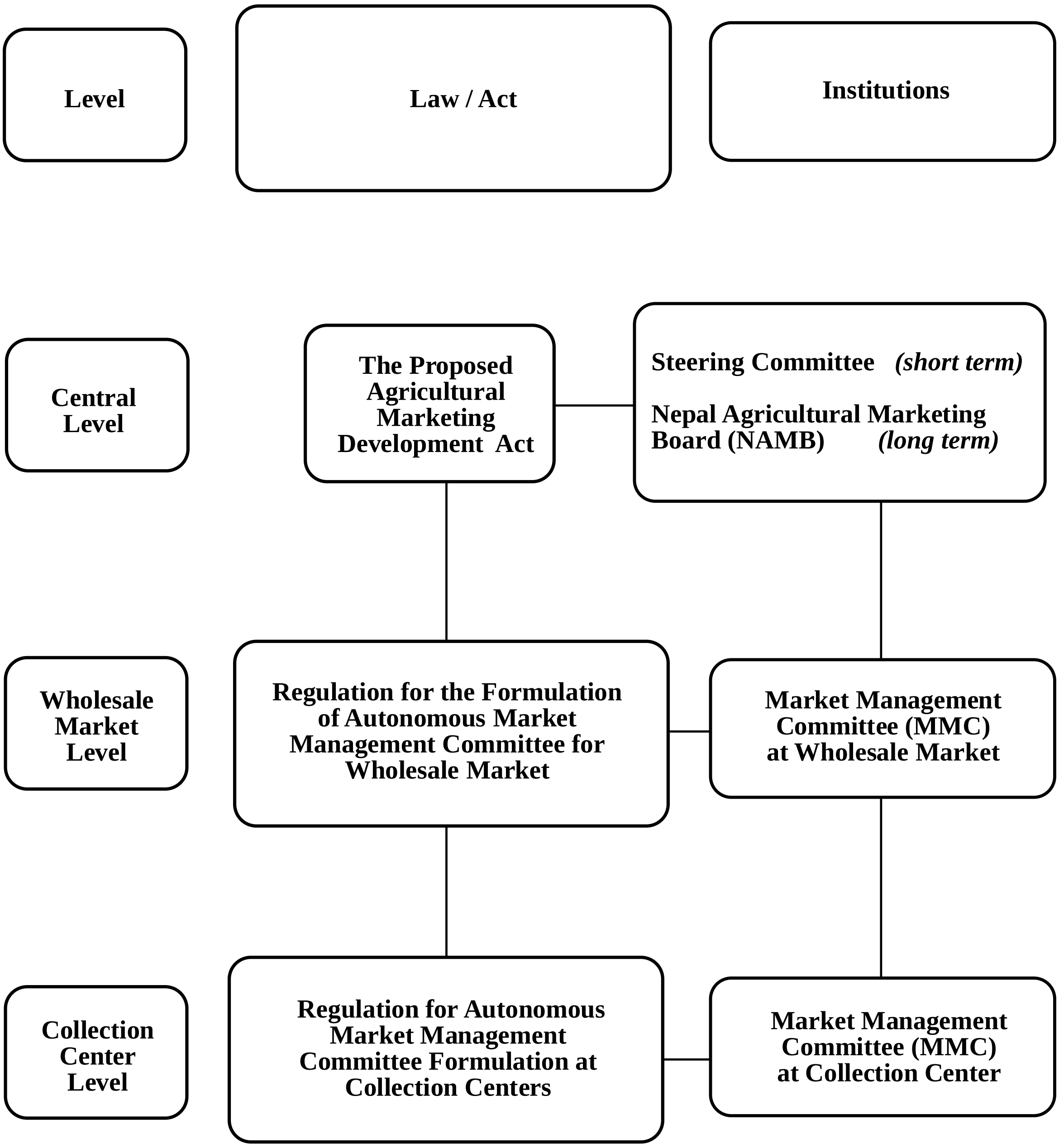


Figure 5-1 Proposed Law and Institution for Agricultural Marketing Management System

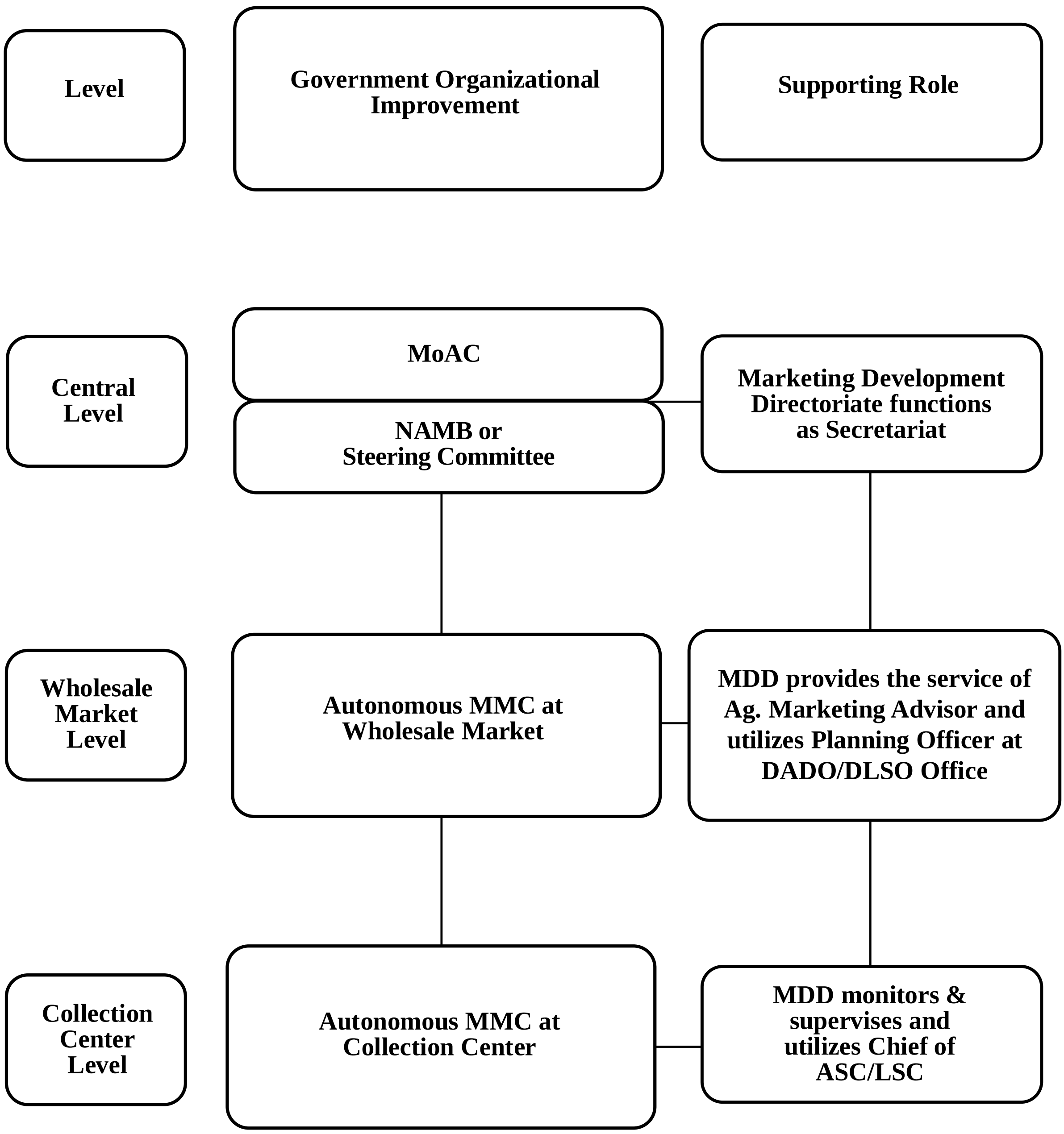


Figure 5-2 Proposed Government Organization for Agricultural Marketing Management System

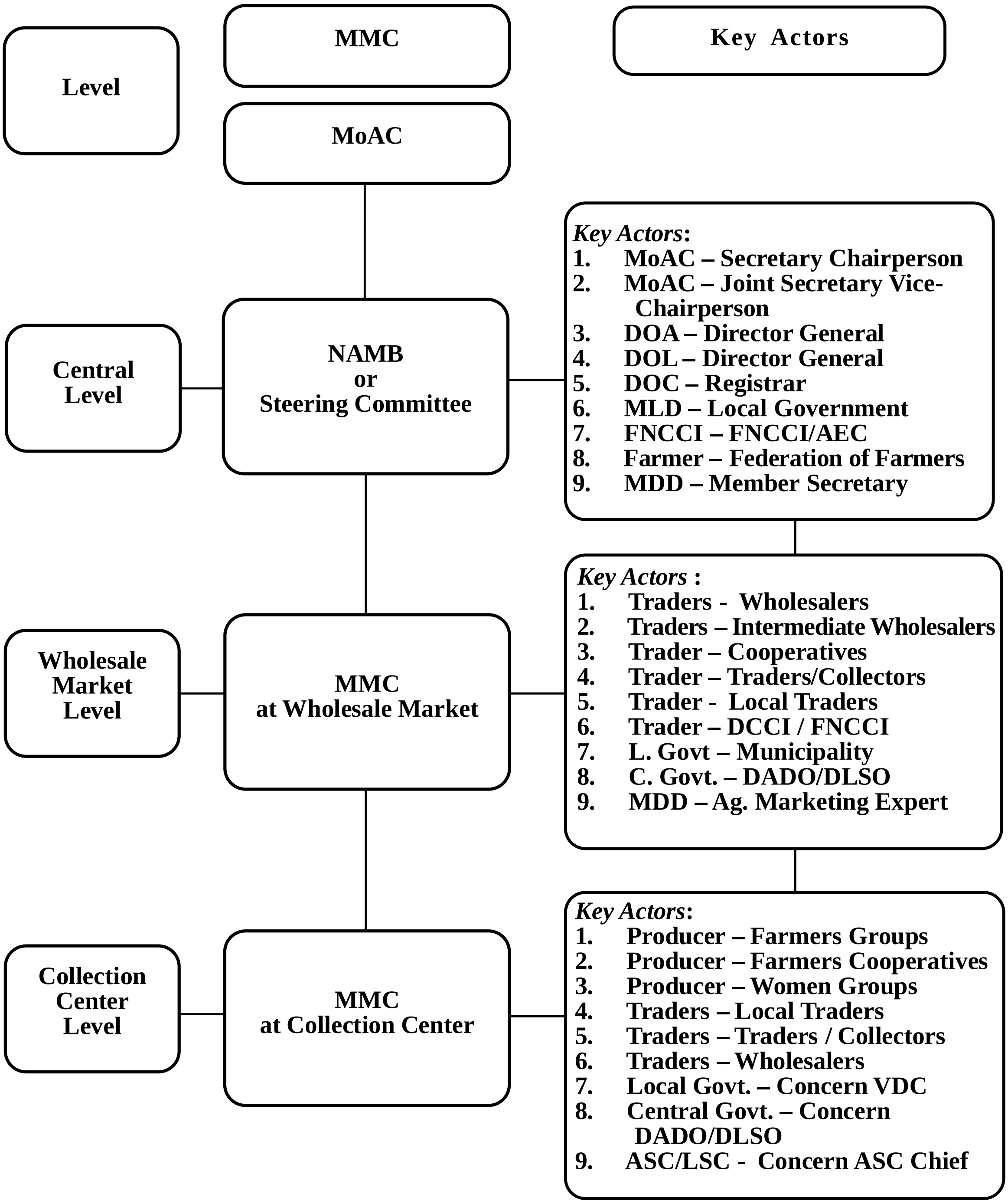
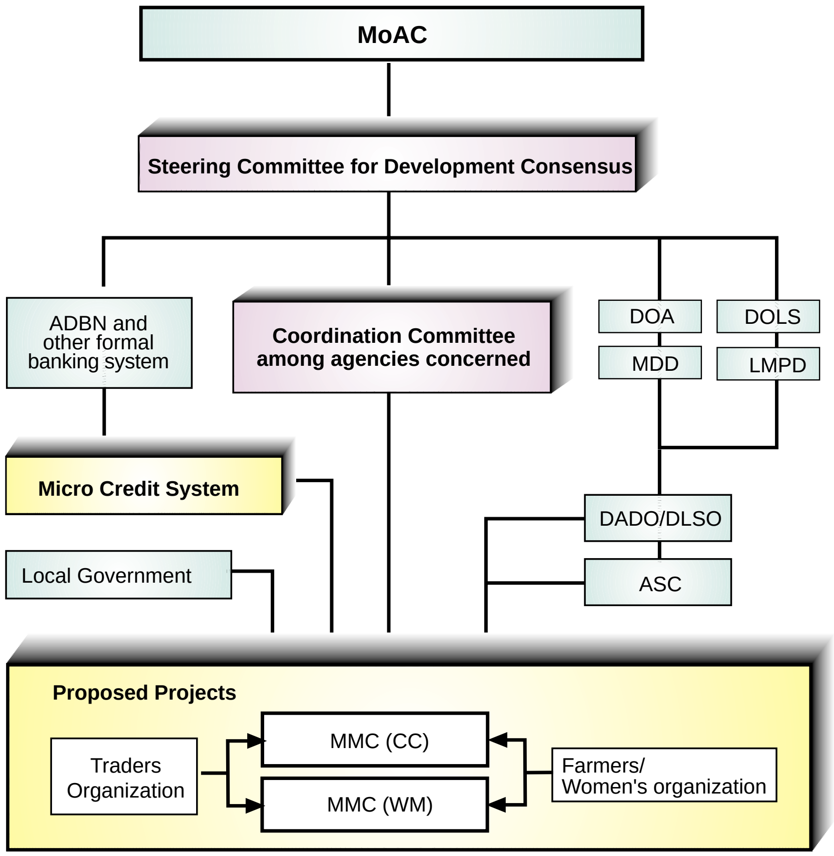


Figure 5-3 Proposed Market Management Committee (MMC) and Key Actors at Various Level

Short Term for 2005



Long Term for 2015

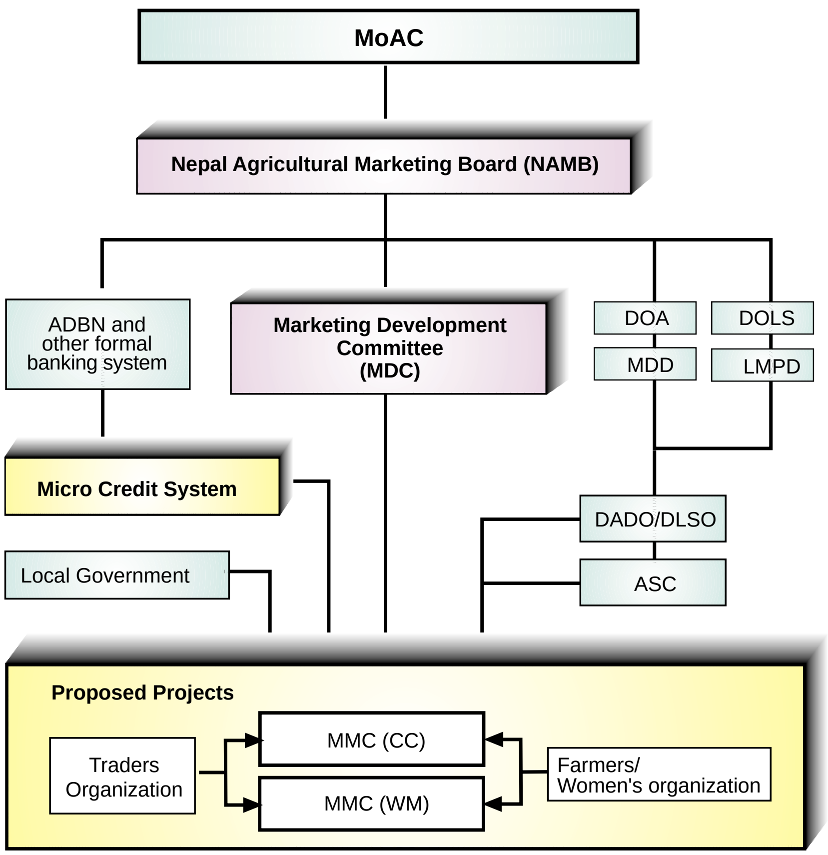


Fig. 5-4 Proposed Agricultural Marketing Management System, Short Term (2005) and Long Term (2015)

< Without Project >

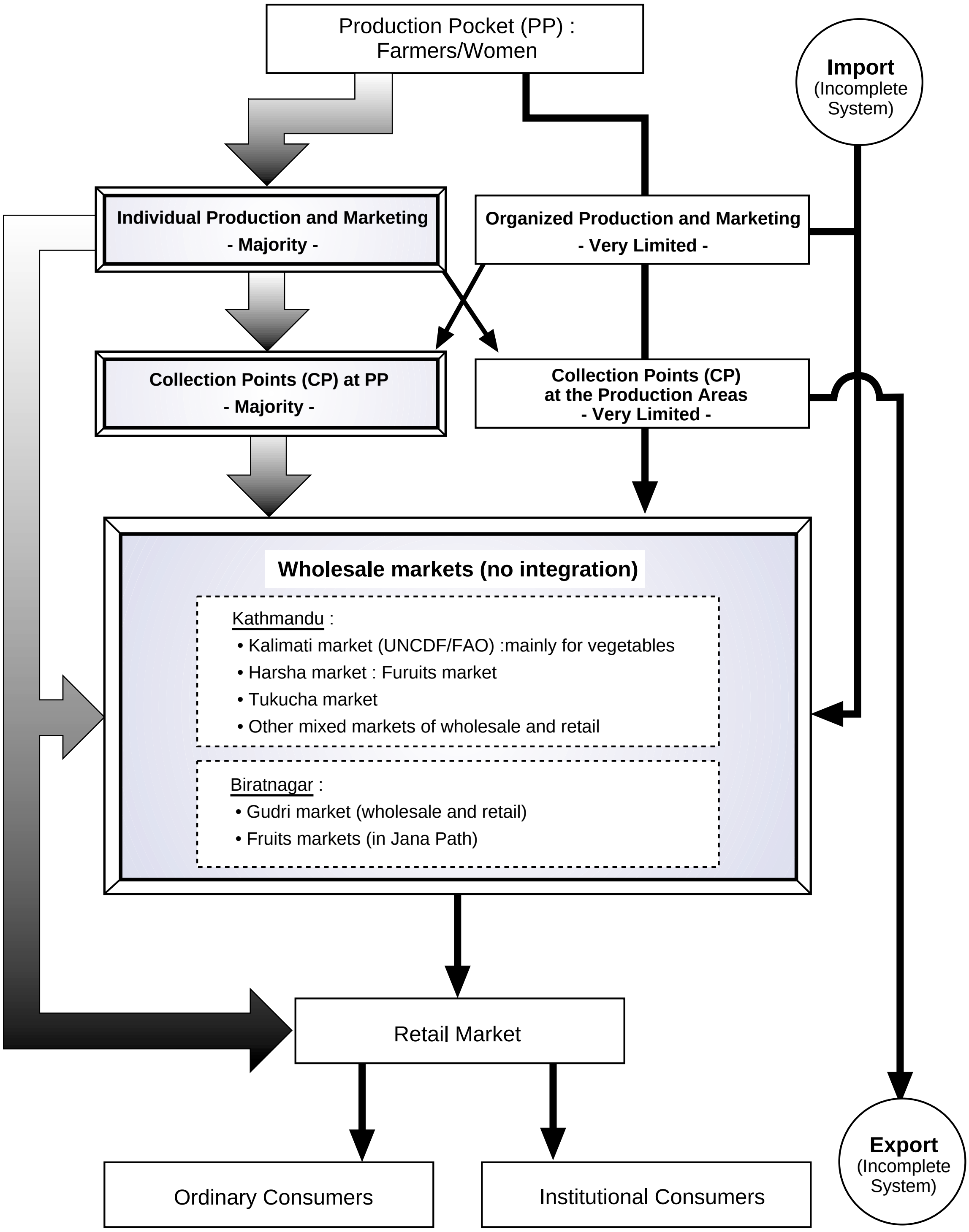


Fig. 5-5 Agricultural Marketing System without the proposed Integrated Marketing System project in the Central and Eastern Region

< With Project >

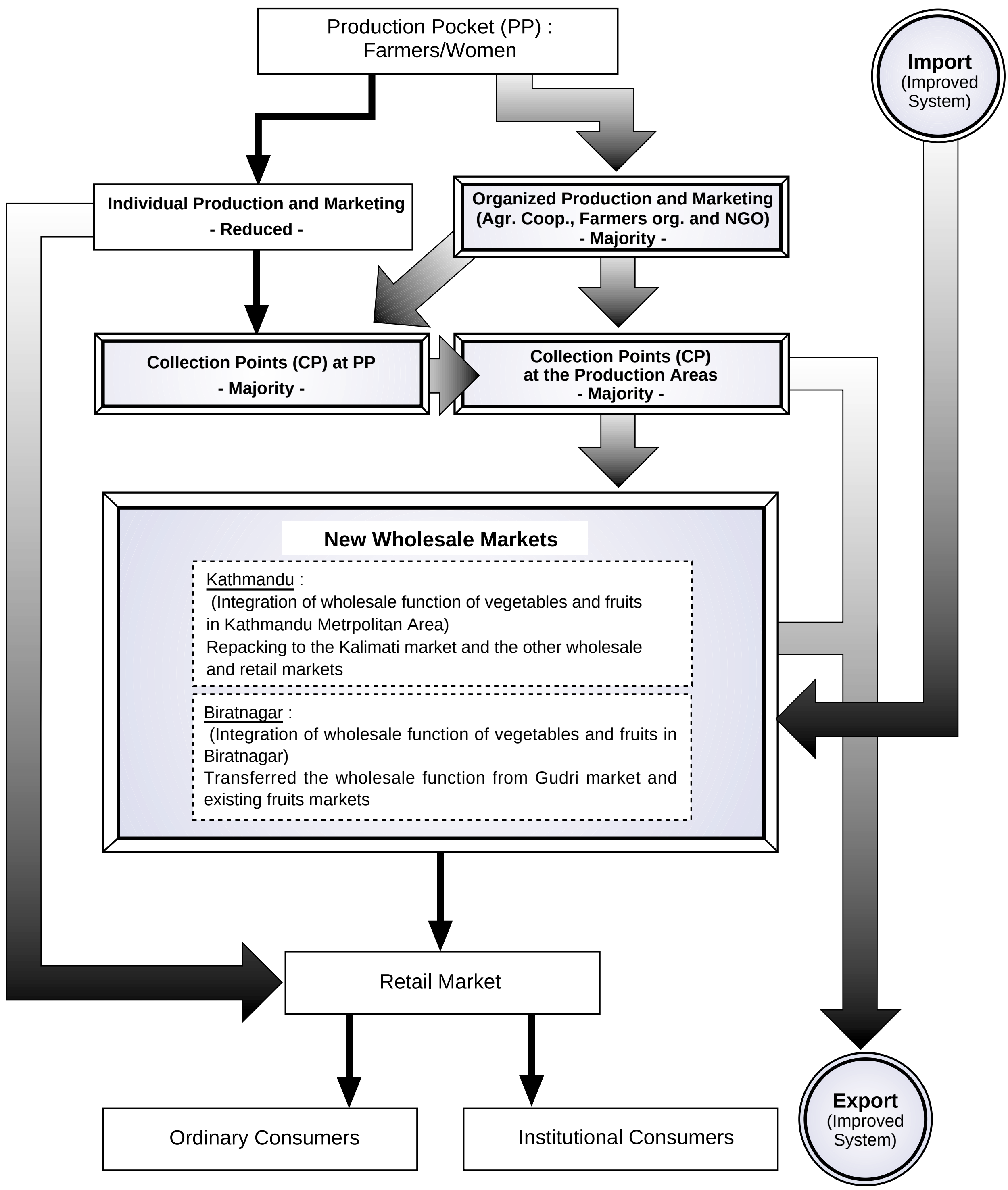


Fig. 5-6 Agricultural Marketing System with the proposed Integrated Marketing System project in the Central and Eastern Region

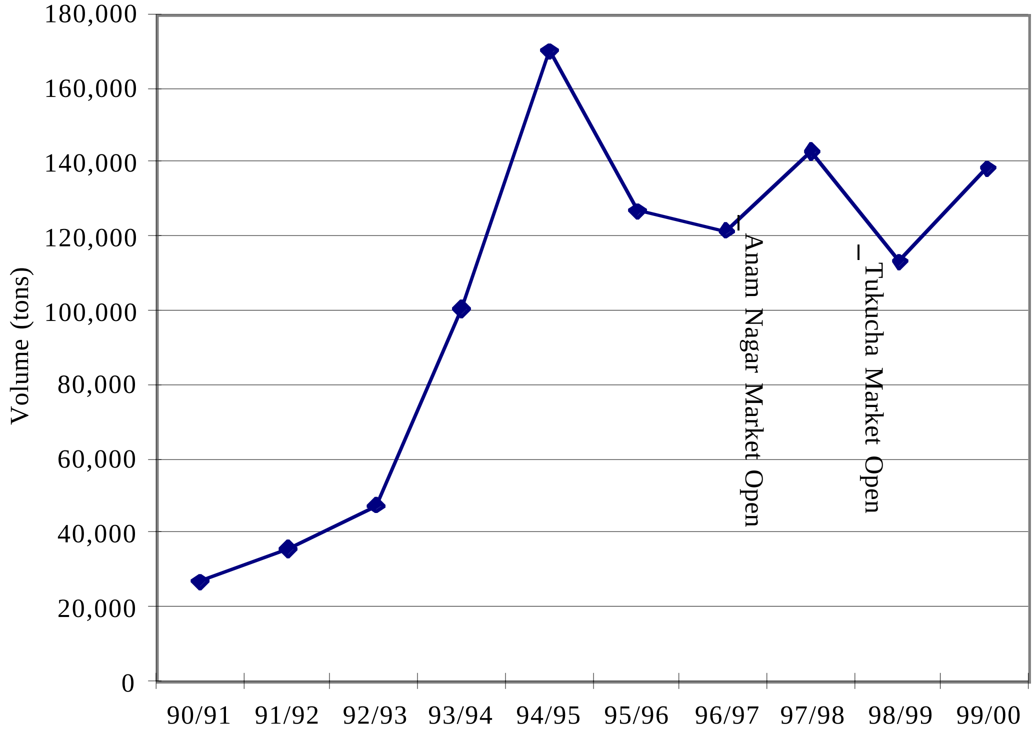


Fig. 9-1 Incoming Volume to Kalimati Market, 1990/91 to 1999/2000

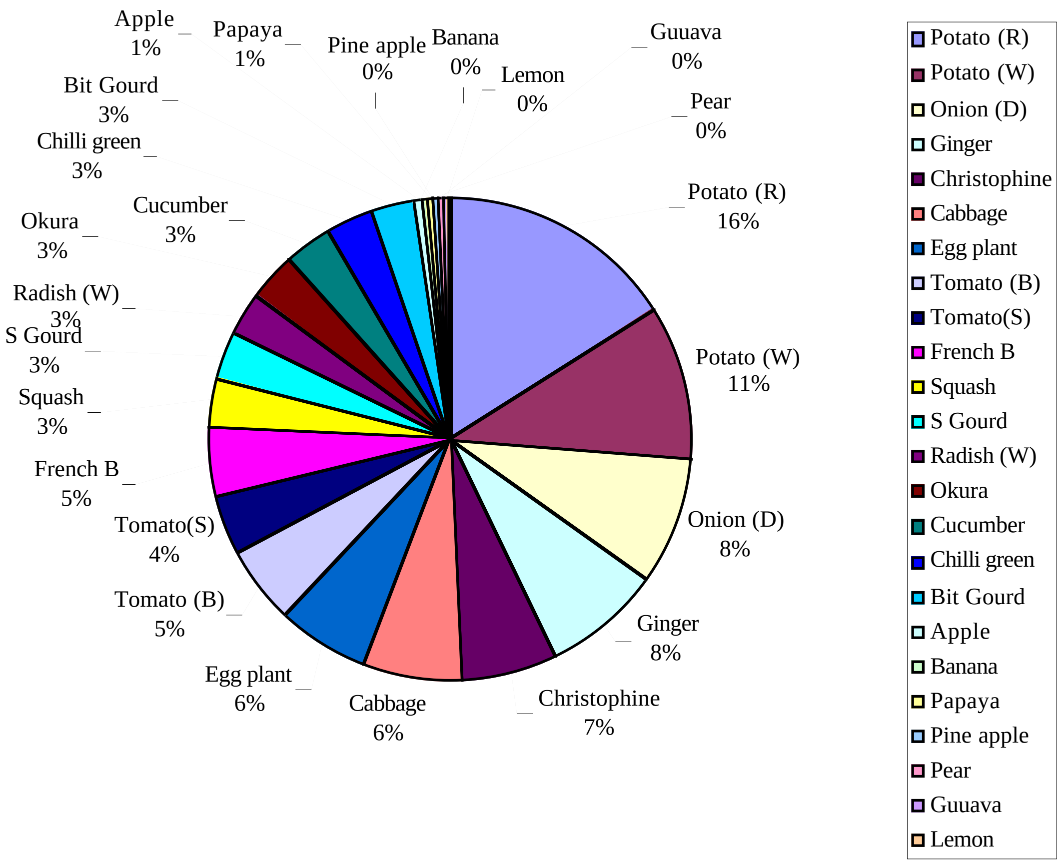
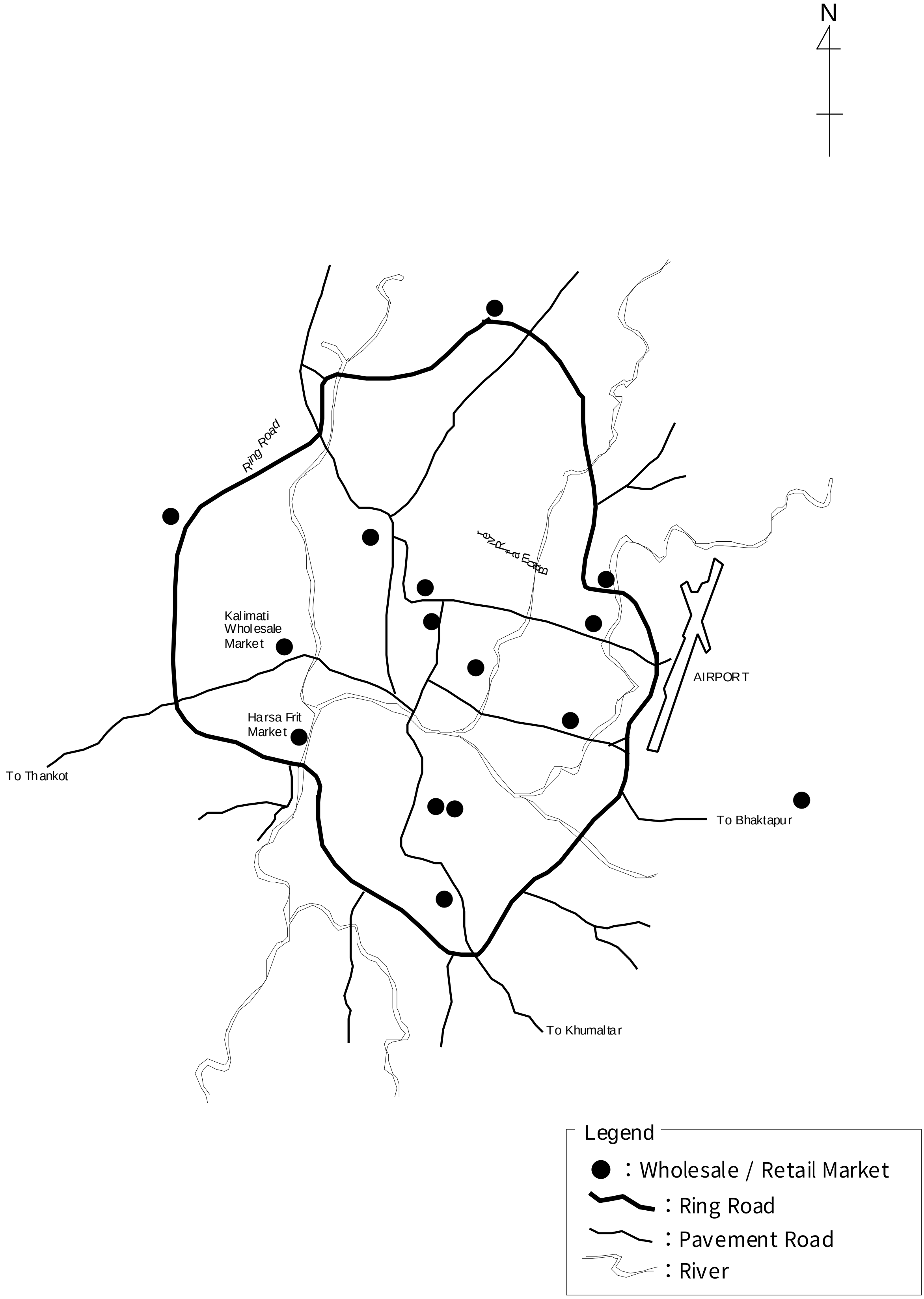
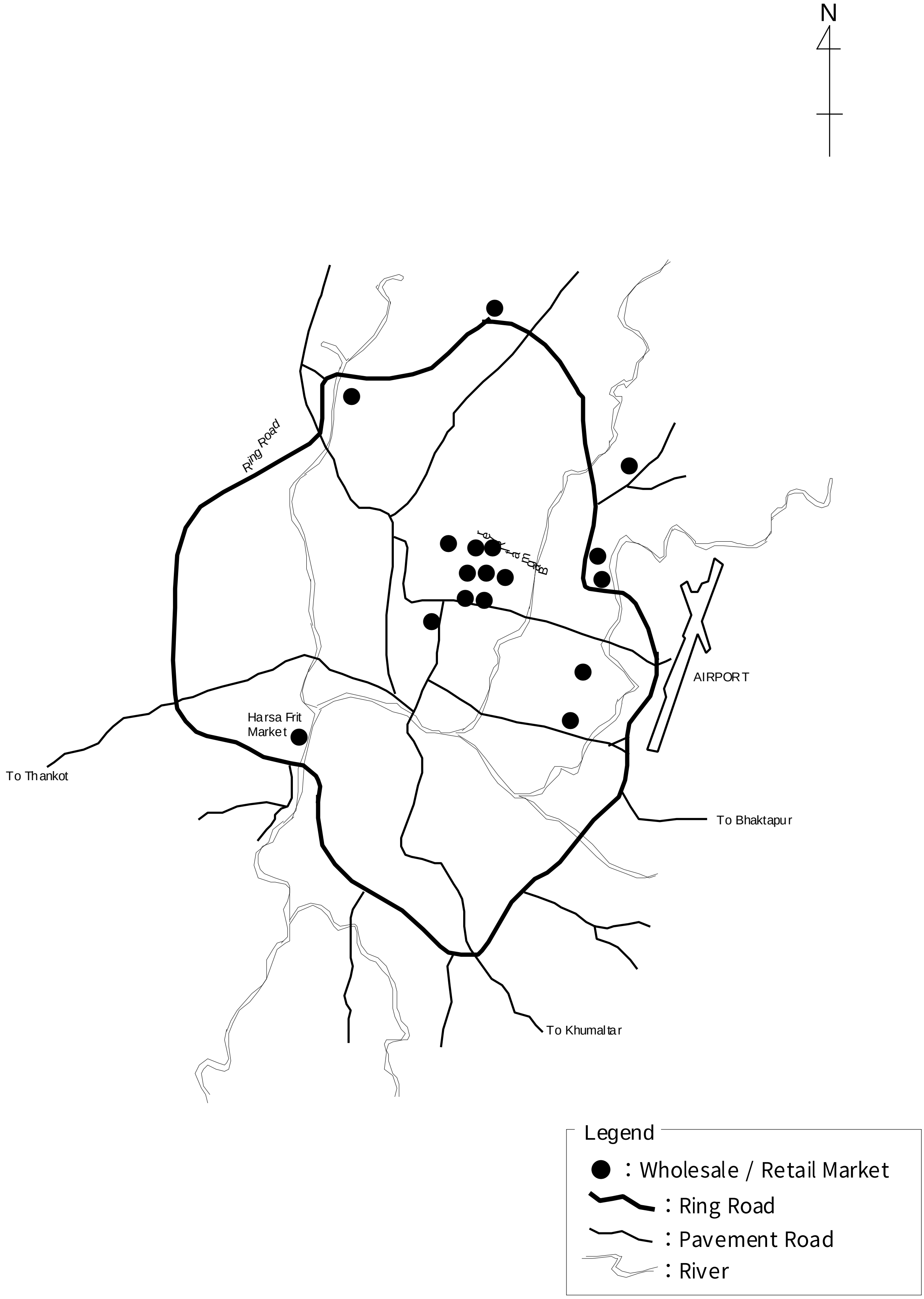


Fig. 9-2 Vegetables Arrival in Kalimati Market (Sep/Oct 2000)
Total Volume 9,378 tons



Scale 1 : 100,000

Fig. 9-3 Marketing Territory of Kalimati Market	Study on the Agricultural Marketing Development Project in the Kingdom of Nepal



Scale 1 : 100,000

Fig. 9-4 Marketing Territory of Tukucha Market	Study on the Agricultural Marketing Development Project in the Kingdom of Nepal

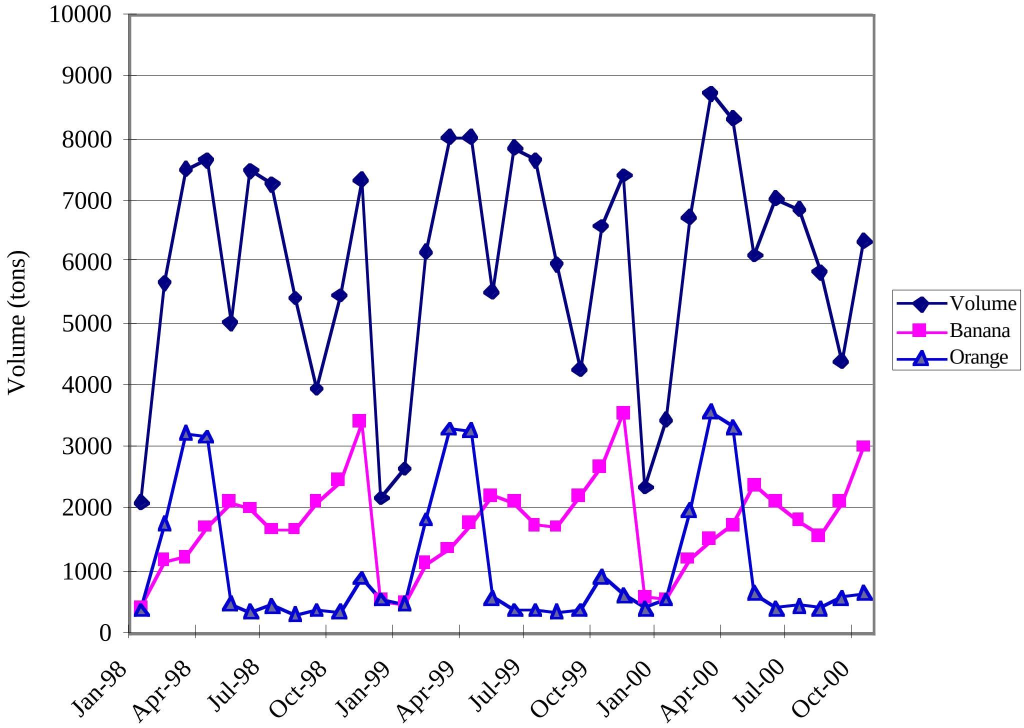


Fig. 9-5 Incoming Volume of Fruit to Harsha Market by Month

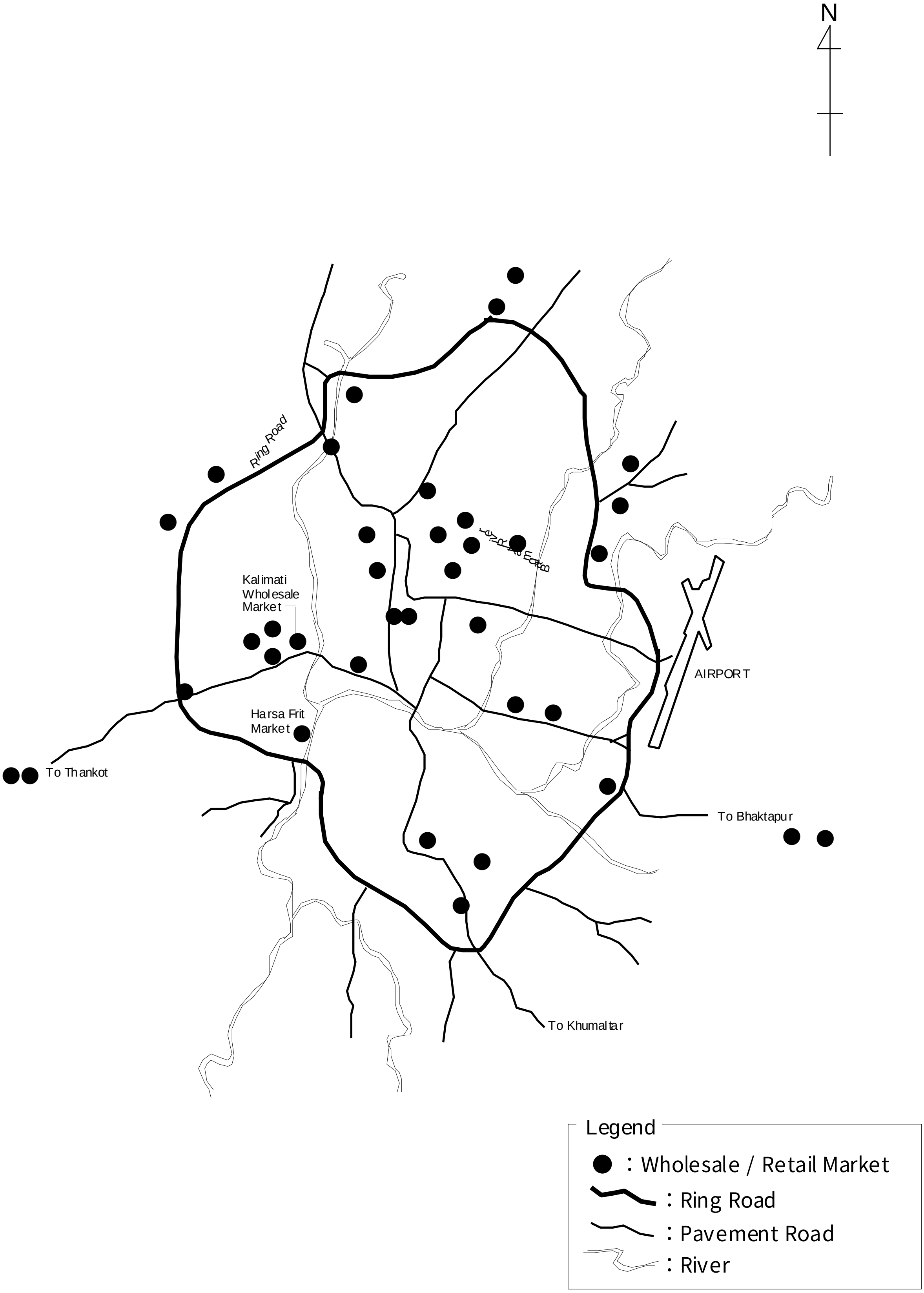


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Fig. 9-6 Marketing Territory of Harsha Fruits Market	Study on the Agricultural Marketing Development Project in the Kingdom of Nepal

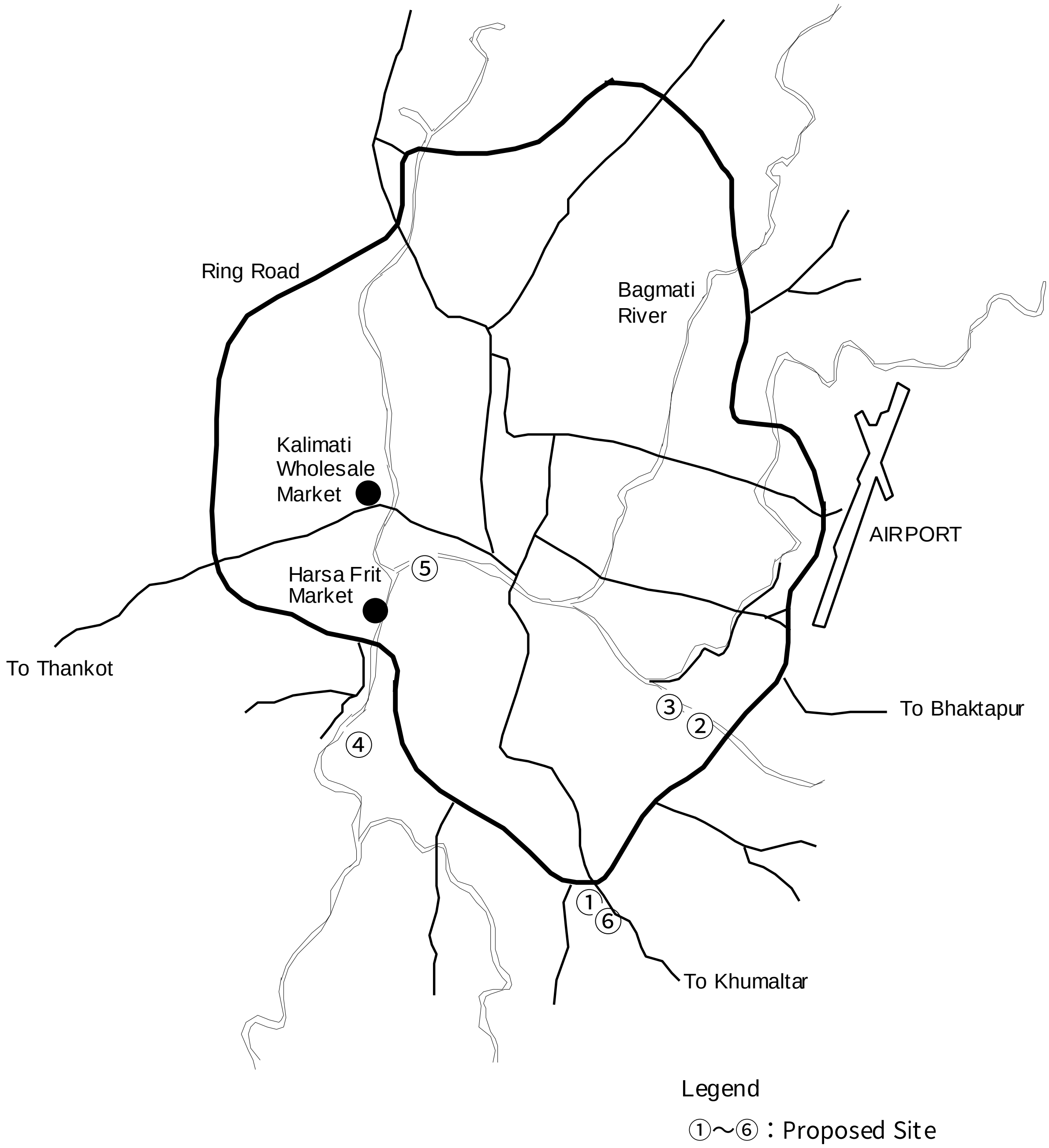

Fig. 9-7 Location Map of Proposed Sites for NWM in Kathmandu

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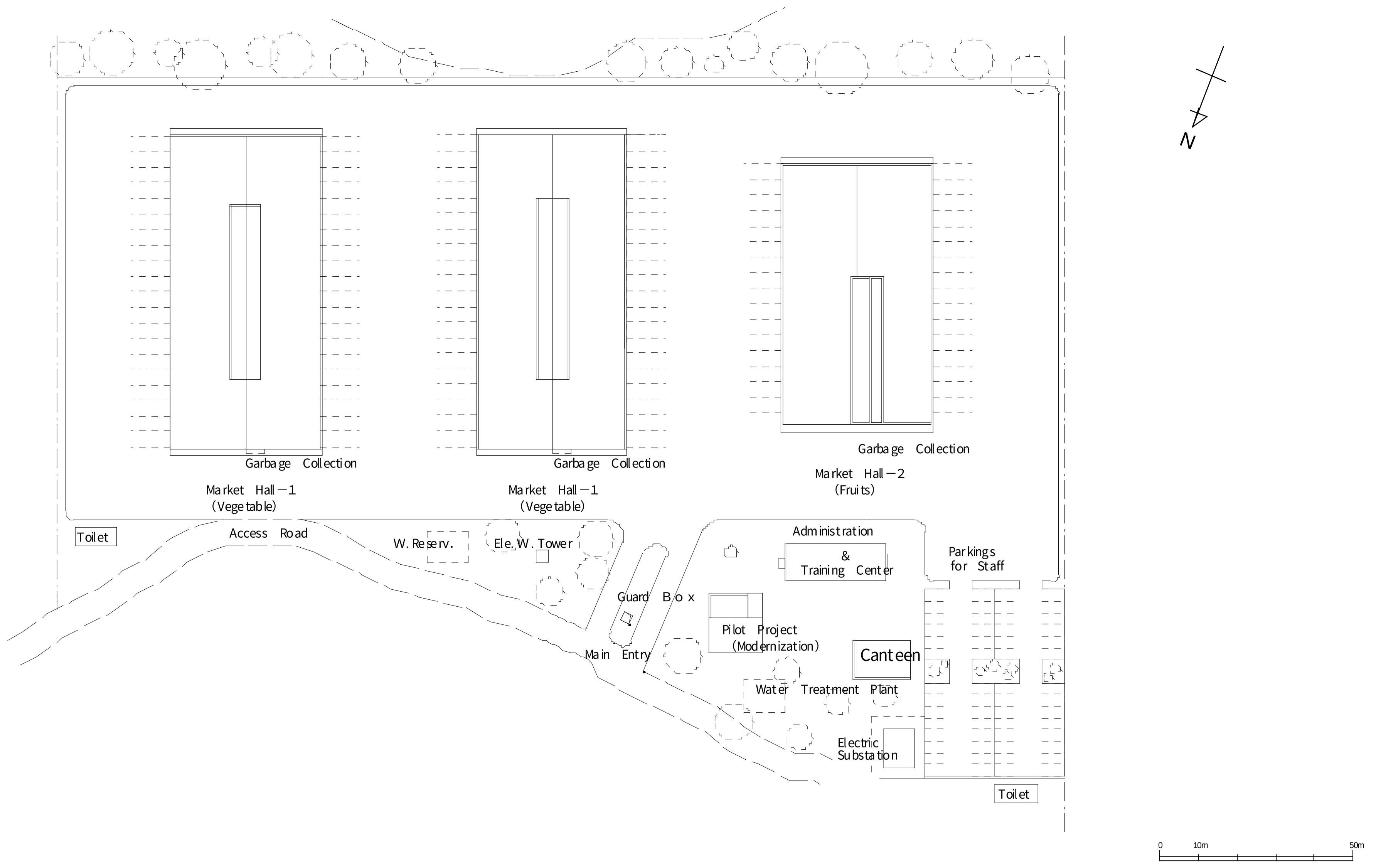

Fig. 9-8 Layout Plan of NWM in Site A, Kathmandu

Scale 1 : 1500

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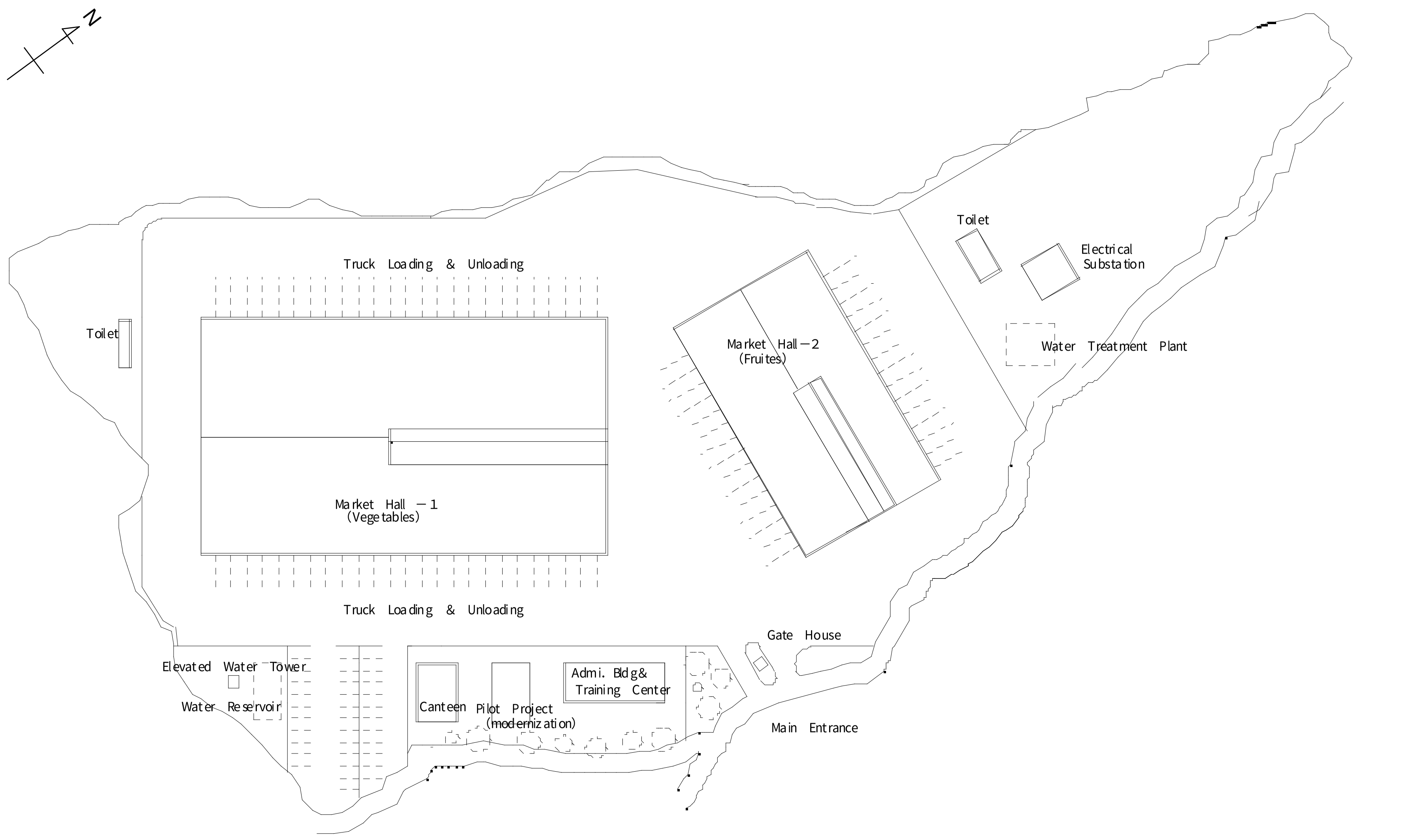

Fig. 9-9 Layout Plan of NWM in Site B, Kathmandu

Scale 1 : 1500

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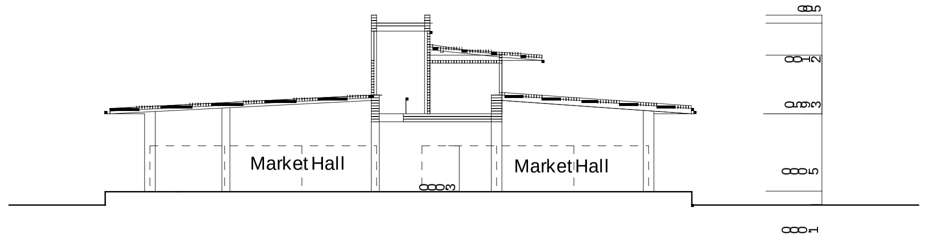
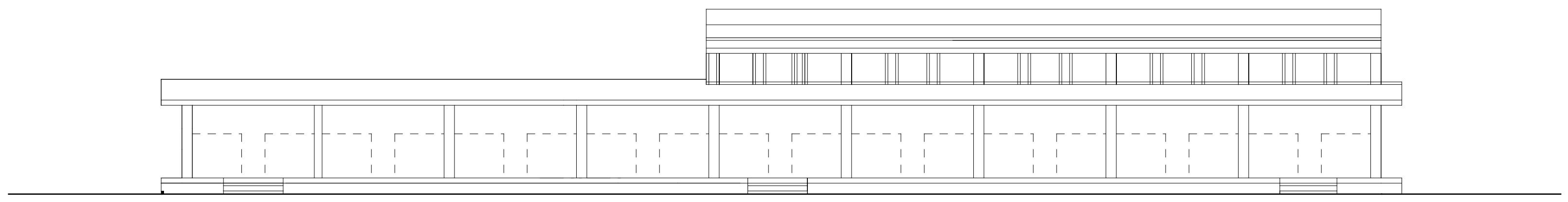
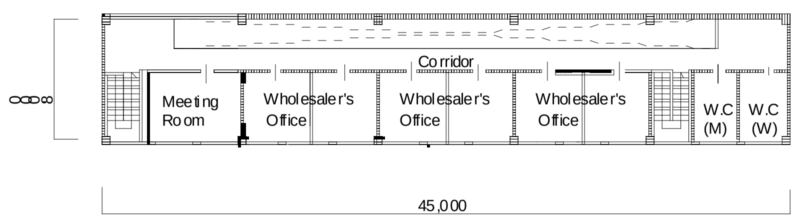


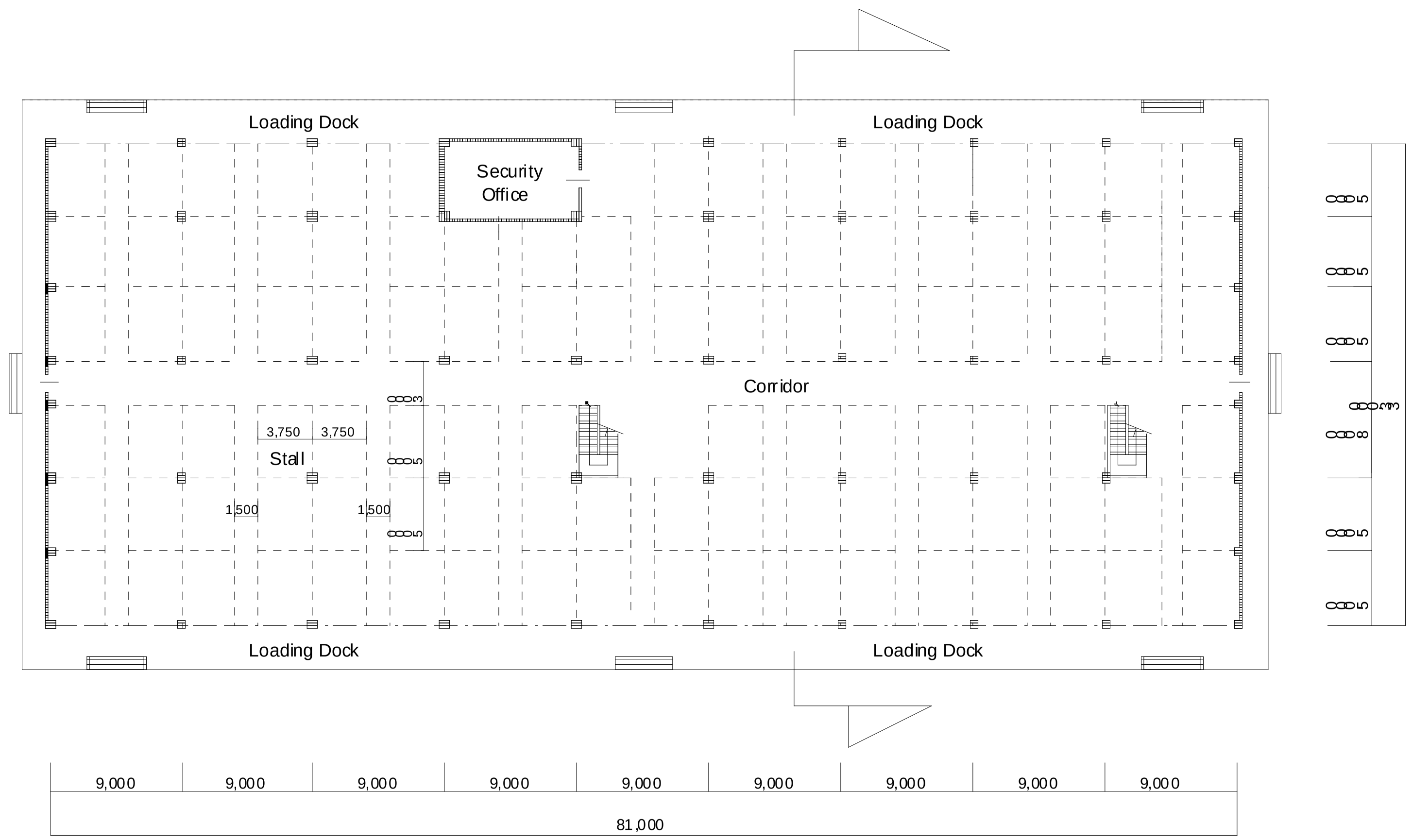
Section



Elevation



Second Floor Plan



First Floor Plan

Fig. 9-10 Drawing of Market Hall-1 A in NWM, Kathmandu
(Plan / Elevation / Section)

Scale 1 : 500

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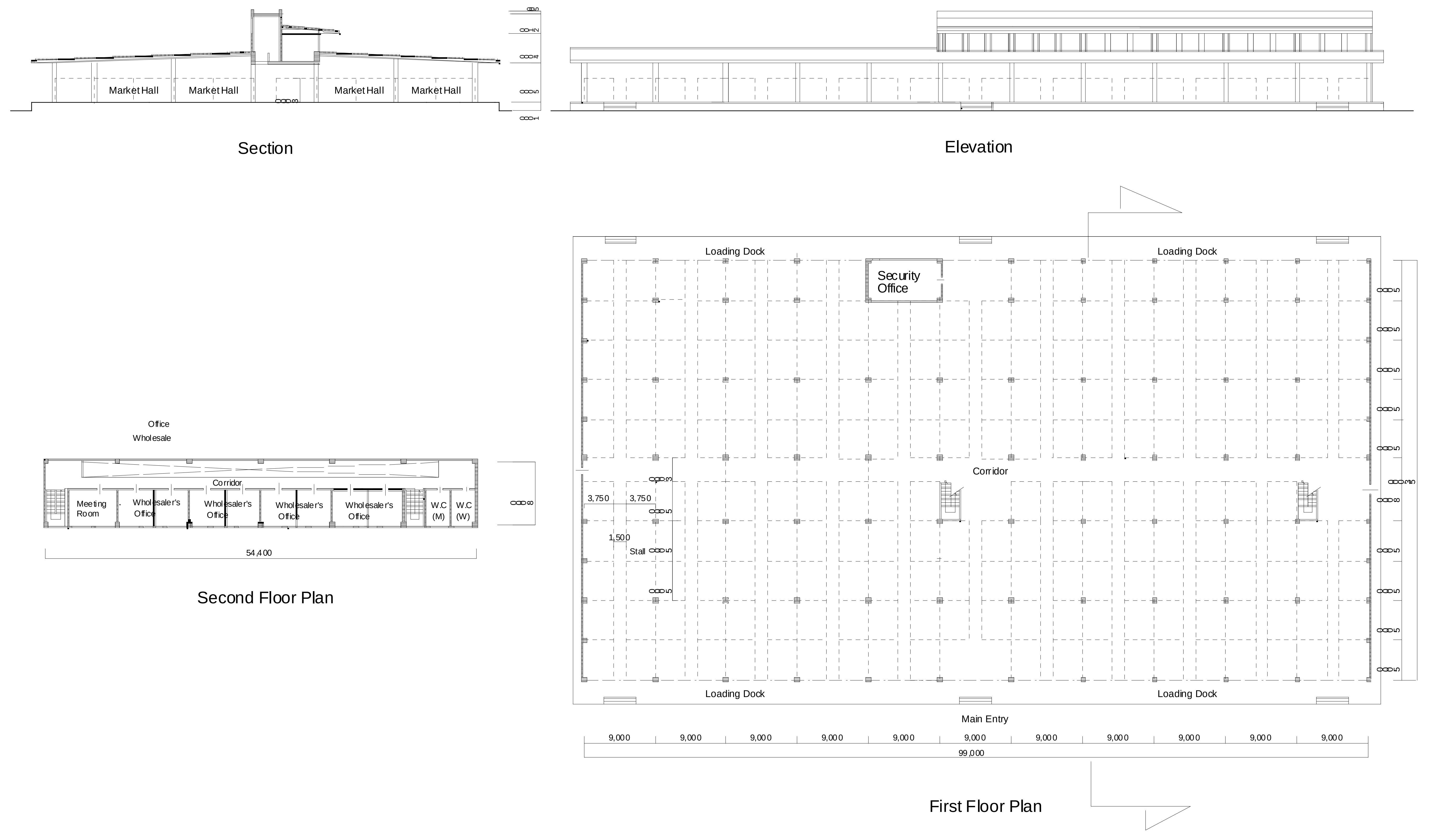

Fig. 9-11 Drawing of Market Hall-1 B in NWM, Kathmandu
(Plan / Elevation / Section)

Scale 1 : 500

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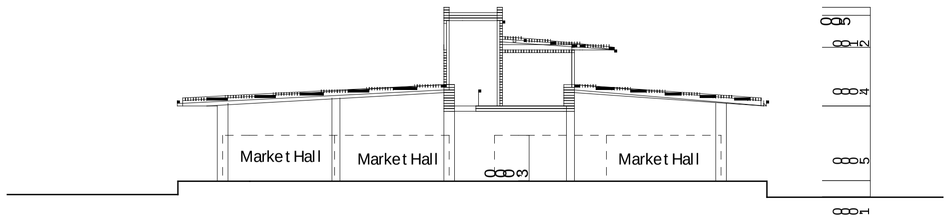
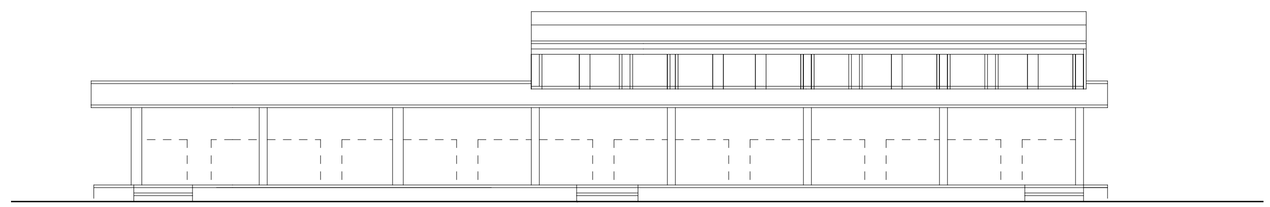
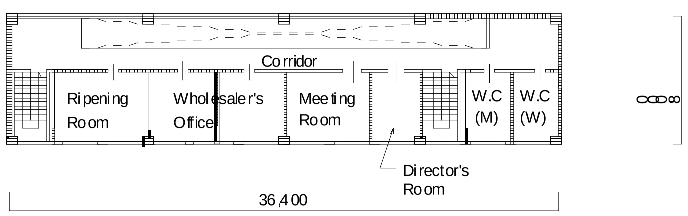


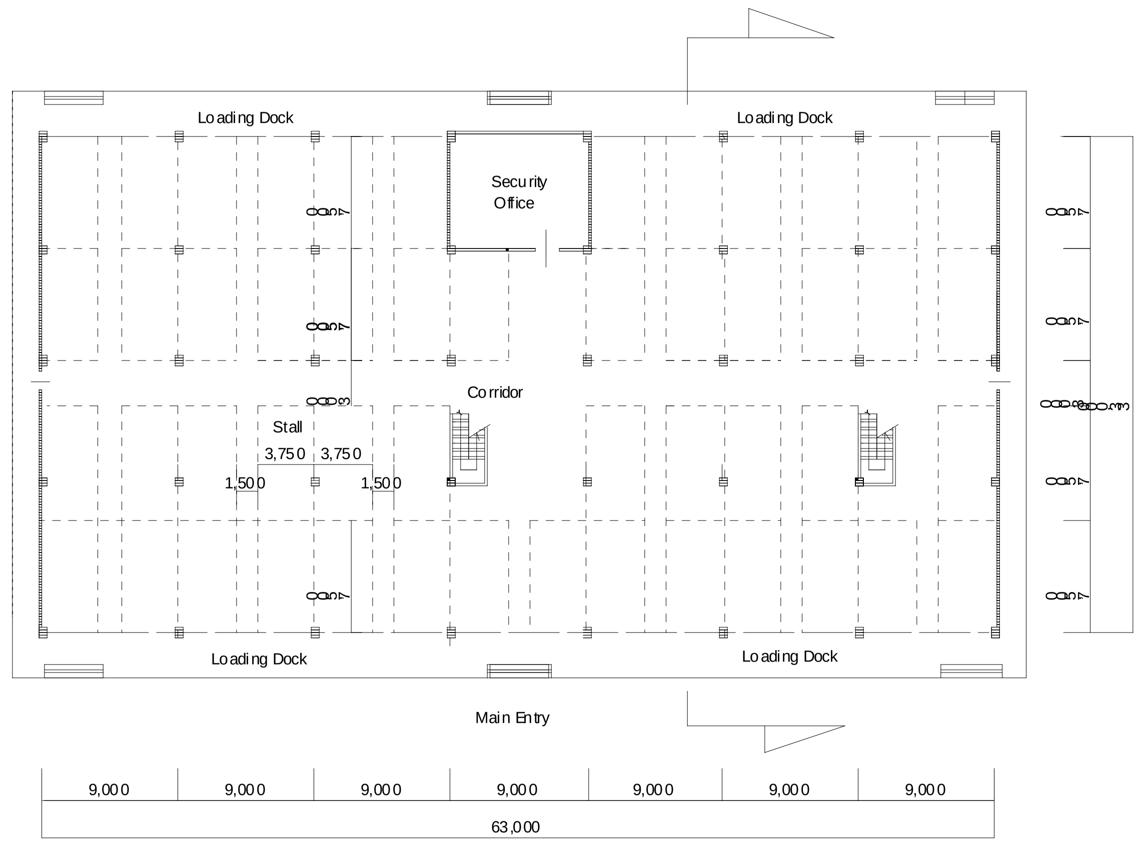
Section



Elevation



Second Floor Plan



First Floor Plan

Fig. 9-12 Drawing of Market Hall-2 in NWM, Kathmandu
(Plan / Elevation / Section)

Scale 1 : 500

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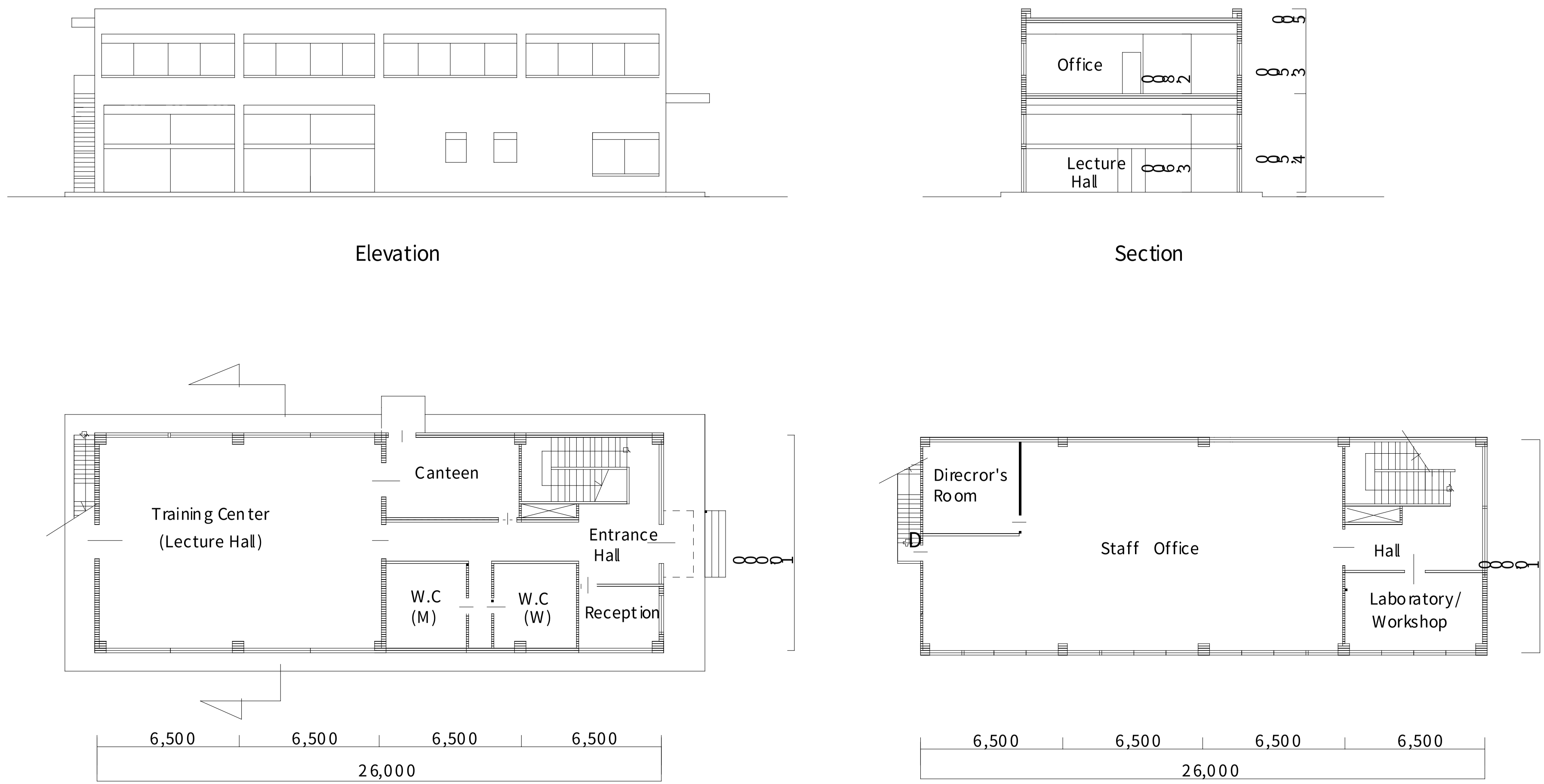

Elevation

Section

First Floor Plan

Second Floor Plan

Fig. 9-13 Drawing of Administration Office and Training Center in NWM, Kathmandu
(Plan / Elevation / Section)

Scale 1 : 300

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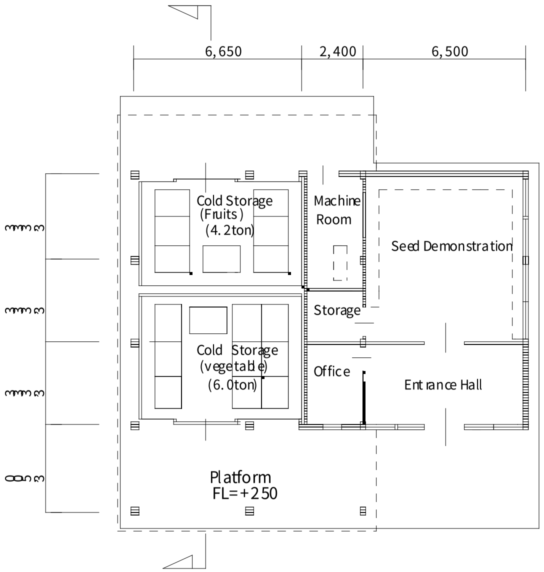
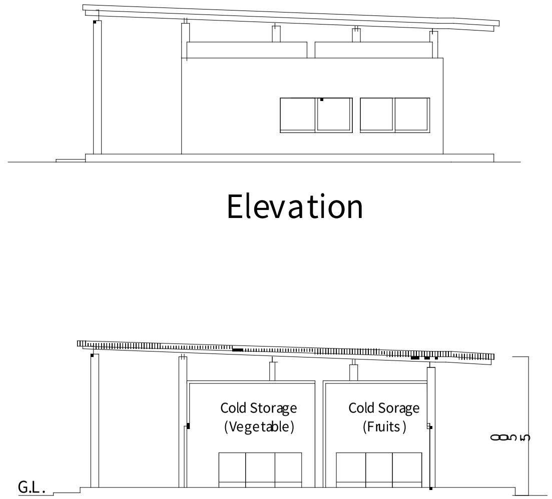
in the Kingdom of Nepal



Floor Plan



Elevation

Section

Fig. 9-14 Drawing of Pilot Project Building in NWM, Kathmandu
(Plan / Elevation / Section)

Scale 1 : 300

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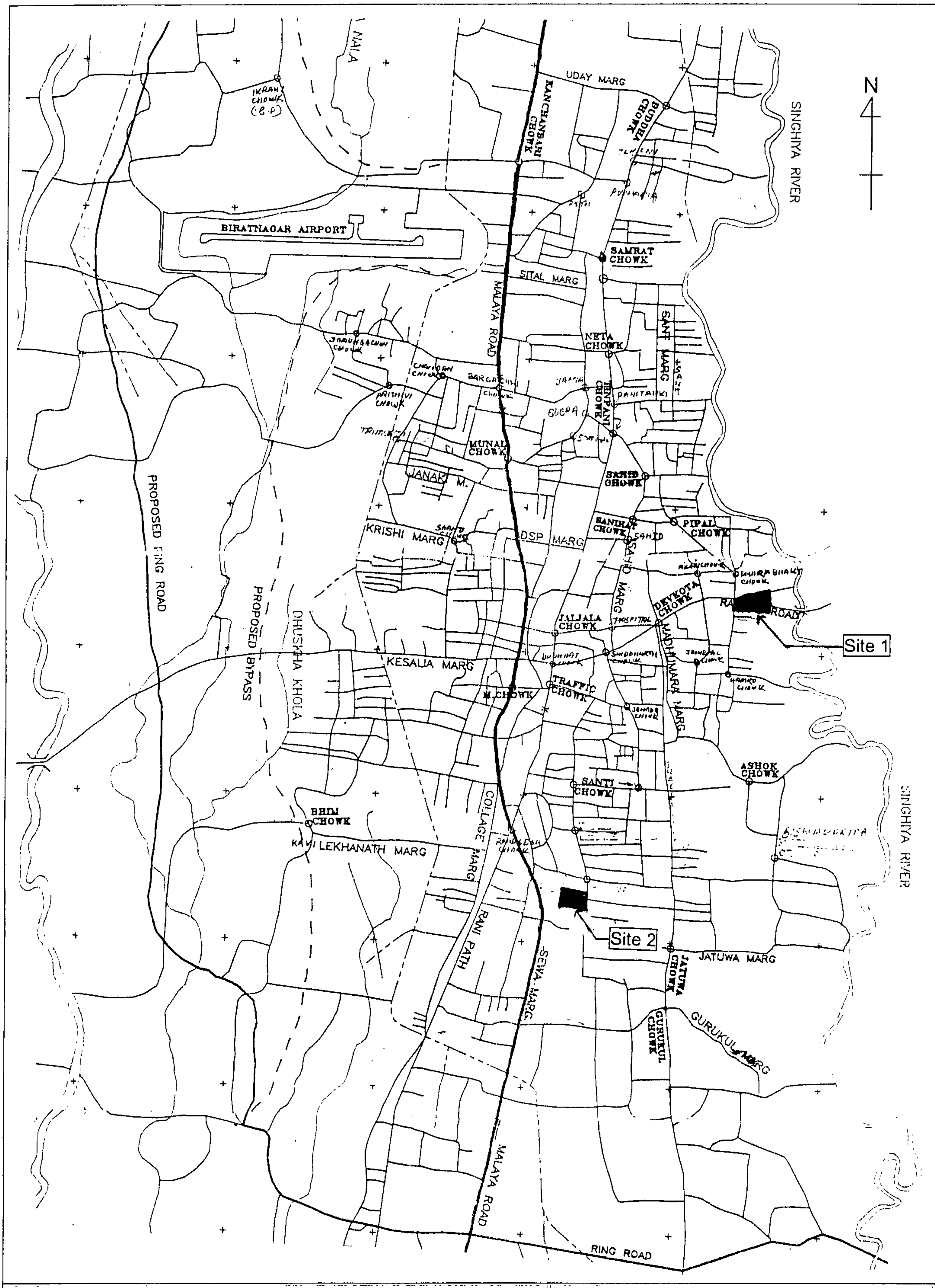

Fig. 9-15 Location Map of Proposed Sites for NWM in Biratnagar

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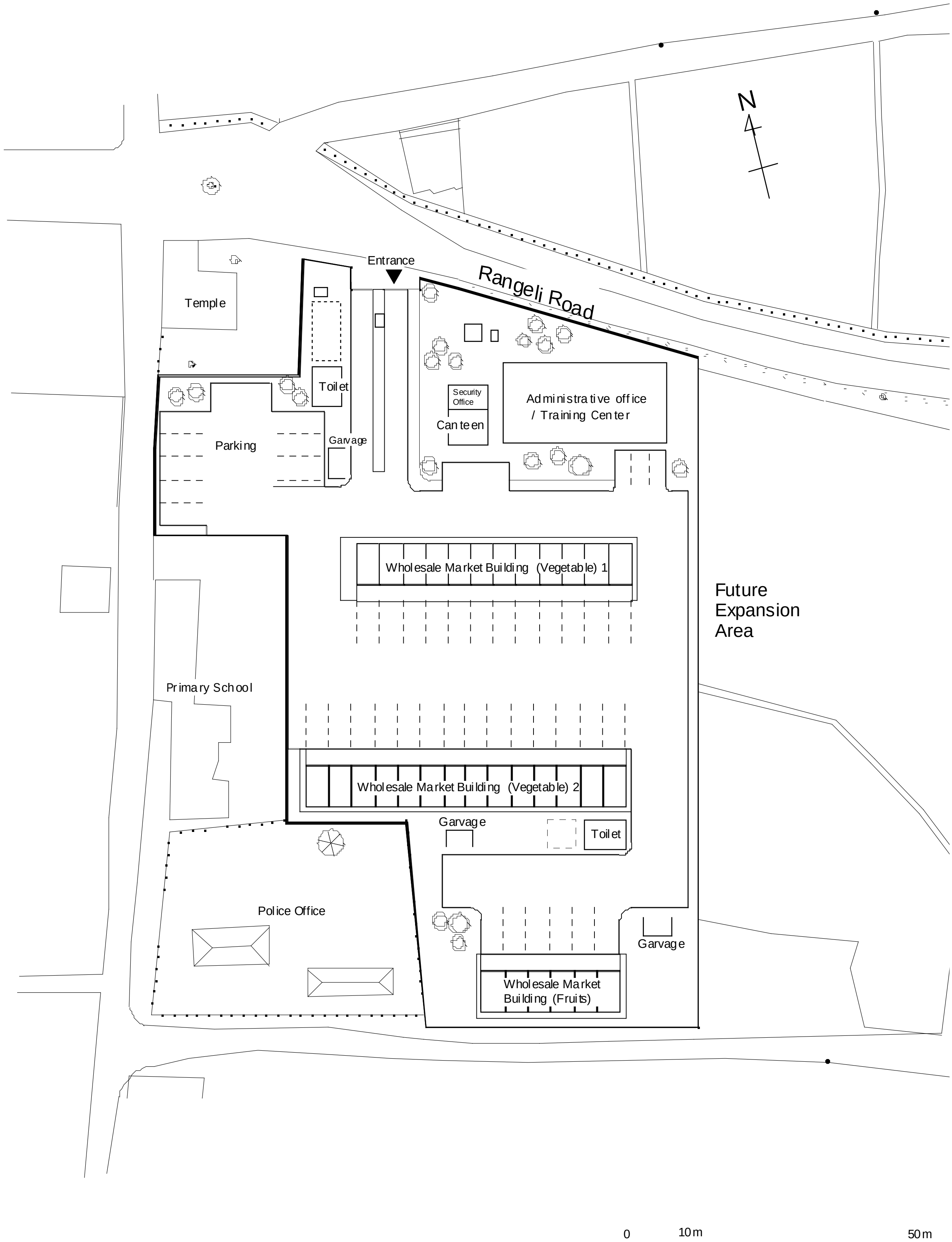

Fig. 9-16 Layout Plan of NWM in Site 1, Biratnagar	Scale 1 : 1000	Study on the Agricultural Marketing Development Project in the Kingdom of Nepal

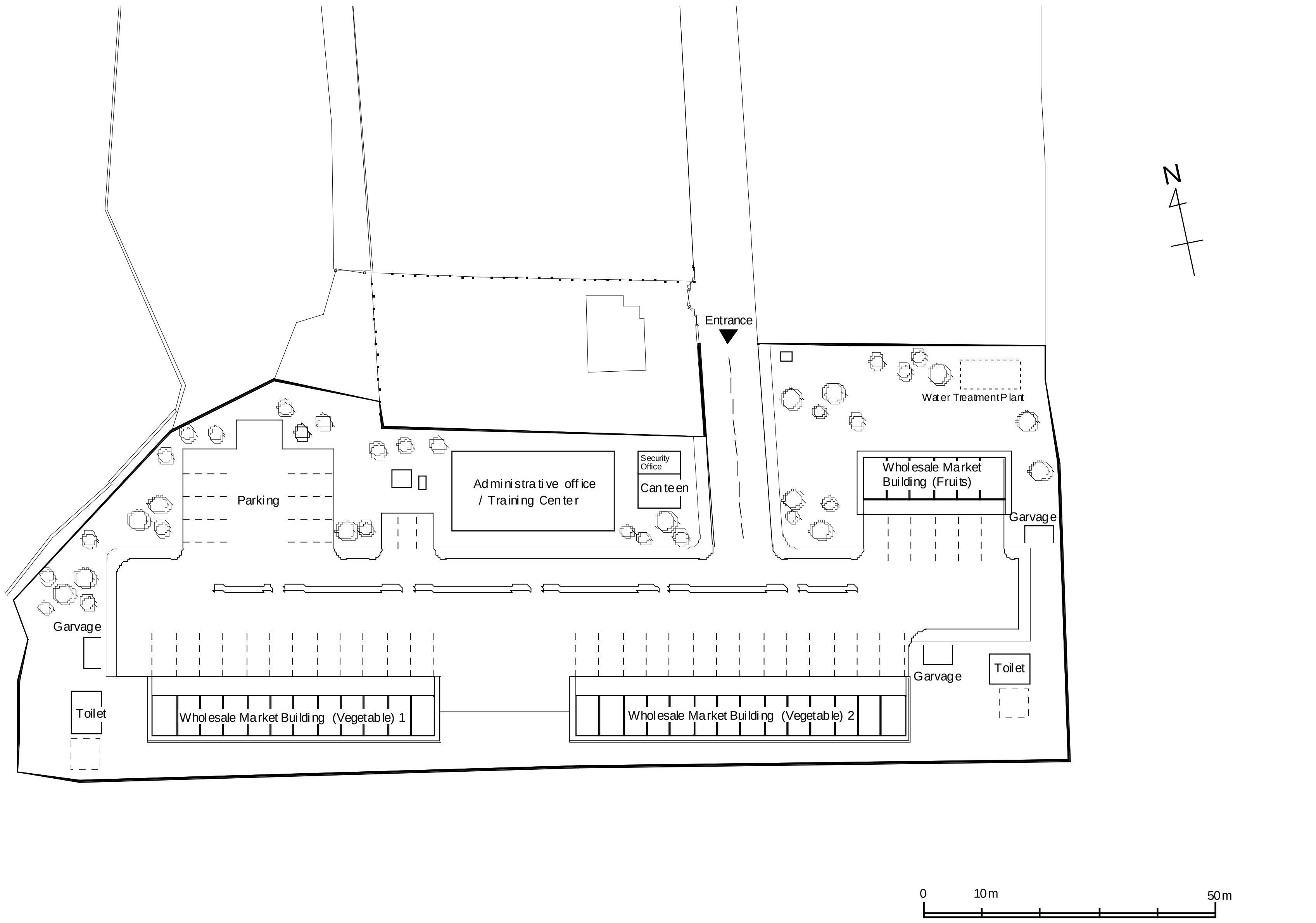

Fig. 9-17 Layout Plan of New Wholesale Market in Site 2, Biratnagar

Scale 1 : 1000

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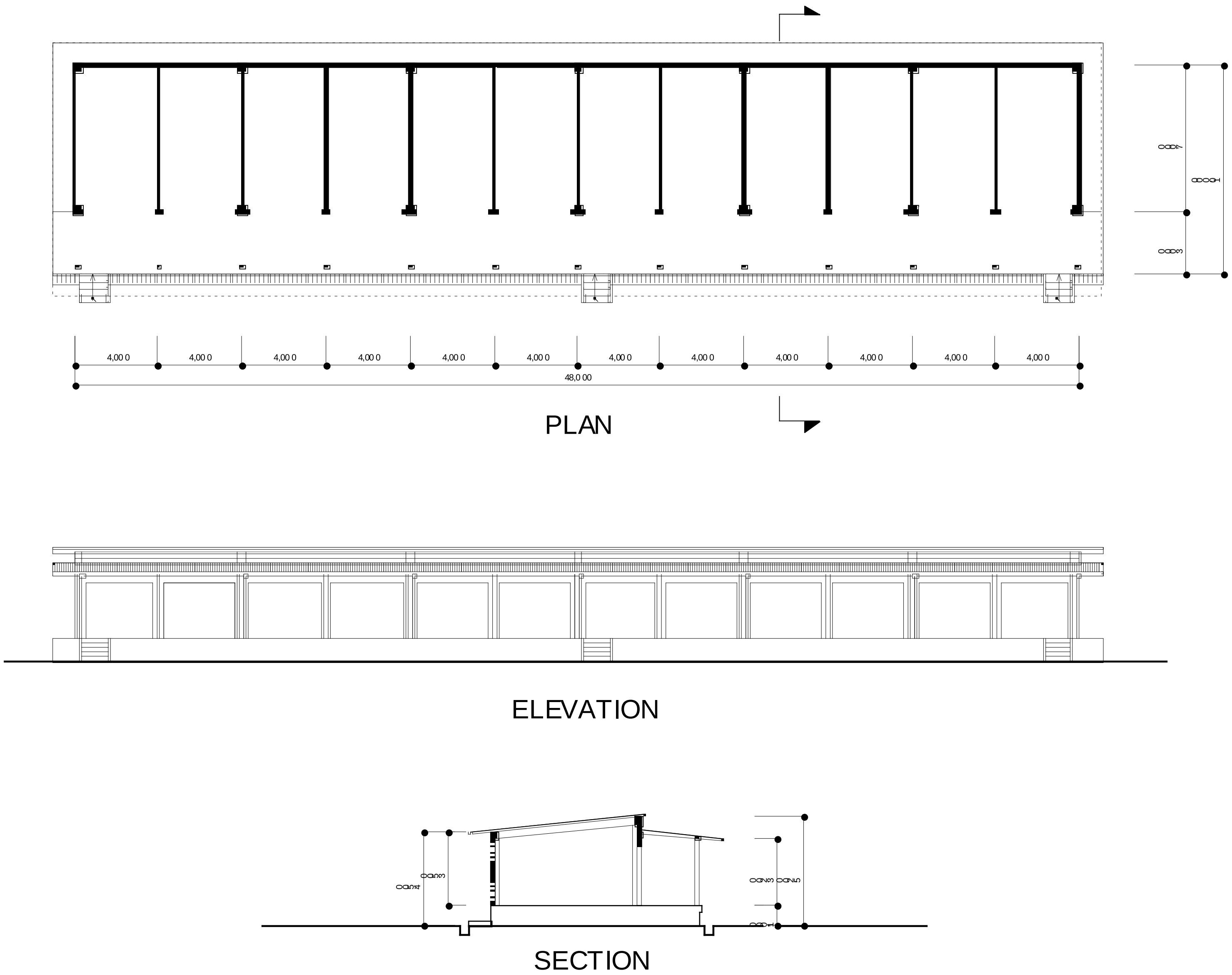

Fig. 9-18 Drawing of Wholesale Market Building for Vegetables in NWM, Biratnagar
(Plan / Elevation / Section)

Scale 1 : 300

Study on the Agricultural Marketing
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in the Kingdom of Nepal

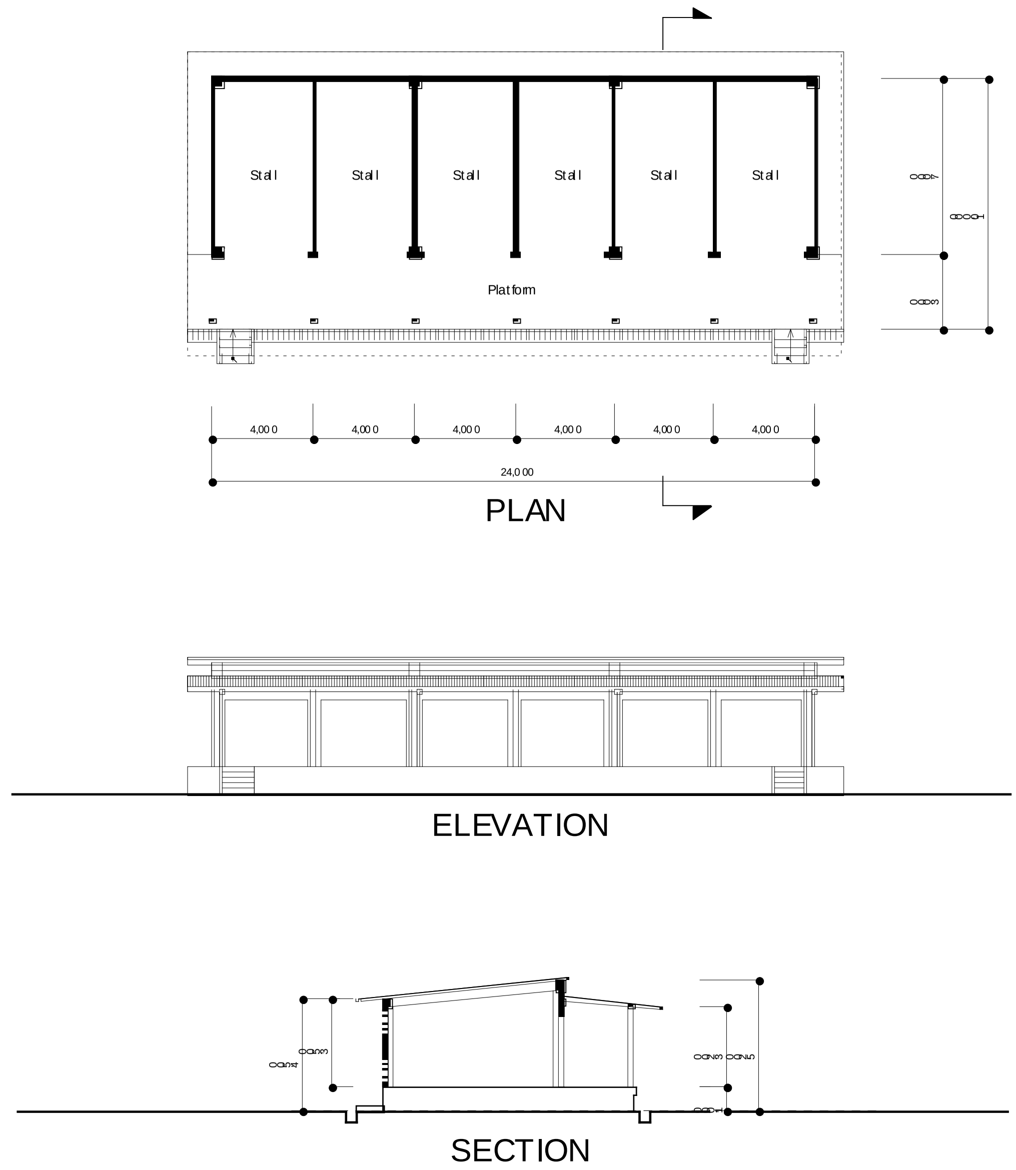
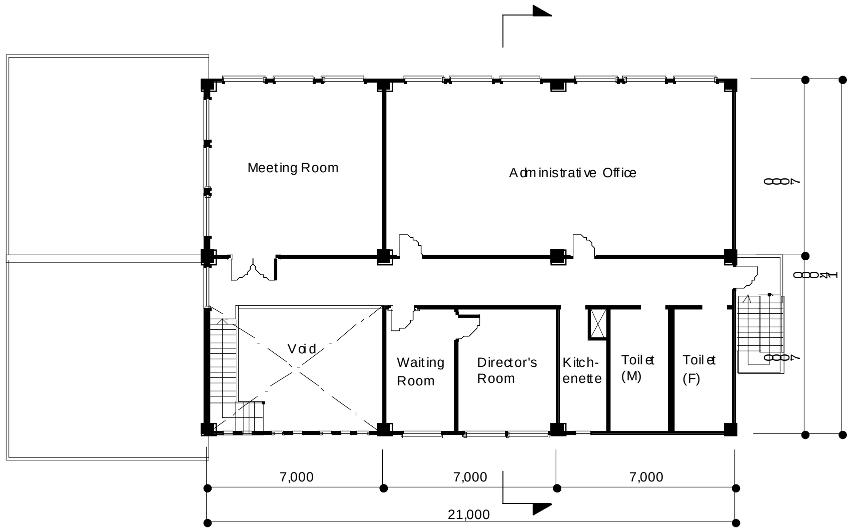


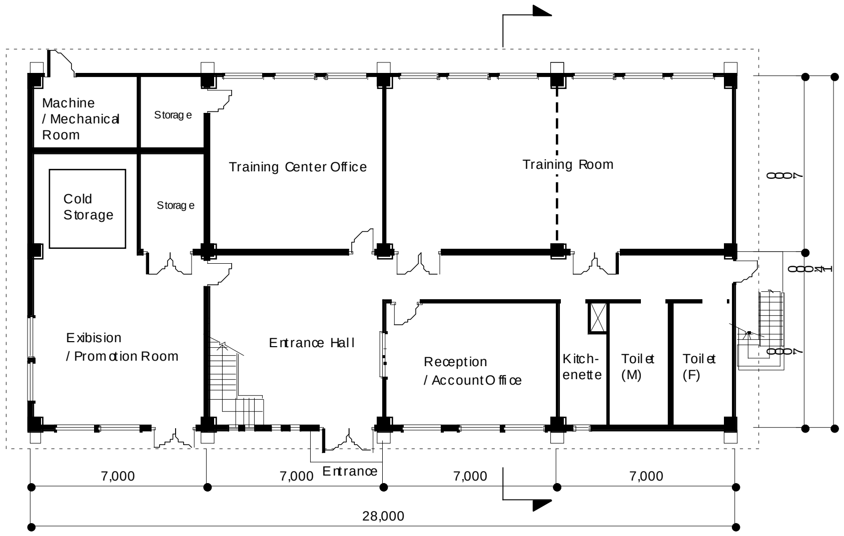
Fig. 9-19 Drawing of Wholesale Market Building for Fruits in NWM, Biratnagar
(Plan / Elevation / Section)

Scale 1 : 300

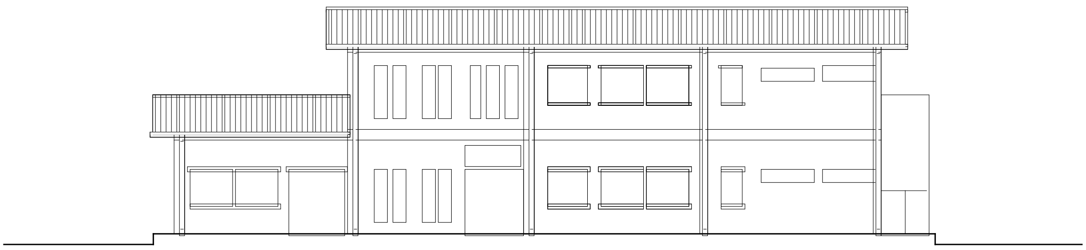
Study on the Agricultural Marketing Development Project in the Kingdom of Nepal



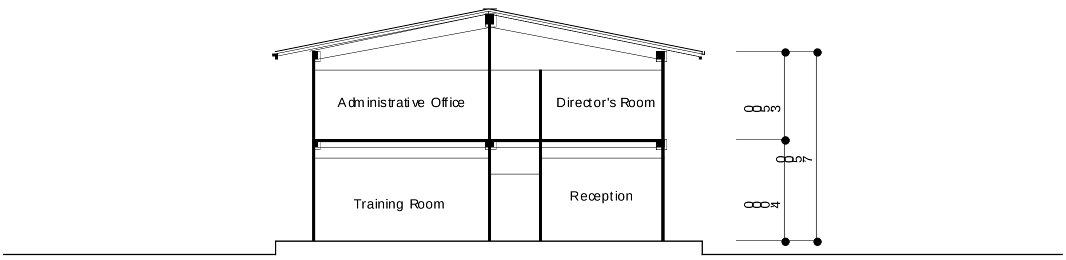
2F PLAN



1F PLAN



ELEVATION



SECTION

Scale 1 : 300

Fig. 9-20 Drawing of Administrative Office / Training Center in NWM, Biratonagar
(Plan / Elevation / Section)

Study on the Agricultural Marketing Development Project in the Kingdom of Nepal

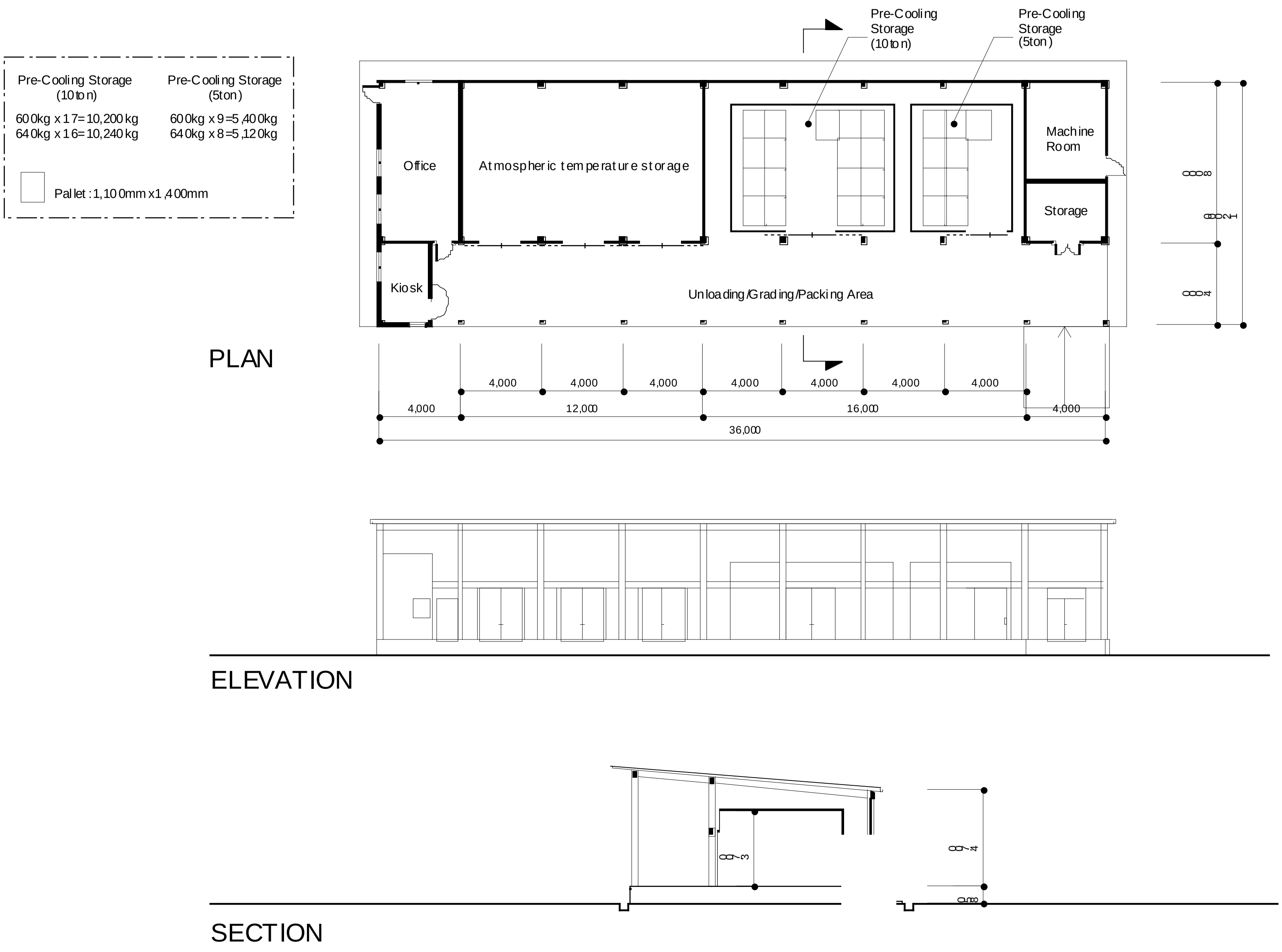


Fig. 9-21 Drawing of Collection Center and Pallet Layout in Pre-cooling Storage
(Plan / Elevation / Section)

Scale 1 : 300

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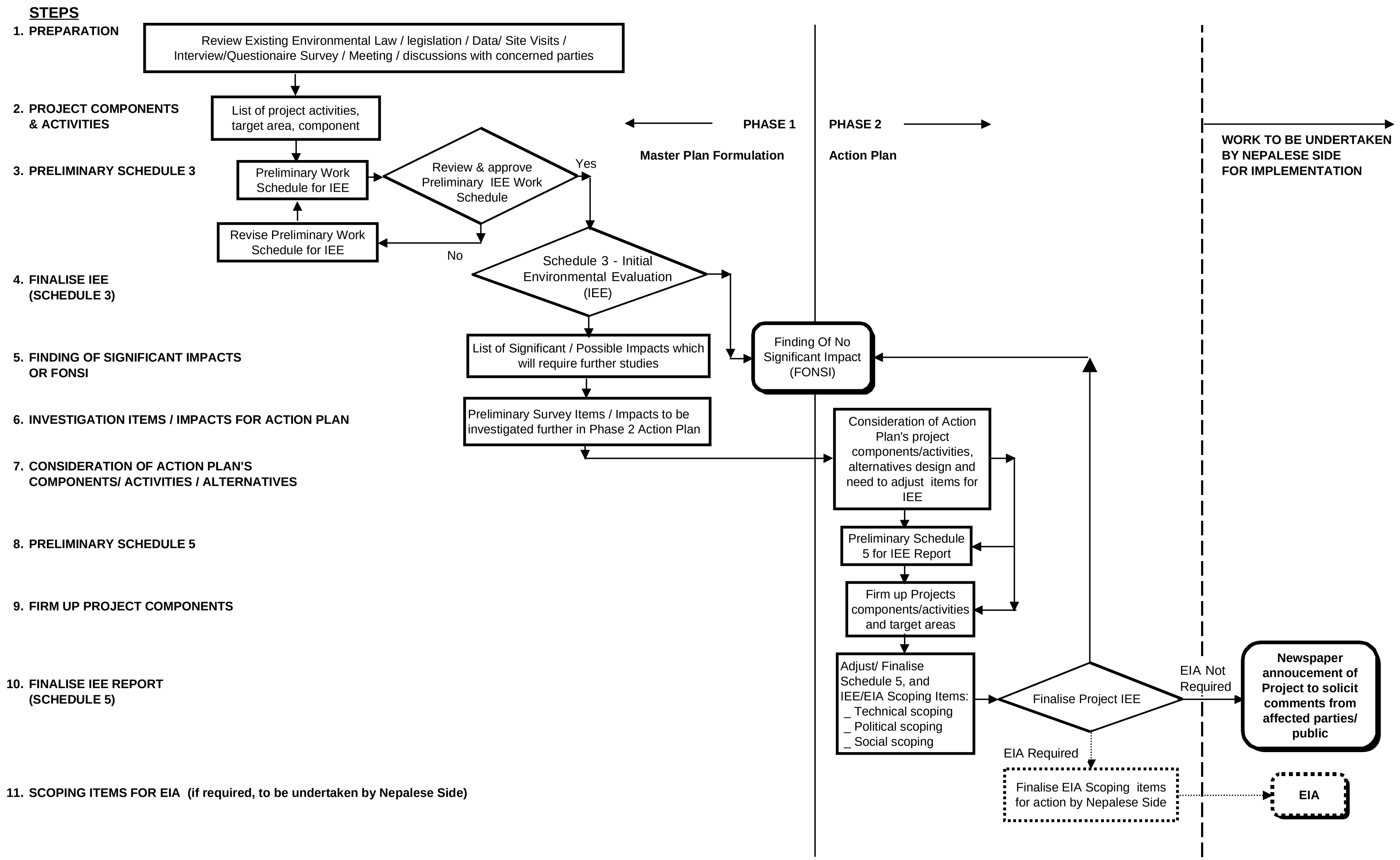

Fig. 12-1 Methodology for IEE/ EIA

Study on the Agricultural Marketing Development Project in the Kingdom of Nepal

Tables

Table 2-1: Production of Staple/Cash Crops and Horticultural Crops (1993/94 to 1998/99)

Commodities	Annual Growth rate (%)			Weight (%)			
	Area	Volume	Yield	Area 1993/94	Area 1998/99	Production 1993/94	Production 1998/99
Staple and cash crops	1.0	3.1	2.1	85.0	92.6	78.7	75.2
Horticultural Crops	2.5	4.5	2.0	15.0	7.4	21.3	24.8
All Crops	1.1	3.5	2.4	100.0	100.0	100.0	100.0

Source : Statistical Information on Nepalese Agriculture, 1993/94 and 1998/99 ASD, MoAC
Growth rate (%) : from 1993/94 to 1998/99

Table 2-2 Horticultural Crops Production by Commodities and Area (1998/99)

Commodities	Area (ha)	Share (%)	Volume (mt)	Share (%)
Potato	118,043	36.1	1,091,218	36.4
Spices	23,973	7.3	108,651	3.6
Fruits	45,108	13.8	456,013	15.2
Vegetables	140,177	42.8	1,342,587	44.8
Total	327,301	100.0	2,998,449	100.0

Source : Statistical Information on Nepalese Agriculture, 1998/99 ASD, MoAC

Table 2-3 Number of Production Pocket Areas by Crop (1999-2001)

Commodities	Number of Production Pockets	Share (%)
Cereals	359	27.1
Horticulture	593	44.8
Fish	51	3.9
Livestock	249	18.8
Sericulture and Apiculture	72	5.4
Total	1,324	100.0

Source : Proposal for Package for the Year 1999-2001, Planning and Manpower Division, DOA

Table 2-4 Number of Production Pockets by Development Region and Commodities (1999-2001)

	Number of Production Pockets				
Development Region	Potato	Fruits	Vegetables	Spices	Total
Eastern Region	15	50	53	13	131
Central	15	28	78	3	124
Western	33	53	97	14	197
Mid-Western	17	27	38	7	89
Far-Western	6	21	25	0	52
Total	86	179	291	37	593

Source : Proposal for Package for the Year 1999-2001, Planning and Manpower Division, DOA

Table 2-5 Projected Production of Horticulture Crops (2011/12)

Commodities	Area (ha)	Production (mt)	Productivity (mt/ha)	Annual Growth Rate (%) 1998/99 – 2011/12		
				Area	Production	Productivity
Potato	140,500	1,735,000	12.35	1.5	3.9	2.5
Spices	30,500	150,000	4.92	2.0	2.7	0.7
Fruits	104,000	655,000	6.30	7.2	3.1	-2.8
Vegetables	200,620	2,882,000	14.4	3.0	6.6	3.5
Total	475,620	5,422,000	11.40	3.2	5.8	4.0

Source : - APP, HMG/N
- Statistical Information on Nepalese Agriculture, 1993/94 ASD of MoAC
- Statistical Information on Nepalese Agriculture, 1998/99 ASD of MoAC
- Annual Report 1999/2000, VDD, DOA
- Projection of Potato Production and DES in Nepal, CIP/FAO
- Projected Fruits Production, authorized 9th Plan, tentative 10th and 11th Plan by FDD, DOA
- Projected Vegetables Production, authorized 9th Plan, tentative 10th and 11th Plan, VDD, DOA
- JICA Study Team, July, 2000

Table 2-6 Horticulture Production by Region and Commodities (1998/99)

Unit: Tons

Region	Ecology	Potato	Vegetable	Fruit	Spice	Total
East	Mountain	66,291	17,304	12,198	5,117	100,910
	Hill	174,822	84,426	49,484	16,022	324,754
	Terai	143,916	235,581	51,716	8,487	439,700
	Sub-total	385,029	337,311	113,398	29,626	**865,364**
Central	Mountain	69,757	28,829	11,765	642	110,993
	Hill	207,525	201,265	61,080	4,942	474,812
	Terai	133,280	377,204	76,742	7,434	594,660
	Sub-total	410,562	607,298	149,587	13,018	**1,180,465**
West	Mountain	8,200	2,718	4,445	64	15,427
	Hill	78,306	119,091	66,276	24,316	287,989
	Terai	45,457	80,616	30,586	14,886	171,545
	Sub-total	131,963	202,425	101,397	39,266	**475,051**
Mid-West	Mountain	21,846	4,883	11,209	112	38,050
	Hill	42,903	49,494	29,730	15,758	137,885
	Terai	53,365	94,032	17,339	5,208	169,944
	Sub-total	118,114	148,409	58,278	21,078	**345,879**
Far-West	Mountain	10,865	8,610	6,438	350	26,263
	Hill	17,340	15,621	16,583	2,671	52,215
	Terai	17,345	22,893	10,332	2,642	53,212
	Sub-total	45,550	47,124	33,353	5,663	**131,690**
Nation	Total	1,091,218	1,342,567	456,013	108,651	**2,998,449**

Remarks: The above figure does not contain the volume retained as seed, also not include post harvest losses.

Source: Statistical Information on Nepalese Agriculture 1998/1999, HMG Ministry of Agriculture

Table 2-7 Domestic Availability of Potato and Spices (1998/99)

Unit: tons

	Eco zone	Potato	Seed	Consum.	Spice	Seed	Consum.
East	Mount.	66,291	14,231		5,117	986	
	Hill	174,822	30,401		16,022	4,458	
	Terai	143,916	23,978		8,487	4,771	
	Sub	385,029	68,610	316,419	29,626	10,221	19,405
Central	Mount	69,757	11,746		642	192	
	Hill	207,525	29,021		4,942	1,988	
	Terai	133,280	18,850		7,434	1,371	
	Sub	410,562	59,617	350,945	13,018	3,551	9,467
West	Mount	8,200	1,767		64	0	
	Hill	78,306	15,835		24,316	8,971	
	Terai	45,457	7,487		14,886	4,584	
	Sub	131,963	25,089	106,874	39,266	13,555	25,751
Wid-W	Mount	21,846	5,137		112	22	
	Hill	42,903	7,916		15,758	4,432	
	Terai	53,365	6,984		5,208	1,626	
	Sub	118,114	20,037	98,077	21,078	6,080	14,998
Far-W	Mount	10,865	2,411		350	147	
	Hill	17,340	3,549		2,671	1,057	
	Terai	17,345	3,240		2,642	1,256	
	Sub	45,550	9,200	30,761	5,663	2,460	3,203
Nation	Total	1,091,218	182,553	908,665	108,651	35,867	72,784

Source: Statistical Information on Nepalese Agriculture 1998/99, HMG Ministry of Agriculture

Table 2-8 Per Capita Consumption of Horticulture Product (1998 and 2000)

Unit: kg/person/year

Region	Potato	Vegetables	Fruits	Spices
East	57.0	62.1	21.2	3.0
Central	48.8	79.6	19.9	2.3
West	30.0	50.6	24.5	4.9
M. West	37.0	50.4	21.3	3.1
F. West	19.0	23.9	16.6	1.5
Nationwide	42.7	60.6	22.8	3.3

Source: JICA Study Team Aug. 2000

Region	Potato	Vegetables	Fruits	Spices
Nationwide	32.7	57.7	16.6	1.7

Source: FAO Food Balance 1998

Table 2.9 Per Capita Consumption of Horticulture Product at Major Urban Area (2000)

Unit: kg/person/year

	Potato	Vegetables	Fruits	Spices
Biratnagar	25.0	105.0	40.0	7.2
Birgunj	27.5	110.0	35.0	6.3
Kathmandu	27.5	112.0	25.4	13.4
Pokhara	27.0	93.0	23.0	6.4
Butwal	34.7	52.0	17.5	5.3
Nepalgunj	32.5	101.0	16.5	5.5
Mahendranagar	27.5	60.0	10.5	7.5

Source: JICA Study Team, August 2000.

Table 2.10 Per Capita Consumption of Horticulture Product in Kathmandu Valley by FAO Master Plan (1999)

Unit: kg/person/year

	Potato	Vegetable	Fruits	Spices
Kathmandu V. Urban	25.0	48.3	14.0	3.1
Kathmandu V. Rural	14.8	49.1	7.5	2.1

Source: Master Plan for Agricultural Marketing in Kathmandu Valley: TCP/NEP/8921

Table 2.11 Per Capita Consumption of Horticulture Products in Urban Nepal (1995-1996)

Unit: kg/person/year

Commodity	Per Capita Consumption
Potato	26.1
Pigeon pea	2.7
Lentils	4.2
Onion, dry	5.3
Tomato	4.7
Total Vegetable	16.9
Chilllies	0.8
Ginger	0.7
Turmeric	0.5
Total Spice	2.0

Source: Report on Household Budget Survey, Urban Nepal (Mid July 1995 - Mid July 1996), Nepal Rastra Bank

Table 2-12 Per Capita Consumption of Horticultural Products in Kathmandu and Lalitpur (2000)

Commodity	Kg/person/Year
Potato	35.28
Vegetables	86.79
Fruits	27.12
Spice	7.63

Source: JICA Survey Team, November 2000.

Table 2-13 Comparison of Per Capita Consumption by Various Sources (1995-2000)

Unit: kg/person/year

Region	Potato	Vegetables	Fruits	Spices
East	57.0	62.1	21.2	3.0
Central	48.8	79.6	19.9	2.3
West	30.0	50.6	24.5	4.9
M. West	37.0	50.4	21.3	3.1
F. West	19.0	23.9	16.6	1.5
Nation	42.7	60.6	22.8	3.3

Source: JICA Study Team (Calculation) Aug. 2000

Region	Potato	Vegetables	Fruits	Spices
Biratnagar	25.0	105.0	40.0	7.2
Birgunj	27.5	110.0	35.0	6.3
Kathmandu	27.5	112.0	25.4	13.4
Pokhara	27.0	93.0	23.0	6.4
Butwal	34.7	52.0	17.5	5.3
Nepalgunj	32.5	101.0	16.5	5.5
Mahendranagar	27.5	60.0	10.5	7.5

Source: JICA (Household survey) Aug. 2000

Region	Potato	Vegetables	Fruits	Spices
Kathmandu & Lalitpur	35.28	86.79	27.12	7.63

Source: JICA (Household survey) Nov. 2000

Region	Potato	Vegetables	Fruits	Spices
Nation	32.7	57.7	16.6	1.7

Source: FAO Food Balance 1998

Region	Potato	Vegetables	Fruits	Spices
Kathmandu Valley Urban	25.0	48.3	14.0	3.1
Kathmandu Valley Rural	14.8	49.1	7.5	2.1

Source: FAO M/P of Kathmandu Valley. Dec. 1999

Region	Potato	Vegetables	Fruits	Spices
Urban Nepal	26.1	16.9*	n.a.	2.0

Remarks: * Not all vegetables are included
Source: Nepal Rastra Bank Household Budet Survey, 1995/96

Table 2-14 Import of Horticulture Product from India (1998/99)

Unit:Tons

	Potato	Onion	Vegetable	Fruit	Spice
Import (A)	22,024	7.940	32,126	13.770	7,274
Domestic production (B)	1,091.218	-	1,342,567	456.013	108.651
Share (A/B)	2.02 %		2.98 %	3.02 %	6.69 %

Source: Plant Quarantine Program, Central Office, DOA (July 2000)

Table 2-15 Export of Horticulture Product to India (1998/99)

Product	Exported Q'ty (Tons)	Major Check Post
Vegetable	1,698	Bairhawa, Kakarbhitta
Fruit	518	Bairhawa, Birgunj
Spice	7,959	Kakarbhitta, Nepalgunj

Source: Plant Quarantine Program, Central Office, DOA (July 2000)

Table 2-16 Export of High Value Commodity from Kathmandu Airport (2000)

Date	Commodity	Weight	Destination
Aug., 1999	Iceberg Lettuce	506 kg	India
	Iceberg Lettuce	308 kg	India
	Iceberg Lettuce	1,100 kg	India
	Vegetable Dye Powder	1,000 kg	Japan
	Tissue culture plant	9,180 pieces	Netherland
	Radish seed	2,000 kg	Bangladesh
	Radish seed	2,000 kg	Bangladesh
Sep., 1999	Tea	750 kg	Japan
	Iceberg Lettuce	506 kg	India
	Tissue culture plant	8,160 pieces	Netherland
Oct., 1999	Cut flower bulb	46 packs (Truck)	India
Nov., 1999	Iceberg Lettuce	550 kg	India
	Tissue culture plant	8,870 pieces	Netherland
Dec., 1999	Iceberg Lettuce	605 kg	India
	Strawberry	60 kg	India
	Garlic	50 ton (Truck)	India
	Tissue culture plant	9,285	Netherland
Jan., 2000	Tuki flower & Tito Karea	1,350 kg	India
	Raw coffee beans	500 kg	Japan
Mar., 2000	Raw coffee beans	447 kg	Japan
Apr., 2000	Iceberg Lettuce	506 kg	India
	Herb seed	5 kg	Japan
May, 2000	Cut flower (Lilium and Gladiolus)	1,500 pices	India

Source: Plant Quarantine, Kathmandu Airport Office; 5 July, 2000

Air Cargo Freight

Destination	Fair	Limit	Airline	Remarks
Tokyo	US$3.88/kg		TG	Document fee US$2/item
Amsterdam	US$2.52/kg		TG	
Delhi,Calcutta	Rs 35/kg	Min. 1,000kg	RA	
Dacca	US$0.45/kg	Upto 2,000kg	BG	

Table 2-17 Import/Export Volume at Kakarbitta Check Post (1998/99)

Unit: tons

	Import			Export	
Commodity	98/99	99/	Commodi	98/99	99/
Potato	25,28	4,64	Ginger	3,471	821
Pumpkin	238	150	Cabbage	1,307	1,20
Tomato	1,158	9	Radish	67	-
Chili	455	7	Apple	117	-
Onion	213	-	Orange	86	-
Bitter gourd	242	-	Cardamo	-	262
Banana	202	245	Cauliflow	30	-
Pineapple	101	121	Lentil	-	1,63

Source: Data from Kakarbitta Check Post

Table 2-18 Value of Import/Export of Horticultural Product to/from India (1998/99)

Import		Export	
Commodity	Value	Commodit	Value
Fruits	63,500,00	Ginger	131,000,0
Vegetables	254,000,0	Dried	36,600
Pulses	145,800,0	Cardamom	196,000,0
Total	463,300,0	Total	327,036,6

Source: Nepal Overseas Trade Statistics, 1998 - 1999; Trade Promotion Center, Kathmandu

Table 2-19 Value and volume of Exported Horticulture Product to Bangladesh (1998/99)

	Q'ty	Value	FOB price
Tomato	4,642 kg	81,768	17.6
Onion	900 ton	11,924,75	13.2
Lentils	27,433	884,263,9	32.2
Orange	14,382	238,891	16.6
Apple	7,176 kg	194,510	27.1
Radish	16,305	1,680,815	103.1

Source: Nepal Overseas Trade Statistics, 1998-99; Trade Promotion Center, Kathmandu

Table 2-20 Value of Import/Export Horticultural Product to/from India (2000)

Unit: Rs (Million)

Import			Export		
Year	98/	99/	Year	98/	99/
Fruits	135.	92.3	Fruits	3.2	11.9
Vegetabl	366.	434.	Vegetabl	10.9	3.5
Spices	-	-	Spices	430.	405.
Total	502.	526.	Total	444.	420.

Source: Research Div., Nepal Rastra Bank; Issue No. 12 (August 2000)

Table 2-21 Demand and Supply Balance of Horticultural Product in Nepal (2000)

Unit: 1,000 tons

	Demand			Supply		
	Domestic	Export	Total	Domestic	Import	Total
Potato	931	0	931	909	22	931
Vegetable	1,380	2	1,382	1,342	40	1,382
Fruit	505	1	506	456	50	506
Spice	72	8	80	73	7	80

Remarks: Fruit imported volume is estimated as 50,000 tons considering with present conditions at Harsha Fruit Market in Kathmandu.
Source: JICA Study Team, November 2000

Table 2-22 Origin and Destination of Potato (2000)

Unit: 1,000 tons

	East	Central	West	M. West	F. West	Sub total	Expor	Total
East	294	7	13	2	0	316	0	316
Central	0	338	9	4	0	351	0	351
West	0	0	107	0	0	107	0	107
M. West	0	0	0	98	0	98	0	98
F. West	0	0	0	0	37	37	0	37
Sub total	294	345	129	104	37	909	0	909
Import	5	11	3	2	1	22	-	931
Total	299	356	132	106	38	931	0	931
Population	5,331,250	7,540,944	4,525,942	2,916,441	2,052,339	22,367,048		

Source: JICA Study Team, November 2000

Table 2-23 Origin and Destination of Vegetables (2000)

Unit: 1,000 tons

	East	Central	West	M. West	F. West	Sub total	Export	Total
East	328	6	2	1	0	337	2	335
Central	2	577	25	3	0	607	0	607
West	0	8	193	2	0	203	0	203
M. West	0	0	8	140	0	148	0	148
F. West	0	0	0	0	47	47	0	47
Sub total	330	591	228	146	47	1,342	2	1,340
Import	3	26	3	2	6	40	-	40
Total	333	617	231	148	53	1,382		1,380
Population	5,331,252	7,540,944	4,525,942	2,916,441	2,052,339	22,357,048		

Source: JICA Study Team, November 2000

Table 2-24 Origin and Destination of Fruits, (2000)

Unit: 1,000 tons

	East	Central	West	M. West	F. West	Sub total	Export	Total
East	112	0	2	0	0	114	1	113
Central	0	140	6	4	0	150	0	150
West	0	1	100	0	0	101	0	101
M. West	0	1	0	57	0	58	0	58
F. West	0	0	0	0	33	33	0	33
Sub total	112	142	108	61	33	456	1	455
Import	6	33	9	1	1	50	-	50
Total	118	175	117	62	34	506	1	505
Population	5,331,252	7,540,944	4,525,942	2,916,441	2,052,339	22,357,048		

Remarks: Fruit imported volume is estimated as 50,000 tons.
Source: JICA Study Team, November 2000

Table 2-25 Selected Collection Centers' Trading Volume, Products and their Destination

Location	Location	Trading volume (Tons/year)	Typical product	Destination
Surunga	Sunsari, East, Terai	220	Tomato (40 farmers)	Factory, Kathmandu
Nawalpur	Sarlahi, Central, Terai	2,400	Tomato, Okura, Bitter gourd,	Kathmandu, Pokhara
Dhusa	Dhading, Central, Hill	8,000 to 9,000	Egg plant, Tomato, Bitter gourd	Kathmandu, Pokhara, Narayangadh
Palung/ Taman	Makwanpur, Central, Hill	3,000	Potato, Radish, Cauliflower, Cabbage	Biratnagar, Bairahwa, Kathmandu
Tin Piple/ Tamaghat	Kavre, Central, Hill	5,000	Potato, Tomato, Bitter gourd	Kathmandu
Yampa Phant	Tanahu, West, Hill	2,000	Cucumber, Tomato, Cabbage	Pokhara, Kathmandu

Source: JICA Study Team, May and July, 2000

Table 2-26 Selected Wholesale Markets' Trading Volume, Catchment Area, Operation and Function (2000)

Market	Location	Trading Vol. (Ton/year)	Catchment Area	Operation	Function
Birtamod	Jhapa, East, Terai	1,500	East, Hill	Seasonal Operation	16 stalls
Biratnagar	Morang, East, Terai	30,000	Morang, East, Terai & Hill		
Janakapur	Dhanusha, Central, Terai	780	Dhanusha	2 times a week.	50 stalls
Narayangadh	Chitwan, Central, Terai	36,000	Central, Terai East, Terai		45 stalls
Kalimati	Kathmandu, Central, Hill	144,100[1)] 91,172[2)]	Central, West Terai & Hill, Kath. Valley, East, Terai		Wholesalers:301 Retailers: 71 Farmers: 100
Pokhara	Kaski, West, Hill	9,000	West, Terai & Hill, Central, Hill		72 stalls 34 open shed

Remarks: [1)] Figure from Kalimati Market Development Board. Data of 1999/2000.
[2)] Figure from TCP/NEP/8921, Master Plan in Kathmandu Valley.
Source: JICA Study Team, May and July, 2000

Table 2-27 Retail Prices at Major Markets (May – July 2000)

Unit: Rs/kg

	Biratnagar	Narayan.	Pokhara	Bhairawa	Nepalgunj	Mahendra.
Potato	7-8			5-6	8-10	8
Onion					8	12
Tomato	20	6-10	10-13	12	40	48
Egg plant	4			16		20
Cabbage		4-5		10		20
Bitter gourd		14	25	10-24		
Cucumber	5	6-10	10-12		25	24
Okura		14		20	10	16
Chili		12	20	12	16	32
Ginger						
Apple			50-55	80		
Citrus			40	40		
Watermelon		6-8	5			
Time of Survey	July 2000	May 2000	May 2000	May 2000	June 2000	June 2000

Source: JICA Study Team, May-July 2000

Table 2-28 Wholesale Price Comparison between Indian markets and Mahendranagar (June-July 2000)

Unit: Rs./kg

Time	Commodity	Indian Market			Mahendranagar
		Barali 125 km	Plivit 80 km	Khatima 26 km	
June 2000	Potato R	4.24	4.50	5.5	7.0
	Onion	6.93	9.41	9.81	12.5
	Cabbage	-	-	-	15.5
	Eggplant R	13.17	11.6	-	16.5
	Tomato L	18.56	18.24	-	34.0
	Cauliflower	36.0	38.4	-	32.5
	Capsicum	28.8	25.5	-	33.5
	Ginger	56.0	52.0	64.0	57.5
	Apple	24.8	37.6	-	57.5
	Mango	16.0	-	-	37.5
July 2000	Potato R	3.6	3.6	4.2	7.7
	Onion	5.6	5.2	5.6	12.5
	Cabbage	19.2	19.2	21.6	19.5
	Eggplant R	8.8	9.2	11.2	21.5
	Tomato L	16.0	16.0	16.0	32.5
	Cauliflower	25.6	25.6	27.2	35.0
	Capsicum	25.6	20.0	25.6	41.5
	Ginger	60.0	60.0	56.0	80.0
	Apple	44.0	48.0	31.2	35.0
	Mango	21.6	20.8	22.4	30.0

Source: AEC Kathmandu, July 2000

Table 2-29 Buying & Selling Price between Traders at Nepalgunj and Gorahi (July 2000)

Unit: Rs./kg

	Commodity	Wholesaler	Wholesaler	Retailer	Origin
Nepalgunj	Potato	7.5 - 8.0	9 – 10	10 – 16	Makwanpur, India
	Onion	4 - 4.5	5 – 6	8	India
	Cucumber	7 – 8	10 – 12	25	Dhading
	Tomato	20 – 22	30	40	Salyan, Dang
Gorahi	Potato	7	8 – 10	12	India
	Onion	6	8 – 10	10	Dang
	Cucumber	6	8	16	Dang
	Tomato	28	30 – 32	40	Dang

Source: JICA Study Team, July 2000

Table 2-30 Production Cost and Farmgate Price of Vegetables (2000)

Unit: Rs./kg

Crop	Production cost	Farm gate price	Market/Center
Tomato	2.50	5 – 8	Pokhara/Dhusa
Cauliflower	2.66	6 – 10	Pokhara/Bardibas
Cabbage	1.34	1.5	Pokhara
Beans	2.82	4	Dhalkebar
Eggplant	1.17	2	Saruattha/Dhusa

Source: Review on the performance of Marketing Extension Activities under SMIP. Paper presented in National Seminar on Project Completion Workshop, July 2000

Table 2-31 Incoming Volume to Kalimati Wholesale Market (96/77 – 99/00)

Unit: tons

	96/97	97/98	98/99 [1)]	99/00
Total	116,519	120,652	106,382	138,992
Potato (R)	13,590	12,777	8,116	11,306
Potato (W)	13,360	10,514	6,722	9,346
Onion	9,570	7,702	6,691	9,176
Eggplant (L)	5,157	5,008	5,111	9,553
Cabbage	6,308	7,060	9,367	8,913
Tomato (S)	4,437	7,219	6,310	4,640
Green chili	4,042	3,409	4,074	6,338
Ginger	8,091	4,151	2,637	5,769

Remarks: [1)] Data is for 11 months
Source: KFVWMDB, June 2000

Table 2-32 Incoming Volume of Fruit to Kalimati Market (96/77 – 99/00)

Unit: tons

	96/97	97/98	98/99	99/00
Fruit Incoming (A)	4,968	6,357	3,472	5,192
Total Incoming (B)	116,519	120,652	106,382	138,992
Share (A/B)	4.3%	5.3%	3.3%	3.7%

Source: KFVWMDB, June 2000

Table 2-33 Trend of Wholesale Prices at Kalimati Market (May/June 1998 – 2000)

Unit: Rs./kg

	May/June 1998	May/June 1999	May/June 2000
Potato (R)	10.63	9.64	6.10
Tomato (S)	14.22	14.00	5.38
Onion	9.22	11.94	8.38
Cabbage	13.55	2.93	6.50
Cauliflower	19.43	15.63	10.73
Eggplant	13.42	6.73	9.79
Cucumber	9.49	14.70	9.70
Lemon	60.34	40.52	39.04

Source: Kalimati Wholesale Market Development Board: July 2000

Table 2-34 Advantage and Disadvantage of Proposed FAO Master Plan Project

	Without Project	With Project
Wholesaler	Entering inside ring road forbidden from 6 am to 8 pm. Access road congestion. Opportunity loss for vehicle and deterioration of fresh product No possibility for trade expansion.	Easy to access Possibility for trade expansion. No opportunity loss for vehicle. Fruit can be handled in the same market.
Retailer	Easy to access. Commodities are limited.	Additional transportation cost. Fruit can be traded in the same market.
Consumer	Price decreasing/stable Convenient for access	Retail price become higher due to additional transport cost from new market. More option to purchase vegetable and fruit.
Farmers	Cannot bring more products. No space to hold stall.	Can bring more product Motivation arises to increase production.

Source: FAO M/P of Kathmandu Valley. Dec. 1999

Table 2-35 Current Livestock Population (1998/99)

(Head/birds)

Cattle	Buffaloes	Goats	Sheep	Pigs	Poultry
7,030,698	3,470,600	6,204,616	855,159	825,132	17,796,826

Source. Statistical Information on Nepalese Agriculture 1998/99, MoAC

Table 2-36 Main Sources of Meat in Nepal, India and Japan

(kg/capita/year)

	Nepal	India	Japan
Meat	10.00	4.3	39.6
Beef	-	-	9.6
Buffalo meat	7.2	2.6	-
Goat meat/mutton	1.7	0.7	0.4
Pork	0.6	0.4	15.2
Poultry	0.5	0.5	14.1
Other meat	0	0.1	0.3
Milk/milk products	39.0	57.7	68.2
Eggs	0	0.1	19.9

Source. Statistical Information on Nepalese Agriculture 1998/99, MoAC
Food Balance Sheets FAO 1998

Table 2-37 Various Usages of Livestock

Types	Sex	Usage	Exportable to India	Preference by Ethnic Groups	Possibility for Fattening	Regions
Buffalo	Young male	Draft (castrated)			Likely (just after birth)	Terai, Hills
	Aged male	Meat		Newar, Tamangs, Magars	No	
	Young female	Milking			No	Hills, Terai
	Aged female	Socially none for meat	Yes		No	
Cattle	Young male	Draft (castrated)			No	Terai, Hills
	Aged male	None for meat	No, cattle are exportable because of law but exported illegally in practice.		No	
	Young female	Milking			No	Hills, Terai
	Aged female	None for meat	Yes		No	
Goat	Young male	Meat		All ethnic groups	Promising (for 15 to 20 months)	
	Aged male	Meat				
	Young female	Socially none for meat				
	Aged female	Socially none for meat	Yes			
Pig	Young male	Meat		Rais, Limbus, Tamangs, Magars, Tharus		Mostly in the Eastern Hills and Terai
	Aged male	Meat			Yes (for 6 months	
	Young female	Socially none for meat				
	Aged female	Socially none for meat				
Chicken	-	Meat		Most of ethnic groups	Yes (2 months for broiler)	In the case of improved variety, Kathmandu Valley, Pokhara, Chitwan and other urban areas
Animal Products	Ghee, Butter, Cheese, Hide & Skins		Yes			

Source: JICA Study Team, Aug. 2000

Table 2-38　Regional Characteristics in the Livestock Sector

Regions	Characteristics
Eastern	Pig, goat and cattle Region
Central	Poultry Region
Western	Buffalo Region
Mid-Western	Sheep Region
Far-Western	Nothing in particular

Source: JICA Study Team, Aug. 2000

Table 2-39　Estimated Demand and Supply of Animal Products (1999)

(1,000 ton)

	Demand			Supply		
Commodities	Consumption	Exports	Total	Production	Imports	Total
Buffalo meat	146	3	149	122	27	149
Goat/mutton	38	0	38	36	2	38
Pork	14	0	14	14	0	14
Chicken meat	13	0	13	12	1	13
Eggs	19	0	19	19	0	19
Milk	1,073	0	1,073	1,073	0	1,073

Remarks. Exports and imports are based on the data at Animal Quarantine Check Posts
Source: JICA Study Team, Aug. 2000

Table 2-40　Production of Pond Cultured Fish by Development Region (1998/99)

unit: mt (%)

	Far Western	Mid Western	Western	Central	Eastern	Total
Hill/Mountain Area	-	12 (0.1)	98 (0.8)	2 (0.0)	1 (0.0)	113 (0.9)
Terai	282 (2.4)	311 (2.6)	1,445 (12.1)	5,417 (45.3)	4,380 (36.7)	11,835 (99.1)
Total	282 (2.4)	323 (2.7)	1,543 (12.9)	5,419 (45.4)	4,381 (36.7)	11,948 (100)

Source: Fisheries Development Division

Table 2-41 **Origin and Destination of the Cultured Fish in Nepal (1998)**

Unit: ton

Origin		Destination												
		FW/R		MW/R		W/R		C/R			E/R		INDIA (export)	TOTAL
		Hill/ mount.	Terai	Hill/ mount.	Terai	Hill/ mount.	Terai	Hill/ mount.	Terai	(KTM)	Hill/ mount.	Terai		
FW/R	Hill/Mountain Area	0	0	0	0	0	0	0	0	0	0	0	0	0
	Terai	0	282	0	0	0	0	0	0	0	0	0	0	282
MW/R	Hill/Mountain Area	0	0	12	0	0	0	0	0	0	0	0	0	12
	Terai	0	0	0	311	0	0	0	0	0	0	0	0	311
W/R	Hill/Mountain Area	0	0	0	0	75	0	0	0	23	0	0	0	98
	Terai	0	0	0	0	0	1,445	0	0	0	0	0	0	1,445
C/R	Hill/Mountain Area	0	0	0	0	0	0	2	0	0	0	0	0	2
	Terai	0	0	0	0	0	0	40	5,017	360	0	0	0	5,417
	(Kathmandu)	0	0	0	0	0	0	0	0	0	0	0	0	0
E/R	Hill/Mountain Area	0	0	0	0	0	0	0	0	0	1	0	0	1
	Terai	0	0	0	0	0	0	0	0	160	0	4,220	0	4,380
INDIA (IMPORT)		0	0	0	24	5	65	0	78	532	0	268	0	972

Source: JICA Study Team, Aug. 2000

Table 2-42 Average Fish Retail Price in Different Regions (1999)

Unit: Rs/kg

	FWestern R	MWestern	Western R	Central R	Kathmandu	Eastern R	Average
Mountain/Hill	80.7	126.4	91.5	132.5	81.0	96.0	104.4
Terai	90.0	89.9	78.8	76.4		79.6	80.9
Indian border**	91.8	82.5	-	72.4		74.2	78.2

Remarks: 1. Indian Market close to Nepal border (each region)
2. Kathmandu described separately from Central Region (Mountain/Hill), Central region not include Kathmandu.
3. According to fish traders, fish price rises in winter season following a increase of fish demands, but there is still no reliable statistics to prove this. It is known that the fish demand increases in winter season

Source: Agricultural Marketing Information Bulletin, 1999

Table 2-43 Roles, Responsibility and Rights of MMC

S.No.	Roles & Responsibilities of MMC	Field Observation	
		Yes	Not Observed
1	Management and maintenance of physical facilities of the markets	Yes	
2	Management and operation of the market	Yes	
3	Make provision of stalls and stores for agricultural produce marketing	Yes	
4	Contracting Activities.		No
5	Make provision of drinking water, electricity, telephone, & toilet	Yes	
6	Quality control		No
7	Encourage grading and packaging systems		No
8	Conflict resolution on trading / marketing of products	Yes	
9	Market information publication on sales amount, price, transport and market relation information	Yes	No
10	Fixing service charges and collection.		No
11	Monitoring & supervision		No
12	Defining wholesale market by volume and weight	Yes	No
13	Space allocation for various products according to the products handled.		No
14	Rules and Regulation for vehicle management parking and loading and unloading.		No
15	Introducing Auction System.		No
16	Encourage competitive marketing system		No
17	Registration of wholesalers		No
18	Appointment of Market Management and other staff members with defined salary and facilities.	Yes	
19	Organize training		No
20	MMC funds management.	Yes	
21	Information of Market Stocks.		No
22	Follow up on payments of sales		No
23	Fixed the opening & closing time of markets		No
24	Land purchase, building construction, machinery purchase and renting the physical facilities		No
25	Establishment of branch office and its management		No
26	Contract Appointment of Agriculture marketing specialist as per need.		No

Source: - Field Observation and Interviews, 2000.

Table 3-1 Selection of the Potential Areas for Livestock Sector

Key Factors	Eastern Region			Central Region			Western Region			Mid-Western Region			Far-Western Region			Remarks
	Mnt.	Hills	Terai	Mnt.	Hills	Terai	Mnt.	Hills	Terai	Mnt.	Hills	Terai	Mnt.	Hills	Terai	
1. Surpuls of Animal Products																Marketable surplus
a) Buffalo emat	○													○		above 7.2 kg/year
b) Goat meat & mutton							○			○	○	○		○		above 1.7 kg/year
c) Pork	○	○			○						○	○			○	above 0.6 kg/year
d) Chicken meat	○			○	○							○				above 0.5 kg/year
e) Milk	○	○		○	○			○					○	○	○	above 39 kg/year
f) Eggs	○			○	○											above 0.9 kg/year
2. Share in Production												○				
a) Buffalo meat					20/100	12/100		16/100								
b) Goat meat & mutton			15/100			13/100		12/100								
c) Pork		25/100						12/101				14/100				
d) Chicken meat					34/100	12/100		12/100								
e) Milk			10/100		14/100	11/100		21/100								
f) Eggs			13/100		31/100	15/100										
g) Wool								16/100		26/100	15/100					
3. Production Pockets																Producing areas
a) Cow		11/51	10/51					11/51								
b) Goat		6/46	8/46			8/46		10/46								
c) Buffalo		10/157	10/157		15/157	13/157		43/157	18/157		17/157					
4. Population Density			◎		◎	◎			○							Consuming areas
5. Existence of DDC's milk plants			○		○			○	○							Processing
6. Existence of Livestock Markets			○			○			○			○				Marketing
7. Existence of Quarantine Check Posts		○	○	○		○			○			○	○		○	Important gates
a) Live buffaloes						◎						○				
b) Live cattle									◎			○				
c) Live goats						○						◎				
d) Live pigs		◎				○										
e) Live chicken			○						◎						○	
f) Eggs																
g) Milk																
8. Institutions		◎	○		○	○										People's participation
9. Accessibility to Markets	▲	▲	○	▲	○	◎	▲	▲	◎	▲	▲	◎	▲	▲	▲	Accessibility

Remarks: ①Eastern Terai: important zone because of existence of Quarantine Post, big livestock market (ex.Damak) and DDC milk plant and consuminf area
②Central Hills: important zone because of big consuming area and existence of DDC milk plant
③Central Terai: important zone because of good accessibility, existence of quarantine Post, big livestock market (ex. Jitpur)
④Western Terai: important zone because of good accessibility, existence of Quarantine Post, livestock markets and DDC milk plant
⑤Mid-Western Terai: important zone because of good accessibility, existence of Quarantine Post, big livestock markets (ex. Thapuwa) and livestock collection center (Kohalpur)

Source: Source: JICA Study Team, July 2000

Table 3-2 Farmers and Traders Organization for Agricultural Marketing

SN	Government Support	Eastern			Central			Western			Mid-Western			Far-Western			Nepal
		Mountain	Hill	Terai	Mountain	Hill	Terai	Mountain	Hill	Terai	Mountain	Hill	Terai	Mountain	HIll	Terai	
1	Vegetable Farmers Groups (No)	6	40	10	7	43	30	9	60	20	10	30	15	12	22	12	346
2	Fruit Farmers Groups (No)	3	30	5	5	15	5	10	40	5	8	18	3	10	8	3	168
3	Potato Farmers Cooperatives (No)	1	5	4	5	6	3	1	5	4	0	3	5	0	5	3	50
4	Farmers Groups (Total No.)	45	201	397	60	312	574	20	522	72	81	221	93	50	85	125	2,858
5	Vegetable Farmers Cooperatives (No.)	-	5	2	-	6	3	-	3	2	-	-	-	-	-	-	
6	Fruit Farmers Association (No)	-	-	-	-	2	-	1	3	-	-	-	-	-	-	-	
7	Potato Farmers Cooperatives (No)	-	2	2	2	2	1	-	2	2	-	-	3	-	-	1	17
8	Fish Farmers Groups (No)	0	0	37	0	0	73	0	2	32	0	5	28	0	0	9	186
9	Fish Farmers Association (No)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
10	Traders Associations (No)	-	4	5	-	12	7	2	9	2	-	1	3	-	-	2	47
11	Farmers Associations/Cooperatives																

Source: JICA Study Team, 2000

Table 3-3 Market Management : Market Management Committee (MMC) and Participation of Users (Farmers, Traders, Local Government and MoAC Local Officers)

SN	Government Support	Eastern			Central			Western			Mid-Western			Far-Western			Nepal
		Mou ntain	Hill	Terai	Mounta in	Hill	Terai	Mou ntain	Hill	Terai	Mou ntain	Hill	Terai	Mou ntain	HIll	Tera i	
1	Wholesale Market			Birtamod			Narayangadh		Pokhara				Kohalp ur & Lamahi				
2	MMC Participations of Users in Wholesale Market	-	-	* (1 MMC) Trader Farmer Coop. Municipality			(1 MMC) Trader Association Municipality Farmers 9Individual)		(1 MMC) Traders Association Municipality Farmers Groups				* *				
3	Chairperson of MMC			Trader			Trader		Trader								
4	Collection Center		Basantapur Katahari		Jiri Charik ot	Sindhulimadi	Dhalkebar Bardibas Nawalpur Labandi Saruhatha					Kapurk ot					
5	MMC and Participation of users in Collection Center		(2 MMC) Farmers Coop Traders VDC		(2 MMC) Farmer s Groups Traders VDC	(1 MMC) Municipality Traders Farmers Groups	(5 MMC) Traders VDC Farmers (Individual)					(1 MMC) Farmers Groups Trader VDC					
6	Chairperson of MMC		Farmer		Farmer	Trader	Trader					Trader Farmer	*				
7	Co-operative Managed Collection Centers					Dhusa Handikhola Tinpiple Tamaghat											
8	MMC and Participation of users in cooperatives Managed Collection Centers					(4 MMC) Farmers Cooperative Traders VDC											
9	Chairperson of MMC					Farmer											
10	Wholesale Market					Kalimati											
11	MMC and Participation of Users in Kalimati Wholesale Market					(1 MMC) Trader Municipality Farmers Cooperative											
12	Chairperson of MMC					Trader											

Source: JICA Study Team, 2000

Table 5-1 Number of Horticultural Production Pockets, Area and Production in Eastern and Central Region (1998/99)

	No. of Production			Production (1998/99)	
	Pockets	Area (ha)	Share (%)	Volume (MT)	Share (%)
E. Hills	81	33,932	11.2	308,732	10.7
E. Terai	18	46,174	15.2	431,213	14.8
C. Hills	47	43,145	14.2	469,870	16.3
C. Terai	35	57,674	19.0	587,226	20.3
Total	181	180,925	59.6	1,797,041	62.1

Source : Statistical Information on Nepalese Agriculture, 1998/99 ASD, MoAC

Table 5-2 Major Factors to support Horticultural Production in Eastern and Central Region (1998/99)

	Irrigated Area (1998/99)		Sale of Fertilizer (1998/99)		Sale of Vegetable Seed (1998/99)	
	Area (ha)	Share (%)	Volume (kg)	Share (%)	Volume (kg)	Share (%)
E. Hills	21,502	2.4	13,778	0.7	193	1.2
E. Terai	263,639	29.7	304,942	16.0	5,583	34.4
C. Hills	34,495	3.9	185,205	9.7	6,310	38.7
C. Terai	197,084	22.2	502,142	26.4	581	3.6
Total	516,720	58.2	1,006,067	52.8	12,667	77.9

Source : Statistical Information on Nepalese Agriculture, 1998/99 ASD, MoAC

Table 9-1 Future Demand and Supply Balance of Horticultural Product in Nepal (2005 – 2015)

Unit:1,000 tons

	Demand			Supply		
	Domestic	Export	Total	Domestic	Import	Total
Year 2005						
Potato	1,068	0	1,068	1,043	25	1,068
Vegetable	1,584	2	1,586	1,540	46	1,586
Fruit	538	1	539	523	16	539
Spice	82	10	92	84	8	92
Year 2010						
Potato	1,191	0	1,191	1,163	28	1,191
Vegetable	1,765	3	1,768	1,717	51	1,768
Fruit	600	1	601	583	18	601
Spice	91	11	102	93	9	102
Year 2015						
Potato	1,315	0	1,315	1,284	31	1,315
Vegetable	1,948	3	1,951	1,895	56	1,951
Fruit	663	1	664	644	20	664
Spice	101	12	113	103	10	113

Remarks: Fruit imported volume is estimated as 50,000 tons considering with present conditions at Harsha Fruit Market in Kathmandu.

Source: JICA Study Team, November 2000

Table 9-2 Origin and Destination Projection of Potato (2005 – 2015)

Unit:1,000 tons

	East	Central	West	M. West	F. West	Sub total	Export	Total
Year 2005								
East	336	8	15	3	0	362	0	362
Central	0	389	10	4	0	403	0	403
West	0	0	123	0	0	123	0	123
M. West	0	0	0	112	0	112	0	112
F. West	0	0	0	0	43	43	0	43
Sub total	336	397	148	119	43	1,043	0	1,043
Import	6	13	3	2	1	25	-	25
Total	342	410	151	121	44	1,068	0	1,068
Population	6,089,794	8,686,290	5,177,334	3,348,098	2,370,296	25,671,813		
Year 2010								
East	373	10	18	3	0	404	0	404
Central	0	435	10	4	0	449	0	449
West	0	0	137	0	0	137	0	137
M. West	0	0	0	125	0	125	0	125
F. West	0	0	0	0	48	48	0	48
Sub total	373	445	165	132	48	1,163	0	1,163
Import	7	14	4	2	1	28	-	28
Total	380	459	169	134	49	1,191	1,191	1,191
Population	6,767,267	9,708,534	5,757,027	3,732,762	2,652,779	28,618,369		
Year 2015								
East	411	11	20	3	0	445	0	445
Central	0	481	11	4	0	496	0	496
West	0	0	151	0	0	151	0	151
M. West	0	0	0	138	0	138	0	138
F. West	0	0	0	0	53	53	0	53
Sub total	411	492	182	145	53	1,283	0	1,283
Import	8	15	4	2	1	30	-	30
Total	419	507	186	147	54	1,313	0	1,313
Population	7,455,575	10,731,294	6,344,782	4,120,030	2,934,200	31,585,880		

Source: JICA Study Team, November 2000

Table 9-3 Origin and Destination Projection of Vegetable (2005 – 2015)

Unit:1,000 tons

	East	Central	West	M. West	F. West	Sub total	Export	Total
Year 2005								
East	375	7	2	1	0	385	2	383
Central	2	665	29	4	0	700	0	700
West	0	9	221	2	0	232	0	232
M. West	0	0	9	161	0	170	0	170
F. West	0	0	0	0	54	54	0	54
Sub total	377	681	261	168	54	1,541	2	1,539
Import	3	29	3	2	9	46	-	46
Total	380	710	264	170	63	1,587		1,585
Population	6,089,794	8,686,290	5,177,334	3,348,098	2,370,296			
Year 2010								
East	416	8	3	1	0	428	3	425
Central	3	743	32	4	0	782	0	782
West	0	10	245	3	0	258	0	258
M. West	0	0	10	179	0	189	0	189
F. West	0	0	0	0	60	60	0	60
Sub total	419	761	290	187	60	1,717	3	1,714
Import	4	33	3	2	9	51	-	51
Total	423	794	293	189	69	1,768	3	1,765
Population	6,767,267	9,708,534	5,757,027	3,732,762	2,652,779			
Year 2015								
East	458	9	3	1	0	471	3	468
Central	3	821	35	4	0	863	0	863
West	0	11	270	3	0	284	0	284
M. West	0	0	11	198	0	209	0	209
F. West	0	0	0	0	66	66	0	66
Sub total	461	841	319	206	66	1,893	0	1,893
Import	4	36	3	2	10	55	-	55
Total	465	877	322	208	76	1,948	3	1,945
Population	7,455,575	10,731,294	6,344,782	4,120,030	2,934,200	31,585,880		

Source: JICA Study Team, November 2000

Table 9-4 Origin and Destination Projection of Fruit (2005 – 2015)

Unit:1,000 tons

	East	Central	West	M. West	F. West	Sub total	Export	Total
Year 2005								
East	128	0	2	0	0	130	1	129
Central	0	161	7	5	0	173	0	173
West	0	1	114	0	0	115	0	115
M. West	0	1	0	66	0	67	0	67
F. West	0	0	0	0	38	38	0	38
Sub total	128	163	123	71	38	523	1	122
Import	1	9	4	1	1	16	-	16
Total	129	172	127	72	39	539	1	538
Population	6,089,794	8,686,290	5,177,334	3,348,098	2,370,296	25,671,813		
Year 2010								
East	142	0	2	0	0	144	1	143
Central	0	180	8	6	0	194	0	194
West	0	1	126	0	0	127	0	127
M. West	0	1	0	74	0	75	0	75
F. West	0	0	0	0	43	43	0	43
Sub total	142	182	136	80	43	583	1	582
Import	1	10	5	1	1	18	-	18
Total	143	192	141	81	44	601	1	600
Population	6,767,267	9,708,534	5,757,027	3,732,762	2,652,779			
Year 2015								
East	156	0	2	0	0	158	1	157
Central	0	199	9	7	0	215	0	215
West	0	1	139	0	0	140	0	140
M. West	0	1	0	82	0	83	0	83
F. West	0	0	0	0	48	48	0	48
Sub total	156	201	150	89	48	644	1	643
Import	1	11	6	1	1	20	-	20
Total	157	212	156	90	49	664	1	663
Population	7,455,575	10,731,294	6,344,782	4,120,030	2,934,200	31,585,880		

Source: JICA Study Team, November 2000

Table 9-5 Numbers of Truck and Weight of Cargo coming into Kalimati Wholesale Market (Nov 7 – 13, 2000)

	Nov. 7	Nov.8	Nov. 9	Nov. 10	Nov. 11	Nov. 12	Nov. 13	Total
Truck	57	64	65	56	58	67	64	431
Cargo (tons)	189.2	224.7	226.8	199.6	196	210.7	246.5	1,493.5

Source: JICA Study Team: November, 2000

Table 9-6 Incoming Volume except Large Trucks during Daytime coming into Kalimati Wholesale Market (Nov 7 – 13, 2000)

	Small truck	Van/Pick-up	Tempo	Cycle	Porter	Others
7 - 9	1	7	1	30	35	9
9 - 11	0	4	4	27	15	0
11 - 13	0	4	4	4	7	0
13 - 15	1	4	1	1	7	4
15 - 17	0	1	2	3	9	1
17 - 19	0	3	0	0	5	0
Total	2	23	12	65	78	14
Incoming volume (kg)	@2,500kg 5,000	@1,000kg 23,000	@200kg 2,400	@50kg 3,250	@40kg 3,120	@5kg 70

Source: JICA Study Team: November, 2000

Table 9-7 Origin of trucks coming to Kalimati Market (Nov 7 – 13, 2000)

	Total	Kathman	Kavre	Dhading	Makwan	Nuwakot	India
Nov. 7	57	10	10	12	10	4	1
Nov. 8	64	10	10	15	9	3	3
Nov. 9	65	10	15	10	10	2	2
Nov. 10	56	3	13	8	11	1	3
Nov. 11	58	8	10	12	10	3	3
Nov. 12	67	10	8	10	13	5	3
Nov. 13	64	4	9	9	12	9	11
Total	431	57	75	76	75	27	26
	(100%)	(13.2%)	(17.4%)	(17.6%)	(17.4%)	(6.3%)	(6.0%)

Source: JICA Study Team: November, 2000

Table 9-8 Destination and Volume of Outgoing Truck from Kalimati Market (Nov 11 – 13, 2000)

	Nov. 11	Nov. 12	Nov. 13
Number of Outgoing vehicles	101 (36.87 tons)	93 (27.94 tons)	84 (28.79 tons)
Destination No. 1	Tukucha 43 (17.47 tons)	Tukucha 32 (9.03 tons)	Tukucha 44 (16.39 tons)
No. 2	Anam Nagar 16 (6 tons)	Anam Nagar 10 (2.4 tons)	Anam Nagar 10 (2.55 tons)
No. 3	Lagankhel 16 (5.65 tons)	Lagankhel 10 (2.7 tons)	Lagankhel 10 (3.4 tons)
No. 4	Patan 5	Ason 6	Patan 7
No. 5	Ason 3	Patan, Baneshor 5	Baneshwor 2

Source: JICA Study Team: Nov. 2000

Table 9-9 Outgoing Volume from Kalimati Market during Daytime (Nov 7 – 13, 2000)

Hour	Van/Pick-up	Tempo	Cycle	Porter	Others
7- 9	16	67	354	289	592
9 - 11	15	57	172	123	389
11 - 13	10	27	94	82	292
13 - 15	6	22	98	93	343
15 - 17	5	16	71	47	495
17 - 19	5	4	24	26	744
Total	57	193	813	660	2,855
Outgoing volume (kg)	@1,000kg 57,000	@200kg 38,600	@50kg 40,650	@40kg 26,400	@5kg 14,275

Source: JICA Study Team, Nov. 2000

Table 9-10 Balance of Incoming/Outgoing in Kalimati Market (Nov 7 – 13, 2000)

Hour	Incoming	Outgoing
Mid-night to Morning	213 tons	30 tons
Daytime	40 tons	214 tons
Total	253 tons	244 tons

Source: JICA Study Team: Nov. 2000

Table 9-11 Willingness of Kalimati Wholesalers to move to the New Wholesale Market

Number of surveyed	Yes	No
269	246 (91.4%)	23 (8.6%)

Source: JICA Study Team: Nov. 2000

Table 9-12 Numbers of Truck and Weight of Cargo incoming to Tukucha (Nov 7 – 13, 2000)

	Nov. 7	Nov. 8	Nov. 9	Nov. 10	Nov. 11	Nov. 12	Nov. 13	Total
Truck	46	46	61	34	38	65	65	355
Cargo (tons)	47.365	43.84	54	55	52.35	57.115	64.37	374.04

Source: JICA Study Team: November 2000

Table 9-13 Incoming Volume to Tukucha during Daytime (Nov 7 – 13, 2000)

Hour	Van/Pick-up	Tempo	Cycle	Porter	Others
7 - 9	0	0	6	21	7
9 - 11	1	1	4	3	4
11 - 13	0	0	1	0	0
13 - 15	1	3	0	0	0
15 - 17	1	4	0	0	0
17 - 19	0	0	0	0	0
Total	3	8	11	24	11
Incoming volume (kg)	@1,000kg 3,000	@200kg 1,600	@50kg 550	@40kg 960	@5kg 55

Source: JICA Study Team: Nov. 2000

Table 9-14 Origin of Trucks coming to Tukucha Market (Nov 7 – 13, 2000)

	Total	Kalimati	Kathman	Bhakatpur	Nuwakot	Makwan	Kavre
Nov. 7	46	20	2	9	3	3	3
Nov. 8	46	32	1	7	2	3	1
Nov. 9	61	41	4	6	2	4	3
Nov. 10	34	16	1	6	4	2	3
Nov. 11	38	24	2	2	3	5	1
Nov. 12	65	25	1	19	5	3	5
Nov. 13	65	42	3	9	3	5	4
Total	355	200	14	58	22	25	20

Source: JICA Study Team: Nov. 2000

Table 9-15 Destination and Volume of Outgoing Truck from Tukucha Market (Nov 11 – 13, 2000)

	Nov. 11	Nov. 12	Nov. 13
Number of Outgoing Vehicles	9 (0.87 tons)	32 (2.925 tons)	27 (4.17 tons)
Destination No. 1	Anam Nagar 2 (0.29 tons)	Baneshwor 3 (0.5 tons)	Maiti devi 3 (0.59 tons)
No. 2	Thamel 2 (0.19 tons)	Naxal 3 (0.42 tons)	Anam Nagar 2 (0.5 tons)
No. 3	Narayanthan (0.13 tons)	Balaju 3 (0.36 tons)	Baneshwor 4 (0.41 tons)

Source: JICA Study Team: Nov. 2000

Table 9-16 Outgoing Volume from Tukucha Market during Daytime (Nov 7 – 13, 2000)

Hour	Van/Pick-up	Tempo	Motorcycle	Cycle	Porter	Others
7 - 9	1	40	71	164	73	201
9 - 11	0	11	18	85	26	119
11 - 13	0	2	3	33	5	21
13 - 15	0	5	6	41	20	62
15 - 17	0	1	4	20	15	170
17 - 19	0	1	3	16	7	295
Total	1	60	105	359	146	868
Outgoing	@1,000kg	@200kg	@80kg	@50kg	@40kg	@5kg
volume (kg)	1,000	12,000	8,400	17,950	5,840	4,340

Source: JICA Study Team: Nov. 2000

Table 9-17 Balance of Incoming/Outgoing in Tukucha Market (Nov 7 – 13, 2000)

Hour	Incoming	Outgoing
Early morning	53.4 tons	2.7 tons
Daytime	6.2 tons	49.6 tons
Total	59.6 tons	52.3 tons

Source: JICA Study Team: Nov. 2000

Table 9-18 Willingness of Tukucha Wholesalers to move to the New Wholesale Market

Number of surveyed	Yes	No
126	114 (90.5%)	12 (9.5%)

Source: JICA Study Team: Nov. 2000

Table 9-19 Incoming Volume of Fruits to Harsha Market (1998-2000)

Unit: tons

Year	Banana	Orange	Apple	Mango	Grape	Pomegra	Total
1998	20,484	12,300	7,704	6,084	5,268	3,768	67,080
1999	21,576	12,912	8,340	6,504	5,676	4,368	72,468
2000	17,940	12,652	6,684	6,180	6,120	3,420	63,820

Note: The data of 2000 is January to October
Source: Nepal Fruit Wholesalers Association

Table 9-20 Numbers of Truck and Weight of Cargo coming into Tukucha Wholesale Market (Nov 7 – 13, 2000)

	Nov. 7	Nov. 8	Nov. 9	Nov. 10	Nov. 11	Nov. 12	Nov. 13	Total
Truck	1	5	3	15	11	6	8	49
From India	1	2	2	7	3	4	7	26
Cargo (tons)	10	30.9	28	86.7	71.55	33.7	66.59	297.44

Source: JICA Study Team: Nov. 2000

Table 9-21 Destination and Volume of Outgoing Truck from Harsha Market (Nov 10-12, 2000)

	Nov. 10	Nov. 11	Nov. 12
Number of Outgoing Vehicle	75 (29.88 tons)	50 (19.84 tons)	76 (37.44 tons)
Destination No. 1	Kalimati (5.976 tons)	Chhabel (2.1 tons)	Kalimati (4.75 tons)
No. 2	Chabahil (3.05 tons)	Baneshwor (2 tons)	Bhaktapur (3.1 tons)
No. 3	Maharajgunj (1.9 tons)	Maharajgunj (1.75 tons)	Thamel (2.65 tons)
No. 4	Kavre (1.9 tons)	Tripureshwor (1.75 tons)	Kalanki (2.35 tons)
No. 5	Lagankhel (1.68 tons)	Kalimati (1.685 tons)	Lagankhel (1.35 tons)

Source: JICA Study Team: Nov. 2000

Table 9-22 Outgoing Volume from Harsha Market during Daytime (Nov 7 – 13, 2000)

Hour	Van/Pick-up	Tempo	Motorcycle	Cycle	Porter	Others
7 - 9	2	30	1	134	68	56
9 - 11	1	22	1	56	32	26
11 - 13	2	9	0	11	0	5
13 - 15	1	10	1	7	4	3
15 - 17	1	4	1	3	0	1
17 - 19	0	1	0	0	0	0
Total	7	76	4	211	104	91
Outgoing volume (kg)	@1,000kg 7,000	@300kg 22,800	@80kg 320	@50kg 10,550	@40kg 4,160	@5kg 455

Source: JICA Study Team: Nov. 2000

Table 9-23 Transaction of Traders in Anam Nagar in a day

	Commodity	Sales Volume (kg)	Sales Amount (Rs.)
1	Season vegetable	300	5,000
2	Season vegetable	300	6,000
3	Veg., Chili, Ginger	500	6,000
4	Potato, Onion	300	3,000
5	Onion, Peas	120	-
6	Ginger, Chili, Garlic	80	3,000
7	Leaf vegetable	150	250
8	Leaf vegetable	30	300
9	Tomato	100	3,000
10	Radish	1,500	-
Average		338	3,320

Source: JICA Study Team: November 2000

Table 9-24 Existing Marketing Situation in Kathmandu (2000)

Market	Number of wholesaler	Commodity sold	Trade volume per day	Transaction Characteristics
Kalimati	300	Potato, Onion, Vegetables	260 tons (380 tons)	Almost intermediary. Fruits only 3-5%
Tukucha	175	Potato, Onion, Vegetables, Green vegetables	60 tons	Farmers from Bhaktapur and Nuwakot bring by themselves.
Harsha	80	Fruits imported	65 tons, bottom (165 tons, average)	Almost intermediary or direct contact with Indian traders
Anam Nagar	(150)	Green leafy vegetables	50 tons	Farmers from Bhaktapur, Nuwakot bring by themselves.
Krishak Bazaar	12	Fruits domestic (Oct. - Mar.)	30 tons	Farmers from Kavre, Dhading Makwanpur,
Total	Vegetable, 475 Fruits, 92		Vegetable, 370 (490) tons Fruits, 80 (180) tons	

Source: JICA Study Team, November 2000

Table 9-25 Estimation of New Market Capacity for Vegetable (2000 and 2010)

Unit: tons

	Central Region	Kathmandu Valley	Kalimati Market	New Market
2000	973,000 (100%)	128,000 (13%) (100%)	95,000 (74%)	
2010	1,253,000 (100%)	163,000 (13%) (100%)	95,000 (58%)	68,000

Source: JICA Study Team, November 2000

Table 9-26 Estimation of New Market Capacity for Fruit (2000 and 2010)

Unit: tons

	Central Region	Kathmandu Bottom	Valley Average	New Market
2000	150,000 (100%)	29,000 (19%)	66,000 (44%)	
2010	192,000 (100%)	37,000 (19%)	84,000 (44%)	40,000

Source: JICA Study Team, November 2000

Table 9-27 Projection of Urban and Rural Population in Kathmandu Valley (2000 - 2010)

Unit: Thousand persons

	Kathmandu Valley	Urban	Rural
2000	1,450.7	918.8	531.9
2005	1,666.1	1,085.1	581.0
2010	1,887.8	1,260.5	627.3
2015	2,105.6	1,436.5	669.1

Source: Master Plan for Agricultural Marketing in Kahmandu Valley, April 2000, FAOTCP/NEP/8921

Table 9-28 Estimation of Demand (2010 and 2015)

	Per capita consumption	2010	2015
Vegetable + Potato	130.7 kg	165,000 tons	188,000 tons
Fruit	19.9 kg	25,000 tons	29,000 tons
Fruit (1)	27.1 kg	34,000 tons	39,000 tons

Note: Fruit (1) is the result of Household Survey repeated by JICA Team in November 2000

Table 9-29 Numbers of Truck and Volume of Cargo coming into Gudri Market (Nov 21-23, 2000)

	Nov. 21	Nov. 22	Nov. 23	Total
Truck	7	12	10	33
Volume (tons)	24.77	51.3	62.885	138.955
From India (tons)	20	37.4	37.24	94.64

Source: JICA Study Team: Nov. 2000

Table 9-30 Incoming Volume except Trucks coming into Gudri Market (Nov 21-23, 2000)

Date	Hour	Rickshaw	Handy cart	Cycle	Hand carry	Total
Nov. 22	6 - 7	16	2	22	11	
	7 - 8	22	2	26	11	
	8 - 9	11	4	20	13	
	Total	49	8	68	35	
	Incoming	@200kg	@200kg	@50kg	@20kg	
	Volume(kg)	9,800	1,600	3,400	700	15,500
Nov. 23	6 - 7	4	1	16	5	
	7 - 8	15	5	22	9	
	8 - 9	26	1	15	18	
	Total	45	7	53	32	
	Incoming	@200kg	@200kg	@50kg	@20kg	
	volume(kg)	9,000	1,400	2,650	640	13,690
Nov. 24	6 - 7	2	0	16	4	
	7 - 8	27	0	21	13	
	8 - 9	17	1	3	2	
	Total	46	1	40	19	
	Incoming	@200kg	@200kg	@50kg	@20kg	
	volume(kg)	9,200	200	2,000	380	11,780

Source: JICA Study Team: November 2000

Table 9-31 Outgoing Volume from Gudri Market (Nov 22-24, 2000)

Date	Hour	Rickshaw	Handy cart	Cycle	Hand carry	Total
Nov. 22	6 - 7	22	0	23	16	
	7 - 8	15	1	2	14	
	8 - 9	15	0	1	10	
	Total	52	1	26	40	
	Outgoing Volume(kg)	@200kg 10,400	@200kg 200	@50kg 1,300	@20kg 800	12,700
Nov. 23	6 - 7	3	1	0	3	
	7 - 8	14	1	1	9	
	8 - 9	21	2	4	9	
	Total	38	4	5	21	
	Outgoing volume(kg)	@200kg 7,600	@200kg 800	@50kg 250	@20kg 420	9,070
Nov. 24	6 - 7	2	0	0	0	
	7 - 8	12	0	2	4	
	8 - 9	11	5	2	9	
	Total	25	5	4	13	
	Outgoing volume(kg)	@200kg 5,000	@200kg 1,000	@50kg 200	@20kg 260	6,460

Source: JICA Study Team: Nov. 2000

Table 9-32 Outgoing Volume from Gudri Market between 9 am to 1 pm (Nov 25-26, 2000)

Date	Hour	Rickshaw	Handy cart	Cycle	Hand carry	Total
Nov 25	9 - 10	30	4	2	20	
	10 - 11	15	1	0	2	
	11 - 12	25	3	5	5	
	12 - 13	2	0	0	0	
	Total	72	8	7	27	
	Outgoing volume(kg)	@200kg 14,400	@200kg 1,600	@50kg 350	@20kg 540	16,890
Nov. 26	9 - 10	36	17	11	27	
	10 - 11	21	9	9	16	
	11 - 12	14	4	4	9	
	12 - 13	3	1	1	3	
	Total	74	28	25	55	
	Outgoing volume(kg)	@200kg 14,800	@200kg 5,600	@50kg 1,250	@20kg 1,100	22,750

Source: JICA Study Team: November 2000

Table 9-33 Balance of Incoming/Outgoing in Gudri Market

Incoming	Outgoing
50 tons by Truck 10 tons by Man-driven vehicles	30 tons by Man-driven vehicles (15 tons from retailers, estimated) (5 tons by Truck, estimated)
Total: 60 tons	Total: 50 tons

Source: JICA Study Team: November, 2000

Table 9-34 Existing Marketing Situation in Biratnagar (2000)

Market	Number of traders	Commodity sold	Trade volume per day	Transaction characteristics
Gudri	Wholesalers 19	Potato, Onion, Vegetables	60 tons 3 ton/trader/day	Intermediary dominates than farmers
	Retailers 24	Potato, Onion, Vegetables	15 tons 0.6 ton/trader/day	
Jana Path	Wholesalers 6	Apple, Orange, Mango, Grape	2 tons	Mostly intermediary
	Retailers 3	Apple, Orange, Mango, Grape	0.3 tons	

Source: JICA Study Team, November 2000

Table 9-35 Estimation of New Biratnagar Market for Vegetable (2000 and 2010)

Unit: tons

	Eastern Region	Biratnagar	New Market
2000	632,000	24,000	
2010	803,000	30,500	30,000

Source: JICA Study Team, November 2000

Table 9-36 Estimation of Demand in Biratnagar (2010 and 2015)

	Per capita consumption	2010	2015
Vegetable + Potato	119.1 kg/year	23,000 tons	25,600 tons
Fruit	21.2 kg/year	4,000 tons	4,600 tons

Table 9-37 Forecast of Demand and Supply by Animal Products (1 of 3)

(1) Buffalo Meat

Per Capita Consumption: **7.2 kg/year** FAO'98

	Year 2000 (ton)				Year 2005 (ton)				Year 2010 (ton)				Year 2015 (ton)			
	Population	Production	Demand	Balance	Population	Production	Demand	Balance	Population	Production	Demand	Balance	Population	Production	Demand	Balance
Eastern Region	*5,272,564*	*27,507*	*37,962*	*-10,455*	*6,089,794*	*33,598*	*43,847*	*-10,249*	*6,767,267*	*41,297*	*48,724*	*-7,427*	*7,455,575*	*51,078*	*53,680*	*-2,602*
Mountain	379,607	3,435	2,733	702	460,870	3,916	3,318	598	504,517	4,464	3,633	831	551,071	5,088	3,968	1,120
Hills	1,621,872	12,394	11,677	717	1,907,744	16,467	13,736	2,731	2,108,089	21,878	15,178	6,700	2,315,142	29,066	16,669	12,397
Terai	3,271,085	11,678	23,552	-11,874	3,721,180	13,215	26,792	-13,577	4,154,660	14,955	29,914	-14,959	4,589,362	16,924	33,043	-16,119
Central Region	*7,684,239*	*43,003*	*55,327*	*-12,324*	*8,686,290*	*49,782*	*62,541*	*-12,759*	*9,708,534*	*57,861*	*69,901*	*-12,040*	*10,731,294*	*67,463*	*77,265*	*-9,803*
Mountain	530,189	3,280	3,817	-537	626,125	2,960	4,508	-1,548	690,879	2,671	4,974	-2,303	758,033	2,410	5,458	-3,048
Hills	3,387,645	24,940	24,391	549	3,793,447	29,380	27,313	2,067	4,248,784	34,610	30,591	4,019	4,702,277	40,771	33,856	6,915
Terai	3,766,405	14,783	27,118	-12,335	4,266,718	17,442	30,720	-13,278	4,768,872	20,580	34,336	-13,756	5,270,983	24,281	37,951	-13,670
Western Region	*4,512,113*	*28,281*	*32,487*	*-4,206*	*5,177,334*	*34,025*	*37,277*	*-3,252*	*5,757,027*	*41,004*	*41,451*	*-447*	*6,344,782*	*49,493*	*45,682*	*3,811*
Mountain	19,848	7	143	-136	24,460	6	176	-170	26,610	5	192	-187	28,965	5	209	-204
Hills	2,704,771	21,362	19,474	1,888	3,199,103	26,298	23,034	3,264	3,525,409	32,375	25,383	6,992	3,865,192	39,856	27,829	12,027
Terai	1,787,494	6,912	12,870	-5,958	1,953,770	7,721	14,067	-6,346	2,205,009	8,624	15,876	-7,252	2,450,625	9,632	17,644	-8,012
Mid-Western Region	*2,949,321*	*14,267*	*21,235*	*-6,968*	*3,348,098*	*16,276*	*24,106*	*-7,830*	*3,732,762*	*19,089*	*26,876*	*-7,787*	*4,120,030*	*23,005*	*29,664*	*-6,658*
Mountain	287,003	887	2,066	-1,179	340,776	881	2,454	-1,573	374,615	874	2,697	-1,823	410,136	868	2,953	-2,085
Hills	1,411,947	7,498	10,166	-2,668	1,634,138	7,340	11,766	-4,426	1,806,559	7,185	13,007	-5,822	1,984,293	7,033	14,287	-7,254
Terai	1,250,371	5,882	9,003	-3,121	1,373,184	8,055	9,887	-1,832	1,551,589	11,030	11,171	-141	1,725,601	15,105	12,424	2,681
Far-Westen Region	*2,138,747*	*15,997*	*15,399*	*598*	*2,370,296*	*24,583*	*17,066*	*7,517*	*2,652,779*	*39,012*	*19,100*	*19,912*	*2,934,200*	*63,798*	*21,126*	*42,671*
Mountain	378,532	2,441	2,725	-284	437,103	2,788	3,147	-359	480,703	3,184	3,461	-277	526,300	3,636	3,789	-153
Hills	737,646	7,344	5,311	2,033	875,265	10,181	6,302	3,879	961,211	14,115	6,921	7,194	1,051,548	19,569	7,571	11,998
Terai	1,022,568	6,212	7,362	-1,150	1,057,928	11,614	7,617	3,997	1,210,865	21,713	8,718	12,995	1,356,352	40,592	9,766	30,826
Total	22,556,983	129,055	162,410	-33,355	25,671,813	158,264	184,837	-26,573	28,618,369	198,263	206,052	-7,789	31,585,880	254,837	227,418	27,418

(2) Goat Meat/Mutton

Per Capita Consumption: **1.7 kg/year** FAO'98

	Year 2000 (ton)				Year 2005 (ton)				Year 2010 (ton)				Year 2015 (ton)			
	Population	Production	Demand	Balance	Population	Production	Demand	Balance	Population	Production	Demand	Balance	Population	Production	Demand	Balance
Eastern Region	*5,272,564*	*9,801*	*37,962*	*-28,161*	*6,089,794*	*11,914*	*43,847*	*-31,933*	*6,767,267*	*14,492*	*48,724*	*-34,232*	*7,455,575*	*17,634*	*53,680*	*-36,046*
Mountain	379,607	803	2,733	-1,930	460,870	1,049	3,318	-2,269	504,517	1,371	3,633	-2,262	551,071	1,790	3,968	-2,178
Hills	1,621,872	2,931	11,677	-8,746	1,907,744	3,541	13,736	-10,195	2,108,089	4,279	15,178	-10,899	2,315,142	5,171	16,669	-11,498
Terai	3,271,085	6,067	23,552	-17,485	3,721,180	7,324	26,792	-19,468	4,154,660	8,842	29,914	-21,072	4,589,362	10,673	33,043	-22,370
Central Region	*7,684,239*	*9,460*	*55,327*	*-45,867*	*8,686,290*	*10,618*	*62,541*	*-51,923*	*9,708,534*	*12,145*	*69,901*	*-57,756*	*10,731,294*	*14,154*	*77,265*	*-63,111*
Mountain	530,189	1,064	3,817	-2,753	626,125	1,530	4,508	-2,978	690,879	2,200	4,974	-2,774	758,033	3,163	5,458	-2,295
Hills	3,387,645	3,255	24,391	-21,136	3,793,447	3,061	27,313	-24,252	4,248,784	2,879	30,591	-27,712	4,702,277	2,708	33,856	-31,148
Terai	3,766,405	5,141	27,118	-21,977	4,266,718	6,027	30,720	-24,693	4,768,872	7,066	34,336	-27,270	5,270,983	8,283	37,951	-29,668
Western Region	*4,512,113*	*7,492*	*32,487*	*-24,995*	*5,177,334*	*9,142*	*37,277*	*-28,135*	*5,757,027*	*11,266*	*41,451*	*-30,185*	*6,344,782*	*14,085*	*45,682*	*-31,597*
Mountain	19,848	253	143	110	24,460	473	176	297	26,610	884	192	692	28,965	1,652	209	1,443
Hills	2,704,771	5,037	19,474	-14,437	3,199,103	6,014	23,034	-17,020	3,525,409	7,180	25,383	-18,203	3,865,192	8,572	27,829	-19,257
Terai	1,787,494	2,202	12,870	-10,668	1,953,770	2,655	14,067	-11,412	2,205,009	3,202	15,876	-12,674	2,450,625	3,861	17,644	-13,783
Mid-Western Region	*2,949,321*	*10,518*	*21,235*	*-10,717*	*3,348,098*	*11,483*	*24,106*	*-12,623*	*3,732,762*	*12,670*	*26,876*	*-14,206*	*4,120,030*	*14,132*	*29,664*	*-15,532*
Mountain	287,003	1,373	2,066	-693	340,776	1,284	2,454	-1,170	374,615	1,200	2,697	-1,497	410,136	1,122	2,953	-1,831
Hills	1,411,947	4,003	10,166	-6,163	1,634,138	4,929	11,766	-6,837	1,806,559	6,069	13,007	-6,938	1,984,293	7,474	14,287	-6,813
Terai	1,250,371	5,142	9,003	-3,861	1,373,184	5,270	9,887	-4,617	1,551,589	5,401	11,171	-5,770	1,725,601	5,536	12,424	-6,888
Far-Westen Region	*2,138,747*	*4,190*	*15,399*	*-11,209*	*2,370,296*	*5,397*	*17,066*	*-11,669*	*2,652,779*	*7,220*	*19,100*	*-11,880*	*2,934,200*	*9,871*	*21,126*	*-11,255*
Mountain	378,532	698	2,725	-2,027	437,103	508	3,147	-2,639	480,703	370	3,461	-3,091	526,300	269	3,789	-3,520
Hills	737,646	1,648	5,311	-3,663	875,265	2,257	6,302	-4,045	961,211	3,092	6,921	-3,829	1,051,548	4,236	7,571	-3,335
Terai	1,022,568	1,844	7,362	-5,518	1,057,928	2,632	7,617	-4,985	1,210,865	3,758	8,718	-4,960	1,356,352	5,366	9,766	-4,400
Total	22,556,983	41,461	162,410	-120,949	25,671,813	48,554	184,837	-136,283	28,618,369	57,793	206,052	-148,259	31,585,880	69,876	227,418	-157,542

Table 9-37 Forecast of Demand and Supply by Animal Products (2 of 3)

(3) Pork

Per Capita Consumption: **0.6 kg/year**

	Year 2000 (ton)				Year 2005 (ton)				Year 2010 (ton)				Year 2015 (ton)			
	Population	Production	Demand	Balance	Population	Production	Demand	Balance	Population	Production	Demand	Balance	Population	Production	Demand	Balance
Eastern Region	*5,272,564*	*6,298*	*37,962*	*-31,664*	*6,089,794*	*7,216*	*43,847*	*-36,631*	*6,767,267*	*8,273*	*48,724*	*-40,451*	*7,455,575*	*9,491*	*53,680*	*-44,189*
Mountain	379,607	1,006	2,733	-1,727	460,870	1,109	3,318	-2,209	504,517	1,223	3,633	-2,410	551,071	1,348	3,968	-2,620
Hills	1,621,872	3,599	11,677	-8,078	1,907,744	4,094	13,736	-9,642	2,108,089	4,658	15,178	-10,520	2,315,142	5,299	16,669	-11,370
Terai	3,271,085	1,693	23,552	-21,859	3,721,180	2,013	26,792	-24,779	4,154,660	2,392	29,914	-27,522	4,589,362	2,844	33,043	-30,199
Central Region	*7,684,239*	*3,698*	*55,327*	*-51,629*	*8,686,290*	*6,522*	*62,541*	*-56,019*	*9,708,534*	*11,608*	*69,901*	*-58,293*	*10,731,294*	*20,801*	*77,265*	*-56,464*
Mountain	530,189	185	3,817	-3,632	626,125	205	4,508	-4,303	690,879	226	4,974	-4,748	758,033	250	5,458	-5,208
Hills	3,387,645	2,875	24,391	-21,516	3,793,447	5,284	27,313	-22,029	4,248,784	9,710	30,591	-20,881	4,702,277	17,843	33,856	-16,013
Terai	3,766,405	638	27,118	-26,480	4,266,718	1,033	30,720	-29,687	4,768,872	1,672	34,336	-32,664	5,270,983	2,708	37,951	-35,243
Western Region	*4,512,113*	*2,281*	*32,487*	*-30,206*	*5,177,334*	*3,098*	*37,277*	*-34,179*	*5,757,027*	*4,221*	*41,451*	*-37,230*	*6,344,782*	*5,774*	*45,682*	*-39,908*
Mountain	19,848	2	143	-141	24,460	2	176	-174	26,610	2	192	-190	28,965	2	209	-207
Hills	2,704,771	1,825	19,474	-17,649	3,199,103	2,408	23,034	-20,626	3,525,409	3,176	25,383	-22,207	3,865,192	4,190	27,829	-23,639
Terai	1,787,494	454	12,870	-12,416	1,953,770	688	14,067	-13,379	2,205,009	1,043	15,876	-14,833	2,450,625	1,582	17,644	-16,062
Mid-Western Region	*2,949,321*	*2,213*	*21,235*	*-19,022*	*3,348,098*	*2,514*	*24,106*	*-21,592*	*3,732,762*	*2,861*	*26,876*	*-24,015*	*4,120,030*	*3,259*	*29,664*	*-26,405*
Mountain	287,003	30	2,066	-2,036	340,776	23	2,454	-2,431	374,615	17	2,697	-2,680	410,136	13	2,953	-2,940
Hills	1,411,947	938	10,166	-9,228	1,634,138	1,085	11,766	-10,681	1,806,559	1,256	13,007	-11,751	1,984,293	1,453	14,287	-12,834
Terai	1,250,371	1,245	9,003	-7,758	1,373,184	1,406	9,887	-8,481	1,551,589	1,588	11,171	-9,583	1,725,601	1,793	12,424	-10,631
Far-Westen Region	*2,138,747*	*990*	*15,399*	*-14,409*	*2,370,296*	*1,360*	*17,066*	*-15,706*	*2,652,779*	*1,913*	*19,100*	*-17,187*	*2,934,200*	*2,790*	*21,126*	*-18,336*
Mountain	378,532	37	2,725	-2,688	437,103	90	3,147	-3,057	480,703	217	3,461	-3,244	526,300	525	3,789	-3,264
Hills	737,646	24	5,311	-5,287	875,265	25	6,302	-6,277	961,211	26	6,921	-6,895	1,051,548	27	7,571	-7,544
Terai	1,022,568	929	7,362	-6,433	1,057,928	1,245	7,617	-6,372	1,210,865	1,670	8,718	-7,048	1,356,352	2,238	9,766	-7,528
Total	22,556,983	15,480	162,410	-146,930	25,671,813	20,710	184,837	-164,127	28,618,369	28,876	206,052	-177,176	31,585,880	42,115	227,418	-185,303

(4) Chicken Meat

Per Capita Consumption: **0.5 kg/year** FAO'98

	Year 2000 (ton)				Year 2005 (ton)				Year 2010 (ton)				Year 2015 (ton)			
	Population	Production	Demand	Balance	Population	Production	Demand	Balance	Population	Production	Demand	Balance	Population	Production	Demand	Balance
Eastern Region	*5,272,564*	*2,717*	*37,962*	*-35,245*	*6,089,794*	*4,350*	*43,847*	*-39,497*	*6,767,267*	*7,664*	*48,724*	*-41,060*	*7,455,575*	*14,332*	*53,680*	*-39,348*
Mountain	379,607	273	2,733	-2,460	460,870	276	3,318	-3,042	504,517	278	3,633	-3,355	551,071	281	3,968	-3,687
Hills	1,621,872	748	11,677	-10,929	1,907,744	690	13,736	-13,046	2,108,089	637	15,178	-14,541	2,315,142	588	16,669	-16,081
Terai	3,271,085	1,696	23,552	-21,856	3,721,180	3,384	26,792	-23,408	4,154,660	6,749	29,914	-23,165	4,589,362	13,463	33,043	-19,580
Central Region	*7,684,239*	*6,884*	*55,327*	*-48,443*	*8,686,290*	*9,608*	*62,541*	*-52,933*	*9,708,534*	*13,763*	*69,901*	*-56,138*	*10,731,294*	*20,238*	*77,265*	*-57,027*
Mountain	530,189	279	3,817	-3,538	626,125	251	4,508	-4,257	690,879	226	4,974	-4,748	758,033	204	5,458	-5,254
Hills	3,387,645	4,806	24,391	-19,585	3,793,447	6,200	27,313	-21,113	4,248,784	7,999	30,591	-22,592	4,702,277	10,318	33,856	-23,538
Terai	3,766,405	1,799	27,118	-25,319	4,266,718	3,157	30,720	-27,563	4,768,872	5,538	34,336	-28,798	5,270,983	9,716	37,951	-28,235
Western Region	*4,512,113*	*1,903*	*32,487*	*-30,584*	*5,177,334*	*2,105*	*37,277*	*-35,172*	*5,757,027*	*2,356*	*41,451*	*-39,095*	*6,344,782*	*2,674*	*45,682*	*-43,008*
Mountain	19,848	11	143	-132	24,460	12	176	-164	26,610	13	192	-179	28,965	14	209	-195
Hills	2,704,771	1,417	19,474	-18,057	3,199,103	1,467	23,034	-21,567	3,525,409	1,518	25,383	-23,865	3,865,192	1,572	27,829	-26,257
Terai	1,787,494	475	12,870	-12,395	1,953,770	626	14,067	-13,441	2,205,009	825	15,876	-15,051	2,450,625	1,088	17,644	-16,556
Mid-Western Region	*2,949,321*	*1,591*	*21,235*	*-19,644*	*3,348,098*	*2,022*	*24,106*	*-22,084*	*3,732,762*	*2,697*	*26,876*	*-24,179*	*4,120,030*	*3,740*	*29,664*	*-25,924*
Mountain	287,003	64	2,066	-2,002	340,776	61	2,454	-2,393	374,615	58	2,697	-2,639	410,136	55	2,953	-2,898
Hills	1,411,947	591	10,166	-9,575	1,634,138	550	11,766	-11,216	1,806,559	511	13,007	-12,496	1,984,293	476	14,287	-13,811
Terai	1,250,371	936	9,003	-8,067	1,373,184	1,411	9,887	-8,476	1,551,589	2,128	11,171	-9,043	1,725,601	3,209	12,424	-9,215
Far-Westen Region	*2,138,747*	*477*	*15,399*	*-14,922*	*2,370,296*	*580*	*17,066*	*-16,486*	*2,652,779*	*738*	*19,100*	*-18,362*	*2,934,200*	*980*	*21,126*	*-20,146*
Mountain	378,532	93	2,725	-2,632	437,103	148	3,147	-2,999	480,703	236	3,461	-3,225	526,300	376	3,789	-3,413
Hills	737,646	143	5,311	-5,168	875,265	199	6,302	-6,103	961,211	277	6,921	-6,644	1,051,548	386	7,571	-7,185
Terai	1,022,568	241	7,362	-7,121	1,057,928	233	7,617	-7,384	1,210,865	225	8,718	-8,493	1,356,352	218	9,766	-9,548
Total	22,556,983	13,572	162,410	-148,838	25,671,813	18,665	184,837	-166,172	28,618,369	27,218	206,052	-178,834	31,585,880	41,964	227,418	-185,454

Table 9-37 Forecast of Demand and Supply by Animal Products (3 of 3)

(5) Milk

Per Capita Consumption: **39.0 kg/year**

	Year 2000 (ton)				Year 2005 (ton)				Year 2010 (ton)				Year 2015 (ton)			
	Population	Production	Demand	Balance	Population	Production	Demand	Balance	Population	Production	Demand	Balance	Population	Production	Demand	Balance
Eastern Region	*5,272,564*	*261,736*	*37,962*	*223,774*	*6,089,794*	*320,006*	*43,847*	*276,159*	*6,767,267*	*392,466*	*48,724*	*343,742*	*7,455,575*	*482,809*	*53,680*	*429,129*
Mountain	379,607	27,818	2,733	25,085	460,870	30,809	3,318	27,491	504,517	34,122	3,633	30,489	551,071	37,791	3,968	33,823
Hills	1,621,872	117,769	11,677	106,092	1,907,744	152,464	13,736	138,728	2,108,089	197,379	15,178	182,201	2,315,142	255,527	16,669	238,858
Terai	3,271,085	116,149	23,552	92,597	3,721,180	136,733	26,792	109,941	4,154,660	160,965	29,914	131,051	4,589,362	189,491	33,043	156,448
Central Region	*7,684,239*	*310,542*	*55,327*	*255,215*	*8,686,290*	*356,788*	*62,541*	*294,247*	*9,708,534*	*411,486*	*69,901*	*341,585*	*10,731,294*	*476,355*	*77,265*	*399,090*
Mountain	530,189	29,202	3,817	25,385	626,125	29,889	4,508	25,381	690,879	30,593	4,974	25,619	758,033	31,314	5,458	25,856
Hills	3,387,645	154,280	24,391	129,889	3,793,447	170,684	27,313	143,371	4,248,784	188,833	30,591	158,242	4,702,277	208,912	33,856	175,056
Terai	3,766,405	127,060	27,118	99,942	4,266,718	156,215	30,720	125,495	4,768,872	192,060	34,336	157,724	5,270,983	236,129	37,951	198,178
Western Region	*4,512,113*	*306,418*	*32,487*	*273,931*	*5,177,334*	*365,954*	*37,277*	*328,677*	*5,757,027*	*437,157*	*41,451*	*395,706*	*6,344,782*	*522,336*	*45,682*	*476,654*
Mountain	19,848	530	143	387	24,460	650	176	474	26,610	797	192	605	28,965	977	209	768
Hills	2,704,771	239,039	19,474	219,565	3,199,103	283,194	23,034	260,160	3,525,409	335,506	25,383	310,123	3,865,192	397,481	27,829	369,652
Terai	1,787,494	66,849	12,870	53,979	1,953,770	82,110	14,067	68,043	2,205,009	100,854	15,876	84,978	2,450,625	123,878	17,644	106,234
Mid-Western Region	*2,949,321*	*130,038*	*21,235*	*108,803*	*3,348,098*	*146,199*	*24,106*	*122,093*	*3,732,762*	*167,951*	*26,876*	*141,075*	*4,120,030*	*197,130*	*29,664*	*167,466*
Mountain	287,003	8,499	2,066	6,433	340,776	8,821	2,454	6,367	374,615	9,155	2,697	6,458	410,136	9,501	2,953	6,548
Hills	1,411,947	70,404	10,166	60,238	1,634,138	69,376	11,766	57,610	1,806,559	68,363	13,007	55,356	1,984,293	67,365	14,287	53,078
Terai	1,250,371	51,135	9,003	42,132	1,373,184	68,002	9,887	58,115	1,551,589	90,433	11,171	79,262	1,725,601	120,264	12,424	107,840
Far-Westen Region	*2,138,747*	*146,205*	*15,399*	*130,806*	*2,370,296*	*226,131*	*17,066*	*209,065*	*2,652,779*	*390,786*	*19,100*	*371,686*	*2,934,200*	*736,775*	*21,126*	*715,649*
Mountain	378,532	23,575	2,725	20,850	437,103	24,298	3,147	21,151	480,703	25,043	3,461	21,582	526,300	25,811	3,789	22,022
Hills	737,646	58,794	5,311	53,483	875,265	64,722	6,302	58,420	961,211	71,248	6,921	64,327	1,051,548	78,431	7,571	70,860
Terai	1,022,568	63,836	7,362	56,474	1,057,928	137,111	7,617	129,494	1,210,865	294,495	8,718	285,777	1,356,352	632,533	9,766	622,767
Total	22,556,983	1,154,939	162,410	992,529	25,671,813	1,415,078	184,837	1,230,241	28,618,369	1,799,846	206,052	1,593,794	31,585,880	2,415,405	227,418	2,187,987

(6) Egg

Per Capita Consumption: **0.9 kg/year** FAO'98

	Year 2000 (ton)				Year 2005 (1,000 No.)				Year 2010 (1,000 No.)				Year 2015 (ton)			
	Population	Production	Demand	Balance	Population	Production	Demand	Balance	Population	Production	Demand	Balance	Population	Production	Demand	Balance
Eastern Region	*5,272,564*	*4,291*	*37,962*	*-33,671*	*6,089,794*	*6,393*	*43,847*	*-37,454*	*6,767,267*	*10,194*	*48,724*	*-38,530*	*7,455,575*	*16,970*	*53,680*	*-36,710*
Mountain	379,607	387	2,733	-2,346	460,870	344	3,318	-2,974	504,517	306	3,633	-3,327	551,071	272	3,968	-3,696
Hills	1,621,872	969	11,677	-10,708	1,907,744	889	13,736	-12,847	2,108,089	815	15,178	-14,363	2,315,142	747	16,669	-15,922
Terai	3,271,085	2,935	23,552	-20,617	3,721,180	5,160	26,792	-21,632	4,154,660	9,073	29,914	-20,841	4,589,362	15,951	33,043	-17,092
Central Region	*7,684,239*	*9,772*	*55,327*	*-45,555*	*8,686,290*	*12,743*	*62,541*	*-49,798*	*9,708,534*	*17,166*	*69,901*	*-52,735*	*10,731,294*	*23,852*	*77,265*	*-53,413*
Mountain	530,189	503	3,817	-3,314	626,125	419	4,508	-4,089	690,879	349	4,974	-4,625	758,033	291	5,458	-5,167
Hills	3,387,645	5,971	24,391	-18,420	3,793,447	6,983	27,313	-20,330	4,248,784	8,167	30,591	-22,424	4,702,277	9,552	33,856	-24,304
Terai	3,766,405	3,298	27,118	-23,820	4,266,718	5,341	30,720	-25,379	4,768,872	8,650	34,336	-25,686	5,270,983	14,009	37,951	-23,942
Western Region	*4,512,113*	*2,913*	*32,487*	*-29,574*	*5,177,334*	*2,897*	*37,277*	*-34,380*	*5,757,027*	*2,892*	*41,451*	*-38,559*	*6,344,782*	*2,897*	*45,682*	*-42,785*
Mountain	19,848	11	143	-132	24,460	7	176	-169	26,610	5	192	-187	28,965	3	209	-206
Hills	2,704,771	1,918	19,474	-17,556	3,199,103	1,833	23,034	-21,201	3,525,409	1,752	25,383	-23,631	3,865,192	1,675	27,829	-26,154
Terai	1,787,494	984	12,870	-11,886	1,953,770	1,057	14,067	-13,010	2,205,009	1,135	15,876	-14,741	2,450,625	1,219	17,644	-16,425
Mid-Western Region	*2,949,321*	*2,235*	*21,235*	*-19,000*	*3,348,098*	*2,377*	*24,106*	*-21,729*	*3,732,762*	*2,529*	*26,876*	*-24,347*	*4,120,030*	*2,690*	*29,664*	*-26,974*
Mountain	287,003	60	2,066	-2,006	340,776	62	2,454	-2,392	374,615	64	2,697	-2,633	410,136	67	2,953	-2,886
Hills	1,411,947	828	10,166	-9,338	1,634,138	868	11,766	-10,898	1,806,559	911	13,007	-12,096	1,984,293	955	14,287	-13,332
Terai	1,250,371	1,347	9,003	-7,656	1,373,184	1,447	9,887	-8,440	1,551,589	1,554	11,171	-9,617	1,725,601	1,668	12,424	-10,756
Far-Westen Region	*2,138,747*	*704*	*15,399*	*-14,695*	*2,370,296*	*746*	*17,066*	*-16,320*	*2,652,779*	*789*	*19,100*	*-18,311*	*2,934,200*	*834*	*21,126*	*-20,292*
Mountain	378,532	101	2,725	-2,624	437,103	109	3,147	-3,038	480,703	117	3,461	-3,344	526,300	125	3,789	-3,664
Hills	737,646	194	5,311	-5,117	875,265	206	6,302	-6,096	961,211	218	6,921	-6,703	1,051,548	231	7,571	-7,340
Terai	1,022,568	409	7,362	-6,953	1,057,928	431	7,617	-7,186	1,210,865	454	8,718	-8,264	1,356,352	478	9,766	-9,288
Total	22,556,983	19,915	162,410	-142,495	25,671,813	25,156	184,837	-159,681	28,618,369	33,570	206,052	-172,482	31,585,880	47,243	227,418	-180,175

Table 9-38 Proposed Transaction System

SN	Transaction System	Existing Transaction System	Proposed Transaction System in New WM & CC	Impact/Benefit
1	Contract Harvesting	• In general large fruit orchards are contracted out for harvesting & transportation, • Various procedure of advanced payment & credit system adopted	• Contract laws to be developed & implemented	• Secure dealing & fair pricing
2	Transaction system at Farm Gate	• Local traders deal with producers at farm gate, • Various advance payments are practiced at various rates, • Final dealing is clear only to the local traders not to the producers	• Contract law to be developed & adopted	• Payment Procedure defined and fair price paid to the producers
3	Transaction System at CC	• Individual farmers sell to the local traders or to the traders/collectors, • Farmers reported selling both on cash & on credit as required, • Various advance and credit system used • Various commission rates	• Contract law to be developed & adopted, • Farmers deal at contractual agreement with traders, • Farmers directly deals with their own Co-operatives, • Farmers co-operatives decide various transaction system and payment schedule based on their own decisions • Commission rate for cooperatives decide by the producers themselves.	• Farmers receive contracted price, • Farmers with their own cooperatives benefited more from open & clean transaction system
4	Transaction System at WM	• Local traders bring to sell at WM, • Traders/Collectors collect and bring to sell at WM, • Farmers take to WM for direct sale, • Various transaction system and payment methods are adopted • Various commission rates by wholesalers	• Contract law to be developed & adopted, • Farmers Marketing Co-operatives collect, quality improve, & transport to wholesale market for auction sale, • Traders collect, improve quality, and transport to WM for auction sale • Open cash and credit system of payment adopted • Defined commission rate to wholesalers	• Quality handling for better price • Open system for fair pricing and benefits
5	Transaction System with Buyers and Retailers	• Various systems adopted by buyers based on their retailers to be dealt with	• Contract Law to be developed and adopted, • Buyers rate are open to all based on the auction system • Commission rate of buyers fixed • Payment procedure open and transparent	• Fair transaction system provide better chance for fair price and benefits

Source: Jica Study Team, 2000

Table 9-39 Proposed Pricing Mechanism

SN	Pricing Mechanism	Existing Pricing Mechanism	Proposed New Pricing Mechanism	Impacts/Benefit
1	Pricing Mechanism at Farm Gate	• No pricing mechanism at farm gate level • Farm gate prices are fixed by local collectors • Producer farmers have no knowledge on CC pricing mechanism	• Farm gate price be linked to the CC pricing mechanism	• Fair price at farm gate
2	Pricing Mechanism at CC	• Price fixed by local traders, • Price fixed by traders/collectors • Price reduced by local traders in absence of the outside traders/collectors	• Price fixed by traders based on the Wholesale Market price • Price openly fixed by Co-operatives to suit the environment • Price fixed by Co-operatives based on the WM price • Cleaning, grading, packing, and marking cost reduced by Co-operatives	• Fair price at CC • Better opportunity on Open prices of the cooperatives
3	Pricing Mechanism at Wholesale Market	• Unclear pricing mechanism at WM • Price fixed by the Wholesalers • Prices unknown and fluctuate very much	• Prices fixed by Auction System • Sold to the highest bidders, so fair price • Daily wholesale price known to all	• Fair price to all actors • And benefit shared by all on fair deal basis
4	Pricing Mechanism at Buyers & Retailers	• Prices fixed by buyers • Prices fixed by the Retailers • Price not known to all • Price differed by buyers and retailers	• Buyers buy in Auction system • Open pricing system • Price known to all • Uniform pricing	• Better price to all • Benefit to all • Price known

Source: Jica Study Team, 2000

Table 9-40 Proposed Licensing System

SN	Licensing:	Existing Licensing System	Proposed New Licensing	Impact/Benefit
	At Wholesale Market			
1	Commission Agents	No License system Variable commission rates charged by the commission agents No training to commission agents	Phase -wise Licensing System Licensing in Phase 1 by MMC Commission Agents trained in Auction System Commission Agents function as Auctioneers	Auctioning by trained Auctioneers Fair price in Auction
2	Buyers/Wholesalers	No License System Charge variable rates Variable commission percentages	Phase- wise Licensing by MMC Training to Buyers/Wholesalers	Price open & known to retailers
3	Local Traders/Traders	No License System Pay variable charges to wholesalers	Trained local traders on lot number preparation for auctioning	Local capacity building of local traders
4	Marketing Co-operatives	No License System No commission charge fixed No experience in marketing at WM	Phase- wise Licensing by MMC Training to cooperative members Selling by Trade Marks	Fair share to producer farmers
5	Institutional Buyers	No License System Not defined	Phase-wise Licensing by MMC Training to institutional suppliers and buyers	Secure buyers
	At Collection Center:			
1	Producer Farmers' Groups as Suppliers	No License System No training on licensing system	Phase-wise licensing is proposed if necessary only	Producer farmer's recognized
2	Cooperative as both buyer and supplier	No License System No training to cooperative members	Phase-wise Licensing is proposed Training to cooperative members is also proposed	Cooperatives recognized Cooperative members trained
3	Local Trader as buyers & Suppliers	NO Licensing System No training to traders	Phase-wise Licensing is proposed Training to local traders is also proposed	Local capacity building of local traders

Source: 1. Profile of Kalimati Fruit & Vegetable Wholesale Market Development Board, 2000.
2. The Delhi Agricultural Produce Marketing (Regulation) Act, 1998 & Field Visit to Azadpur Wholesale Market.
3. Bihar Agricultural Produce Markets Act, 1960 & its amendments and Field Visit to Patna Wholesale Market.
4. West Bengal Agricultural Produce Marketing (Regulation) Act, 1972 & Field Visit to Siliguri Wholesale Market.
5. Proposed Suggestion by the Team Member.

Table 9-41 Proposed Quality Control System

SN	Quality Control System	Existing Quality Control System	Proposed Quality Control System	Impact/Benefit
	At Wholesale Market:			
1	Re-grading and Re-Packaging for Distribution	No re-grading or re-packing done at WM on regular basis	Re-grading & re-packing at WM based on the market demand Re-grading & re-packing for Export Marketing	Quality products Exported Beneficial to packers & graders
2	Sampling Survey and Quality Test	No samples taken for testing No quality test	Regular sample survey is proposed Regular quality testing is also proposed in later phase	Quality assurance
3	Certificate to Special Brand	No certification system	Certificate to Special Brand	Incentive for quality products
	At Collection Center:			
1	Cleaning, washing, Grading, packaging and Trade Marking	No cleaning and washing space at CC No grading system followed at CC Packing is done mainly in Bamboo Baskets No trade marking introduced Limited storage facilities	Cleaning and Washing space at CC proposed for quality improvement A grading system suggested for CC by Co-operatives Various packing materials (local based) suggested Trade Marking by the production pockets is proposed Storage facilities by private sector except the pilot test Packaging with Brand name	Quality up-graded Better price for graded products Trade mark benefit for the production pockets
2	Quality transportation to WM	Transportation on hired trucks Transportation on night buses No quality transportation measures taken	Truck facility created at CC Co-operative members and Traders trained in quality transportation measures	Reduced losses during transportation
3	Quality Display at WM	Poor quality products supplied without grading Poor packaging and look at display Damaged products not sorted out	Quality Display at WM Display by grade and packaging materials Display of trade marks and quality	Products selection Quality display
4	Sample survey & quality test	No regular sampling for quality test No regular quality testing system	Regular sample survey for quality testing Quality testing on regular basis	Quality products secured
5	Certification	No certification system No recognition for quality work	A certification system is proposed for quality control incentives to the farmers cooperatives' Organizations	Recognition and certification incentives
6	Recommendations & Demonstrations	No recommendation System No demonstration system on quality	Recommendation & Demonstration on: - Selected seed varieties Product size control Spoilage reduction	Uniform products for better price Quality products for better price Reduced losses for better price
7	Quality Maintenance	No Program	A quality maintenance program is suggested	Better price for quality products

Source: JICA Study Team's Field Visit to Collection Centers at Dhusa, Dhankuta, Dhupgari, India and Phentsiling, Bhutan.

Table 9-42 Proposed Waste Management System

SN	Waste Management	Existing Waste Management System	Proposed Waste Management System in New WM & CC	Impact/Benefit
	a. Garbage Collection Timing			
1	Auctioning Timing	No	5.00 am to 10.00 am	Less Conflicts Defined time period
2	Buyers Handling Timing	Not specified	10.00 am to 2.00 pm	
3	Garbage Collection Timing	Not specified	2.00 pm to 7.00 pm	
4	Arrival Receiving, Unloading and Arranging Lots for Auctioning	No	7.00 pm to 5.00 am	
	b. Garbage Collection Area			
1	Weighing Area	No	Twice a day	Clean marketing areas
2	Marketing Area	No	Twice a day	
3	Auctioning Area	No	Once a day	
4	Grading and Packaging Area	No	Several times a day	
5	Loading and Unloading Area	No	Twice a day	
6	General Area	Not specified	Once a day	
	c. Garbage Treatment System			
1	Simple Garbage Treatment by Decomposition	No	Local decomposition process at CC	Benefits of decomposed products
2	Garbage Treatment in the Plant at WM	No	Garbage treatment plant at WM	Beneficial products
3	Garbage Treatment Outside the WM	No	Garbage treatment plant	Benefit to users
	d. Recycling use of Wastage and Treated Garbage			
1	Used as Organic Manure	Some	Use as organic manure	Add soil fertility
	e. Disposal of Garbage			
1	Garbage disposal	Dumping site	Dumping site with processing plant	Bad smell & Dirty

Source: JICA Study Team, 2000

Table 9-43 Proposal for Development of Financial Management System

SN	Financial Management System	Existing Financial Management System		Proposed Financial Management System for New WM and CC	Impact/Benefit
		At Kalimati WM	At Biratngar WM		
	a. Source of Income Revenue				
1	Stall Rental	Revenue from stall rent	Stall rented by municipality	Revenue from rented stall	Main source of revenue
2	Store Rental	Revenue from store rent	Store rented by municipality	Revenue from rented store	
3	Equipment Rental	Revenue from plastic crate rent	No	Revenue from rented plastic crates and other equipments	Main source of revenue
4	License Fee	No license fee	No	Licensing will be introduced	
5	Marketing Fee	No marketing fee	No	Marketing fee 1 %	Increase revenue
6	Market Yard Fee	No market yard fee	No	Market yard fee 1 %	
7	Entry Fee	Entry fee to transporter	No	No entry fee	
8	Parking Fee	No parking area	No	Parking fee rupees per truck	
9	Land use tax	No land use tax paid to land owner	No	Paid to land owners	
	b. Expenditures				
1	Repair & maintenance	By management body	No	Management body made responsible	
2	Improvements	No improvement made	No	MMC responsible	Regular improvement plan
3	Facilities	Equipments	No	Management body made responsible	
4	Utilities	Electricity, drinking water, toilet, telephone	Minimal	Management body made responsible	
5	Operation and management	By management body	No	Management body made responsible	
6	Salary	Staff salary	No	Management body made responsible	
7	Depreciation cost	No depreciation cost calculated	No	MMC responsible	
8	Periodical Reporting	Periodic reporting	No	MMC responsible	Information available
	c. Accounting System				
1	Budget Preparation	Annual budget prepared	No	Both annual and long term budget will be prepared	Regular budget available
2	Accounting System	Simple accounting system adopted	No	Standard accounting system will be adopted	Better accounting system
3	Balance Sheet	Balance sheets prepared	No	Balance sheets will be published	Balance sheet available

Source: JICA Study Team, 2000

Table 9-44 Proposed Development of Education and Training

SN	Trainings	Existing Education and Training	Proposed Development of Education & Training	Proposed Development of Education and Training	Impact/Benefit
	A. Quality Improvement		At Collection Center	At Wholesale Market	
1	Cleaning & Washing	No	Training on cleaning and washing	No	Local Capacity Building
2	Grading & Sorting	No	Training on grading & sorting	Training on re-grading	
3	Packaging	Bamboo Basket	Training on Packaging	Training on re-packaging	
4	Sample survey & quality test	No	Training on sample survey	Training on quality test	
5	Recommend & Demonstrate	No	Training on New Technologies	No	Quality improvement
6	Select seed varieties	No	Training on quality improved seed use	No	
7	Product size control	No	Training on product size control for marketing	No	
8	Spoilage reduction method	No	Training on spoilage reduction methods	Training on spoilage reduction methods	
	B.Process Improvement				
1	Licensing	No	Training on Licensing	Training on Licensing	
2	Pricing Mechanism	No	Training on pricing mechanism	Training on pricing mechanism	
3	Accounting	Yes	Further training on accounting training	Training on accounting	Trained in accounting system
4	Auctioning	No	Training on Auctioning	Training on Auctioning	Trained in Auctioning system
5	Data collection & Recording	Partial	Training on data collection and recording	Training on data collection and recording	
6	Data Processing	No	Training on data processing	Training g on data processing	
7	Information Dissemination	Partial	Training on Information dissemination	Training on Information dissemination	Information dissemination
8	Garbage Recycling	No	Training on garbage recycling	Training on garbage recycling	

Source: JICA Study Team, 2000.

Table 9-45 Details of Facilities for NWM in Kathmandu

(Facilities)	(Floor area)	(Structure)	(Remarks)
(Market Hall)			
(Site A)			
Market Hall-1 building-1	3,540.4 m^2	RC/Steel beam	For vegetables
Market Hall-1 building-2	3,540.4 m^2		For vegetables
Market Hall-2 building	3,269.7 m^2		For fruits
(Site B)			
Market Hall-1 building	6,674.6 m^2	RC/Steel beam	For vegetables
Market Hall-2 building	3,279.3 m^2		For fruits
Administration & Training center	520 m^2	RC	Lecture hall, Kitchen, workshop
Pilot Project Building	155.5 m^2	RC/Steel beam	Cold Storage, Seed Demonstration
Canteen	150 m^2	RC	Kitchen Equipment
Electric Building	120 m^2	RC	
Public Toilets	72 m^2	RC	36 m^2 x 2 toilets
Guard Box	6.2 m^2	RC	Placed at the main entrance
Elevated Water Tower	9 m^2	RC	H= 16 m
Water Treatment Plant/ drainage system	80m^2	RC	Placed underground
Trash/Garbage collection	20m^2	RC	Roof with columns
Streetlights	20 lights	-	Attached to the buildings

(Equipment)	(Quantity)	(Remarks)
Cold storage	2 unit	For vegetable and fruits
Balance	250	
Truck scale	2	1 ton
Plastic crate	1500	Capacity : 25kg
	900	: 40kg
Trolley	2	1 ton
Truck	1	6 ton
Micro Bus	1	For 20 passengers
Generator	1	Capacity of 250 KVA
Apparatus for quality check	2 unit	
Audio visual equipment	2 unit	
Computer	5 set	
Telephone	10	
Facsimile	1	
Light pressure cleaners	10 set	
Small incinarator	2	

Source: JICA Study Team, 2000

Table 9-46 Stall Size for Wholesaler in NWM (Vegetable) at Kathmandu

Total Handling Volume of Target year 2010. (ton/ year)	Planned Handling Volume of one Wholesaler (ton/ day)	Storage Volume in $1m^2$ (ton/ m^2)	Required Storage space (m^2)	Required Office and Display space (m^2)	Required Floor area of stall (m^2)	Planned Floor area of stall (m^2)
100,000	1.5	0.378	3.96	9.6	13.56	18.75

Source: JICA Study Team, 2000

Table 9-47 Stall Size for Wholesaler in NWM (Fruits) at Kathmandu

Total Handling Volume of Target year 2010. (ton/ year)	Planned Handling Volume of one Wholesaler (ton/ day)	Storage Volume in 1 m^2 (ton/ m^2)	Required Storage space (m^2)	Required Office and Display space (m^2)	Required Floor area of stall (m^2)	Planned Floor area of stall (m^2)
40,000	2.5	0.378	5.70	13.8	19.5	28.1

Source: JICA Study Team, 2000

Table 9-48 Proposed Personnel for NWM in Kathmandu

Position	Permanent	Contract
Market manager	1	
Assist. Manager	1	
Administration Chief	1	
Personnel	1	1
Security	2	6
Transport		1
Telephone		2
Account chief	1	
Fee collector	4	
Market operation chief	1	
Wholesale market operation	3	
Farmers market operation	2	
Entrance gate management	3	3
Repair/ Maintenance		2
Parking management		1
Auction management	1	
Weighing/ Quality/ Packing	1	2
Legal section	1	
Planning	1	
Market information	1	3
Total	20	26

Source: JICA Study Team, 2000

Table 9-49 Details of Administration and Training Center of NWM in Kathmandu

Room	Number of Users	Installed furniture and equipment	Standard unit floor area (m^2/person)	Required floor area (m^2)	Planned floor area (m^2)
Administrative Office	22	Desk and chair, shelf, white board, cabinet, computer	7-12	154-264	176
Lecture Hall/Workshop	Max 50	audio-visual equipment, black board, desk-chair, podium	2,2	110	130
Manager's room	1	desk and chair, shelf, cabinet, computer	18-25	18-25	19
Laboratory/ Workshop	4	desk and chair, shelf, cabinet, computer	7.0-12	28	26
Canteen	-		-	-	3
Toilet	-		-	-	31

Source: JICA Study Team, 2000

Table 9-50 Details of Pilot Project Building of NWM in Kathmandu

Room	Number of Users	Installed furniture and equipment	Standard unit floor area (m^2/person)	Required floor area (m^2)	Planned floor area (m^2)
Cold Storage	-	Prefabricated cold storage	-	-	61.7
Exhibition Center	-	Display table, desk and chair,	-	-	43
Office	1	Desk and chair, shelves, computer	7-12	7-12	7
Entrance Hall	-	Reception desk and chair, wall hanger for exhibit	-	-	22
Storage	-	Storage for furniture	-	-	5

Source: JICA Study Team, 2000

Table 9-51 Details of Facilities for NWM in Biratnagar

(Facilities)	(Floor Area)	(Structure)	(Remarks)
Wholesale market building (vegetable)	$480m^2 + 560m^2$	RC	
Wholesale market building (fruits)	$240m^2$	RC	
Administrative office / Training center	$392m^2$ (1F) + $259m^2$ (2F)	RC 2 stories	(1F) : entrance hall, reception, training center office, training room, exhibition/promotion room, cold storage, storage (2F) : administrative office, director's room, meeting room
Security office / Canteen	$28m^2 + 42m^2$	RC	
Guard box	$3.75m^2$	RC	
Toilet	$35m^2$ x 2	RC	
Water reservoir tank	$8m^2$	RC	15ton
Elevated water tank	$2m^2$	RC	2ton, H : 16m
Electric sub-station	$4m^2$	RC	
Wasted water treatment plant	$50m^2$	RC	Constructed in underground
Garbage collection shed	15 m^2 x 3	Brick	
Street lights	20 poles	Steel	
Fence and gate	600m	Brick	
Well	1		Depth : 100m
Asphalt Pavement Area	$4,500m^2$		

(Equipment)	(Quantity)	(Remarks)
Cold storage	1	2.2kw, prefabricated
Balance	32	For each wholesaler
Truck scale	2	1 ton
Plastic crate	300	Capacity : 25kg
Trolley	2	1 ton
Truck	1	6 ton
Micro Bus	1	For 20 passengers
Generator	1	20KVA
Apparatus for quality check	2 unit	
Audio visual equipment	2 unit	
Computer	5 set	
Telephone	8	
Facsimile	1	
Light pressure cleaners	8 set	
Small incinarator	2	

Source: JICA Study Team, 2000

Table 9-52 Required Floor Area of Stall for Vegetable Wholesaler in NWM at Biratnagar

A	B	C	D	E	F	G
Total handling volume of target year 2010. (ton/year)	Planned handling volume of one wholesaler (ton/day)	Storage volume in 1 m^2 (ton/ m^2)	Required storage space (m^2)	Required office and display space (m^2)	Required floor area of stall (m^2)	Planned floor area of a stall (m^2)
			D=B/C		F=D+E	G=F+aisle
30,000	3.2	0.29	11.0	9.0	20.0	28.0

Source: JICA Study Team, 2000

Table 9-53 Required Floor Area of Stall for Fruit Wholesaler in NWM at Biratnagar

A	B	C	D	E	F	E
Total handling volume of target year 2010. (ton/year)	Planned peak handling volume of one wholesaler (ton/day)	Storage volume in 1 m^2 (ton/ m^2)	Required storage (m^2)	Required office and display space (m^2)	Required floor area of a stall (m^2)	Planned floor area of a stall (m^2)
			D=B/C/2		F=D+E	E=F+aisle
2,000	1.86	0.108	6.9	9.0	15.9	28.0

Source: JICA Study Team, 2000

Table 9-54 Proposed Personnel for NWM in Biratnagar

Position	Permanent	Contract
Market manager	1	
Assist. manager	1	
Administration chief	1	
Personnel		2
Security		3
Transport		1
Telephone		1
Account chief	1	
Fee collector		2
Market operation	1	
Entrance gate	1	1
Repair/maintenance		1
Planning	1	
Market information	1	1
Total	8	12

Source: JICA Study Team, 2000

Table 9-55 Details of Administrative Office of NWM in Biratnagar

Room	Proposed number of users	Installed furniture and equipment	Standard unit floor area (m^2/person)	Required floor area (m^2)	Planned floor area (m^2)
Administrative office	10	desk and chair, shelf, white board, cabinet, computer	7 ~ 12	70 ~ 120	98
Meeting room	Max 20	table and chair, audio/visual equipment	2.2	44	49
Manager's room	1	desk and chair, shelf, cabinet, computer	18 ~ 25	18 ~ 25	20
Waiting room					15
Reception/account office	4	counter, desk and chair, shelf, cabinet, computer	7 ~ 12	28 ~ 48	35
Toilet	-	-	-	-	25
Kitchenette	-	-	-	-	9

Source: JICA Study Team, 2000

Table 9-56 Details of Training Center of NWM in Biratnagar

Room	Proposed number of users	Installed furniture and equipment	Unit floor area (m^2/person)	Required floor area (m^2)	Planned floor area (m^2)
Instructor's room	5	desk and chair, shelf, white board, cabinet, computer	7 ~ 12	35 ~ 60	49
Training room (multi purpose)	max 25	table and chair, audio/visual equipment	2.5 ~ 4	65 ~ 100	98
Exhibition/promotion room	-	desk and chair, shelf, cabinet, computer			49
Cold storage	-	Prefabricated cold storage			16
Storage	-	scale, maintenance tools			12
Machine/mechanical room	-	generator, control panel			12
Toilet	-				25
Kitchenette	-				9

Source: JICA Study Team, 2000

Table 9-57 Proposed sites of Collection Centers in Central Region

District	Production Pocket Area	Max. Volume/day	Infrastructure Access Road	Land for C.C.
Makawanpur	Daman	20ton	65km, Paved but partially rough road,2.35hrs.	O.K.
Kavre	Panauti	20ton	34km, Paved road but poor maintenance. 2km rough road, 1.25 hrs.	O.K.
Chitwan	Bhandara	20ton	268km, Paved but some rugged,3.50 hrs	0.5ha
Nuwakot	Kakani	20ton	27km, Slanted & zigzag road with poor maintenance, 1.17 hrs	0.5ha
Dhading	Chharaurdi	30ton	13km, GTZ rough road, 1.5 hrs	0.5ha

Remarks : Access distance and road conditions are from Kathmandu to the related site.
Source: JICA Study Team, 2000

Table 9-58 Proposed sites of Collection Centers in Eastern Region

District	Production Pocket Area	Max. Volume/day	Infrastructure Access Road	Land for C.C
Jhapa	Surunga	15ton	86km, National Highway Blacktop, 1hr.50min.	0.5ha
Dhankuta	Joropati	15ton	109km, Blacktop except 7km earthen 3hr.	0.3ha
Sunsari	Babiya	20ton	45km, Blacktop 1hr.14min.	0.35ha
Morang	Katahari Sisbania	20ton	12km, Rangeli Highway Blacktop, 50min.	0.25ha

Remarks : Access distance and road conditions are from Biratnagar to the related site.
Source: JICA Study Team, 2000

Table 9-59 Proposed Project Components of Collection Centre

(Facility)	(Floor area)	(Remarks)
Collection Center	432m^2	Structure : RC
Pre-cooling room		Capacity : 10ton and 5ton
Atmospheric temperature storage room		Capacity : 15ton
Office		
Kiosk		
Toilet	30m^2	Structure : RC
Guard box	2.25m^2	Structure : RC
Garbage stock shed	8m^2	Structure : RC
Wasted water treatment plant	30m^2	Structure : RC
Fence and gate	200m	
Well	1	
(Equipment)	**(Quantity)**	
Pre-cooling facilities		
Pre-cooling storage (5 ton)	1	9.6 kw, Prefabricated
Pre-cooling storage (10 ton)	1	14.2 kw, Prefabricated
Water tank	1	
Wasted disposal box	1	
Weighing equipment		
Top –pan scale	1	50 kg
Platform scale	1	1 ton
Transportation equipment		
Plastic crate model A	1,500	25 kg
Plastic crate model B	600	40 kg
Wooden pallet	100	1 ton
Trolley	2	1 ton
Truck	1	6.5 ton
Quality control equipment		
Thermomerter	2	
Refractometer	1	Brix 0.0~32.0.m%
Vernier caliper	1	
Administration equipment		
Telephone/ Fax	1	
Calculator	1	
Desk and chairs	3 set	
Public information board	1	
Others	1 lot	

Source: JICA Study Team, 2000

Table 9-60 Proposed sites of Livestock Market

	Livestock Markets			Collection Center
	Belbari	Ramawapur	Mahadevstan	
Land Size	1.90 ha	2.7 ha	1.6 ha	2.0 ha

Source: JICA Study Team, 2000

Table 9-61 Proposed Project Components of Livestock Market

	Livestock Markets			Collection Center
	Belbari	Ramawapur	Mahadevstan	
Watering Units	15x0.6mx 3 units	16x0.6mx 5 units	17x0.6mx3 units	19x0.6mx 5 units
No. of Toilets	2	3	2	3
Livestock shed	5x30mx2sheds	5x50mx6sheds	5x30mx2sheds, 3x50mx7sheds,	5x50x6sheds
Feed Storage	15x2mx1storage	25x2mx2storage	50x2mx3storage 15x2mx3storage	15x2mx2storage
Loading/ Unloading Unit	1	2	1	1
office	1	1	1	1
Sheds for Farmer/Traders	3 sheds	10 sheds	2 sheds	3 sheds
Drainage	1.90x0.7=1.3ha	2.70x0.7=1.9ha	1.60x0.7=01.1ha	2. 0x0.7=1.4 ha
Length of Fence	800m	750m	700m	700m
Unit Balance	2	3	4	2
Improvement of Access Road	100m	1600m	400m	-
Parking Area	15 trucks	50 trucks	15 trucks	30 trucks
Canteen	1	1	1	1

Source: JICA Study Team, 2000

Table 9-62 Proposed Project Components of Fisheries Collection/ Packing Centre

(Facility)	(Floor area)	
Collection/Packing Center	240m^2	Structure : RC
Fish shed		For Unloading / Sorting / Washing /Packing / Loading
Storage room		Included ice and fish storage
Office		Reception, manager's room and office
Toilet	30m^2	Structure : RC
Guard box	2.25m^2	Structure : RC
Garbage stock yard	8m^2	Structure : RC
Water reservoir tank	8m^2	Structure : RC
Elevated water tank	2m^2	Structure : RC
Electricity power station	4m^2	Structure : RC
Wasted water treatment plant	30m^2	Structure : RC
Street lights	10	
Fence and gate	200m	
Well	1	
Asphalt pavement area	1,000m^2	
Pilot fish pond	10ha	
(Equipment)	(Quqntity)	
Truck	1	1unit, 5ton
Tractor	1	1
Motorcycle	3	
Cold storage	1	Prefabricated Included refrigerator (2.2kw)
Ice storage	1	Prefabricated Included refrigerator (5.5kw)
Generator	1	40KVA
Balance	2	
Water pump	5	
Plastic fish box	200	
Plastic insulated box	5	
Fishing gear	1 unit	
Tel/facsimile machine	1	
Computer	2 set	

Source: JICA Study Team, 2000

Table 9-63 Proposed Project Components of Sanitary Control for Livestock Products

(Facility)	(Floor area)	
Main Laboratory Building	646m^2 (1F) +	2-stories
	646m^2 (2F)	Structure : RC
Technology Building	471m^2 (1F) +	2-stories
	450m^2 (2F)	Structure : RC
Water reservoir tank	8m^2	Structure : RC
Elevated water tank	4m^2	Structure : RC
Wasted water treatment plant	50m^2	Structure : RC
Asphalt pavement area	1,000m^2	

(Equipment)	(Quantity)
Gas chromatography	1
High performance liquid chromatography	1
Automatic amino acid analyzer	1
Spectrophotometer	2
Foyer transform infra-red spectrophotometer	1
Automatic protein analyzer	1
Automatic absorption spectrophotometer	1
Inductively coupled plasma spectrophotometer	1
Electron spin resonance spectrophotometer	1
Phase contrast microscope	2
Electron microscope	1
Ordinary microscope	3
Near infra red spectrophotometer	1
Germanium semi-conductor detector	1
UV spectrophotometer	1
Vacuum oven 40-240C	1
Electric muffle furnace, max 1150C	1
Water bath controller system	1
Rotary evaporator	1
Multi frame centrifuge, accessories	1
Magnetic stirrer	2
Electronic analytical balance	2
Portable balance	2
Magnetic stirrer	2
Kjeldahl distillation unit	1
Extraction apparatus, socket	1
Stainless anti-vibrating table	1
Refrigerator	2
Low temperature freezer	2
Water purification apparatus	1
Ion chromatograph	1
Sampling goods, automobile, clothing for freezing, others.	
Material of sampling, safety glasses, dust protection mask.	
Others.	
For analysis matter, chloride detector, can seamier, others	
Photographic apparatus, developing unit, others.	

Source: JICA Study Team, 2000

Table 10-1 Project Cost for New Wholesale Market in Kathmandu (Site A)

No.	Items	(US$)
1	Land Preparation Cost	1,050,000
2	Infrastructure Extension cost	530,000
3	Building Construction Cost	
	(1) Building Works Direct Construction Cost	
B-1	Marketing Hall - 1	4,248,500
B-2	Marketing Hall - 2	1,961,800
B-3	Administration & Training Center	338,000
B-4	Pilot Project Building	77,500
B-5	Electric Power Station	36,000
B-6	City Water Reservoir / Elevated Water Tank	75,000
-	Canteen/ Others	100,000
-	Sub-total	6,836,800
	(2) External Works	720,000
	(3) Main Line of Infrastructure on the Site	150,000
	(4) Equipment	400,800
	Total Cost	8,107,600
	(5) Overhead and Profit	1,621,520
	(6) Consulting service fee	648,600
	(7) Grand Total Cost for Building Construction	10,377,720
	Grand Total Cost (US$)	11,957,720

Table 10-2 Project Cost for New Wholesale Market in Kathmandu (Site B)

No.	Items	(US$)
1	Land Preparation_Cost	1,050,000
2	Infrastructure Extension cost	530,000
3	Building Construction Cost	
	(1) Building Works Direct Construction Cost	
B-1	Marketing Hall - 1	4,004,760
B-2	Marketing Hall - 2	1,967,580
B-3	Administration & Training Center	338,000
B-4	Pilot Project	77,500
B-5	Electric Power Station	36,000
B-6	City Water Reservoir / Elevated Water Tank	75,000
-	Canteen/ Others	78,000
-	Sub-total	6,576,840
	(2) External Works	720,000
	(3) Main Line of Infrastructure on the Site	150,000
	(4) Equipment	400,800
	Total Cost	7,847,640
	(5) Overhead and Profit	1,569,500
	(6) Consulting service fee	627,810
	(7) Grand Total Cost for Building Construction	10,044,950
	Grand Total Cost (US$)	11,624,950

Table 10-3 Project Cost for New Wholesale Market in Biratnagar

No.	Items	(US$)
1 Land Preparation Cost		378,000
2 Infrastructure Extension cost		189,500
3 Building Construction Cost		
(1) Building Works Direct Construction Cost		
B-1	Marketing Hall (vegetable)	624,000
B-2	Marketing Hall(fruits)	144,000
B-3	Administration & Training Center	390,600
B-4	Security/Canteen	42,000
B-5	Electric Sub-Station	33,900
B-6	City Water Reservoir / Elevated Water Tank	50,000
-	Others	70,000
-	Sub-total	1,354,500
(2) External Works		280,000
(3) Main Line of Infrastructure on the Site		100,000
(4) Equipment		250,000
Total Cost		1,984,500
(5) Overhead and Profit		496,100
(6) Consulting service fee		420,000
(7) Grand Total Cost for Building Construction		2,900,600
Grand Total Cost		3,468,100

Table 10-4 Project Cost for Collection Centres in Central Region

District	(US$)
Mankawanpur	
Facility	287,650
Equipment	469,800
Sub-Total	757,450
Overhead and Profit	151,490
Consulting service fee	60,600
Total Cost	**969,540**
Kavre	
Facility	287,650
Equipment	469,800
Sub-Total	757,450
Overhead and Profit	151,490
Consulting service fee	60,600
Total Cost	**969,540**
Chitwan	
Facility	287,650
Equipment	469,800
Sub-Total	757,450
Overhead and Profit	151,490
Consulting service fee	60,600
Grand Total Cost	**969,540**
Nuwakot	
Facility	287,650
Equipment	469,800
Sub-Total	757,450
Overhead and Profit	151,490
Consulting service fee	60,600
Total Cost	**969,540**
Dhading	
Facility	287,650
Equipment	469,800
Sub-Total	757,450
Overhead and Profit	151,490
Consulting service fee	60,600
Total Cost	**969,540**

Table 10-5 Project Cost for Collection Centres in Eastern Region

District	(US$)
Jhapa	
Facility	287,650
Equipment	469,800
Sub-Total	757,450
Overhead and Profit	151,490
Consulting service fee	60,600
Total Cost	**969,540**
Dhankuta	
Facility	287,650
Equipment	469,800
Sub-Total	757,450
Overhead and Profit	151,490
Consulting service fee	60,600
Total Cost	**969,540**
Sunsari	
Facility	287,650
Equipment	469,800
Sub-Total	757,450
Overhead and Profit	151,490
Consulting service fee	60,600
Total Cost	**969,540**
Morang	
Facility	287,650
Equipment	469,800
Sub-Total	757,450
Overhead and Profit	151,490
Consulting service fee	60,600
Total Cost	**969,540**

Table 10-6 Project Cost for Livestock Marketing System

Item	(US$)
Belbari market	
Facilities/ Equipment	181,200
Improve. Access Road	17,600
Total	198,800
Ramawapur market	
Facilities/ Equipment	607,400
Improve. Access Road	281,100
Total	888,500
Mahadevstan market	
Facilities/ Equipment	595,900
Improve. Access Road	84,500
Total	680,400
Collection Center	
Facilities/ Equipment	517,200
Improve. Access Road	
Total	517,200
Project Cost for Slaughter house	
Place	(US$)
Balambu	689,200
Thankot	91,900

Table 10-7 Project Cost for Fish Marketing System

Place	(US$)
Facilities	297,500
Equipment	101,000
Total	398,500

Table 10-8 Project Cost for Sanitary Control System

Place	(US$)
Facilities	272,000
Equipment	2,608,700
Total	2,880,000

Table 11-1 Benefits of Development of the Integrated Horticulture Marketing System in the Central Region and Eastern Region

Benefit	Description	Beneficiary
Time / cost savings (Wholesale Market component) (Collection Centre components	• Due to the city time entry restriction, trucks are not able to enter the present Kalimati Wholesale Market during the day-time/ peak hours. With the new wholesale market located outside the ring road, there will be no such time entry restriction which will have a major impact on the time/ cost savings of transporters, wholesalers, traders and farmers. • Gudri market in Biratnagar restricts truck movement. The new wholesale market will remove this restriction and also free flow of produce in and out of the market. • Ample truck berth in the market will mean faster truck turn around time, less congestion, better produce movement within the market, and time savings. • With the construction of the Collection centres, farmers will save time trekking to the collection points as the collection centres will be strategically located to benefit the farmers in the production pocket.	farmers, women traders, traders, retailers, consumers, transporters and exporters
Reduction of quantity/ quality loss (Wholesale Market & Collection Centre components)	• Timely transport into/ out of the new market and ample truck parking/ unloading berth will mean greater efficiently in unloading/ loading produce leading to reduction of quantity/ quality loss of produce. • More shaded storage & cold storage space will reduce quantity/ quality loss. • Regular collection and marketing schedule from the collection centres will ensure timely sales & transport of the produce to the wholesale markets reducing quantity/ quality loss. • Introduction of better handling and packaging of produce at the collection centres will also reduce quantity/ quality loss.	farmers, women traders, traders, retailers, consumers, and exporters
Reduced transaction time and cost (Collection Centre components)	• With the bulk collection, traders will be able to effectively arrange transport and marketing of produce. • Truck trips will be reduce due to better bulk transport arrangement possible at the collection centres.	
Stable supply and price adjustment (Collection Centre components)	• With an efficient market information system, farmers will be better informed on the price and supply situation thus leading to more stable supply and prices.	farmers, small-scale women traders
Increase supply of high quality /off-season products (sales to Kathmandu, or for export from Biratnagar)	• The new market will facilitate the effected collection & marketing of high quality /off-season products.	farmers, women traders, traders, retailers, consumers, transporters and exporters
Production increase	• A more efficient marketing system to increase farmer's income will encourage greater production and marketing of produce.	farmers, women traders, traders, retailers, consumers, transporters and exporters
Training facilities in Kathmandu new wholesale market	• The new market will have training facilities to upgrade the skills of the farmers, women groups, traders and exporters to improve their competitiveness.	farmers, women traders, traders, retailers, consumers, and exporters
Other Benefits	• The transfer of some of the wholesale activities from the present wholesale market (Kalimati or Biratanagar Gudri Traditional Market) will reduce congestion in the area, improve sanitation in the market, facilitate/ encourage retailing activities and better marketing linkage with the new wholesale market, collection centres and production areas.	farmers, women traders, traders, retailers, consumers, transporters

Table 11-2 Benefits of Construction of slaughter slabs for livestock

Benefit	Description	Beneficiary
Improve slaughtering conditions of livestock	• The slaughtering slab will provide a sanitary work environment that can be easily cleaned and maintained. • Better handling/ management of the blood and waste products from the slaughter will improve the present slaughter areas (riverside and river) condition.	Consumers and butchers
Improve environment in and around the retail market	• The improvement in the slaughter area will impact on the surrounding areas in terms of odour, sight, pollution and reduction of pest, etc.	Consumers and butchers
Improve selling condition of meats	• With improved sanitation and better handling, contamination of the meat will be reduced leading to better selling condition of the meat.	Consumers and butchers
Contribute to supply hygienic meats to a certain extent	• With better slaughtering condition, meat from the slaughter area will be in better condition with less contamination/ health risk, thus contributing to more hygienic meat at the retail end.	Consumers and butchers
Other Benefits	• Improvement in the riverside and river condition where the present slaughtering is taking place will result from better waste management at the slaughter area. • Health risk/ epidemic from contaminated meat as a consequence of unsanitary slaughtering will be reduced.	Consumers and butchers

Table 11-3 Benefits of Construction of livestock markets

Benefit	Description	Beneficiary
Time / cost savings	• Improvement in the market facilities & provision of ample space will make transportation/ movement of livestock more efficient, faster truck turn around time, less congestion, leading to time / cost savings.	farmers, traders, retailers, transporters and exporters
Reduction of quantity/ quality loss	• Timely transport into/ out of the new market and ample space will mean greater efficiently in unloading/ loading produce leading to reduction of weight loss of livestock.	farmers, traders, traders, retailers, consumers, and exporters
Stable supply and price adjustment	• With an efficient market information system, farmers will be better informed on the price and supply situation thus leading to more stable supply and prices.	farmers, small-scale women traders
Improve environment in and around the market	• The improvement in the physical market area and market management will impact on the surrounding areas in terms of odour, sight, pollution and reduction of pest, etc. • The market facilities will provide better holding/ staying conditions for livestock.	farmers, traders, traders, retailers, consumers, and exporters
Other Benefits	• The market will encourage the farmer’s and trader’s marketing activities. • Health risk/ epidemic from contaminated meat will be reduced.	farmers, traders, traders, retailers, consumers, and exporters

Table 11-4 Benefits of Establishing of sustainable and efficient fish distribution chain in Central and Eastern region

Benefit	Description	Beneficiary
Effective utilization of fish pond with higher productivity	• Increase of incomes for fish farmers, traders is expected with higher production. • Nutritional benefit: increase of home consumption of fish improves the nutritional condition of poor farmer, and provide a cheaper source of protein for consumers.	Fish farmer, fish trader and consumers
Nutritional benefit	• With more fish production, increased fish supply will increase home consumption of fish thereby improving the nutritional condition of poor farmer and provide a cheaper source of protein for consumers.	Fish farmer and consumers
Reduction of the quality / quantity losses during market chain	• With more effective marketing and storage facilities for fish, quality/ quantity loss will be reduced.	Fish farmer, fish trader and consumers
Reduction of transaction cost and time saving	• Development of a more effective marketing network is expected to reduce transaction cost and time savings.	Fish farmer, fish trader and consumers
Increase of incomes	• With the diversification into fish farming in addition to their existing agriculture activities, the small farmers are expected to have increase income from the sales of fish	Fish farmers in the rural community
Other Benefits	• Better utilization of available water resources and reducing the exploitation pressure on the wildlife reserve. • Import substitution of Indian fish • Enhancing the ability of FDD staff to establish an effective planning of swamp development. • Diversification into fish farming will reduce financial risk of farmers from crop failure.	FDD, Fish farmer and consumers

Table 11-5 Physical Life, Depreciation, and Maintenance of Project Components at Central Region

New Wholesale Market

Facilities & Equipment	Physical Life (years)	Maintenance ratio (%)	Total Cost	Depreciation	Maintenance	Reinvestment Cost 5 yr	10 yr	15 yr	20 yr
1. Buildings	25	0.5%	7,706,800	308,272	19,267				
2. Equipment	10	5.0%	400,800	40,080	10,020		200,400		200,400
Total Cost			8,107,600	348,352	29,287	0	200,400	0	200,400

Remarks:

1. Maintenance & reinvestment cost of building and equipment undertaken by local contractors at local rates.
2. Depreciation & maintenance calculated on direct construction cost only.

Direct Construction Cost of WSM

Building total	7,706,800
Equipment total	400,800
	8,107,600

Collection and Distribution Centers

Facilities & Equipment	Physical Life (years)	Maintenance ratio (%)	Total Cost	Depreciation	Maintenance	Reinvestment Cost 5 yr	10 yr	15 yr	20 yr
1. Buildings & pavement	25	0.5%	287,650	11,506	719				
2. Equipment									
- Crates, pallet, etc	5	1.0%	20,000	4,000	100	10,000	10,000	10,000	10,000
- Vehicle (pick up truck)	10	5.0%	25,000	2,500	625		12,500		12,500
- Pre-cooling equipment	15	3.0%	420,000	28,000	6,300			210,000	
- Office, weighing equipm	10	5.0%	4,800	480	120		2,400		2,400
Total Cost for one collection centre			757,450	46,486	7,864	10,000	24,900	220,000	24,900
Total Cost for all 5 collection centres			3,787,250	232,430	39,321	50,000	124,500	1,100,000	124,500

Remarks:

1. Maintenance & reinvestment cost of building and equipment undertaken by local contractors at local rates.
2. Depreciation & maintenance calculated on direct construction cost only.

Direct Construction Cost of each CC

Building total	287,650
Equipment total	469,800
	757,450

Table 11-6 Benefits of New Wholesale Market and 5 Collection Centers at Central Region

1. **City Entry Time Restriction**	
No. of trucks having to wait for nightime to enter city limits per day =	1
Average waiting time lost due to this restriction (hr) =	4
0pportunity cost of big truck (8 tons) use (Rs/hr) =	1000
Total benefit of entry at any time to NWM per day = A.B.C	
Benefit per day (Rs) =	Rs 4,000
Benefit per year (Rs) =	Rs 1,460,000
Benefit per year (US$) =	$19,743
2. **Reduced quantity/ quality loss (faster, better handling, packing, storage, etc)**	
Existing quantity losses at wholesale markets due to congestion, handling, storage, etc	3%
Without project losses in 2004 from 120,000t handled by Kathmandu markets (t) =	3,600
With project losses reduction at 50%, volume saved (t) =	1,800
Benefit of quantity loss reduction in 2004 (Rs) =	Rs 20,862,000
Benefit of quantity loss reduction in 2004 (US$) =	$282,110
Without project quality losses in 2004 =	5%
With project losses reduction at 50%, quality saved (Rs) =	34,770,000
Benefit of quality loss reduction in 2004 (US$) =	$470,183
Total Benefits of Quantity & Quality saved =	$752,292
At 2015, quantity losses without project =	5%
Without project losses in 2015 from 188,000t handled by Kathmandu markets (t) =	9,400
With project losses reduction, 50% (t) =	4,700
Benefit of quantity loss reduction in 2015 (Rs) =	Rs 54,473,000
Benefit of quantity loss reduction in 2015 (US$) =	$736,619
Without project quality losses in 2010 =	7%
With project losses reduction at 50%, quality saved (Rs) =	76,262,200
Benefit of quality loss reduction in 2015 (US$) =	$1,031,267
Total Benefits of Quantity & Quality saved =	$1,767,886
3. **Time and Cost savings from more efficient marketing system**	
No. of farmers affected =	500
No. of hours per day saved per farmer with project =	1
Total hours saved per day =	500
Total hours saved for 300 marketing days =	150,000
Opportunity cost of farmers per day =	Rs 5
Total Benefit for 1 Collection Centre =	Rs 750,000
Total Benefit (US$) for all 5 Collection Centres =	$50,710
4. **Reduced quantity loss**	
Post-harvest loss reduction for potato =	3%
Post-harvest loss reduction for fruits =	15%
Post-harvest loss reduction for vegetables =	10%
Av. quantity loss reduced for potato (ton) =	67
Av. quantity loss reduced for fruits (ton) =	324
Av. quantity loss reduced for vegetables (ton) =	312
Total quantity loss reduction (ton) =	703
Total Benefit for 1 Collection Centre =	Rs 1,628,627
Total Benefit (US$) for all 5 Collection Centres =	$110,117
5. **Quality Loss Reduction**	
Value of wholesale price for quality loss reduction =	3%
Av. handling vol. of potato (ton) =	2,220
Av. handling vol. of fruits (ton) =	2,160
Av. handling vol. of vegetables (ton) =	3,120
Total.av. handling vol.(ton)	7,500
Benefit of quality reduction for 1 Collection Centre =	Rs 2,607,750
Benefit of quality reduction (US$) for all 5 Collection Centres =	$176,318
6. **Transaction Time and Cost savings**	
Truck (6T) trips per year from CC =	1,250
Truck trips saved with project =	25%
Benefits from truck trips saved =	Rs 1,875,000
Traders time(hr) saved per day =	2
No. of traders per CC =	20
Traders time (hr) saved per year with project =	12,000
Benefits from traders time saved for 1 Collection Centre =	Rs 600,000
Total Benefits of better transaction system for 1 Collection Centre =	Rs 2,475,000
Total Benefits of better transaction system for all 5 Collection Centre =	$167,343

Table 11-7 Annual Operation Cost of New Wholesale Market at Kathmandu and 5 Collection Centres, Central Region

Annual Operating Cost of New Wholesale Market

Number of Personnel and Annual Cost

Position	Status		Unit Salary		Annual Salary		Total Annual	Total Annual	
	Permanent	Contract	Permanent	Contract	Permanent	Contract	Salary (Rs)	Salary (US$)	
Market manager	1		15,000		180,000		180,000	2,434	
Assist.									
Manager	1		12,000		144,000		144,000	1,947	
Administration chief	1		10,000		120,000		120,000	1,623	
Personnel	1	1	8,000	5,000	96,000	60,000	156,000	2,110	
Security	2	6	8,000	6,000	192,000	432,000	624,000	8,438	
Transport		1		4,000		48,000	48,000	649	
Telephone		2		4,000		96,000	96,000	1,298	
Account chief	1		10,000		120,000		120,000	1,623	
Fee collector	4		7,000		336,000		336,000	4,544	
Market operation chief	1		10,000		120,000		120,000	1,623	
Wholesale market operation		3		6,000		216,000	216,000	2,921	
Farmers market operation		2		6,000		144,000	144,000	1,947	
Entrance gate managemen	3	3	8,000	5,000	288,000	180,000	468,000	6,329	
Repair/Maintenance		2		4,000		96,000	96,000	1,298	
Parking management		1		5,000		60,000	60,000	811	
Auction management	1		7,000		84,000		84,000	1,136	
Weighing/Quality/									
Packing	1	2	7,000	5,000	84,000	120,000	204,000	2,759	
Legal section	1		8,000		96,000		96,000	1,298	
Planning	1		8,000		96,000		96,000	1,298	
Market information	1	3	10,000	6,000	120,000	216,000	336,000	4,544	
Total	20	26	128,000	56,000	2,076,000	1,668,000	3,744,000	50,629	A

Electricity charges per year	Rs 956,112	$12,929	
Water charges per year	Rs 368,240	$4,980	
Telephone charges per year	Rs 161,280	$2,181	
Vehicle Fuel expenses per year	Rs 274,800	$3,716	
Gas expenses per year	Rs 15,120	$204	
Office expenses per year	Rs 120,000	$1,623	
Total		$25,633	B
Total Annual Operation Cost of WSM (A+B)		**$76,262**	

Annual Operating Cost of All 5 Collection Centres in Central Region

	Rs	US$
Personnel Expenses per year	Rs 1,890,000	$25,558
Fuel Consumption	Rs 793,776	$10,734
Power Consumption	Rs 2,430,000	$32,860
Office Expenses	Rs 600,000	$8,114
Repair Cost	Rs 600,000	$8,114
Total Annual Operation Cost of 5 CC		$85,379
Total Annual Operation Cost of WSM and 5 CC		**$161,641**

Table 11-8 Economic Evaluation of New Wholesale Market and 5 Collection Centers in Central Region

Unit: US$

	Investment	O/M Cost	Benefits	Net Benefit
2003	13,702,878			-13,702,878
2004		207,223	1,276,523	1,069,300
2005		207,223	1,368,850	1,161,626
2006		207,223	1,461,177	1,253,953
2007		207,223	1,553,503	1,346,280
2008		207,223	1,645,830	1,438,607
2009		207,223	1,738,157	1,530,933
2010		207,223	1,830,484	1,623,260
2011		207,223	1,922,810	1,715,587
2012		207,223	2,015,137	1,807,914
2013		207,223	2,107,464	1,900,240
2014		207,223	2,199,791	1,992,567
2015		207,223	2,292,117	2,084,894
2016		207,223	2,292,117	2,084,894
2017		207,223	2,292,117	2,084,894
2018		207,223	2,292,117	2,084,894
2019		207,223	2,292,117	2,084,894
2020		207,223	2,292,117	2,084,894
2021		207,223	2,292,117	2,084,894
2022		207,223	2,292,117	2,084,894
2023		207,223	2,292,117	2,084,894
			EIRR =	9.9%

Table 11-9 Economic Sensitivity Analysis for New Wholesale Market and 5 CC, Central Region

Sensitivity Analysis, Case 1

Investment Cost +10%, Benefit ± 0% Unit: US$

	Investment	O/M Cost	Benefits	Net Benefit
2003	15,073,166			-15,073,166
2004		207,223	1,276,523	1,069,300
2005		207,223	1,368,850	1,161,626
2006		207,223	1,461,177	1,253,953
2007		207,223	1,553,503	1,346,280
2008		207,223	1,645,830	1,438,607
2009		207,223	1,738,157	1,530,933
2010		207,223	1,830,484	1,623,260
2011		207,223	1,922,810	1,715,587
2012		207,223	2,015,137	1,807,914
2013		207,223	2,107,464	1,900,240
2014		207,223	2,199,791	1,992,567
2015		207,223	2,292,117	2,084,894
2016		207,223	2,292,117	2,084,894
2017		207,223	2,292,117	2,084,894
2018		207,223	2,292,117	2,084,894
2019		207,223	2,292,117	2,084,894
2020		207,223	2,292,117	2,084,894
2021		207,223	2,292,117	2,084,894
2022		207,223	2,292,117	2,084,894
2023		207,223	2,292,117	2,084,894
ition).			EIRR =	8.7%

Sensitivity Analysis, Case 2

Investment Cost ± 0%, Benefit +10% Unit: US$

	Investment	O/M Cost	Benefits	Net Benefit
2003	13,702,878			-13,702,878
2004		207,223	1,404,175	1,196,952
2005		207,223	1,505,735	1,298,511
2006		207,223	1,607,294	1,400,071
2007		207,223	1,708,854	1,501,630
2008		207,223	1,810,413	1,603,190
2009		207,223	1,911,973	1,704,749
2010		207,223	2,013,532	1,806,309
2011		207,223	2,115,091	1,907,868
2012		207,223	2,216,651	2,009,427
2013		207,223	2,318,210	2,110,987
2014		207,223	2,419,770	2,212,546
2015		207,223	2,521,329	2,314,106
2016		207,223	2,521,329	2,314,106
2017		207,223	2,521,329	2,314,106
2018		207,223	2,521,329	2,314,106
2019		207,223	2,521,329	2,314,106
2020		207,223	2,521,329	2,314,106
2021		207,223	2,521,329	2,314,106
2022		207,223	2,521,329	2,314,106
2023		207,223	2,521,329	2,314,106
			EIRR =	11.3%

Sensitivity Analysis, Case 3

Investment Cost -10%, Benefit ± 0% Unit: US$

	Investment	O/M Cost	Benefits	Net Benefit
2003	12,332,590			-12,332,590
2004		207,223	1,276,523	1,069,300
2005		207,223	1,368,850	1,161,626
2006		207,223	1,461,177	1,253,953
2007		207,223	1,553,503	1,346,280
2008		207,223	1,645,830	1,438,607
2009		207,223	1,738,157	1,530,933
2010		207,223	1,830,484	1,623,260
2011		207,223	1,922,810	1,715,587
2012		207,223	2,015,137	1,807,914
2013		207,223	2,107,464	1,900,240
2014		207,223	2,199,791	1,992,567
2015		207,223	2,292,117	2,084,894
2016		207,223	2,292,117	2,084,894
2017		207,223	2,292,117	2,084,894
2018		207,223	2,292,117	2,084,894
2019		207,223	2,292,117	2,084,894
2020		207,223	2,292,117	2,084,894
2021		207,223	2,292,117	2,084,894
2022		207,223	2,292,117	2,084,894
2023		207,223	2,292,117	2,084,894
			EIRR =	11.3%

Sensitivity Analysis, Case 4

Investment Cost ± 0%, Benefit -10% Unit: US$

	Investment	O/M Cost	Benefits	Net Benefit
2003	13,702,878			-13,702,878
2004		207,223	1,148,871	941,647
2005		207,223	1,231,965	1,024,741
2006		207,223	1,315,059	1,107,835
2007		207,223	1,398,153	1,190,930
2008		207,223	1,481,247	1,274,024
2009		207,223	1,564,341	1,357,118
2010		207,223	1,647,435	1,440,212
2011		207,223	1,730,529	1,523,306
2012		207,223	1,813,623	1,606,400
2013		207,223	1,896,718	1,689,494
2014		207,223	1,979,812	1,772,588
2015		207,223	2,062,906	1,855,682
2016		207,223	2,062,906	1,855,682
2017		207,223	2,062,906	1,855,682
2018		207,223	2,062,906	1,855,682
2019		207,223	2,062,906	1,855,682
2020		207,223	2,062,906	1,855,682
2021		207,223	2,062,906	1,855,682
2022		207,223	2,062,906	1,855,682
2023		207,223	2,062,906	1,855,682
			EIRR =	8.4%

Table 11-10 Annual Revenue of New Wholesale Market and 5 Collection Centres in Central Region

Annual Revenue of New Wholesale Market at Central Region

		US$
1. Marketing fee of transaction amount @	1%	
2004, Annual Transaction Volume =	120,000 t	
Transaction amount (@Rs11.59/kg) =	Rs 1,390,800,000	
1% of transaction amount at 2004 =	Rs 13,908,000	$188,073
2010, Annual Transaction Volume =	*140,000 t*	
Transaction amount (@Rs11.59/kg) =	*Rs 1,622,600,000*	
1% of transaction amount at 2010 =	*Rs 16,226,000*	*$219,419*
2. Registration fee per year @	Rs 400	
No. of vegetable wholesalers =	200	
No. of fruit wholesalers =	50	
Total Registration fee collectable =	Rs 100,000	$1,352
3. Stall rental (per sq.ft per month) @	Rs 10	
200 stalls for vegetable @ 200 sq.ft =	Rs 4,800,000	$64,909
50 stalls for vegetable @ 300 sq.ft=	Rs 1,800,000	$24,341
Canteen rental @Rs15,000/mth	Rs 180,000	$2,434
4. Entry/ Parking fee		
No. of big trucks entering per year =	7,300	
No. of small trucks entering per year =	13,505	
No. of other vehicles entering per year =	70,445	
Fee from big trucks (@Rs60) =	438,000	
Fee from small trucks (@Rs35) =	472,675	
Fee from other vehicles (@Rs15) =	1,056,675	
Total entry/parking fee =	1,967,350	$26,604
Total Annual Revenue of Wholesale Market (2004) =		$307,713
Total Annual Revenue of Wholesale Market (2010) =		*$339,058*

Annual Revenue of Collection Centres at Central Region

Average Annual Handling Volume and Amount at C.C.

Unit: MT, Rs

	Potato		Fruit		Vegetable		Total		
	Volume (t)	Amount (Rs)	Volume (t)	Amount (Rs)	Volume (t)	Amount (Rs)	Volume (t)	Amount (Rs)	Amount (US$)
1. Daman	3,600	41,616,000	900	12,606,000	3,000	53,808,000	7,500	108,030,000	1,460,852
2. Panauti	3,000	35,016,000	2,100	30,162,000	2,400	43,920,000	7,500	109,098,000	1,475,294
3. Bhandara	1,500	17,376,699	2,400	33,686,400	3,600	64,536,000	7,500	115,599,099	1,563,206
4. Kakani	1,500	17,289,000	3,000	43,164,000	3,000	54,816,000	7,500	115,269,000	1,558,742
5. Chhadeaurali	1,500	17,289,000	2,400	38,742,000	3,600	65,712,000	7,500	121,743,000	1,646,288
Total	11,100	128,586,699	10,800	158,360,400	15,600	282,792,000	37,500	569,739,099	7,704,383

Remarks:

1. Direct sales to Wholesale Market: transaction price for Potato = Rs12.11/kg, Fruits = Rs14.74/kg, Vegetables = Rs18.72/kg
2. Sales to Trader/local brokers at CC: transaction price for Potato = Rs11.38/kg, Fruits = Rs13.86/kg, Vegetables = Rs17.60/kg
3. Direct sales to Neighboring Countries from CC: transaction price for Potato = Rs12.11/kg, Fruits = Rs14.74/kg, Vegetables = Rs18.72/kg
4. Direct sales to traveler/local people at CC: transaction price for Potato = Rs11.38/kg, Fruits = Rs13.86/kg, Vegetables = Rs17.60/kg

A. Total Annual Revenue of all 5 CC @7% of handling amount =		$539,307
B. Revenue from farm input handling charge =	Rs 296,250	$4,006
Total Annual Revenue of all 5 CC (A+B) =		$543,313

Table 11-11 Income Statement and Cash Flow for New Wholesale Market and all 5 Collection Centers in Central Region

Unit: US$

			1	2	3	4	5	6	7	8	9	10	11	12
I	**Income Statement**	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
	A. Revenue		851,026	856,250	861,474	866,698	871,923	877,147	882,371	882,371	882,371	882,371	882,371	882,371
	1) Revenue from market & 5 CC		851,026	856,250	861,474	866,698	871,923	877,147	882,371	882,371	882,371	882,371	882,371	882,371
	B. Expense		811,030	811,030	811,030	811,030	811,030	811,030	811,030	811,030	811,030	811,030	811,030	811,030
	1) Operation		161,641	161,641	161,641	161,641	161,641	161,641	161,641	161,641	161,641	161,641	161,641	161,641
	2) Maintenance		68,608	68,608	68,608	68,608	68,608	68,608	68,608	68,608	68,608	68,608	68,608	68,608
	3) Depreciation		580,782	580,782	580,782	580,782	580,782	580,782	580,782	580,782	580,782	580,782	580,782	580,782
	4)													
	5) Interest													
	C. Income before Depr.&Interest		620,777	626,001	631,226	636,450	641,674	646,898	652,123	652,123	652,123	652,123	652,123	652,123
	D. Net Income		39,995	45,219	50,444	55,668	60,892	66,116	71,341	71,341	71,341	71,341	71,341	71,341
II	**Cash Flow**													
	A. Source of Funds	15,225,420	620,777	626,001	631,226	636,450	641,674	646,898	652,123	652,123	652,123	652,123	652,123	652,123
	1) Government	15,225,420												
	2) Loan													
	3) Own equity													
	4) Depreciation		580,782	580,782	580,782	580,782	580,782	580,782	580,782	580,782	580,782	580,782	580,782	580,782
	5) Net income		39,995	45,219	50,444	55,668	60,892	66,116	71,341	71,341	71,341	71,341	71,341	71,341
	B. Uses of Funds	15,225,420					50,000					324,900		
	1) Buildings (WSM+CCs)	12,363,396												
	2) Equipment	2,862,024												
	3) Reinvestment						50,000					324,900		
	4) Repayment of loan													
	C. Net cash flow		620,777	626,001	631,226	636,450	591,674	646,898	652,123	652,123	652,123	327,223	652,123	652,123

Remarks:

1. Land acquisition/preparation cost and infrastructure extension cost are not included in Building cost.

Table 11-12 Income Statement and Cash Flow for New Wholesale Market at Kathmandu, Central Region

Unit: US$

			1	2	3	4	5	6	7	8	9	10	11	12
I	**Income Statement**	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
	A. Revenue		307,713	312,937	318,161	323,385	328,610	333,834	339,058	339,058	339,058	339,058	339,058	339,058
	1) Total fee		307,713	312,937	318,161	323,385	328,610	333,834	339,058	339,058	339,058	339,058	339,058	339,058
	B. Expense		446,275	446,275	446,275	446,275	446,275	446,275	446,275	446,275	446,275	446,275	446,275	446,275
	1) Operation		68,636	68,636	68,636	68,636	68,636	68,636	68,636	68,636	68,636	68,636	68,636	68,636
	2) Maintenance		29,287	29,287	29,287	29,287	29,287	29,287	29,287	29,287	29,287	29,287	29,287	29,287
	3) Depreciation		348,352	348,352	348,352	348,352	348,352	348,352	348,352	348,352	348,352	348,352	348,352	348,352
	4)													
	5) Interest													
	C. Income before Depr.&Interest		209,790	215,014	220,239	225,463	230,687	235,911	241,136	241,136	241,136	241,136	241,136	241,136
	D. Net Income		-138,562	-133,338	-128,113	-122,889	-117,665	-112,441	-107,216	-107,216	-107,216	-107,216	-107,216	-107,216
II	**Cash Flow**													
	A. Source of Funds	10,377,720	209,790	215,014	220,239	225,463	230,687	235,911	241,136	241,136	241,136	241,136	241,136	241,136
	1) Government	10,377,720												
	2) Loan													
	3) Own equity													
	4) Depreciation		348,352	348,352	348,352	348,352	348,352	348,352	348,352	348,352	348,352	348,352	348,352	348,352
	5) Net income		-138,562	-133,338	-128,113	-122,889	-117,665	-112,441	-107,216	-107,216	-107,216	-107,216	-107,216	-107,216
	B. Uses of Funds	10,377,720										200,400		
	1) Building	9,864,696												
	2) Equipment	513,024												
	3) Reinvestment											200,400		
	4) Repayment of loan													
	C. Net cash flow		209,790	215,014	220,239	225,463	230,687	235,911	241,136	241,136	241,136	40,736	241,136	241,136

Remarks:

1. Land acquisition/preparation cost and infrastructure extension cost are not included in Building cost.

Table 11-13 Income Statement and Cash Flow for a Collection Centre

Unit: US$

			1	2	3	4	5	6	7	8	9	10	11	12
I	**Income Statement**	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
	A. Revenue		103,061	103,077	103,093	103,110	103,127	103,144	103,162	103,180	103,198	103,217	103,236	103,256
	1) 7% Handling Commission		102,260	102,260	102,260	102,260	102,260	102,260	102,260	102,260	102,260	102,260	102,260	102,260
	2) Farm input handlling charge		801	817	834	850	867	885	902	920	939	958	977	996
	3)													
	4)													
	5)													
	B. Expense		71,426	71,426	71,426	71,426	71,426	71,426	71,426	71,426	71,426	71,426	71,426	71,426
	1) Operation		17,076	17,076	17,076	17,076	17,076	17,076	17,076	17,076	17,076	17,076	17,076	17,076
	2) Maintenance		7,864	7,864	7,864	7,864	7,864	7,864	7,864	7,864	7,864	7,864	7,864	7,864
	3) Depreciation		46,486	46,486	46,486	46,486	46,486	46,486	46,486	46,486	46,486	46,486	46,486	46,486
	4) Depreciation													
	5) Interest													
	C. Income before Depr.&Interest		78,121	78,137	78,153	78,170	78,187	78,204	78,222	78,240	78,258	78,277	78,296	78,316
	D. Net Income		31,635	31,651	31,667	31,684	31,701	31,718	31,736	31,754	31,772	31,791	31,810	31,830
II	**Cash Flow**													
	A. Source of Funds	757,450	78,121	78,137	78,153	78,170	78,187	78,204	78,222	78,240	78,258	78,277	78,296	78,316
	1) Government	757,450												
	2) Loan													
	3) Own equity													
	4) Depreciation		46,486	46,486	46,486	46,486	46,486	46,486	46,486	46,486	46,486	46,486	46,486	46,486
	5) Net income		31,635	31,651	31,667	31,684	31,701	31,718	31,736	31,754	31,772	31,791	31,810	31,830
	B. Uses of Funds	757,450					10,000					24,900		
	1) Building	287,650												
	2) Equipment	469,800												
	3) Reinvestment						10,000					24,900		
	4) Repayment of loan													
	C. Net cash flow		78,121	78,137	78,153	78,170	68,187	78,204	78,222	78,240	78,258	53,377	78,296	78,316

Remarks:
1. Land acquisition, preparation and infrastructure extension costs are not included in building cost of NWM.

Table 11-14 Financial Sensitivity Analysis New Wholesale Market and 5 Collection Centres, Central Region

Sensitivity Analysis, Case 1
Investment Cost +10%, Revenue ± 0% Unit: US$

	Investment	Reinvestmt	Income before Depr.	Net Revenue
2003	16,747,962			-16,747,962
2004			620,777	620,777
2005			626,001	626,001
2006			631,226	631,226
2007			636,450	636,450
2008		55,000	641,674	586,674
2009			646,898	646,898
2010			652,123	652,123
2011			652,123	652,123
2012			652,123	652,123
2013		357,390	652,123	294,733
2014			652,123	652,123
2015			652,123	652,123
2016			652,123	652,123
2017			652,123	652,123
2018		1,210,000	652,123	-557,877
2019			652,123	652,123
2020			652,123	652,123
2021			652,123	652,123
2022			652,123	652,123
2023		357,390	652,123	294,733
			FIRR =	-4.0%

Sensitivity Analysis, Case 2
Investment Cost ± 0%, Revenue +10% Unit: US$

	Investment	Reinvestmt	Income before Depr.	Net Revenue
2003	15,225,420			-15,225,420
2004			682,855	682,855
2005			688,602	688,602
2006			694,348	694,348
2007			700,095	700,095
2008		50,000	705,842	655,842
2009			711,588	711,588
2010			717,335	717,335
2011			717,335	717,335
2012			717,335	717,335
2013		324,900	717,335	392,435
2014			717,335	717,335
2015			717,335	717,335
2016			717,335	717,335
2017			717,335	717,335
2018		1,100,000	717,335	-382,665
2019			717,335	717,335
2020			717,335	717,335
2021			717,335	717,335
2022			717,335	717,335
2023		324,900	717,335	392,435
			FIRR =	-2.0%

Sensitivity Analysis, Case 3
Investment Cost -10%, Revenue ± 0% Unit: US$

	Investment	Reinvestmt	Income before Depr.	Net Revenue
2003	13,702,878			-13,702,878
2004			620,777	620,777
2005			626,001	626,001
2006			631,226	631,226
2007			636,450	636,450
2008		45,000	641,674	596,674
2009			646,898	646,898
2010			652,123	652,123
2011			652,123	652,123
2012			652,123	652,123
2013		292,410	652,123	359,713
2014			652,123	652,123
2015			652,123	652,123
2016			652,123	652,123
2017			652,123	652,123
2018		990,000	652,123	-337,877
2019			652,123	652,123
2020			652,123	652,123
2021			652,123	652,123
2022			652,123	652,123
2023		292,410	652,123	359,713
			FIRR =	-1.8%

Sensitivity Analysis, Case 4
Investment Cost -20%, Revenue -10% Unit: US$

	Investment	Reinvestmt	Income before Depr.	Net Revenue
2003	12,180,336			-12,180,336
2004			558,699	558,699
2005			563,401	563,401
2006			568,103	568,103
2007			572,805	572,805
2008		40,000	577,507	537,507
2009			582,209	582,209
2010			586,910	586,910
2011			586,910	586,910
2012			586,910	586,910
2013		259,920	586,910	326,990
2014			586,910	586,910
2015			586,910	586,910
2016			586,910	586,910
2017			586,910	586,910
2018		40,000	586,910	546,910
2019			586,910	586,910
2020			586,910	586,910
2021			586,910	586,910
2022			586,910	586,910
2023		259,920	586,910	326,990
			FIRR =	-0.9%

Remark:
1. The reinvestment cost after 15 years (2018) is reduced substantially if assumed that pre-cooling facilities are excluded in this scenario.

Table 11-15 Physical Life, Depreciation, and Maintenance of Project Components at Eastern Region

New Wholesale Market

Facilities & Equipment	Physical Life (years)	Maintenance ratio (%)	Total Cost	Depreciation	Maintenance	Reinvestment Cost 5 yr	10 yr	15 yr	20 yr
1. Buildings	25	0.5%	1,734,500	69,380	4,336				
2. Equipment	10	5.0%	250,000	25,000	6,250		125,000		125,000
Total Cost			1,984,500	94,380	10,586	0	125,000	0	125,000

Remarks:
1. Maintenance & reinvestment cost of building and equipment undertaken by local contractors at local rates.
2. Depreciation & maintenance calculated on direct construction cost only.

Direct Construction Cost of WSM

Building total	1,734,500
Equipment total	250,000
	1,984,500

Collection and Distribution Centers

Facilities & Equipment	Physical Life (years)	Maintenance ratio (%)	Total Cost	Depreciation	Maintenance	Reinvestment Cost 5 yr	10 yr	15 yr	20 yr
1. Buildings & pavement	25	0.5%	287,650	11,506	719				
2. Equipment									
- Crates, pallet, etc	5	1.0%	20,000	4,000	100	10,000	10,000	10,000	10,000
- Vehicle (pick up truck)	10	5.0%	25,000	2,500	625		12,500		12,500
- Pre-cooling equipment	15	3.0%	420,000	28,000	6,300			210,000	
- Office, weighing equipm	10	5.0%	4,800	480	120		2,400		2,400
Total Cost for one collection centre			757,450	46,486	7,864	10,000	24,900	220,000	24,900
Total Cost for all 5 collection centres			3,787,250	232,430	39,321	50,000	124,500	1,100,000	124,500

Remarks:
1. Maintenance & reinvestment cost of building and equipment undertaken by local contractors at local rates.
2. Depreciation & maintenance calculated on direct construction cost only.

Direct Construction Cost of each CC

Building total	287,650
Equipment total	469,800
	757,450

Table 11-16 Benefits of Biratnagar New Wholesale Market and 4 Collection Centers, Eastern Region

1.	**Gudri Market Entry / Exit Time Restriction**	
	No. of big trucks affected per day =	1
	Average waiting time lost due to this restriction (hr) =	4
	0pportunity cost of big truck (8 tons) use (Rs/hr) =	1000
	Total benefit of entry at any time to NWM per day = A.B.C	
	Benefit per day (Rs) =	Rs 4,000
	Benefit per year (Rs) =	Rs 1,460,000
	Benefit per year (US$) =	$19,743
2.	**Reduced quantity/ quality loss (faster, better handling, packing, storage, etc)**	
	Existing quantity losses at wholesale markets due to congestion, handling, storage, etc =	3%
	Without project losses in 2015 from 32,000t handled by Biratnagar markets (t) =	960
	With project losses reduction at 50%, volume saved (t) =	480
	Benefit of quantity loss reduction in 2015 (Rs) =	Rs 5,563,200
	Benefit of quantity loss reduction in 2015 (US$) =	$75,229
	Without project quality losses in 2015 =	5%
	With project losses reduction at 50%, quality saved (Rs) =	8,692,500
	Benefit of quality loss reduction in 2015 (US$) =	$117,546
	Total Benefits of Quantity & Quality saved =	$192,775
3.	**Time and Cost savings from more efficient marketing system**	
	No. of farmers affected =	500
	No. of hours per day saved per farmer with project =	1
	Total hours saved per day =	500
	Total hours saved for 300 marketing days =	150,000
	Opportunity cost of farmers per day =	Rs 5
	Benefit for 1 Collection Centre =	Rs 750,000
	Total Benefit (US$) from all 4 Collection Centre =	$40,568
4.	**Reduced quantity loss**	
	Post-harvest loss reduction for potato =	3%
	Post-harvest loss reduction for fruits =	15%
	Post-harvest loss reduction for vegetables =	10%
	Av. quantity loss reduced for potato (ton) =	54
	Av. quantity loss reduced for fruits (ton) =	45
	Av. quantity loss reduced for vegetables (ton) =	390
	Total quantity loss reduction (ton) =	489
	Benefit for 1 Collection Centre =	Rs 1,416,878
	Total Benefit (US$) from all 4 Collection Centre =	$76,640
5.	**Quality Loss Reduction**	
	Value of wholesale price for quality loss reduction =	3%
	Av. handling vol. of potato (ton) =	2,250
	Av. handling vol. of fruits (ton) =	375
	Av. handling vol. of vegetables (ton) =	4,875
	Total.av. handling vol.(ton)	7,500
	Benefit of quality reduction for 1 Collection Centre =	Rs 2,607,750
	Benefit of quality reduction (US$) for all 4 Collection Centres =	$141,055
6.	**Transaction Time and Cost savings**	
	Truck (6T) trips per year from CC =	1,250
	Truck trips saved with project =	25%
	Benefits from truck trips saved =	Rs 1,875,000
	Traders time(hr) saved per day =	2
	No. of traders per CC =	20
	Traders time (hr) saved per year with project =	12,000
	Benefits from traders time saved for 1 Collecton Centre =	Rs 600,000
	Benefits of better transaction system for all 1 Collection Centre =	Rs 2,475,000
	Benefits of better transaction system for all 4 Collection Centres =	$133,874

Table 11-17 Annual Operation Cost of New Wholesale Market at Biratnagar and Collection Centres, Eastern Region

Annual Operating Cost of New Wholesale Market at Biratnagar

Number of Personnel and Annual Cost

Position	Status		Unit Salary		Annual Salary		Total Annual	Total Annual	
	Permanent	Contract	Permanent	Contract	Permanent	Contract	Salary (Rs)	Salary (US$)	
Market manager	1		13,000		156,000		156,000	2,110	
Assist. manager	1		10,000		120,000		120,000	1,623	
Administration chief	1		8,000		96,000		96,000	1,298	
Personnel		2		5,000		120,000	120,000	1,623	
Security		3		6,000		216,000	216,000	2,921	
Transport		1		4,000		48,000	48,000	649	
Telephone		1		3,000		36,000	36,000	487	
Account chief	1		8,000		96,000		96,000	1,298	
Fee collector		2		5,000		120,000	120,000	1,623	
Market operation	1		8,000		96,000		96,000	1,298	
Entrance gate	1	1	8,000	5,000	96,000	60,000	156,000	2,110	
Repair/maintenance		1		4,000		48,000	48,000	649	
Planning	1		7,000		84,000		84,000	1,136	
Market information	1	1	7,000	5,000	84,000	60,000	144,000	1,947	
Total	8	12	69,000	37,000	828,000	708,000	1,536,000	$20,771	A

Electricity operation cost per year =	Rs 355,042	$4,801	
Water operation cost per year =	Rs 107,608	$1,455	
Telephone operation cost per year =	Rs 161,280	$2,181	
Vehicle Fuel expenses per year	Rs 274,800	$3,716	
Gas expenses per year	Rs 15,120	$204	
Office expenses per year	Rs 120,000	$1,623	
Total		$13,980	B
Total Annual Operation Cost of WSM (A+B)		**$34,751**	

Annual Operating Cost of All 4 Collection Centres in Eastern Region

	Rs	US$
Personnel Expenses per year	Rs 1,512,000	$20,446
Fuel Consumption	Rs 1,047,006	$14,158
Power Consumption	Rs 1,944,000	$26,288
Office Expenses	Rs 480,000	$6,491
Repair Cost	Rs 480,000	$6,491
Total Annual Operation Cost of 4 CC		**$73,874**
Total Annual Operation Cost of WSM and 4 CC		**$108,626**

Table 11-18 Economic Evaluation of New Wholesale Market and 4 Collection Centers in Eastern Region

Unit: US$

	Investment	O/M Cost	Benefits	Net Benefit
2009	6,100,884			-6,100,884
2010		142,679	604,655	461,975
2011		142,679	604,655	461,975
2012		142,679	604,655	461,975
2013		142,679	604,655	461,975
2014		142,679	604,655	461,975
2015		142,679	604,655	461,975
2016		142,679	604,655	461,975
2017		142,679	604,655	461,975
2018		142,679	604,655	461,975
2019	225,000	142,679	604,655	236,975
2020		142,679	604,655	461,975
2021		142,679	604,655	461,975
2022		142,679	604,655	461,975
2023		142,679	604,655	461,975
2024		142,679	604,655	461,975
2025		142,679	604,655	461,975
2026		142,679	604,655	461,975
2027		142,679	604,655	461,975
2028		142,679	604,655	461,975
2029	225,000	142,679	604,655	236,975
			EIRR =	3.9%

Table 11-19 Economic Sensitivity Analysis for New Wholesale Market and 4 CC, Eastern Region

Sensitivity Analysis, Case 1
Investment Cost +10%, Benefit ± 0% Unit: US$

	Investment	O/M Cost	Benefits	Net Benefit
2009	6,710,972			-6,710,972
2010		142,679	604,655	461,975
2011		142,679	604,655	461,975
2012		142,679	604,655	461,975
2013		142,679	604,655	461,975
2014		142,679	604,655	461,975
2015		142,679	604,655	461,975
2016		142,679	604,655	461,975
2017		142,679	604,655	461,975
2018		142,679	604,655	461,975
2019	247,500	142,679	604,655	214,475
2020		142,679	604,655	461,975
2021		142,679	604,655	461,975
2022		142,679	604,655	461,975
2023		142,679	604,655	461,975
2024		142,679	604,655	461,975
2025		142,679	604,655	461,975
2026		142,679	604,655	461,975
2027		142,679	604,655	461,975
2028		142,679	604,655	461,975
2029	247,500	142,679	604,655	214,475
			EIRR =	2.7%

Sensitivity Analysis, Case 2
Investment Cost ± 0%, Benefit +10% Unit: US$

	Investment	O/M Cost	Benefits	Net Benefit
2009	6,100,884			-6,100,884
2010		142,679	665,120	522,441
2011		142,679	665,120	522,441
2012		142,679	665,120	522,441
2013		142,679	665,120	522,441
2014		142,679	665,120	522,441
2015		142,679	665,120	522,441
2016		142,679	665,120	522,441
2017		142,679	665,120	522,441
2018		142,679	665,120	522,441
2019	225,000	142,679	665,120	297,441
2020		142,679	665,120	522,441
2021		142,679	665,120	522,441
2022		142,679	665,120	522,441
2023		142,679	665,120	522,441
2024		142,679	665,120	522,441
2025		142,679	665,120	522,441
2026		142,679	665,120	522,441
2027		142,679	665,120	522,441
2028		142,679	665,120	522,441
2029	225,000	142,679	665,120	297,441
			EIRR =	5.4%

Sensitivity Analysis, Case 3
Investment Cost -10%, Benefit ± 0% Unit: US$

	Investment	O/M Cost	Benefits	Net Benefit
2009	5,490,796			-5,490,796
2010		142,679	604,655	461,975
2011		142,679	604,655	461,975
2012		142,679	604,655	461,975
2013		142,679	604,655	461,975
2014		142,679	604,655	461,975
2015		142,679	604,655	461,975
2016		142,679	604,655	461,975
2017		142,679	604,655	461,975
2018		142,679	604,655	461,975
2019	202,500	142,679	604,655	259,475
2020		142,679	604,655	461,975
2021		142,679	604,655	461,975
2022		142,679	604,655	461,975
2023		142,679	604,655	461,975
2024		142,679	604,655	461,975
2025		142,679	604,655	461,975
2026		142,679	604,655	461,975
2027		142,679	604,655	461,975
2028		142,679	604,655	461,975
2029	202,500	142,679	604,655	259,475
			EIRR =	5.1%

Sensitivity Analysis, Case 4
Investment Cost ± 0%, Benefit -10% Unit: US$

	Investment	O/M Cost	Benefits	Net Benefit
2009	6,100,884			-6,100,884
2010		142,679	544,189	401,510
2011		142,679	544,189	401,510
2012		142,679	544,189	401,510
2013		142,679	544,189	401,510
2014		142,679	544,189	401,510
2015		142,679	544,189	401,510
2016		142,679	544,189	401,510
2017		142,679	544,189	401,510
2018		142,679	544,189	401,510
2019	225,000	142,679	544,189	176,510
2020		142,679	544,189	401,510
2021		142,679	544,189	401,510
2022		142,679	544,189	401,510
2023		142,679	544,189	401,510
2024		142,679	544,189	401,510
2025		142,679	544,189	401,510
2026		142,679	544,189	401,510
2027		142,679	544,189	401,510
2028		142,679	544,189	401,510
2029	225,000	142,679	544,189	176,510
			EIRR =	2.2%

Table 11-20 Annual Revenue of New Wholesale Market and 4 Collection Centres in Eastern Region

Annual Revenue of Biratnagar New Wholesale Market, Eastern Region

		US$
1. Marketing fee of transaction amount @	1%	
2010, Annual Transaction Volume =	27,000 t	
Transaction amount (@Rs11.59/kg) =	Rs 312,930,000	
1% of transaction amount at 2010 =	Rs 3,129,300	$42,316
2015, Annual Transaction Volume =	*32,000 t*	
Transaction amount (@Rs11.59/kg) =	*Rs 370,880,000*	
1% of transaction amount at 2010 =	*Rs 3,708,800*	*$50,153*
2. Registration fee per year @	Rs 400	
No. of vegetable wholesalers =	26	
No. of fruit wholesalers =	6	
Total Registration fee collectable =	Rs 12,800	$173
3. Stall rental (per sq.ft per month) @	Rs 10	
26 stalls for vegetable @ 300 sq.ft =	Rs 936,000	$12,657
6 stalls for vegetable @ 300 sq.ft=	Rs 216,000	$2,921
Canteen rental @Rs10,000/mth	Rs 120,000	$1,623
4. Entry/ Parking fee		
No. of big trucks entering per year =	730	
No. of small trucks entering per year =	1,460	
No. of other vehicles entering per year =	17,520	
Fee from big trucks (@Rs25) =	43,800	
Fee from small trucks (@Rs15) =	51,100	
Fee from other vehicles (@Rs5) =	262,800	
Total entry/parking fee =	357,700	$4,837
Total Annual Revenue of Wholesale Market (2010) =		$64,527
Total Annual Revenue of Wholesale Market (2015) =		*$72,364*

Annual Revenue of Collection Centres, Eastern Region

Average Annual Handling Volume and Amount at C.C.

Unit: MT, Rs

	Potato		Fruit		Vegetable		Total		
	Volume (t)	Amount (Rs)	Volume (t)	Amount (Rs)	Volume (t)	Amount (Rs)	Volume (t)	Amount (Rs)	Amount (US$)
1. Surunga	1,500	17,289,000	1,500	21,529,200	4,500	80,611,200	7,500	119,429,400	1,615,002
2. Joroati	3,000	40,238,800	0	0	4,500	80,846,400	7,500	121,085,200	1,637,393
3. Babiya	1,500	17,289,000	0	0	6,000	107,448,000	7,500	124,737,000	1,686,775
4. Katahari/Sisbania	3,000	34,972,200	0	0	4,500	82,728,000	7,500	117,700,200	1,591,619
Total	9,000	109,789,000	1,500	21,529,200	19,500	351,633,600	30,000	482,951,800	6,530,788

Remarks:

1. Direct sales to Wholesale Market: transaction price for Potato = Rs12.11/kg, Fruits = Rs14.74/kg, Vegetables = Rs18.72/kg
2. Sales to Trader/local brokers at CC: transaction price for Potato = Rs11.38/kg, Fruits = Rs13.86/kg, Vegetables = Rs17.60/kg
3. Direct sales to Neighboring Countries from CC: transaction price for Potato = Rs12.11/kg, Fruits = Rs14.74/kg, Vegetables = Rs18.72/kg
4. Direct sales to traveler/local people at CC: transaction price for Potato = Rs11.38/kg, Fruits = Rs13.86/kg, Vegetables = Rs17.60/kg

A. Total Annual Revenue of all 4 CC @7% of handling amount =		$457,155
B. Revenue from farm input handling charge	Rs 237,000	$3,205
Total Annual Revenue of all 4 CC (A+B) =		$460,360

Table 11-21 Income Statement and Cash Flow for New Wholesale Market and all 4 Collection Centers in Eastern Region

Unit: US$

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
I	**Income Statement**	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
	A. Revenue		524,887	526,455	528,022	529,589	531,157	532,724	532,724	532,724	532,724	532,724	532,724	532,724	532,724	532,724	532,724
	1) Revenue from market & 4 CC		524,887	526,455	528,022	529,589	531,157	532,724	532,724	532,724	532,724	532,724	532,724	532,724	532,724	532,724	532,724
	B. Expense		485,342	485,342	485,342	485,342	485,342	485,342	485,342	485,342	485,342	485,342	485,342	485,342	485,342	485,342	485,342
	1) Operation		108,626	108,626	108,626	108,626	108,626	108,626	108,626	108,626	108,626	108,626	108,626	108,626	108,626	108,626	108,626
	2) Maintenance		49,907	49,907	49,907	49,907	49,907	49,907	49,907	49,907	49,907	49,907	49,907	49,907	49,907	49,907	49,907
	3) Depreciation		326,810	326,810	326,810	326,810	326,810	326,810	326,810	326,810	326,810	326,810	326,810	326,810	326,810	326,810	326,810
	4)																
	5) Interest																
	C. Income before Depr.&Interest		366,355	367,922	369,490	371,057	372,624	374,191	374,191	374,191	374,191	374,191	374,191	374,191	374,191	374,191	374,191
	D. Net Income		39,545	41,112	42,680	44,247	45,814	47,381	47,381	47,381	47,381	47,381	47,381	47,381	47,381	47,381	47,381
II	**Cash Flow**																
	A. Source of Funds	6,778,760	366,355	367,922	369,490	371,057	372,624	374,191	374,191	374,191	374,191	374,191	374,191	374,191	374,191	374,191	374,191
	1) Government	6,778,760															
	2) Loan																
	3) Own equity																
	4) Depreciation		326,810	326,810	326,810	326,810	326,810	326,810	326,810	326,810	326,810	326,810	326,810	326,810	326,810	326,810	326,810
	5) Net income		39,545	41,112	42,680	44,247	45,814	47,381	47,381	47,381	47,381	47,381	47,381	47,381	47,381	47,381	47,381
	B. Uses of Funds	6,778,760					50,000					249,500					1,100,000
	1) Buildings (WSM+CCs)	4,534,153															
	2) Equipment	2,244,607															
	3) Reinvestment						50,000					249,500					1,100,000
	4) Repayment of loan																
	C. Net cash flow		366,355	367,922	369,490	371,057	322,624	374,191	374,191	374,191	374,191	124,691	374,191	374,191	374,191	374,191	-725,809

Remarks:
1. Land acquisition/preparation cost and infrastructure extension cost are not included in Building cost.

Table 11-22 Income Statement and Cash Flow For New Wholesale Market at Biratnagar, Eastern Region

Unit: US$

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
I	**Income Statement**	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
	A. Revenue		64,527	66,095	67,662	69,229	70,796	72,364	72,364	72,364	72,364	72,364	72,364	72,364	72,364	72,364	72,364
	1) Total fee		64,527	66,095	67,662	69,229	70,796	72,364	72,364	72,364	72,364	72,364	72,364	72,364	72,364	72,364	72,364
	B. Expense		139,717	139,717	139,717	139,717	139,717	139,717	139,717	139,717	139,717	139,717	139,717	139,717	139,717	139,717	139,717
	1) Operation		34,751	34,751	34,751	34,751	34,751	34,751	34,751	34,751	34,751	34,751	34,751	34,751	34,751	34,751	34,751
	2) Maintenance		10,586	10,586	10,586	10,586	10,586	10,586	10,586	10,586	10,586	10,586	10,586	10,586	10,586	10,586	10,586
	3) Depreciation		94,380	94,380	94,380	94,380	94,380	94,380	94,380	94,380	94,380	94,380	94,380	94,380	94,380	94,380	94,380
	4)																
	5) Interest																
	C. Income before Depr.&Interest		19,190	20,757	22,325	23,892	25,459	27,026	27,026	27,026	27,026	27,026	27,026	27,026	27,026	27,026	27,026
	D. Net Income		-75,190	-73,623	-72,055	-70,488	-68,921	-67,354	-67,354	-67,354	-67,354	-67,354	-67,354	-67,354	-67,354	-67,354	-67,354
II	**Cash Flow**																
	A. Source of Funds	2,900,600	19,190	20,757	22,325	23,892	25,459	27,026	27,026	27,026	27,026	27,026	27,026	27,026	27,026	27,026	27,026
	1) Government	2,900,600															
	2) Loan																
	3) Own equity																
	4) Depreciation		94,380	94,380	94,380	94,380	94,380	94,380	94,380	94,380	94,380	94,380	94,380	94,380	94,380	94,380	94,380
	5) Net income		-75,190	-73,623	-72,055	-70,488	-68,921	-67,354	-67,354	-67,354	-67,354	-67,354	-67,354	-67,354	-67,354	-67,354	-67,354
	B. Uses of Funds	2,900,600										250,000					
	1) Building	2,535,193															
	2) Equipment	365,407															
	3) Reinvestment											250,000					
	4) Repayment of loan																
	C. Net cash flow		19,190	20,757	22,325	23,892	25,459	27,026	27,026	27,026	27,026	-222,974	27,026	27,026	27,026	27,026	27,026

Remarks:
1. Land acquisition/preparation cost and infrastructure extension cost are not included in Building cost.

Table 11-23 Financial Sensitivity Analysis New Wholesale Market and 4 Collection Centres, Eastern Region

Sensitivity Analysis, Case 1
Investment Cost +10%, Revenue ± 0% Unit: US$

	Investment	Reinvestmt	Income before Depr.	Net Revenue
2009	7,456,636			-7,456,636
2010			366,355	366,355
2011			367,922	367,922
2012			369,490	369,490
2013			371,057	371,057
2014		55,000	372,624	317,624
2015			374,191	374,191
2016			374,191	374,191
2017			374,191	374,191
2018			374,191	374,191
2019		274,450	374,191	99,741
2020			374,191	374,191
2021			374,191	374,191
2022			374,191	374,191
2023			374,191	374,191
2024		1,210,000	374,191	-835,809
2025			374,191	374,191
2026			374,191	374,191
2027			374,191	374,191
2028			374,191	374,191
2029		274,450	374,191	99,741
			FIRR =	-2.8%

Sensitivity Analysis, Case 2
Investment Cost ± 0%, Revenue +10% Unit: US$

	Investment	Reinvestmt	Income before Depr.	Net Revenue
2009	6,778,760			-6,778,760
2010			402,991	402,991
2011			404,715	404,715
2012			406,439	406,439
2013			408,163	408,163
2014		50,000	409,887	359,887
2015			411,611	411,611
2016			411,611	411,611
2017			411,611	411,611
2018			411,611	411,611
2019		249,500	411,611	162,111
2020			411,611	411,611
2021			411,611	411,611
2022			411,611	411,611
2023			411,611	411,611
2024		1,100,000	411,611	-688,389
2025			411,611	411,611
2026			411,611	411,611
2027			411,611	411,611
2028			411,611	411,611
2029		249,500	411,611	162,111
			FIRR =	-0.3%

Sensitivity Analysis, Case 3
Investment Cost -10%, Revenue ± 0% Unit: US$

	Investment	Reinvestmt	Income before Depr.	Net Revenue
2009	6,100,884			-6,100,884
2010			366,355	366,355
2011			367,922	367,922
2012			369,490	369,490
2013			371,057	371,057
2014		45,000	372,624	327,624
2015			374,191	374,191
2016			374,191	374,191
2017			374,191	374,191
2018			374,191	374,191
2019		224,550	374,191	149,641
2020			374,191	374,191
2021			374,191	374,191
2022			374,191	374,191
2023			374,191	374,191
2024		990,000	374,191	-615,809
2025			374,191	374,191
2026			374,191	374,191
2027			374,191	374,191
2028			374,191	374,191
2029		224,550	374,191	149,641
			FIRR =	-0.2%

Sensitivity Analysis, Case 4
Investment Cost -20%, Revenue -10% Unit: US$

	Investment	Reinvestmt	Income before Depr.	Net Revenue
2009	5,423,008			-5,423,008
2010			329,720	329,720
2011			331,130	331,130
2012			332,541	332,541
2013			333,951	333,951
2014		40,000	335,362	295,362
2015			336,772	336,772
2016			336,772	336,772
2017			336,772	336,772
2018			336,772	336,772
2019		199,600	336,772	137,172
2020			336,772	336,772
2021			336,772	336,772
2022			336,772	336,772
2023			336,772	336,772
2024		40,000	336,772	296,772
2025			336,772	336,772
2026			336,772	336,772
2027			336,772	336,772
2028			336,772	336,772
2029		199,600	336,772	137,172
			FIRR =	1.4%

Remark:
1. The reinvestment cost after 15 years (2024) is reduced substantially if assumed that pre-cooling facilities are excluded in this scenario.

Table 13-1　Education and Training Plan for the Agricultural Marketing Development in the Kingdom of Nepal (1/5)

1. Integrated Agricultural Marketing System

Weakness and Development Issues of the Agricultural Marketing System	Education Training Plan	Donor's Technology Assistance
1. Weakness of Agricultural Marketing System (1) Lack of the concrete agricultural products marketing policy (2) Deficiency of laws and institution/ organization systems (3) Limited participation opportunities for farmers in marketing (4) Lack of traders and farmers' coordination in marketing (5) Limited coverage area of commercial zone from the production area to the consumption area (6) Dispersion of consumption areas and narrow commercial zones (7) Deficiency of the import and export quality control system (8) Inadequate administration system of WM-CC (9) Lack of trained manpower in market management and agricultural products marketing system (10) lack of data base (products volume, marketing volume/price、volume of import/export) **2. Output of Participatory Approach** (1) Establishment of the integrated production and marketing system (2) Introduction of the education and training system for the improved agricultural marketing (3) Management under the clear-cut regulation of the collection centers (CC) and wholesale market(WM) (4) Establishment of Market Management Committee of the CC/WM, of which members should be selected as representatives from users groups (5) Establishment of the Autonomous body for market management (6) Support by the central and local government on the management of CC/WM (7) Establishment of the new collection centers and wholesale market with multipurpose and integrated functions (8) Importance of location of wholesale market which will be the less conflict areas with urban development use	**1. Goals of education Training**： (1) Promotion of commercialized agricultural products through the education training (2) Establishment of commercial zone (3) Establishment of organized marketing structure **2. Concept of Education Training** (1) Policy level : Rising the knowledge and expansion of the experience of Nepal Agricultural Marketing Board (NAMB) or Steering Committee members (2) Establishment of commercial zone : Education training for the establishment of nationwide marketing system (the linkage among the production pockets、the collection points、the collection centers and the wholesale market) (3) Promotion of external trade of agricultural products : Education training for the improvement of quality of products and strengthening of the phyto-sanitary inspection (4) Education training for the integration progress of WM and the identification of the function of NWM/CC (5) Education training for the strengthening of market management organization (6) OJT through the demonstration by the following Pilot Projects 1) Horticulture :Project for The promotion of high quality products marketing and export at NWM/CC （Quality improvement system of domestic products、auction system、micro credit system） 2) Improvement project for livestock and livestock products marketing system at NWM/CC and slaughter slab/sanitary control project of livestock products. 3) Establishment of sustainable and efficient fish distribution (community based project) (7) Education training for the fund management for sustainable training and education, and promotion of commercialized marketing **3. Implementation Body in Nepal** (1) National level：Ministry of Agriculture and Cooperative（MoAC）, NAMB or Steering Committee, Marketing Development Committee (MDC), MMC (CC and WM)、Department of Food Technology and Quality Control （DFTQC） (2) Local level：MoAC department of district office、Local government (3) Project Site level：MMC and the project management body of CC/WM	**1. Method of Donor's Technical Assistance** (1) Education training for the establishment of the rule, management and monitoring in NWM/CC. (2) Expansion of the opportunity of using the micro credit system : Construction of CP for the petty farmers/women group /Training and supporting of the financial management for the education training project 1) Supporting of informal credit system organized by the farmers organization 2) Co-financing :Nepal Agricultural Development Bank（NADB）、UNDP(RUPP project)、small scale formal credit system like Gramine Bank and the use of Coop. Bank under establishment in MoAC at present **2. Implementation Plan** (1) Education training through the project in the Central region (only horticulture products) (2) Education training through the project targeted in the Eastern region, and at the Pilot Project for the improvement of livestock/livestock products marketing and fish marketing. (3) Long term education training covered 3 regions of western area

Table 13-1 Education and Training Plan for the Agricultural Marketing Development in the Kingdom of Nepal (2/5)

2. Development Plan by Sector

2.1. Horticulture Marketing System

	Weakness and Development Issues of the Agricultural Marketing System	Education Training Plan	Donor's Technology Assistance
Sector1 Horticulture Production and Post Harvest System	1. Gap with the consumers preference for the products 2. Lack of production input and poor linkages among relevant organization 3. Poor consciousness of farmers on the planned cropping pattern 4. Limitations of the collection and distribution system at the production area 5. Lack of post harvest technology 6. Shortage of proper post harvest handling facilities 7. Less consciousness for post-harvest handling and processing technology 8. Lack of institutional support 9. Inaccurate data base	**1. Development Goals** Establishment of effective marketing system from collection centers (CC) to wholesale markets (WM) and increase farm household income in the Eastern and Central Region. **2. Development Projects** Establishment of Collection Centers in leading production pocket (PP) areas with organized farmers groups to increase commercialized marketing and encourage participation of farmers. **3. Education Training Components of Development Project** (1) Software Components Organization of farmers and women groups to participate in agricultural marketing system, use and management of sustainable CC, technology transfer on quality improvement and efficient marketing, demonstration of modern technology for export promotion, support for planned production system, expansion of the use of micro-credit system. (2) Hardware Components CC's facilities and equipment for collection, sorting, grading, packing, storage, transportation) **4. Executive Body and Target Group** (1) Executive body: MoAC, MoAC branch office (DADO/ASC), VDC (Village Development Committee), MMC (Market Management Committee) (2) Target Group: Concerned organizations/agencies, farmers and women groups, local traders organization.	(1) Contents of Technology Transfer 1) Knowledge and demonstration on agricultural marketing system 2) Planned production system to meet market demand and needs 3) Quality control and stable collection method 4) Establishment of marketing system at the production area 5) Use and management of CC 6) Participation in marketing activities at the wholesale market 7) Management ability to use micro credit system (2) Method of Technology Transfer 1) Trainers training: sustainable training of Government officers, MMC members of CC, representatives of farmers and women by foreign experts at NWM and CC 2) Training for modernization of agricultural marketing system: training at foreign countries for MMC members of CC, representatives of farmers/women's organizations
Sector2 Horticulture Marketing System	1. Dispersion of consumption areas and narrow commercial zones. 2. Complicated price mechanism lacking in fairness. 3. Limited use and benefit of formal market information system by farmers. 4. Lack of efficient marketing facilities. 5. Inadequate market administration system. 6. Market financing: inadequate fee sytem and financial management. 7. Lack of data base (products volume, marketing volume/ price, volume of import/ export.	**1. Development Goals** Establishment of an orderly wholesale market in metropolitan area for fruits and vegetables. **2. Development Project** Establishment of a wholesale market in the Kathmandu Valley of the Central Region and in the Biratnagar Municipality of the Eastern Region. **3. Education Training Components of Development Project** (1) Software components Establishment of marketing and trading system, price mechanism (open system), licensing, quality control system, marketing information system, waste disposal system, security system, financial management system, education/ training system. (2) Hardware components 1) Kathmandu New Wholesale Market: Land for the New Wholesale Market, Market Hall (fruit and vegetable), Administration & Training Center, Pilot Project Building. 2) Biratnagar New Wholesale Market Land for the New Wholesale Market, Wholesale Market Building (fruit and vegetable), Administration & Training Center **4. Executive Body and Target Group** (1) Executive body: MoAC, MoAC branch office (DADO/ASC), VDC (Village Development Committee), MMC (Market Management Committee), Local Government (Municipality) (2) Target Group: Concerned organizations/agencies, farmers and women groups, traders organization, institutional consumers.	(1) Contents of Technology Transfer 1) Research and acquisition of marketing know-how 2) Development of data base (at various stages of marketing: production data, collection centers data, wholesale market data, external trade data/ statistics, MoAC/DADO to establish national and local level database) 3) Consciousness of farmers, traders and consumers on quality and price 4) Open marketing system and pricing mechanism including auction system 5) Use and management of WM 6) Development of the related industries and their management technology: Vegetable and fruits storage and processing technology, and marketing know-how 7) Modernization technology on agricultural marketing (2) Method of Technology Transfer 1) Policy level: Regular meeting among high officials at the Marketing Board 2) Market level : for representatives of MMC and persons concerned 3) OJT: Use , management and market information system of NWM 4) Modernization of agricultural know-how & marketing system : including foreign training

Table 13-1 Education and Training Plan for the Agricultural Marketing Development in the Kingdom of Nepal (3/5)

2.2. Livestock Marketing System

	Weakness and Development Issues of the Agricultural Marketing System	Education Training Plan	Donor's Technology Assistance
Sector3 Livestock Products Marketing System	1. Limitation of livestock production. 2. Social constraints on meat consumption. 3. Poor access to the wholesale markets. 4. Lack of marketing facilities. 5. Ineffective quarantine inspection system on livestock and meats. 6. Lack of market information system. 7. Less development of livestock farmer's organization. 8. Lack of knowledge for food sanitation and sanitary control.	**1. Development Goals** Improvement of livestock market & slaughter slab and development of management system by the Pilot Project. **2. Development Project** (1) Improvement of livestock market and collection centers (2) Improvement of slaughter slab **3. Education Training Components of Development Project** (1) Software Components Education & training on marketing system of live livestock and meat, handling system, transaction system, price information system, awareness for sanitary meat and issues of traditional/ customary meat consumption preference (2) Hardware Components Cattle shed, slaughter slab, storage **4. Executive Body and Target Group** (1) Executive body: MoAC, MoAC branch office (DLSO), Local Government, MMC (Market Management Committee) (2) Target Group: Concerned organizations/agencies, farmers groups, traders organization, meat sellers	(1) Contents of Technology Transfer 1) Livestock market: market management, O & M, market information system, etc. 2) Slaughter slab: Technology transfer on hygienic meat production, use and management of facilities and equipment, consumers needs 3) Sanitary control of livestock products: Knowledge for policy making and technology, research and test technology development of research staff, knowledge on meat quality / influence on health / sanitary protection (2) Method of Technology Transfer 1) Livestock Products Market: Lecturers will be experts of donor country, TLDP, NGO and domestic consulting engineers etc for personnel concerned with LMMC (Livestock Market Management Committee), government and local government officials (DLS, DLSO, VDC, DDC, Municipality), wholesalers/traders, representative of farmer's groups and meat sellers. 2) Slaughter house: Lecturers will be experts of donor country, TLDP, NGO and domestic consulting engineers etc for officials of Animal Quarantine Section of DLS, Regional Animal Diseases laboratory, DLSO, Quarantine Check Posts and manager of slaughterhouse and meat sellers. 3) Sanitary Control of Livestock Products: Technology transfer will be by seminar for research staff, meat processors, sellers and consumers. 4) Basic training in foreign countries
Sector4 Sanitary Control of Livestock Products	1. Lack of suitable slaughter house for sanitary meat production 2. Weakness of enforcement system of concerned law. 3. Quality standard of sanitary meat is not enforced. 4. Lack of knowledge on food sanitation and hygiene of the meat producers. 5. Low consumer consciousness for sanitary meat.	**1. Development Goals** Strengthening of food inspection by the Pilot Project to ensure sanitary meat to consumers. **2. Development Project** To strengthen the activities of DFTQC in Kathmandu. **3. Education Training Components of Development Project** (1) Software Components Toxic matter eradication, expansion of standardized commodities and prevention of food adulteration and food borne diseases. (2) Hardware Components Research and development building, machinery and equipment of DFTQC. **4. Executive Body and Target Group** (1) Executive Body: MOACC, DFTQC (2) Target Group: DFTQC's staff, staff of quarantine check posts for animals, meat processors and sellers, consumers.	

Table 13-1 Education and Training Plan for the Agricultural Marketing Development in the Kingdom of Nepal (4/5)

2.3. Fish Marketing System

	Weakness and Development Issues of the Agricultural Marketing System	Education Training Plan	Donor's Technology Assistance
Secto5 Fish Marketing System	1. Small quantity of fish consumption. 2. Scattered production centers and small scale producers. 3. Inefficient small lot transportation. 4. Lack of appropriate marketing facilities. 5. Inefficient traditional fish marketing system. 6. Weakness of data base and statistical information system. 7. Weak motivation and participatory approach.	**1. Development Goals** Goals are the establishment of sustainable and efficient fish distribution chain in Terai area, poverty alleviation, and increase income opportunities for women groups. **2. Development Project** Development of fish farming/ aquaculture activities in marginal agricultural land situated east of Koshi Barrage as a production center with function of intensive fish collection and distribution to the market center. **3. Education Training Components of the Project** (1) Software Components 1) Strengthening of Institution FDD, fishers organization (management of cooperatives and marketing, improvement of aquaculture production system, proper fish handling, packing and quality control. 2) Establishment and utilization of fish trust fund 3) Research and analysis (2) Hardware Components Collection/ packing center, Pilot fish pond (community fish pond), administrative office. **4. Executive Body and Target Group** (1) Executive Body MoAC, MoAC branch office (DADO), local government (VDC), community organization. (2) Target Group Concerned organizations/agencies, fisher groups (part-time, full-time), women groups	(1) Contents of Technology Transfer Fishermen organizing method, Cooperative activities for aquaculture development technology, Planned production and effective farm management system, Marketing promotion technology, Development of fisheries statistics. (2) Method of Technology Transfer OJT by professional knowledge on marketing, training in India, test operation at the pilot project.

Table 13-1 Education and Training Plan for the Agricultural Marketing Development in the Kingdom of Nepal (5/5)

2.4. Management System

	Weakness and Development Issues of the Agricultural Marketing System	Education Training Plan	Donor's Technology Assistance
Sector6 Management System	1. Weaknesses of the existing laws related to agricultural market management system: Weakness of the MoAC directives' legal aspects and legal authorities, MMC formed has no legal authority or legal status and MMC formed has no autonomous status. 2. Weaknesses of the existing laws for farmer's marketing cooperatives: laws not simple nor clear for farmers marketing cooperative institutional development, laws not tuned towards farmer's marketing cooperative development, laws more subsistence oriented rather than supportive for improving agricultural marketing development. 3. Weaknesses of the Operation and Management of Collection Centers: more subsistence oriented rather than for commercialized market management, limitations for market management especially in pricing mechanism, transaction system, and licensing, lack of profit making aspects and unclear fair benefits sharing, lack of process for handing over market management of collection centers activities, no legally defined role for marketing cooperatives in market management 4. Weakness of farmers' and local traders' organization: lack of group approach for group benefit, lack trust with group leader, farmers depending more on traders, poor development of local traders, lack of association of local traders 5. Weakness in institutions/ organizations involved in agriculture marketing: **MoAC**: low incentive for field staff, limited manpower with technical skills, lack of trained manpower in and no planning for modernization of market management system, limited participation of the women farmers in commercial production and marketing **Local Government**: lack of skilled human resources for agricultural marketing development programs, no plans for the improvement of the traditional marketing systems, no plan for the modernization of the market management system. **Farmer's Organizations**: members not trained in market management activities, lack of resources and capability, no program planned for the modernization of market management system **Trader's Organization** lack of training programs in Auction System or in any other open marketing system, lack of organized private market management system handled by the traders and wholesalers, lack of resources and capability for improved market management system **Market Management Committee (MMC)**: MMCs' experience is limited to two years, members have no or limited experience as Market Manager, lack of resources and capability of the MMCs.	**1. Development Goals** (1) Establishment and implementation of laws and regulations of market management system. (2) Establishment of market management system at wholesale market and collection center. **2. Development Project** (1) To provide legal status to the formation of the proposed MMC at market centers (2) To provide legal status for small farmers organizations (3) To provide legal status for the involvement of private sector in market management (4) Thus, to provide Laws and Regulations of Market Management System, and (5) To form an Apex Body **3. Education Training Components of the Project** (1) Establishment of: Nepal Agricultural Marketing Board or Steering Committee, Market Development Committee, MMC at WM and CC. (2) Function of WM and CC: Establishment of marketing and trading system, price mechanism (open system), licensing, quality control system, marketing information system, security system, financial management system, education/ training system. **4. Executive Body and Target Group** (1) Executive Body: Market Development Directorate (2) Target Group: Concerned organizations/agencies, users' representatives of agricultural marketing system (farmers groups, traders and private sector)	(1) Contents of Technology Transfer 1) Law and institution on market management system 2) Market management system of WM and CC 3) Marketing modernization training (2) Method of Technology Transfer 1) Law and institution on market management system: a) Establishment of executive body at the National level to develop consensus among officials, managers and users of marketing systems for policy making. b) Technology transfer and monitoring at the various levels of marketing by the executive body. 2) Market management system of WM and CC: training of the representatives of MMC members, farmers organizations and traders associations at the WM and, knowledge of marketing management in the surrounded countries(India, Bhutan, China,, Bangladesh, etc.) 3) Marketing modernization training: Pilot operation of introduction of new technology at NWM and CC.