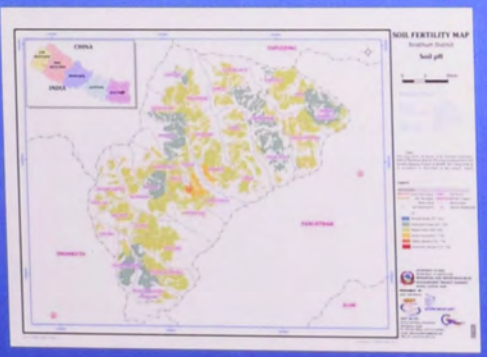
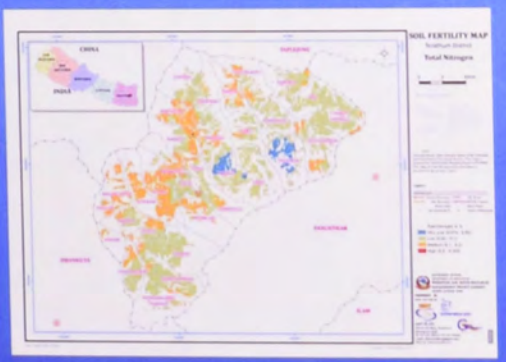
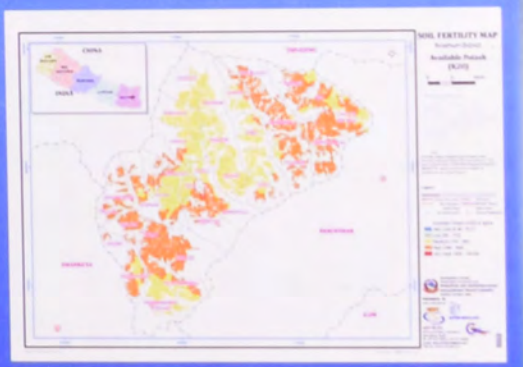
SOIL FERTILITY IN TERATHUM DISTRICT







2013

Government of Nepal
Ministry of Agriculture Development
Department of Agriculture
IRRIGATION AND WATER RESOURCE MANAGEMENT PROJECT (IWRMP)
Sanepa, Lalitpur

Soil Fertility In Terathum District

May 2013

Data Sources and Credits

GIS datasets, satellite and aerial imagery datasets and miscellaneous data are produced/developed by joint venture of Soyan Mega Soft, NEST and GRID Consult (P) Ltd for the project during 2013. These data are owned by IWRMP and authorization from the owner is required for the usage and/or publication of the data in part or whole.

Front Cover Illustration and publication compilation

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Last but not the least, we thank our experts, engineers, technicians and supporting staffs from Joint Venture of Soyan Mega Soft–NEST-GRID for their hard work and concerted effort for the completion of this assignment.

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FOREWORDS

Soil fertility is the inherent properties of soil that supplies plant nutrients to crop to produce sustainable yield. Nepalese soils are low in fertility. Farmers apply heavy amount of organic manure every year but soil erosion is the main cause that the soil need more organic manure every year to each crops to maintain fertility but these days amount of organic manure application is decreasing and same are the level of soil nutrients. Negative balance of plant nutrients in soil system is considered root cause of low crop productivity and results in food insecurity. In fact most of the famers do not even know how much their crops remove plant nutrients from every harvest. In addition, there are other losses such as soil erosion, leaching, fixation and volatilization. These processes exhaust soil and lead to soil degradation. Due to several reasons farmers do not apply recommended dose of fertilizer and deviate from the advisory recommendation. When they have access to fertilizer, they apply in higher dose but mostly nitrogen; limiting phosphorus and potassium including micronutrients. To boost crop production technicians as well as the farmers should know status of their soil nutrients so that the technicians could advise the farmers about soil and soil fertility management and farmers could apply required fertilizer and produce economic sustainable crop yield. To understand the soil, analysis of soil and its mapping related to soil fertility parameters of the district is necessary and that can be very useful to technicians, farmers and other soil use and management groups for improved crop production.

In this publication we have tried to present some basic information of the districts related to agricultural production. The soil fertility maps based on soil analysis results is also presented. The parameters covered and maps are prepared separately for soil texture, organic matter, and total soil nitrogen, plant available P_2O_5, K_2O, Zn and B. This soil fertility map is prepared in a limited time period for which many technicians are involved from field soil sample collection, laboratory analysis, data processing and analysis including report preparation, without their tireless effort this report would not have come to this stage. Special pressure was put on the laboratory technicians to complete the soil samples analysis. The work done by Mr. Kiran Adhikari, Mr. Rajan Budhathoki who worked almost day and night and completed the laboratory analysis is sincerely appreciated. Data processing and fertility maps preparation work carried out by Ms Manisha Suwal and Ms Drishanta Karki is highly commendable. High sense of appreciation goes to Mr. Ragindra Man Rajbhandari who cooperated, guided and facilitated the technicians in report preparation and involved himself personally and prepared this report. I would also like to thank all the other members who directly or indirectly helped us to prepare this report.

May 2013

Dr. Krishna Bahadur Karki

Team Leader and Soil Scientist

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EXECUTIVE SUMMARY

Deteriorating soil fertility and low crop productivity are some of the reasons behind food insecurity in Nepal especially in its remote hill districts. The only possible way out to meet this challenge is to increase food production. Soil fertility, fertilizer application and soil moisture play major roles in improving crop production. To address the problem of increasing food production, under a Food Crisis Response Program (NFCRP), Government of Nepal has received support from the World Bank consisting on the name of Irrigation and Water Resources Management Project (IWRMP).

In one hand population of the country is increasing and on the other land productivity is decreasing. To meet the food required by the growing population IWRMP wanted to investigate detail soil fertility of the four food vulnerable districts of Eastern and Mid-Western Development Regions. They are Taplejung and Tehrathum in the east and Rolpa and Salyan in mid-west. The objectives of this program is to address the short and medium term implications of the global food crisis for the country by improving access to food and strengthening agricultural production, particularly for food insecure districts and smallholders.

Various maps and report published by Land Resources Mapping Project (LRMP), such as land system and land use maps; Topographic maps published by Department of Survey are compared with the recent Satellite imaginary. These maps were analyzed and overlaid developing polygons which were the basis for soil sampling. Field Enumerators were trained in identifying sampling pit in the field. Frequent supervision and monitoring by the expert were conducted during sample collection.

Soil samples were collected from 17th March to 7 April 2013. In all 1400 soil samples (350 sample each districts) were collected and analyzed for organic matter (OM), soil pH, texture (particle sizes), total nitrogen (N), available phosphorus (P_2O_5) and potash (K_2O), Plant available zinc (Zn) and boron (B) following standard analytical procedure as directed by the project. The lab observations of these elements were later Kriginged to produce soil fertility status/map of individual district. These results of the project are reported in final project report in details. Moreover, the separate publication of individual district is published in four volumes comprising the result of individual district per volume. This book is the part of this publication series which contains the project report for Terathum district.

Soil texture in Terathum districts is medium (81%). They are loam, sandy loam and silt loam. Less than 1% samples are heavy (clay, clay loam and sandy clay loam). Soil pH is dominated by slightly to moderately acidic. Very little percent are alkaline and strongly acidic. Soil organic matter is mostly medium to low only 18 out of 352 samples are high and 111 samples fall under low to very low categories. Total nitrogen content in soil is low to very low. Available soil P_2O_5 is mostly medium to low and almost same numbers of samples show high to very high content. Same types of results have been observed in case of available K_2O. About Zn all the 352 samples content deficient level but B content is sufficient to high.

The fertilizer nutrients requirement for all the four project districts is calculated based on the recommendations made by Pandey and Joshi, 2000. These analysis shows that the total nitrogen requirement is 268.86 for Terathum district. Similarly, available phosphorus requirement is 87.04 whereas available potassium requirement is 71.65 for this district.

made to increase crop production and recommend mineral fertilizer in the mid-hills but limited availability of mineral fertilizer is been the stumbling block and hence crop production in Nepal has remained stagnant or declined (Joshi, 1997). Fertilizer is not easily accessible to the remote areas of Nepal and even in easily available region farmers deviate from the advisory dose and apply their own rates of fertilizer creating imbalance in soil fertility(Joshi and Karki 1993; Karki 2008).

Fertilizers are the most essential plant nutrients for promoting growth of the plant so as to increase the plant bio-mass and yield. In short fertilizers increase the bio-mass and improve the quantity, market quality, value and nutritional quality of plant. So fertilizers are indispensible elements for plant growth, development and reproduction. Intensive crop production in agriculture over the years has resulted in soil mining. It can be realized in many areas but particularly in old settlement of Terai and some valleys in the Mid-Hills with the intensive agricultural practices (Karki 2008). These areas are already facing the negative balance in the soil nutrient (Ghani and Brown, 1997) which is alarming. Chemical fertilizers play a significant role in maintaining the soil fertility at lower cost. These are increasingly used by Nepalese farmers because of intensified cropping system, adoption of high fertility technologies for higher yield per hectare. Any compromise on increasing use of chemical fertilizers will inevitably result in steep decline in food grain production and affects the food security in the country. The results of 10,000 soil samples (soil testing and service division of DOA) indicate that 70 % of soils in Nepal are low in organic matter (especially in old settlement areas), nitrogen and phosphorus. The application of one kilogram use of nutrients produces seven kilogram of extra grain (SMD, 2063/64 BS).

To help increase crop production and the Government of Nepal has received support from World Bank to help in enhancing soil fertility and hence crop production in food insecure districts. This support is received under the name of Social Safety Nets Projects (SSNP) under which one is food/cash for work and the other provision of essential inputs (seeds and fertilizers) to remote districts. Main objective of the program is to address the short and medium term implication of the global food crisis for the country by improving access to food and strengthening agriculture production, particularly for food insecure districts and small holders.

Under the provision of supporting essential inputs additional financing is made under the name Irrigation and Water Resources Management Project (IWRMP) to scale up community managed seed program and soil management. The management of the soil fertility assessment is very important. This would give a stereoscopic status of nutrient deficiency, sufficiency and toxicity and indicate their status in the map namely soil fertility mapping. This will give farmers to know their soil and bring to the sustainable production. The policy maker will make the soil management and crop production policy and also amount of seeds and fertilizer needed for the optimum crop production and hence make the district food secured. To address this program effectively Joint Venture of Soyan Mega Soft, Nest (P) Ltd. and GRID consult (P) Ltd is hired to prepare soil fertility map giving them scientific approach. The consultants are assigned to prepare soil fertility map of Terathum, Taplejung, Salyan and Rolpa districts. The soil fertility map will give general status of plant nutrients condition in those districts by analyzing physical and chemical properties of soil. These soil fertility maps will be the basis for soil health improvement program as well as basis for the fertilizer requirements in those targeted districts.

The fertility parameter map for the districts are prepared using lab results of the entire sampling pit using Kigring interpolation method in ArcGIS environment. All the maps prepared for the district are presented in this publication. These maps include administrative boundary map of each district, Soil sampling pit location map and different soil fertility parameter maps including soil pH, organic matter, total nitrogen, available phosphate, available potash, soil texture, available zinc and available boron.

1 THE PROJECT

1.1 Introduction

Land represents one of the major natural resources available for a country. In Nepalese context, more than 90% of its population is dependent upon land for their fulfillment of basic needs. About 31% of Nepal is potentially arable, although less than 18% of the total land area of Nepal is presently being cultivated (LRMP, 1986a).

Nepal is a land of extremes, its physiography ranges from alluvial plains in the tropical-low lands, to very rugged and permanently-snow and ice covered high mountains. The World's highest mountain peaks occur in Nepal. Climatic conditions can vary so much that tropical and temperate agriculture occurs a few kilometers apart. In Such landscapes, topography is an overruling soil forming factor and responsible for a large variability in soil characteristics, distribution and soil depth. Soil depth is so variable that traditional soil survey is considered less meaningful. The land system classification (Carson et al. 1980) can provide better, albeit more generalized, information on landform and soils(Stainton,1972)(ISRIC, 2009).

Soil fertility in Nepal is declining despite tremendous efforts made by the Soil Management Directorate (SMD) of Department of Agriculture (DOA) in development aspect and Soil Science Division (SSD) of NARC in research. Farmers in the remote areas have been fertilizing their crops by using traditional manure which said to be sustainable (Karki, 1986). However heavy soil erosion and unscientific cultivation practice has deteriorated soil fertility especially in the mid-hills of Nepal (Maskey and Joshi, 1991; Shrestha, 1997). Site specific fertilizer recommendation is

Slope

Figure 2 Slope Map of Terathum District

Spatial Extent

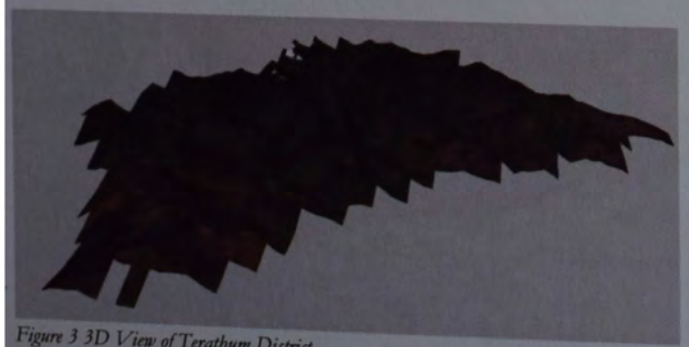


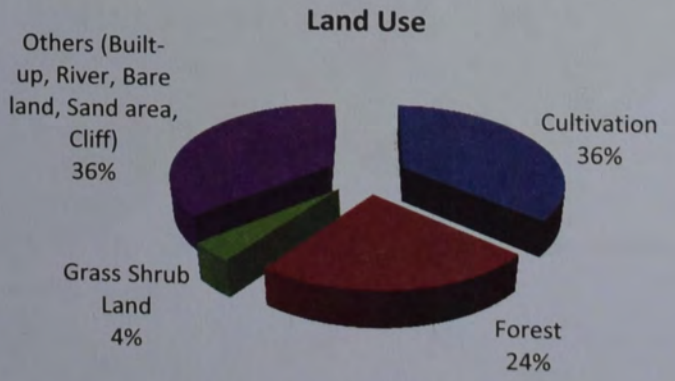
Figure 3 3D View of Terathum District

Latitude	26.967° To 27.297°
Longitude	87.394° To 87.754°

2.2 Land use

Table 1 Land Use of Terathum District (Source: Annual Agriculture Bulletin 2067-68, DOA, Terathum)

Land Use	Area (Ha)
Cultivation	37,282
Forest	24,628
Grass Shrub Land	4,111
Others (Built-up, River, Bare land, Sand area, Cliff)	37,867



2 TERATHUM DISTRICT

This chapter introduces the project area. Different physical, social, environmental and agriculture parameters relevant to the project is discussed in detail in this chapter.

Tarathum is also located in eastern part of Nepal. The word Tehrathum is constructed from thirteen ("tehra") and "thum" (castle or fort). This can be spelled as Terathum, Tehrathum or Terhathum. The town supposedly is the site of one of a series of guard posts once protecting the territory of the Limbus (Limbuwan). Besides, it was used to be the tax ("Tiro" in Nepali) collection centers of these thirteen "thum" before 2019 BS, Hence was believed to name Terathum. Terathum is a word also used to mention Myanglung Bazar which is the district headquarters of Tehrathum. Myanglung is onomatopoeic for the sound of a cat meowing and refers to an old tradition of a Hindu temple (which remains today) in the town which had a resident cat. The "myang" means cat and "lung" means stone in Limbu (Kirat) language. The story is that the cat (myang) in ancient time pawed the stone (lung) in anger. The stone still exists in Myanglung Bazaar at its gateway and is worshipped by the people entering bazaar. Terathum is famous for its Garlic production. The Major tourism destination of the Terathum are Hyatung Fall, Gufa Pokhari, Chattedhunga, Majaui Gufa, Chichiling Pokhari, Marga Pokhari, Yakumba Gadhi, Manchyam Dada, Tinjure, Gaukhuri Gufa, Gurase Ban, Milke, Jaljale. The Major Religious places of the area are Pathivara Devi Temple, Bhagwati Devi Temple, Sihabahini Devi Temple, Shivalaya Temple and different Gumba at Chuhandanda, Simle, Chatedhunga, Aangdim. The physiographic, environmental, socioeconomic, agriculture statuses of the area are presented in subsequent heading below.

2.1 Geography

Area 671 Sq. Km

Elevation Range

Figure 1 Digital Elevation Model of Terathum District

Highest Point 3048 m above MSL

Lowest Point 345m above MSL

Table 2Topographic Distribution of Land in Terathum (Source: National District Profile, 2009)

Physical Condition	Agriculture		Grazing (Ha)	Forest (Ha)	Others (Ha)
	Cultivated (Ha)	Non-Cultivated (Ha)			
High Himalaya	28	17	124	223	0
Mid-Mountain	26891	9931	3901	2374	1142
Siwalik	27075	10207	4111	2462	1142

2.3 Land system and Soil

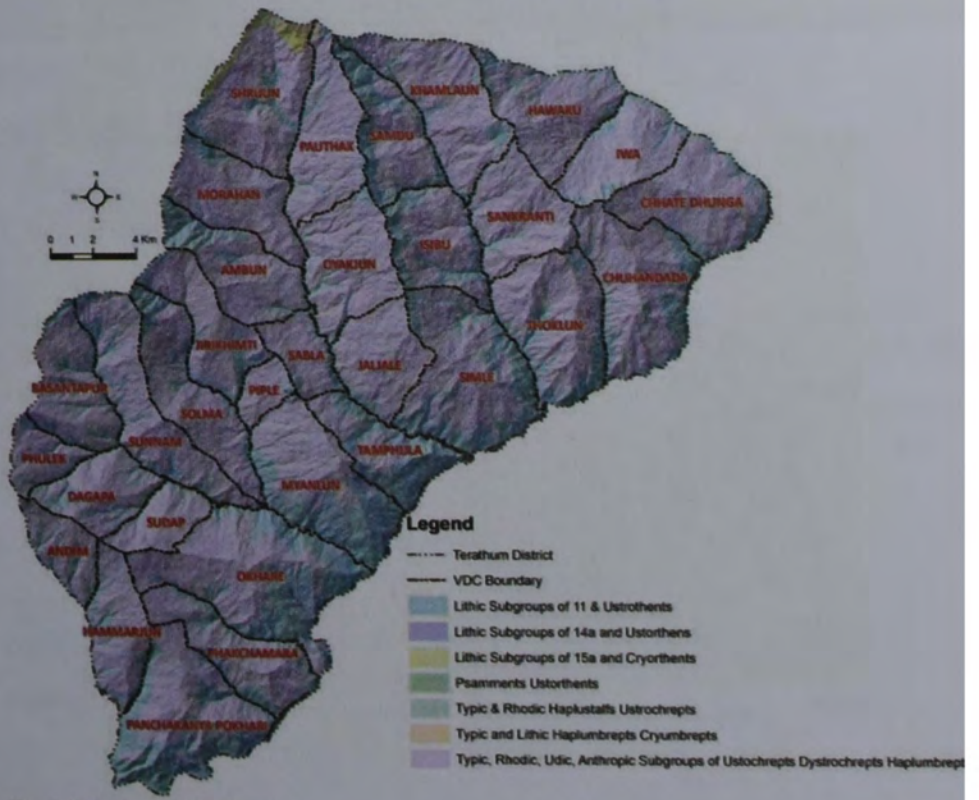


Figure 6 Dominant Soil in Terathum

Figure 4 Land Cover Map of Terathum (Source: Department of Survey, GON)

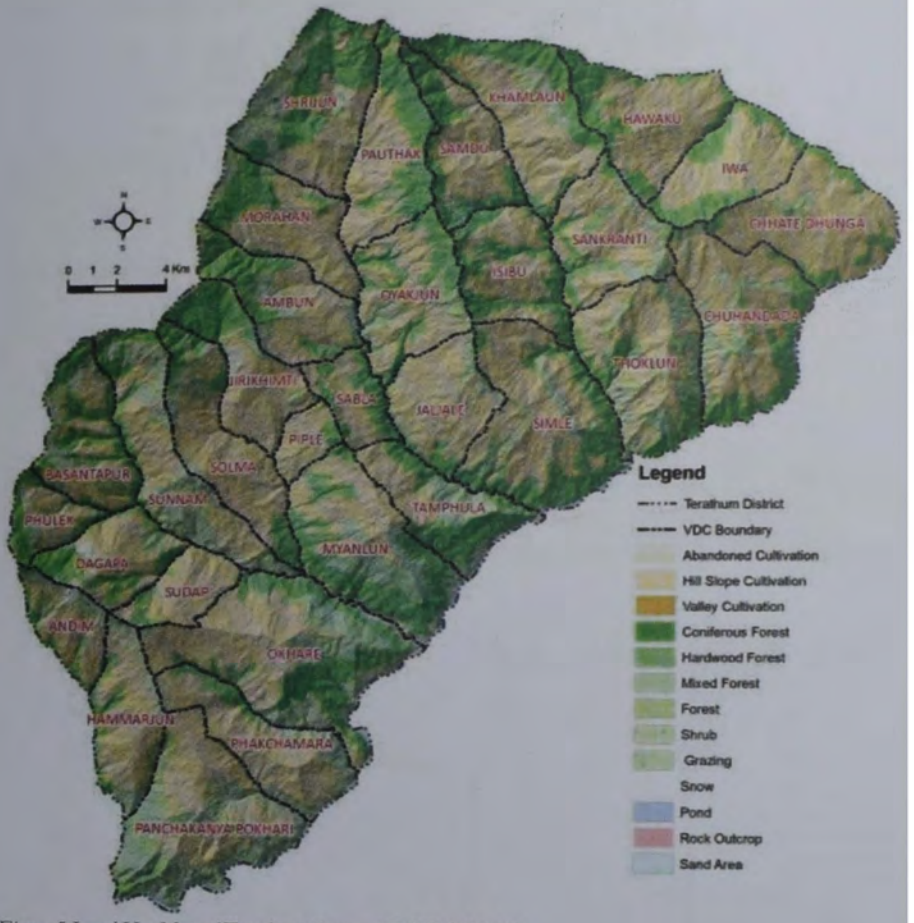


Figure 5 Land Use Map of Terathum (Source: NLUP,2004-06)

Average Yearly Rainfall	1251 mm
Low Temperature Month	January
High Temperature Month	July
Low Precipitation Month	November, January, February

Table 3 Temperature and Rainfall Data of Terathum(Source: Department of Hydrology and Meteorology, Climate Division, Reference station Phidim(Panchther))

Month	Maximum Temperature (°C)	Minimum Temperature (°C)	Rainfall (mm)
January 2010			
February 2010	24.2	9.6	11.6
March 2010	29.7	15.1	13.8
April 2010	32.1	18.1	22
May 2010	32	19.7	115.4
June 2010	32.1	21.7	98
July 2010	30.1	21.8	
August 2010	29.9	21.7	333.4
September 2010	29.5	21.0	209.4
October 2010	28.8	17.1	104
November 2010	25.5	13.2	4.9
December 2010			0

2.6 Population

	Year 2001	Year 2011
Household	20682	22094
Total Male Population	54932	47151
Total Female Population	58179	54426
Total Population	113111	101577
Average Household Size	5.47	4.54
Population Density	168.57	151.38
Population Growth Rate		**-10.08**

2.4 Administrative boundary

Development Region	Eastern Development Region
Zone	Koshi Zone
District headquarter	Myanglung Bazaar

Figure 7 Location Map of Terathum

North Boundary –Taplejung & Sankhuwasabha

West Boundary - Shankhuwasabha and Dhankuta

East Boundary - Panchthar

Figure 8 Administrative Boundary of Terathum

South Boundary- Dhankuta

2.5 Environment

Climate	Sub-Tropical, Temperate and Cool-temperate
Average Minimum Temperature	15°C
Average Maximum Temperature	30°C

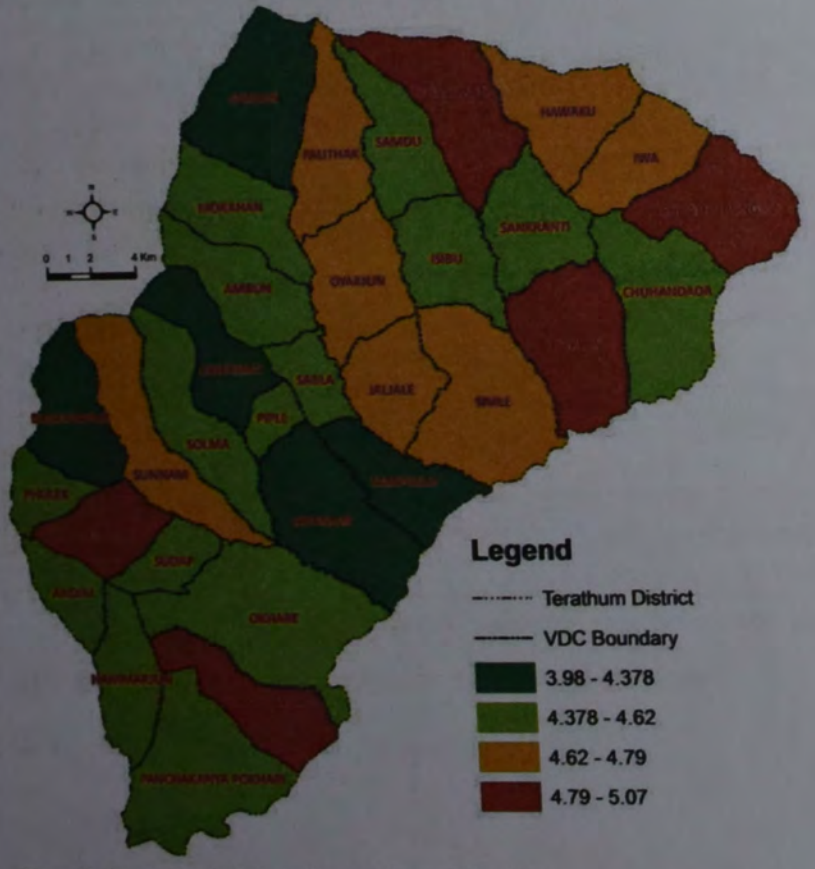


Figure 11 Average Household Size in Terathum (Source: CBS, 2011)

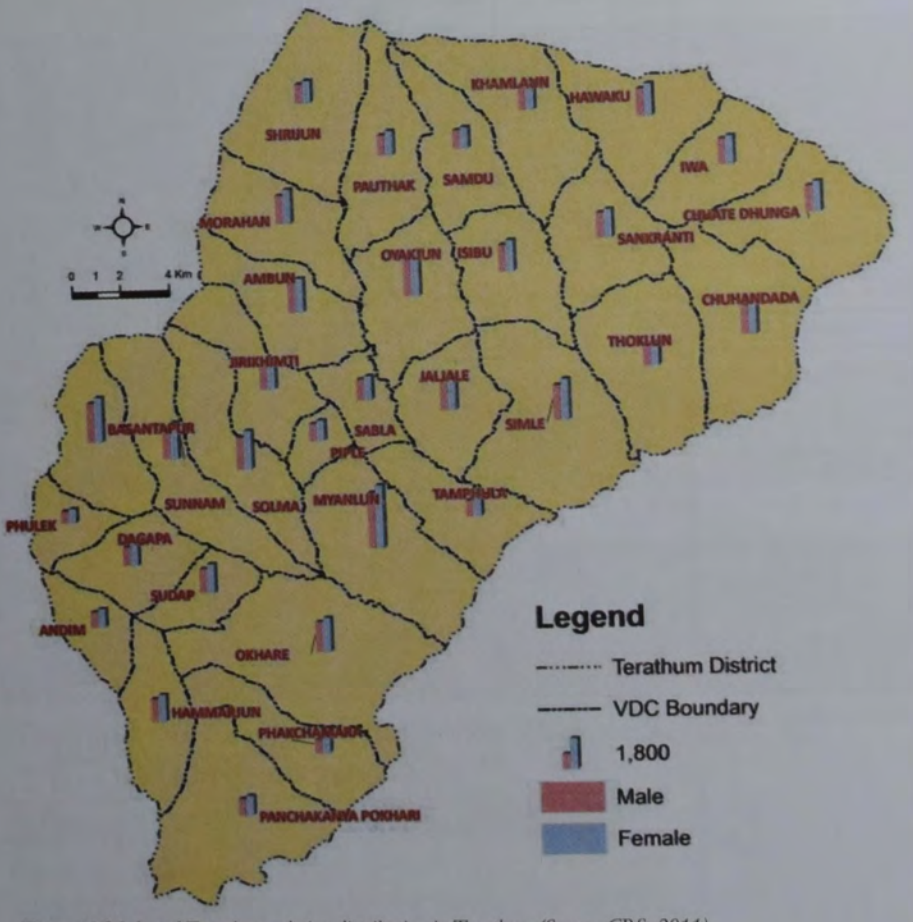


Figure 12 Male and Female population distribution in Terathum (Source: CBS, 2011)

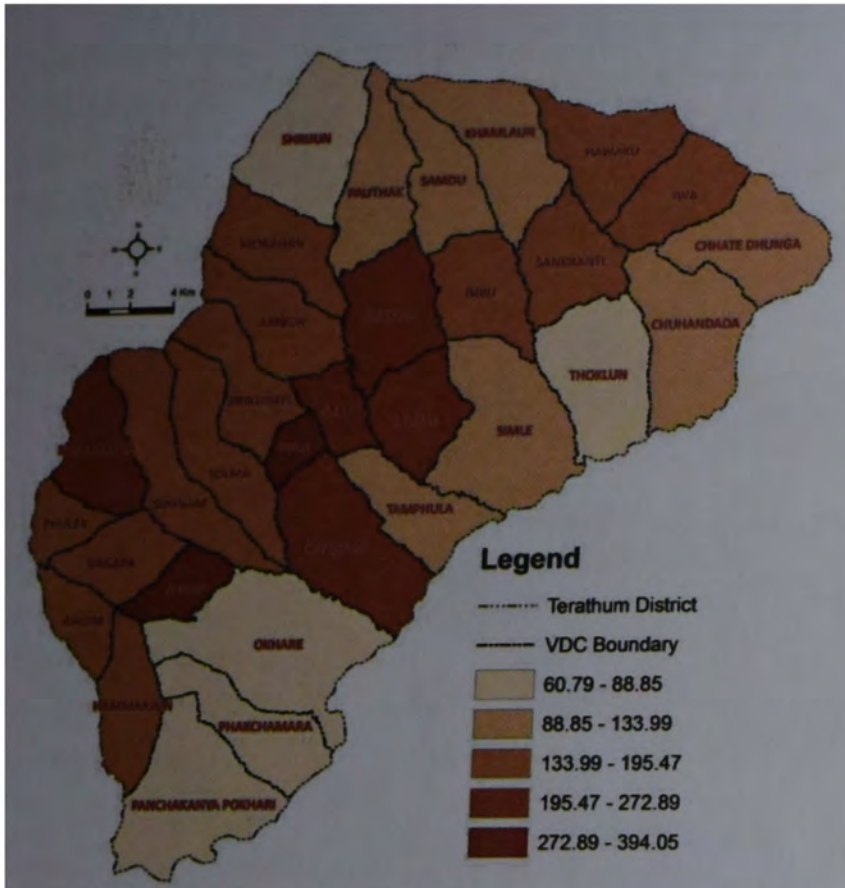


Figure 9 Population Density of Terathum (Source: CBS 2011)

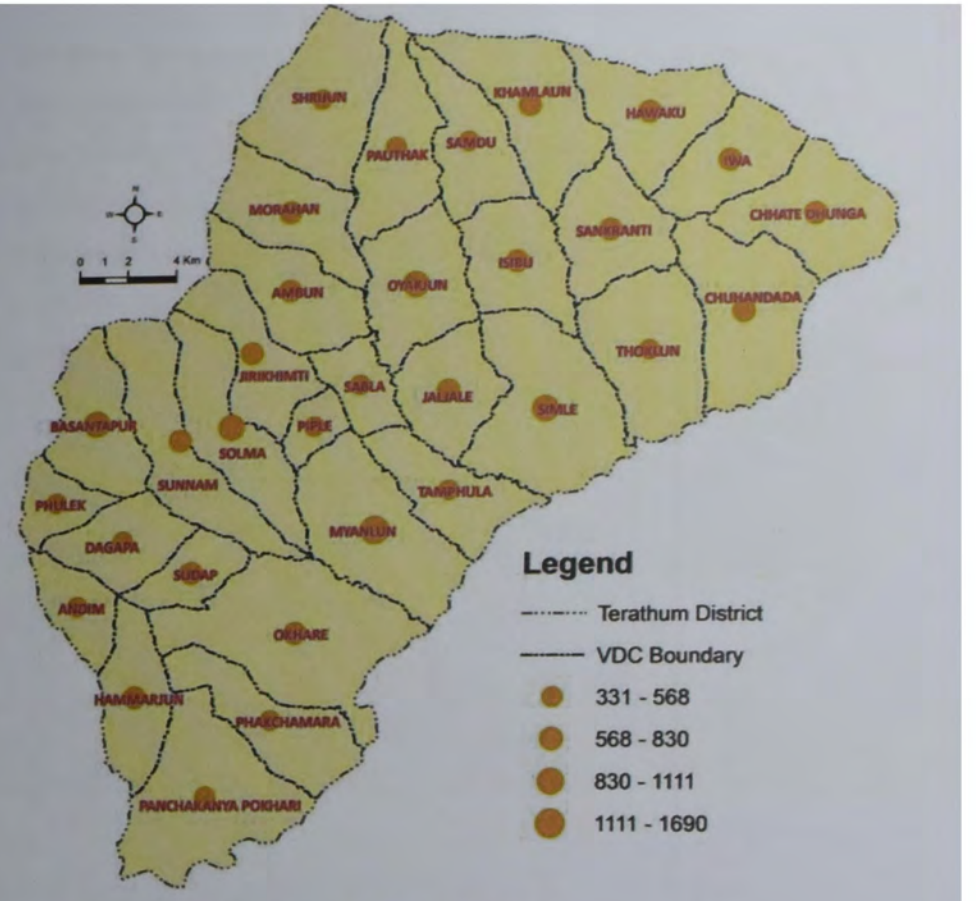


Figure 10 Household Distribution in Terathum (Source: CBS, 2011)

Table 6 Area, Production & Yield of Cash Crops in Terathum, 2010/2011 (Source: Statistical Information on Nepalese Agriculture 2010-2011)

	OIL SEED	POTATO	TOBACCO	SUGARCANE
AREA (Ha)	440	2725		
PRODUCTION (Mt.)	280	27309		
YIELD (Kg/Ha)	636	10022		

Table 7 Area, Production & Yield of Major Spice Crops in Terathum, 2010/2011 (Source: Statistical Information on Nepalese Agriculture 2010-2011)

	CARDAMOM	GINGER	GARLIC	TURMERIC	CHILLI
AREA (Ha)	1000	167	18	2	8
PRODUCTION (Mt.)	280	2187	180	24	32
YIELD (tones/Ha)	0.45	13.10	10.00	12.00	4.00

Table 8 Area, Production & Yield of Pulses in Terathum, 2010/2011 (Source: Statistical Information on Nepalese Agriculture 2010-2011)

	LENTIL	CHICK PEA	PIGEON PEA	BLACK GRAM	GRASS PEA	HORSE GRAM	SOYABEAN	OTHERS
AREA (Ha)	60		2	875		82	680	201
PRODUCTION (Mt.)	45		2	700		37	952	205
YIELD (Kg/Ha)	750		1007	800		453	1400	1022

Table 9 Livestock population and their distribution in Terathum (2010/2011) (Source: Statistical Information on Nepalese Agriculture 2010-2011)

CATTLE	BUFFALOES	SHEEP	GOAT	PIGS	FOWL	DUCK
84027	68390	8603	107068	24492	412500	1159

Table 10 Milk Animals and Milk Production in Terathum (2010/2011) (Source: Statistical Information on Nepalese Agriculture 2010-2011)

COW MILK (Mt.)	7812
BUFFALOES MILK (Mt)	11399
TOTAL MILK PRODUCITON (Mt)	**19211**

2.7 Transportation

The capital Kathmandu is linked with the Terathum district by road

- From Kathmandu throuhgDharan, Dhankuta, Hille, Basantapur, Sungnam to Myaglung.

Beside these, Terathum district has its own rural and agriculture roads namely:

- Basantapur-Myaglung-Aathrai
- Basantapur-Gufa-Aathrai
- Sundhuwa-Sukhrabare
- Jirikhimti-Morahang-Sadhu-Aathrai
- Morahang-Gufa
- Myaglung-Tamor
- Jirikhimti-Magalbare
- Pauthak-Oyangjuk-Jaljale-Simle-Ishubu
- Daregauda-Dangpa
- Shankrati-Dovan-Channge-Taplejung
- Shankrati-Chuhandada-Phidim Bajar
- Chuhandada-Chatedhunga-Iwa-Shankrati

2.8 Agriculture Status

Table 4 Land type and its Classification in Terathum (Source: Nepal District Profile, 2009)

Total Area (Ha)	Total No. of Parcel	Total Tenant (Nos)	Total Land owners (Nos)	Wet-land Classification (Ha)			
				Abal	Doyam	Seem	Chahar
59145	126468	1324	29122	223	2318	7276	934
Dry Land Classification (Ha)							
Abal	Doyam	Seem	Chahar	Pachaun	Total Discounted (Ha)	Total Cultivated (Ha)	
92	3157	11322	6443		27380	31765	

Table 5 Area, Production & Yield of Cereal Crops in Terathum, 2010/2011 (Source: Statistical Information on Nepalese Agriculture 2010-2011)

	PADDY	MAIZE	MILLET	BUCKWHEAT	WHEAT	BARLEY
AREA (Ha)	9592	12300	2700	10	2650	100
PRODUCTION (Mt.)	21102	21014	3061	8	4505	110
YIELD (Kg/Ha)	2200	1708	1134	750	1700	1100

Table 14 Area Production and Yield of different fresh vegetables, 2010/2011 in Terathum (Source: Statistical Information on Nepalese Agriculture 2010-2011)

	AREA (Ha)	PRODUCTION (MT)	YIELD (Mt/Ha)
CAULIFLOWER	260	3456	13.3
CABBAGE	483	8994	18.6
BROCOLI			
TOMATO	42	680	16.2
RADISH	145	2615	18.0
BROAD MUSTARD LEAF	95	1430	15.1
CARROT	25	175	7.0
CAPSICUM	15	65	4.3
PEAS	46	475	10.3
FRENCH BEANS			
FRENCH BEANS POLE	45	550	12.2
BROAD BEANS	10	90	9.0
COWPEA	24	300	12.5
CHILLI	16	65	4.1
OKRA	15	122	8.1
BRINJAL	18	185	10.3
ONION	8	116	14.5
PUMPKIN	170	2440	14.4
SQUASH	10	200	20.0
BITTER GOURD	2	28	14.0
SPONGE GOURD	2	48	24.0
CHAYOTE	109	1660	15.2
TOTAL	**1540**	**23694**	**15.4**

Table 15 Food Availability and Requirement in 2010/11 in Terathum (Source:Statistical Information on Nepalese Agriculture 2010-2011)

EDIBLE PRODUCTION (Mt)						TOTAL EDIABLE PRODUCTION (Mt.)	REQUIREMENT (Mt)	BALANCE (+,-)
RICE	MAIZE	WHEAT	MILLET	BARLEY	BUCK WHEAT			
11402	14598	2487	3602	30	6	32124	20444	11680

Table 11 Area under Citrus Fruits in Terathum, 2010/2011 (Source: Statistical Information on Nepalese Agriculture 2010-2011)

	MANDARINE	SWEET ORANGE	LIME	LEMON	OTHERS
AREA (Ha)	863	34	395	2	1
PORDUCTION AREA (Ha)	573	29	185	2	1
PRODUCTIVITY (Mt.)	12.1	11.2	8.9	4.7	5.8
PRODUCTION (Mt/Ha)	6933.3	324.8	1646.5	9.4	5.8

Table 12 Productive Area and Production of Deciduous (winter) fruits in Terathum, 2009/2010 (Source: Statistical Information on Nepalese Agriculture 2010-2011)

	AREA (Ha)	PRODUCTION (MT)	PRD AREA (Ha)
APPLE	90	456	57
PEAR	125	1265	75
WALNUT	36	39	13
PEACH	49	276	39
PLUM	38	211	31
APRICOT	2		1
PERSIMMON	5	20	2
POMEGRANATE	3	10	2
TOTAL	**348**	**2276**	**221**

Table 13 Area Production and Productive area under Tropical (summer) Fruits in Terathum, 2010/2011 (Source: Statistical Information on Nepalese Agriculture 2010-2011)

	AREA (Ha)	PRODUCTION (MT)	PRD AREA (Ha)
MANGO	110	1000	100
BANANA	31	338	25
GUAVA	75	639	56
PAPAYA	16	156	12
JACKFRUIT	15	127	11
PINEAPPLE	6	54	4
LITCHI	51	282	47
TOTAL	**303**	**255**	**2596**

3 SOIL FERTILITY MAP

The Methodology adopted in the study are derived from scientific literature, Consultant's expert team experience and consultant past experience in the related project. The study methodology selected in such a way that it incorporates latest development in the technology and in the scientific world. The detail of the methodology is presented in the main project report and only brief detail is presented in this publication.

3.1 Coordinate Reference System

The coordinate reference system used for the mapping and GIS is as prescribed in "National Map Projection and Coordinate System" in the aforementioned specification document. The details of the coordinate system used are presented in the following table:

Projection	Modified Universal Transverse Mercator
Spheroid	Everest 1830 (Adjustment 1937)
Semi-Major axis	a=6377276.345m
Semi-Minor axis	b= 6356075.413
1/f	300.8017
Central Meridian	87° E, 0° N
False Coordinate	500,000 m E, 0 m N
Scale Factor at Central Meridian	0.9999

The reference of the vertical datum is the Indian Mean Sea Level (MSL).

3.2 Feature extraction from Satellite Imagery

Medium resolution (5m) Rapid Eye multispectral (5 bands: Red, Green, Blue, Near Infrared and Rededge) (acquisition date March 2010) were acquired by the consultant from its authorized reseller for Nepal. The images were acquired along with their metadata, satellite orbital model file (rational polynomial coefficient file) and tile information files.

These satellite images were then ortho-rectified in LPS of ERDAS Imagine software to increase the horizontal accuracy of the image using GCP and DEM

The ortho-rectified satellite images were then classified to extract cultivated area using object based classification technique in e-Cognition software. This object based classification technique is based on the spectral and contextual property of classified feature. These spectral and contextual properties are adopted based on the different scientific literature.

The cultivation area thus obtained is used to prepare soil fertility map of the cultivation area of the district and also to verify the cultivation area obtained from different secondary data sources.

2.9 Cropping pattern

Table 16 Cropping Pattern in Terathum (Source: Annual Agriculture Bulletin, 2067-2068)

Type	Non Irrigated Area	Percentage (%)
Level Terrace Cultivation	Paddy-Wheat-Paddy	35
	Paddy-Wheat-Maize	25
	Paddy-Fallow Land-Paddy	15
	Paddy-Vegetables-Paddy	10
	Paddy-Soya bean-Paddy	10
	Paddy-Fellow Land-Fallow Land	3
	Paddy-Wheat-Fallow Land	10
Sloping Terrace Cultivation	Maize+Legume Vegetable-Fallow Land	15
	Maize+Pulses-Fallow Land	15
	Maize+Beans-Fallow Land	15
	Maize + Millet-Fallow Land	30
	Maize-Fallow Land-Fallow Land	10
	Potato + Maize-Fallow Land	15

2.10 Major landscape feature

Rivers

Tamor Lumu Khoranga Koya Mewa

Lakes and Ponds

Chichiling Pokhari Tiche Pokhari Siddhamarga Pokhari Chitre Pokhari Lama Pokhari

Waterfalls

Mewa Khola (365m) Lumu Khola (152 m)

a) Information on site sampled

Sampled pit number, Date of observation/sampling, Author of sampling, GPS coordinates of sample site location, Elevation, landform, vegetation, climate and tentative soil classification

b) General information of soil

Parent material, Drainage, Moisture condition, Ground water table, Surface stones or rock outcrop, Erosion, Salt and alkalinity, Human influence, Elevation, landform, vegetation, climate and tentative soil classification

3.5 Laboratory Soil Analysis

Initially, Soil samples collected in the field were preserved in airtight plastic bags. These samples were dried in shade and powdered to be used in reagent for chemical analysis. The laboratory testing was done for various physical and chemical properties. Soil laboratory testing was done in well-equipped soil laboratory. The following routine analysis of soils was done in the laboratory:

Soil Sample Tests	Analysis Method
Texture	Hydrometer & Texture classification (USDA)
pH	1:2.5 soil water paste using combined electrode
Organic Matter (OM)	Walkley and Black Method
Available P_2O_5	Bray and Kurtz method (0.03M NH4 F/0.1M HCL Extraction)
Available K_2O	1N Neutral Ammonium Acetate extraction and K detected by Flame Ignition
Total Nitrogen (N)	Micro Kjeldahl method
Available Zn	Extracted by DTPA extracting solution following procedure outlined by Lindsay and Norvel (1978) and detected in AAS
Available Boron	Hot water extraction and detection in AAS

3.6 Quality Control and Consistency Check

The analysis results are carefully analyzed for its quality assurance. The doubt sample results are reanalyzed for its verification. 5-10 randomly selected samples are re analyzed and its results are compared with its previous result.

3.7 Preparation of Soil Fertility Map

The analyzed chemical properties of the sample soil pit were stored in database in GIS environment. The analysis of the data showed, Kriging as the valid method to be implemented for district soil fertility map preparation. Various literature and scientific publication also recommend Kriging in place of Inverse Weighted Distance, (IDW) for fertility mapping of soil chemical element (Kravchenko et al, 1999; Hengl et al, 2007; Yasrebi et al 2009; Zandi et al 2011; Omran, E., 2012; Chen et al). Thus Kriging interpolation method was adopted to produce the soil fertility map of the cultivation area of the district in ArcGIS environment.

3.3 Soil Sampling Pit Identification

Selection of each sampling pit was based on several secondary spatial data sources that provide information about likely variation in soil properties across the study area. Selection of soil sampling pits are done based on information derived from Topographic data from Survey Department and Land use and Land system data (Originally updated from LRMP data) for district level from National Land Use Project (NLUP). The cultivation area obtained from the above satellite images were not used at the time of sampling location identification as these images arrived late to the consultant.

In this project, soil fertility map of only cultivation area is desired. Thus, only cultivation area is extracted from three independent data sources[1]: Land cover data of topological map, Potential Land use data of NLUP and Land use data of NLUP. The common cultivation area thus obtained is then used to extract corresponding Dominant Soil type of the individual project district from Land system data base of NLUP. Thus extracted land system data is further spatially merged with the corresponding VDC boundary data obtained from topological map. This ensures to locate at least one sampling pit in individual VDC, provided common cultivation area occurred in that VDC. Then this dataset is aggregated for similar Dominant soil type corresponding to individual VDC. The aggregated database is analyzed to distribute sampling pit per variable proportion to the area coverage of the individual variable (i.e. Dominant Soil type per VDC). The stratified random sampling method is used to locate the sampling pit per Dominant Soil type per VDC. The stratified random sampling points are generated using a simple rejection method algorithm: potential points are generated within the polygon (i.e. Dominant Soil type per VDC) boundary based on a bivariate uniform random distribution principle. All together 352 soil sample pits location is generated for the district. Thus obtained points are verified in topographical maps of Department of Survey and in Google Map application.

[1] Soil and Terrain database for Nepal (SOTER) is not used as this database is generalized from LRMP dataset into the scale of 1:1 million

3.4 Soil Field Survey

Soil field survey and sampling provides comprehensive information about the physical characteristics of soil resources of the area. Soil data is collected in the field using soil profile data sheet using guidelines for Soil Profile (FAO 1977) and/or Soil Survey Manual (USDA National Soil Survey Handbook, Revised 2005). The soil samples was taken from soil pits dug at 15cm to 20cm depth (As adopted in Soil fertility maps of various district, published by Soil Management Directorate, Hariharbhawan, Lalitpur, 2063/64 BS).

Following Equipment were used for Soil Sampling:

1. Spade
2. Polythene bucket
3. 12 inches scale
4. Ball point pen/Lead pencil
5. A sheet of thick paper
6. Polythene sheet (2ft x 2ft)

The soil samples basically contains the following data

4.2.2 Soil Fertility Rating for Different Micronutrient

Table 18 Soil fertility rating for different Micronutrients

Micronutrients	Zinc[4], Zn (ppm)or (mg kg^{-1})	Boron[5], B (ppm) or (mg kg^{-1})
Deficiency	<3.1	<0.5
Sufficiency	3.1-20.0	0.5-1.5
High	>20.0	>1.5

4.2.3 Soil Reaction Rating

Table 19 Soil Reaction Rating

Rating	pH
Extremely Acidic	<4.5
Strongly Acidic	4.5-5.2
Moderately Acidic	5.2-5.9
Slightly Acidic	5.9-6.5
Nearly Neutral	6.5-7.0
Slightly Alkaline	7.0-7.5
Moderately Alkaline	7.5-8.3
Strongly Alkaline	8.3-9.0
Extremely Alkaline	>9.0

[4] For Zn DTPA extracting solution as explained by Lindsay and Norvell (1978)
[5] Most common methods for B is Azomethane H methods as modified by Wolf (1974)

4.3 Soil Analysis Results & Discussion

Soil samples were collected from the cultivated field of Terathum Districts in the month of Falgun-Chitra 2069. During this time most of the farmers especially those in the higher altitude in the mountain had already started sowing maize in their field. Some farmers had already spread the manure on their fields. The soil sample collectors had avoided as far as possible the manured part of the field and precaution was taken not to include such soil samples. Rather substitute sampling pit was selected nearby the pre-identified pit in the map. This new location of the pit was marked in the map with its GPS Reading which was later transformed in the GIS database. All the samples were arranged with special care, such that mixed up with the different soil samples can be avoided as well as its contamination during transportation. These samples were air dried for different analysis procedure as stated above.

4.3.1 Soil pH in Terathum District

The basic statistic of the pH in Terathum district is presented below along with its Scatter plot, Sample distribution bar chart, Histogram chart, Normal Q-Q plot and box plot.

4 SOIL LABORATORY ANALYSIS

This chapter presents the detail analysis on the result of the laboratory analysis of the soil sample taken from the district. The conclusion drawn from these analyses were used to prepare soil fertility map and also to make recommendation on soil fertility of individual district.

4.1 Introduction

Soil sample from the sampling pit was collected from the field in plastic bag. Total 350 samples were collected from the district. Labeling tags was used for detail identification of the soil sampling pit. These labeling tags were kept inside the soil sample plastic bag carefully such that moisture content of soil do not damage the information in the tags. These soil samples are then transported and handed over to the soil lab for its detail chemical and physical analysis. Unique lab code was generated for each sample based on the information in the labeling tag. Similarly location of individual sampling pit was updated in the GIS database based on field map and its GPS coordinate. Unique pit number was also generated in the GIS database to explicitly define each sampling pit. In addition, lab codes obtain from the lab for each pit is also entered in the GIS database corresponding to the pit number. The correlation between both lab code and Pit Number are checked and revised multiple time to avoid data mismatching, as these two code are the key to relate spatial location of pit with its lab analysis result. In the lab, the soil sample were tested for pH, Organic Matter, Texture, Total Nitrogen, Available Phosphorus Penta-oxide (P_2O_5), Available Potassium Oxide (K_2O), Zinc (Zn) and Boron (B) using the method describe above. The detail analysis of the result obtained from the lab is presented in the subsequent section.

4.2 Soil Fertility Rating

Soil fertility rating developed by Soil Science Division of NARC and Soil Science Directorate, Department of Agriculture is adopted in the analysis of lab result and Soil Fertility Mapping of the district. The soil fertility rating adopted in this project is presented below.

4.2.1 Soil Fertility Rating for Different Nutrient

Table 17 Soil fertility rating for different nutrients

Nutrients	Organic Matter, OM (%)	Total Nitrogen, N (%)	Available Phosphorus[2], P_2O_5 (Kg Ha^{-1})	Available Potash[3], K_2O (Kg Ha^{-1})
Very Low	<1.0	<0.05	<10.0	<55.0
Low	1.0-2.5	0.05-0.1	10.0-30.0	55.0-110.0
Medium	2.5-5.0	0.1-0.2	30.0-55.0	110.0-280.0
High	5.0-10.0	0.2-0.4	55.0-110.0	280.0-500.0
Very High	>10.0	>0.4	>110.0	>500.0

[2] Olsen Sodium Bi-carbonate P_2O_5
[3] 1 N neutral Ammonium acetate extracted K_2O

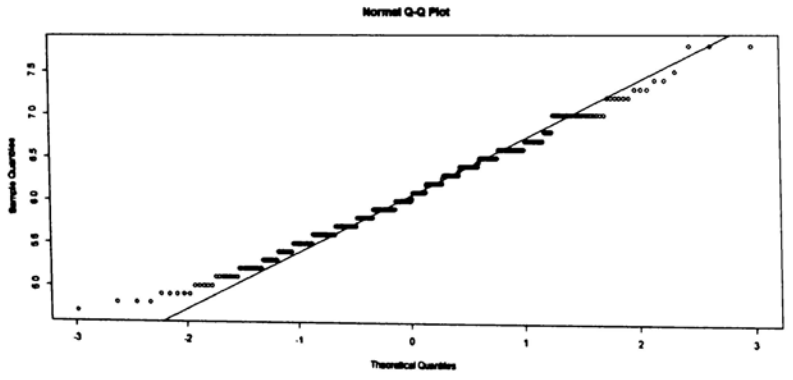


Figure 16 Normal Q-Q Plot of pH in Terathum

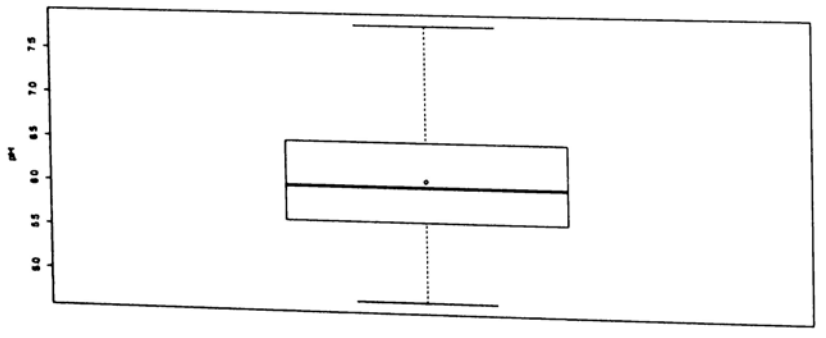


Figure 17 Box Plot of pH in Terathum

The Scatter plot of pH plotted against the number of samples along horizontal axis and corresponding pH value shows that the maximum cluster of samples lies between pH value of 5.5 and 6.5. The Bar Chart of pH of soil samples categorized according to the rating specified in Section 4.2.3 shows that more than120 soil samples are moderately acidic and around 115 soil samples are slightly acidic. The histogram plot of the pH in this district for all samples shows that the pH value ranges from 4.7 to 7.8 with mean and median of the pH value 6.07 and 6.0, which is almost equal. Thus, it is likely that the pH is normally distributed in this district for the entire sample collected. This is also revealed from the shape of the graph which is similar to the shape of typical normal distribution curve. Further, Normal Q-Q plot also called as normal probability plot, which is the plot of ordered data against what would be expected if the data were drawn from a normal distribution. Since the majority of the points depart from the theoretical line, this suggests that they are not normally distributed. The box plot of the pH also shows that the mean is slightly higher than median of the data. The lower hinge (defined as the 25th percentile) of the data is around 5.5. This lower hinge is stretched to the upper hinge (the 75th percentile) at 6.5. Thus the middle half of the scores in the distribution ranges from 5.5 to 6.5.

The pH of the soil is important with respect to the nutrient availability to plants. In strongly acidic condition acid forming cations such as Al, Cu, Fe, Mn, Zn and H are active. In such case, if there are sufficient amount of these elements including other heavy metals like Cd, As and etc., it become toxic to the plant and plants suffer from the nutrients uptake. In addition, phosphorus gets bind by these elements and will not be available to plants. Hence, Plant suffers with P deficiency as well as the basic cations such as Ca, Mg and Na do not avail to the plants (Godo and Reisenauer, 1980). When soil pH drops down to 5.5, plants suffer because of acute acidity and toxicity of the elements. In this condition P is fixed and becomes unavailable. Soil pH

Table 20 Summary Statistic of pH in Terathum

Minimum	1st Quartile	Median	Mean	3rd Quartile	Maximum	Variance	Standard Deviation
4.7	5.6	6.0	6.07	6.50	7.8	0.36	0.60

Extremely Acidic	Strongly Acidic	Moderately Acidic	Slightly Acidic	Nearly Neutral	Slightly Alkaline	Moderately Alkaline	Strongly Alkaline	Extremely Alkaline	Total
-	33	125	117	62	12	3	-	-	352

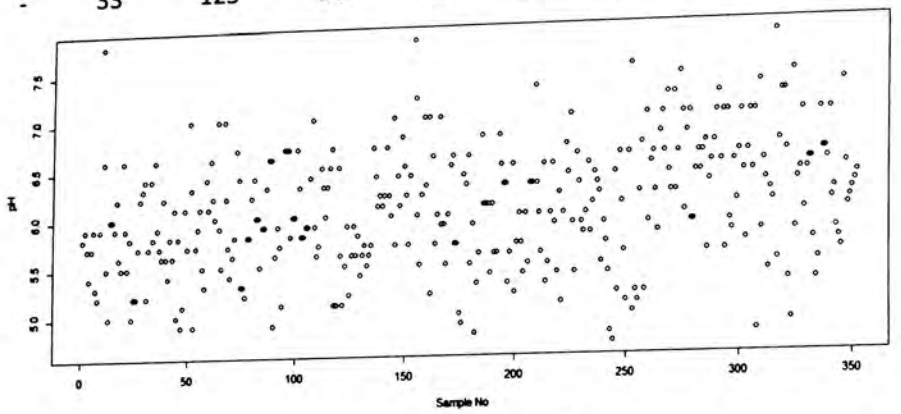


Figure 13 Scatter plot of pH in Terathum District

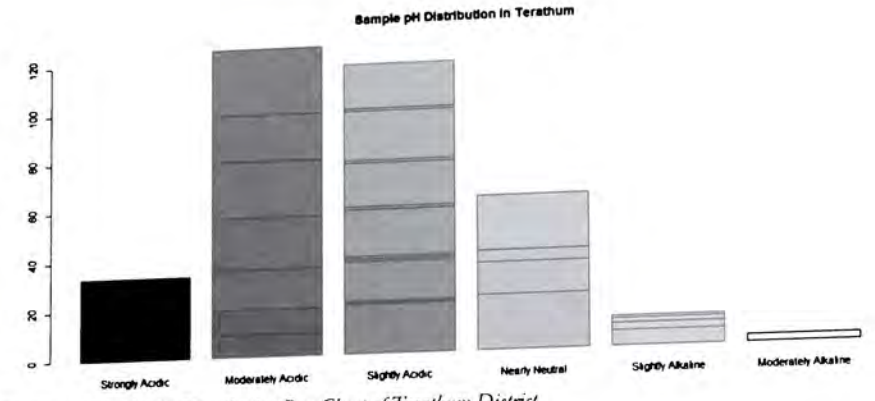


Figure 14 Sample pH Distribution Bar Chart of Terathum District

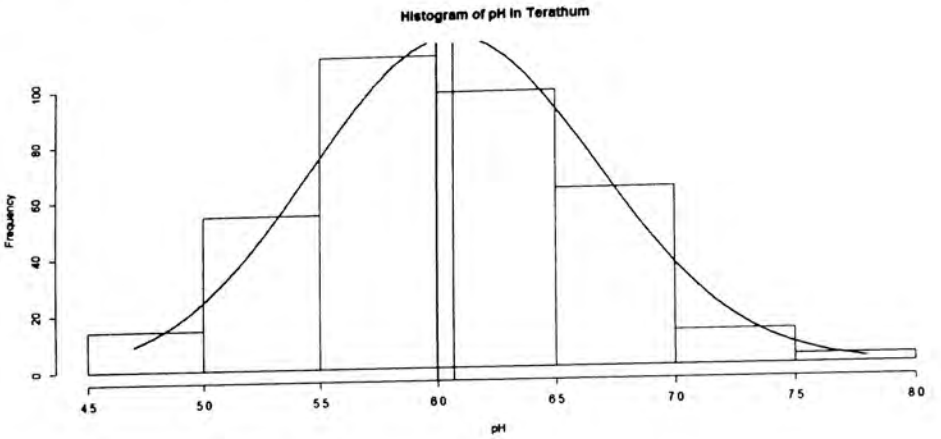


Figure 15 Histogram of pH in Terathum

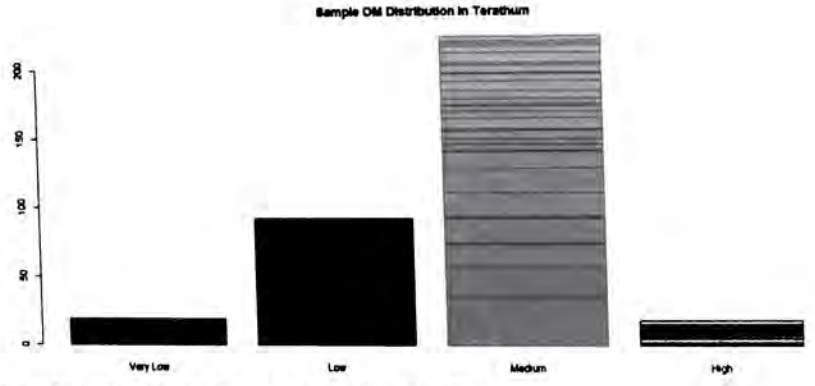


Figure 19 Sample OM Distribution Bar Chart of Terathum District

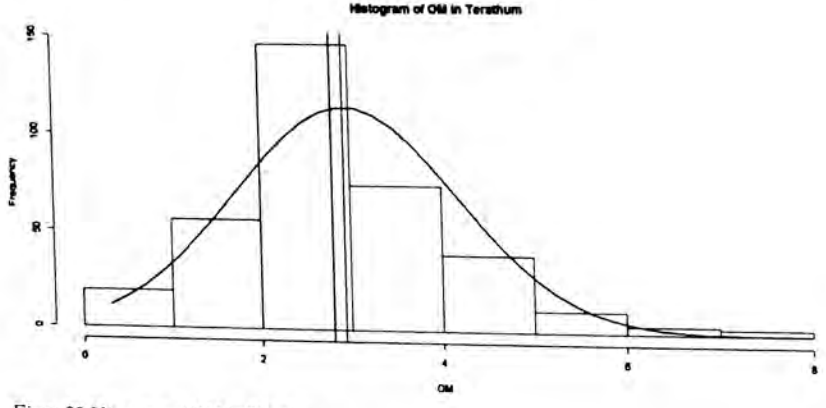


Figure 20 Histogram of OM in Terathum

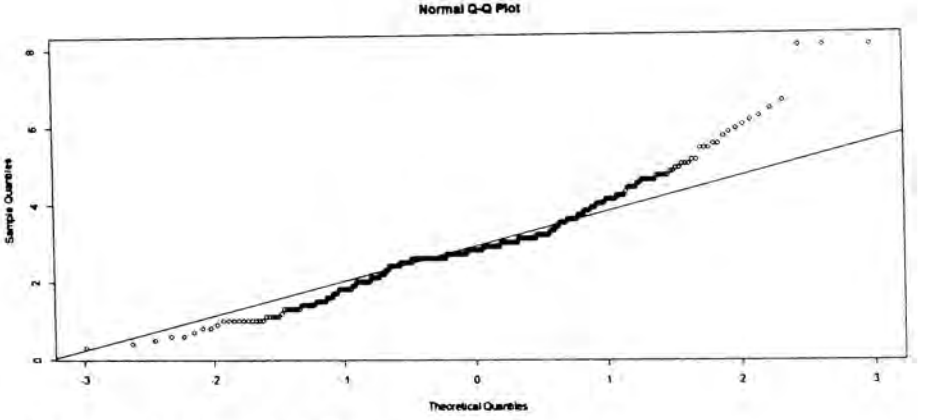


Figure 21 Normal Q-Q Plot of OM in Terathum

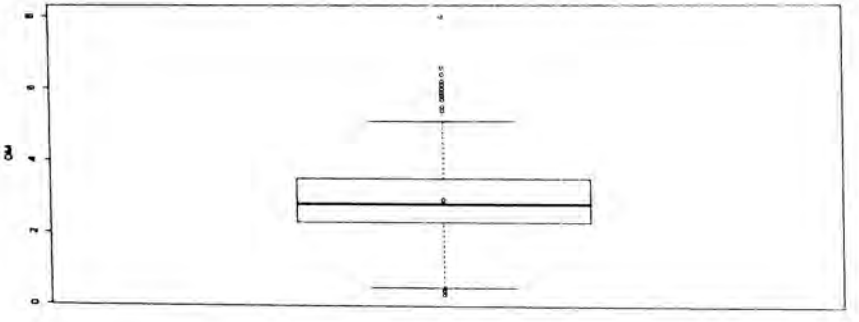


Figure 22 Box Plot of OM in Terathum

needs to be alleviated to at least 6.5 (Pearcy et al., 1989). But application of recommended dose of lime cannot be applied all at a time to raise the soil pH to desired level. Application of all the recommended amount of lime may hamper the soil due to immediate rising of soil pH. On the contrary when the soil is alkaline Ca, Mg and Na will be active and will affect the availability of P as it is bind with these basic cations. The other micronutrients such as Cu Fe, and Zn precipitate and won'tbe not available to plant and crop yield will reduced (Brallier et al., 1996). Thus, it very important to maintain pH of the soil in near neutral condition but it is difficult to keep the pH near neutral and hence pH 6.5 to 7 is recommended as near neutral. There could also be the antagonistic effect of lime on C to Mg and other cations (Edmeades et al., 1983) .Therefore, to keep balance with the micro and macro nutrients elements pH of around 6.0 would be optimum. Since lime is not recommended because of difficulty in transportation. Well decomposed organic manure is as good as lime in buffering the soil pH and hence recommended.

The soil analysis results of Terathum shows that only 68 soils samples out of 351 are acidic that is equal to 19% of the total. The samples having less than pH 5 .0 are very limited and hence lime requirement study is not done. However in such as case blanket application of 2-3 tons of lime could be recommended which also depends on the availability of agricultural lime. Over 80% of the samples do not need any amelioration and in such condition most of the plant nutrients are available to the plants. This soil pH is tolerance to all the prevailing crops in the district.

4.3.2 Soil Organic Matter (OM) in Terathum District

The basic statistic of the Organic Matter percentage (OM) in Terathum district is presented below along with its Scatter plot, Sample distribution bar chart, Histogram chart, Normal Q-Q plot and box plot.

Table 21 Summary Statistic of Organic Matter (OM) in Terathum

Minimum	1st Quartile	Median	Mean	3rd Quartile	Maximum	Variance	Standard Deviation
0.3	2.30	2.80	2.93	3.5	8.00	1.50	1.22

Very Low	Low	Medium	High	Very High	Total
19	92	223	18	-	352

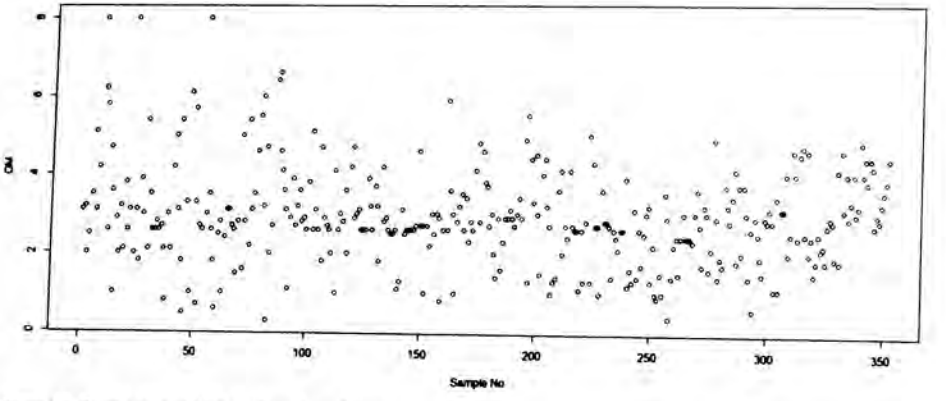


Figure 18 Scatter plot of OM in Terathum District

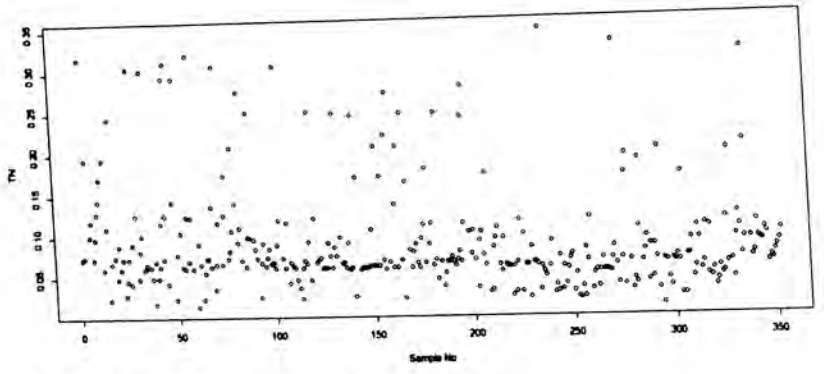


Figure 23 Scatter plot of Total Nitrogen in Terathem District

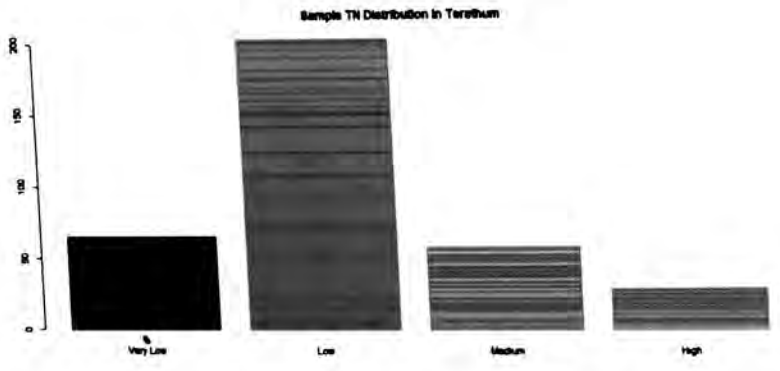


Figure 24 Sample Total Nitrogen Distribution Bar Chart of Terathem District

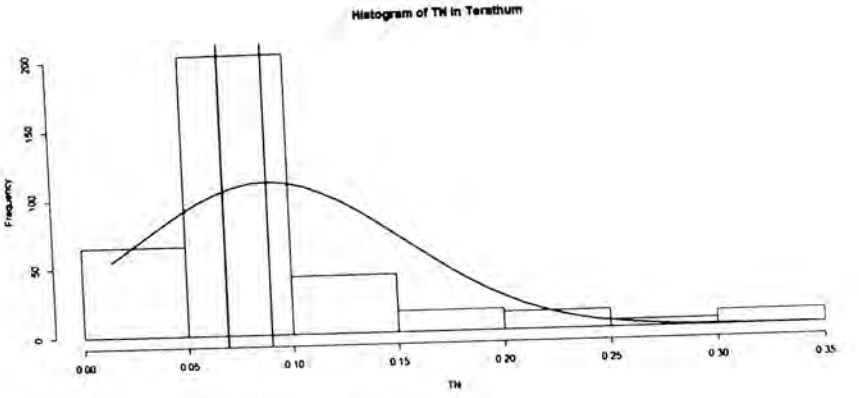


Figure 25 Histogram of Total Nitrogen in Terathem

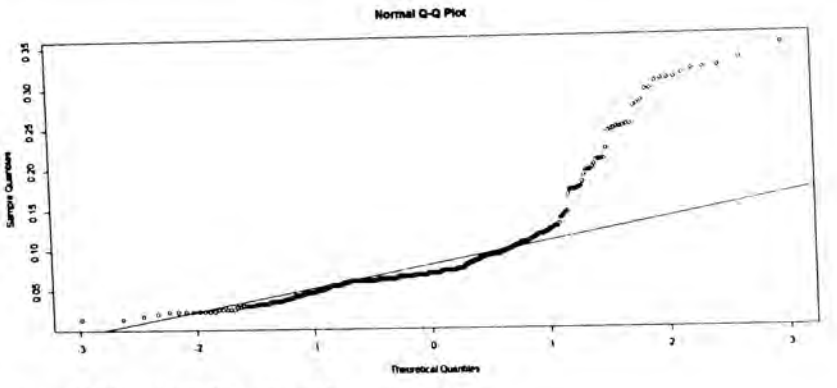


Figure 26 Normal Q-Q Plot of Total Nitrogen in Terathem

The Scatter plot of OM shows that the maximum cluster of samples lies between 2.0% and 4.0%. The Bar Chart of OM of soil samples categorized according to the rating specified in Section 4.2.1 shows that more than 200 soil samples have medium range of Organic Matter content. The histogram plot shows OM range from 0.3% to 8.00% with mean and median of 2.93 and 2.80, which is almost equal. Thus, it is likely that the OM is normally distributed in this district for the entire sample collected. This is also revealed from the shape of the graph which is similar to the shape of typical normal distribution curve. Further, In Normal Q-Q plots the majority of the points deviate from the theoretical line; this suggests that soil sample deviates from normally distribution. The box plot of the OM also shows that the mean and median of the data are quite close to each other with mean little bit higher than median. The lower hinge of the data is around 2. This lower hinge is stretched to the upper hinge at 3.8. Thus the middle half of the scores in this distribution range.

Organic matter in soil improves soil physical properties such as, increase aeration, lower bulk density of soil, increase water holding capacity, holds nutrients from leaching and increase water infiltration, chelation of micronutrients and promotes plant uptake (Balesdent et al., 2000; Chen et al., 1996). But there are chances that even heavy metals could be taken up by the plants through chelation. Soil organic matter improves overall quality of soil and sustain crop productivity (Reeves, 1997). Organic matter content in the soils of Terathum District ranges from 8.0 to 0.3. The mean value is 2.93 and 30% of the samples fall under low to very low categories. Only 223 (60%) samples are medium and 18 (5%) are high. The low amount of organic matter in soil could be due to low production of FYM as the problem of livestock maintenance in the hill districts due to manpower shortage (Bhandari and Grant, 2007) and also loss of organic matter through erosion (Dregne, 1987; Gardner and Gerrard, 2003). Green manuring in the remote areas of Nepal is rarely practiced. Moreover, there is a concept that green manure is only be done in submerged soil. It is true that in submerged condition the decomposition of green manure plants is easy and nutrients release is used by the rice crops. But soil organic matter could be increased by the addition of crop residues and also green manure plant incorporation even in upland condition (Azmal et al., 1996). Other sources of biological N fixation and incorporation of these materials in soil could significantly contribute to soil organic matter (John et al., 1992).

4.3.3 Total Nitrogen (TN) in Terathum District

The basic statistic of the Total Nitrogen percentage (TN) in Terathum district is presented below along with its Scatter plot, Sample distribution bar chart, Histogram chart, Normal Q-Q plot and box plot.

Table 22 Summary Statistic of Total Nitrogen (TN) in Terathem

Minimum	1st Quartile	Median	Mean	3rd Quartile	Maximum	Variance	Standard Deviation
0.014	0.06	0.069	0.0898	0.098	0.345	0.004	0.063

Very Low	Low	Medium	High	Very High	Total
65	202	57	28	-	352

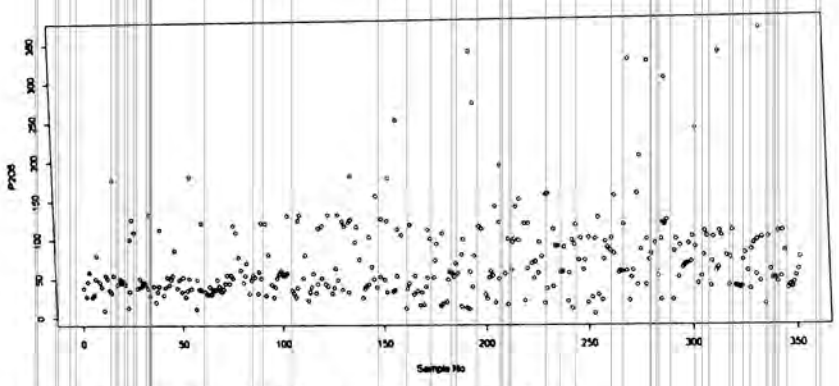


Figure 28 Scatter plot of Available Phosphorus (P_2O_5) in Terathum District

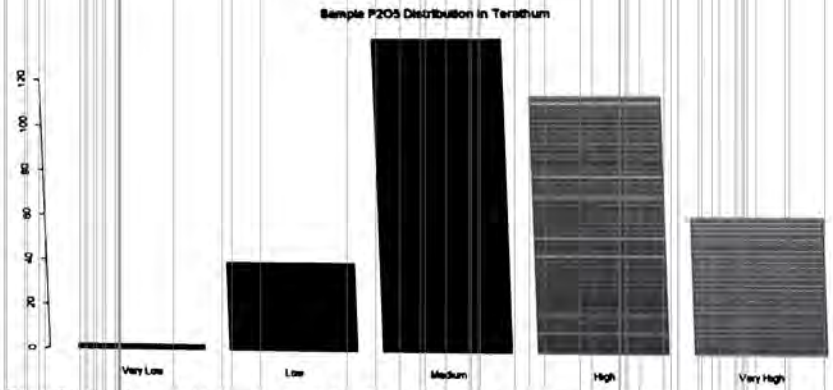


Figure 29 Sample Available Phosphorus (P_2O_5) Distribution Bar Chart of Terathum District

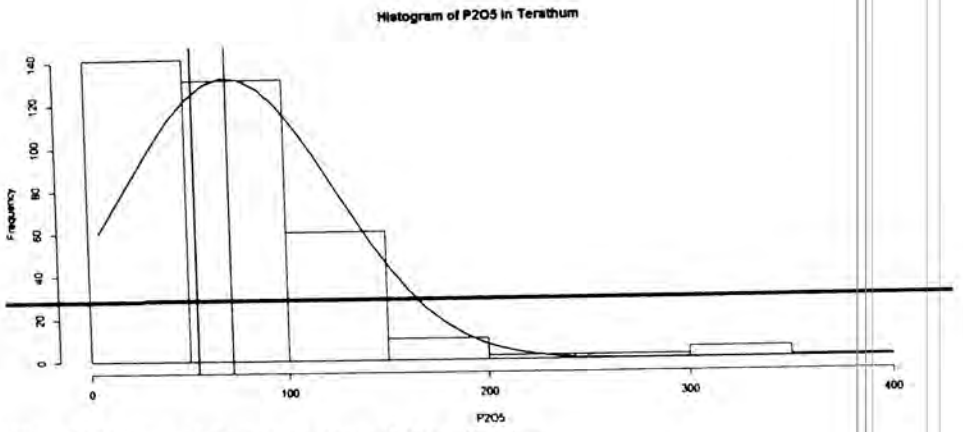


Figure 30 Histogram of Available Phosphorus (P_2O_5) in Terathum

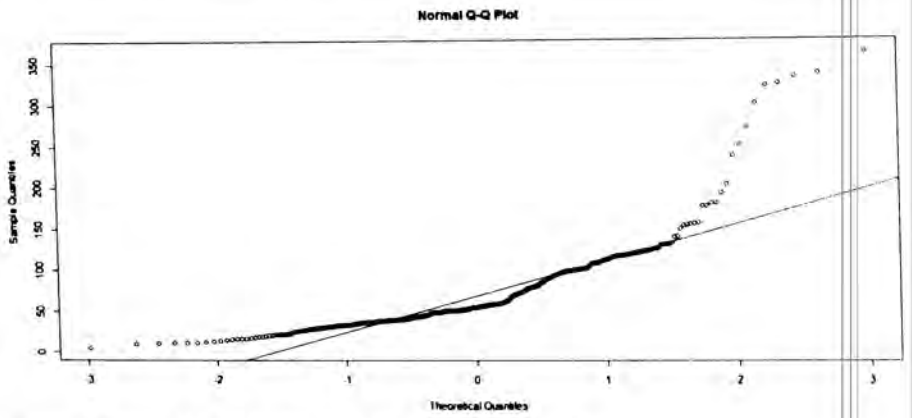


Figure 31 Normal Q-Q Plot of Available Phosphorus (P_2O_5) in Terathum

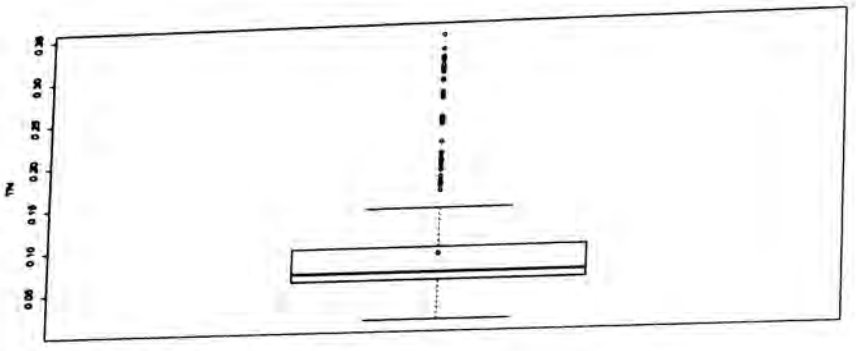


Figure 27 Box Plot of Total Nitrogen in Terathem

The Scatter plot of Total Nitrogen shows that the maximum cluster of samples lies between 0.05% and 0.1%. The Bar Chart of Total Nitrogen of soil samples categorized according to the rating specified in Section 4.2.1 shows that around 200 soil samples have low range of Total Nitrogen content. The histogram plot shows Total Nitrogen range from 0.014% to 0.345% with mean and median of 0.0898 and 0.069, hence mean is slightly greater than median. The shape of the graph is somewhat positively skewed. Further, In Normal Q-Q plots the majority of the points departs from the theoretical line, this also suggests that sample data are not normally distributed. The box plot of the Total Nitrogen also shows that the mean are higher than median. The lower hinge of the data is around 0.08%. This lower hinge is stretched to the upper hinge at 0.1%. Thus the middle half of the scores in this distribution range.

Total nitrogen in Terathum soil shows 267 samples (76%) are low. And only 28 samples (8%) are higher category and 57 (16%) samples are under medium level. The ranges show that the total N content 0.014 to 0.345% and the mean value is 0.0898 % which is low level of total N. Total nitrogen content in soil is not taken into consideration for soil fertility evaluation as it does not remain in soil for a long time. It could be lost through leaching, evaporation and fixed or even conversion to other forms in certain time gap (Bradbury et al., 1993). The cropping pattern shows that 15% of the crops are grown following maize/cowpeas/peas. These legume crops could fix little amount of nitrogen but does not remain for long time. In addition, there is a practice that legume crops are uprooted at the time of harvest and even the root biomass is taken out from the soil. Thus, very little organic matter and N is added into the soil.

4.3.4 Available Phosphorus (P2O5) in Terathum District

The basic statistic of the Available Phosphorus in Kg per Ha (P_2O_5) in Terathum district is presented below along with its Scatter plot, Sample distribution bar chart, Histogram chart, Normal Q-Q plot and box plot.

Table 23 Summary Statistic of Available Phosphorus (P_2O_5) in Terathum

Minimum	1st Quartile	Median	Mean	3rd Quartile	Maximum	Variance	Standard Deviation
4.93	38.67	54.42	71.84	97.68	362.10	2828.037	53.18

Very Low	Low	Medium	High	Very High	Total
2	39	138	113	60	352

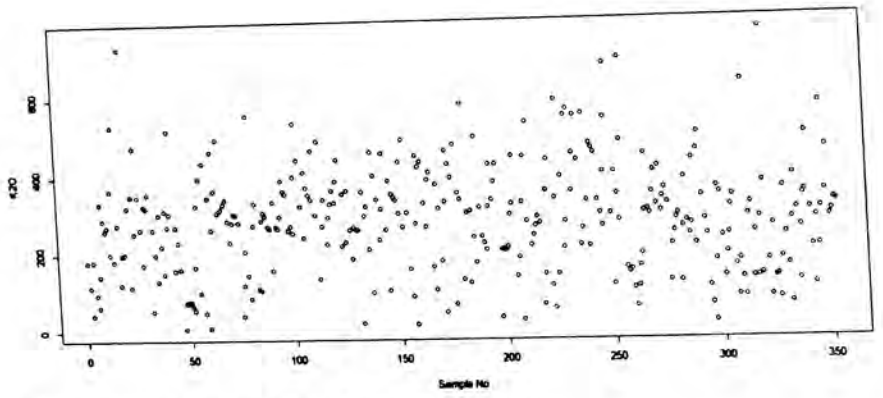


Figure 33 Scatter plot of Available Potash (K_2O) in Terathum District

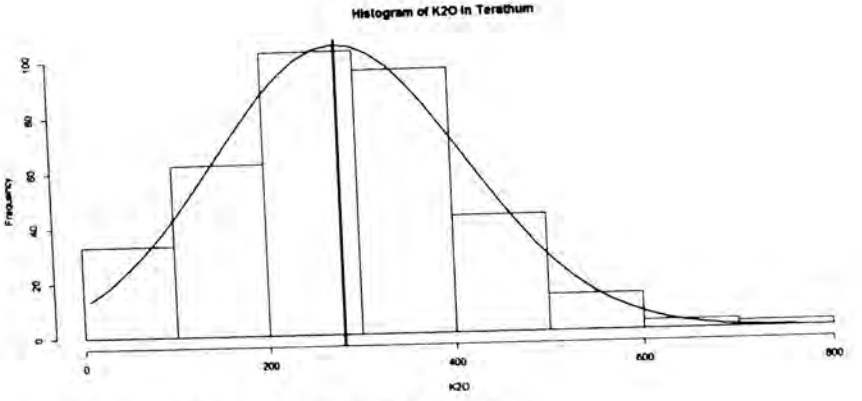


Figure 35 Histogram of Available Potash (K_2O) in Terathum

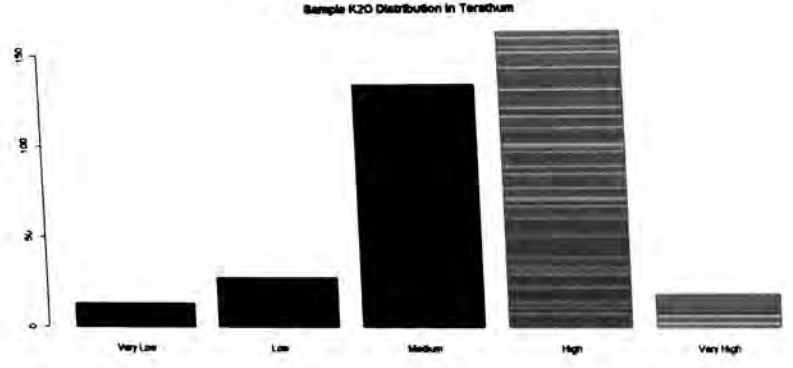


Figure 34 Sample Available Potash (K_2O) Distribution Bar Chart of Terathum District

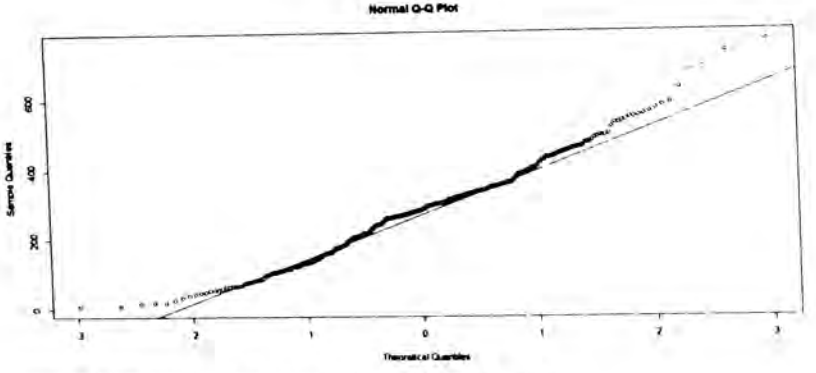


Figure 36 Normal Q-Q Plot of Available Potash (K_2O) in Terathum

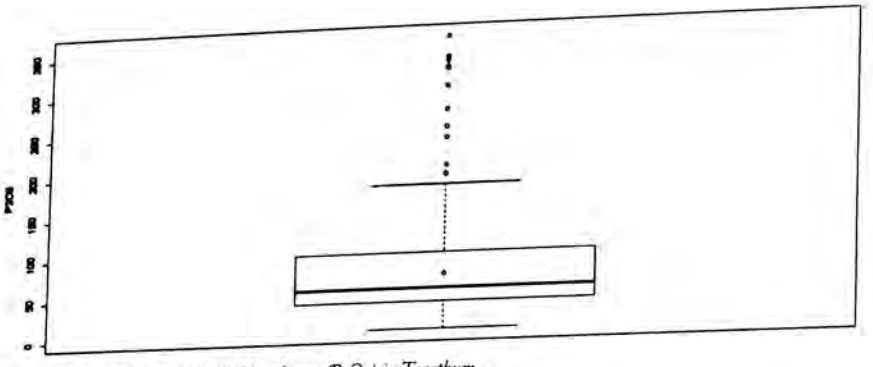


Figure 32 Box Plot of Available Phosphorus (P_2O_5) in Terathum

The Scatter plot of Available Phosphorus (P_2O_5) shows that the maximum cluster of samples lies between 0 Kg per Hectare and 50 Kg per Hectare. The Bar Chart of Available Phosphorus (P_2O_5) of soil samples categorized according to the rating specified in Section 4.2.1 shows that more than 120 soil samples have Medium range of Available Phosphorus (P_2O_5) and around 115 soil samples are in high rating. The histogram plot shows Available Phosphorus (P_2O_5) range from 4.93Kg per Hectare to 362.10Kg per Hectare with mean and median of 71.84 and 54.42, hence mean is greater than median. The shape of the graph is positively skewed. Further, In Normal Q-Q plots the majority of the points departs from the theoretical line, this also suggests that sample data are not normally distributed. The box plot of the Available Phosphorus (P_2O_5) also shows that the mean are higher than median.

Phosphorus in plants develops stem strength and helps in biological nitrogen fixation (Jakobsen, 1985) as well as seed formation. In the soil sample of Terathum only 41 (11%) soil samples are low to very low groups. It shows that the P in soil samples is not related to any of other soil properties. If we say it is related to organic matter which contains also phosphorus, the number of high phosphorus containing soil samples are not that much high in number. Similarly low organic matter and low P2O5 could not be correlated. Likewise relation with total nitrogen content is also not well related. But there could be some relation with available K2O which cannot be supported by any literature. In the plant system there is synergisms in the uptake of P and K by plant (Jungk and Claassen, 1986). The higher amount of P2O5 is also observed in their soil analysis by Soil Science Division, Khumaltar (SSD, 2002/2003) .

4.3.5 Available Potash (K2O) in Terathum District

The basic statistic of the Available Potash in Kg per Ha (K_2O) in Terathum district is presented below along with its Scatter plot, Sample distribution bar chart, Histogram chart, Normal Q-Q plot and box plot.

Table 24Summary Statistic of Available Potash (K_2O) in Terathum

Minimum	1st Quartile	Median	Mean	3rd Quartile	Maximum	Variance	Standard Deviation
6.48	181.90	281.60	280.60	352.10	759.60	18170.71	134.79

Very Low	Low	Medium	High	Very High	Total
13	27	133	161	18	352

Table 25 Summary Statistic of Sand, Clay and Silt in Terathum

	Minimum	1st Quartile	Median	Mean	3rd Quartile	Maximum	Variance	Standard Deviation
Sand	19.0	44.72	56.60	56.37	66.0	95.10	202.37	14.22
Clay	0	8.30	14.65	14.45	19.71	71.0	82.39	9.07
Silt	0.25	22.50	30.0	29.15	37.56	65.0	118.12	10.86

Clay	Clay Loam	Loam	Loamy Sand	Sand	Sandy Clay	Sandy Clay Loam	Sandy Loam	Silt Loam	Total
5	8	118	26	10	1	16	163	5	352

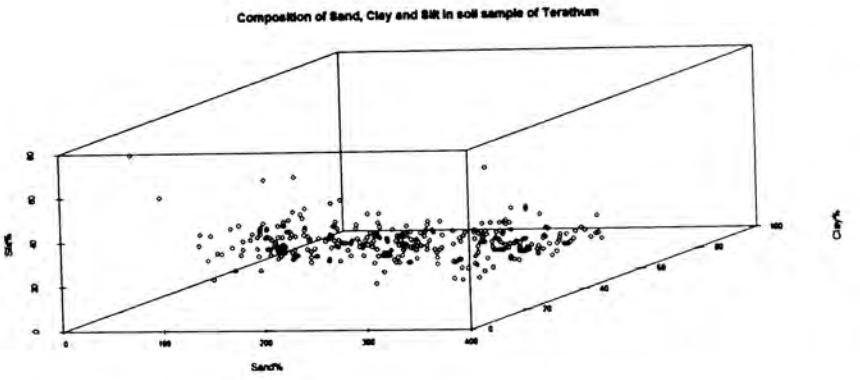


Figure 38 3D Scatter plot of Sand Clay and Silt composition in Terathum District

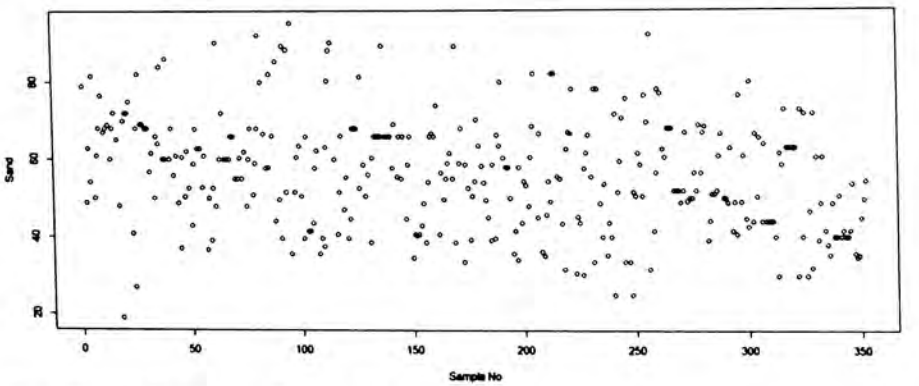


Figure 39 Scatter Plot of Sand in Terathum District

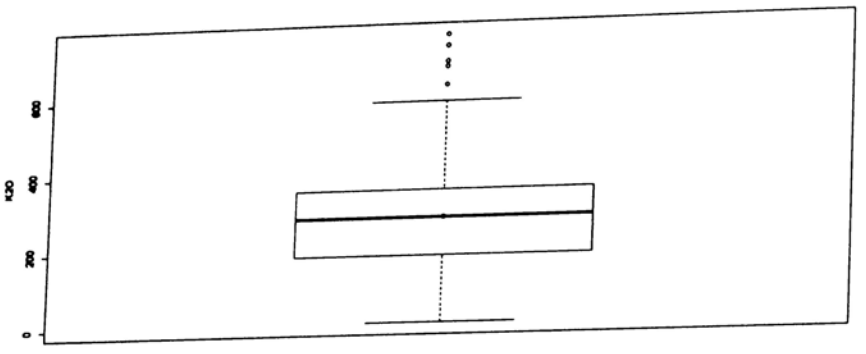


Figure 37 Box Plot of Available Potash (K_2O) in Terathum

The Scatter plot of Available Potash (K_2O) shows that the maximum cluster of samples lies between 200 Kg per Hectare and 300 Kg per Hectare. The Bar Chart of Available Potash (K_2O) of soil samples categorized according to the rating specified in Section 4.2.1 shows around 150 soil samples have High range of Available Potash (K_2O) and around 130 soil samples are in medium rating. The histogram plot shows Available Potash (K_2O) range from 6.48Kg per Hectare to 759.60Kg per Hectare with mean and median of 280.60 and 281.60, hence mean is lower than median. The shape of the graph resembles typical Normal distribution. Further, In Normal Q-Q plots the majority of the points depart from the theoretical line. The box plot of the Available Potash (K_2O) also shows that the mean are slightly lower than median. Thus from these entire statistic we can conclude that the sample data are more likely normally distributed.

Potassium is another important plant nutrient. It helps in transporting manufactured food in leaves to different parts of the body. One of its functions is to control stomata opening and thereby develop drought resistance, fight disease and pest and develops resistance. The main source of soil potassium are the weathering of mineral such as muscovite, microcline and other K containing rocks and minerals that are weathered and release the potassium to soil solution. In most partially weathered mineral soils only a small part of the total potassium is readily exchangeable to other ions; the bulk occurs in non-exchangeable (or difficultly-exchangeable) forms in potash feldspars, micas and micaceous clays, all of which are potential sources of potassium for plants (Arnold, 1960). In this case of Terathum District the soil K shows higher level. Mica are generally slow weathering and releases K slowly to the reserve pool. After the reserve pool releases K to the exchangeable pool and then plant take up. Only 4% of the samples are in very low 59% are high in high rating. This could be the reason that the texture of soil is generally light containing silt and sand more than clay contents. Abundance of K2O in the clay fractions were from the breakdown of the structural units of the expansible minerals, micas and feldspars (Igwe et al., 2005).

4.3.6 Soil Texture in Terathum District

The soil texture is the composition of Sand, Clay and Silt. The basic statistic of the Soil Texture and its constituent in Percentage for Terathum district is presented below along with its Scatter plot, Sample distribution bar chart, Histogram chart, Normal Q-Q plot and box plot.

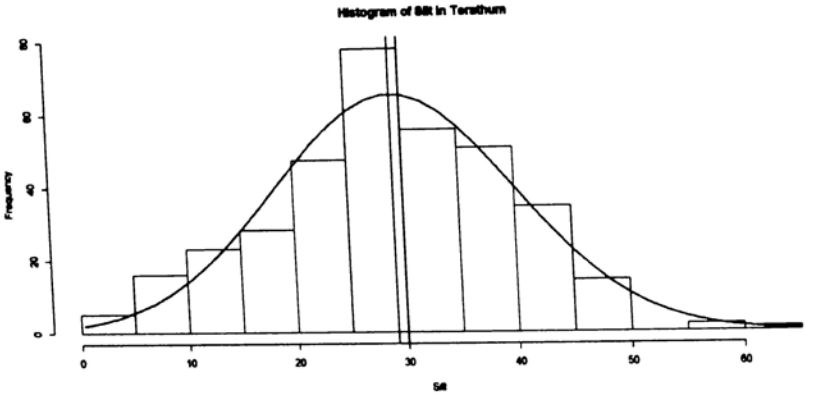


Figure 44Histogram of Silt in Terathum

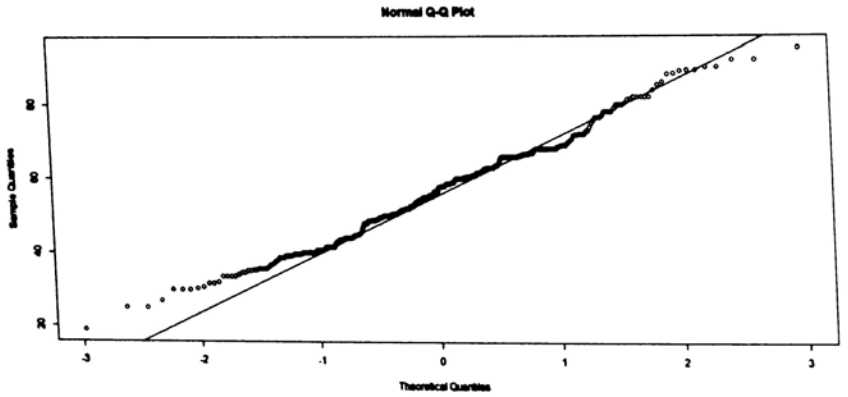


Figure 45 Normal Q-Q Plot of Sand in Terathum

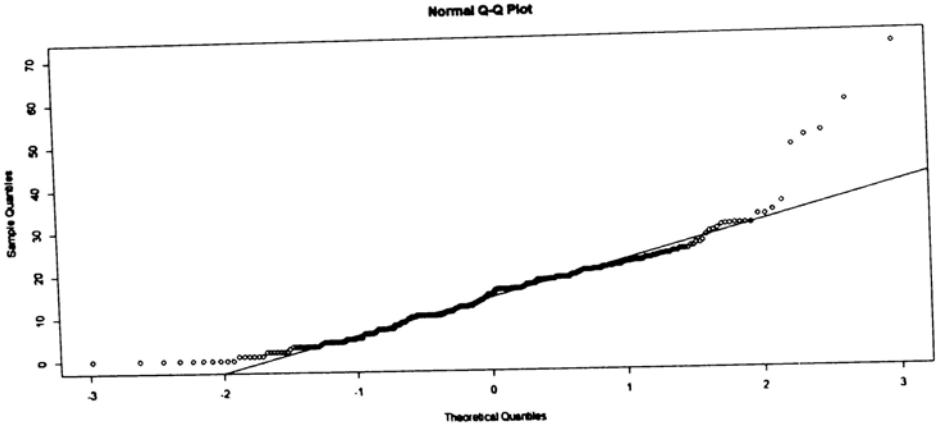


Figure 46Normal Q-Q Plot of Clay in Terathum

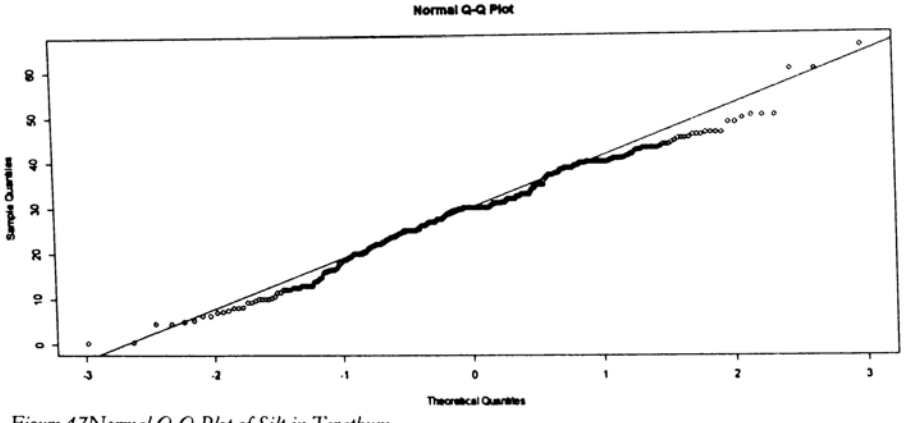


Figure 47Normal Q-Q Plot of Silt in Terathum

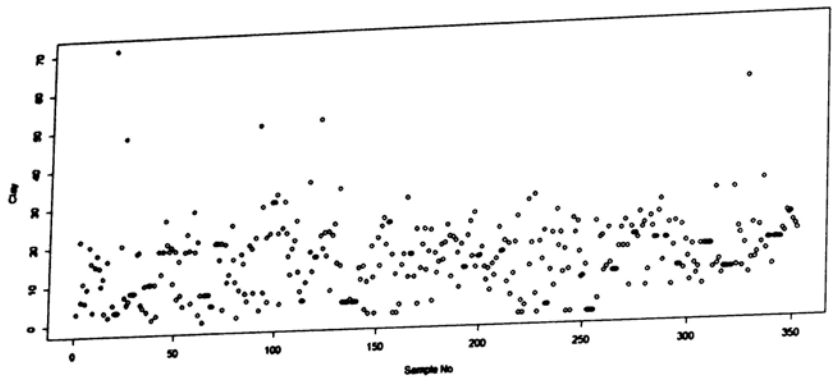


Figure 40Scatter Plot of Clay in Terathum District

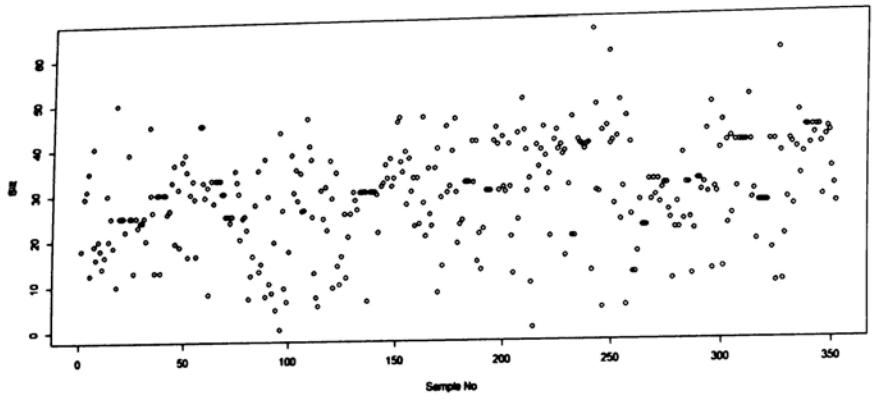


Figure 41 Scatter Plot of Silt in Terathum District

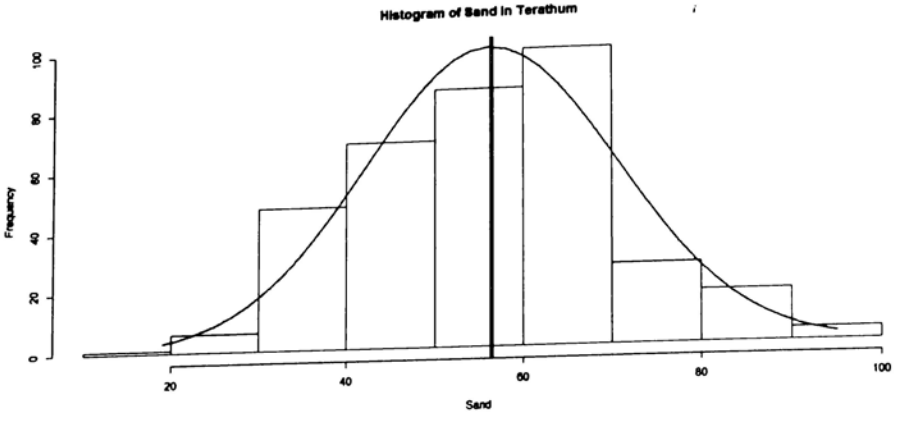


Figure 42 Histogram of Sand in Terathum

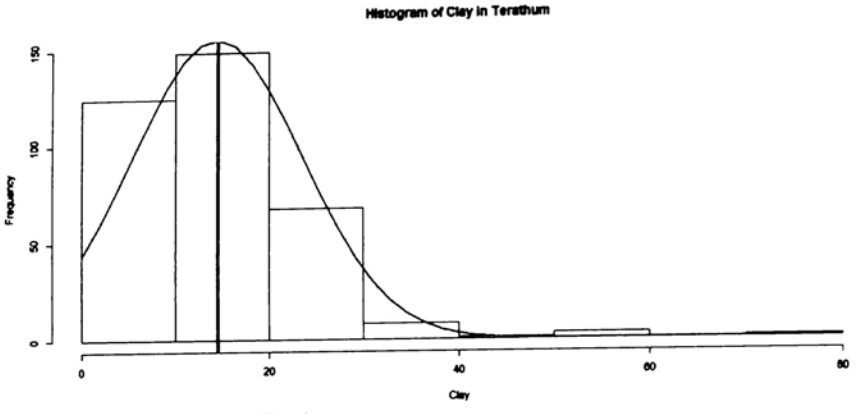


Figure 43Histogram of Clay in Terathum

frequency of irrigation should be high and water should be supplied via control irrigation system (Phene and Sanders, 1976). Heavy amount of organic manure is needed for nutrient maintenance (Schjnning et al., 2002).

4.3.7 Available Zinc (Zn) in Terathum District

The basic statistic of the Available Zinc in mg per Kg (Zn) in Terathum district is presented below along with its Scatter plot, Sample distribution bar chart, Histogram chart, Normal Q-Q plot and box plot.

Table 26 Summary Statistic of Available Zinc (Zn) in Terathum

Minimum	1st Quartile	Median	Mean	3rd Quartile	Maximum	Variance	Standard Deviation
0.686	0.904	1.06	1.09	1.223	2.26	0.057	0.240

Deficient	Sufficient	High	Total
352	-	-	352

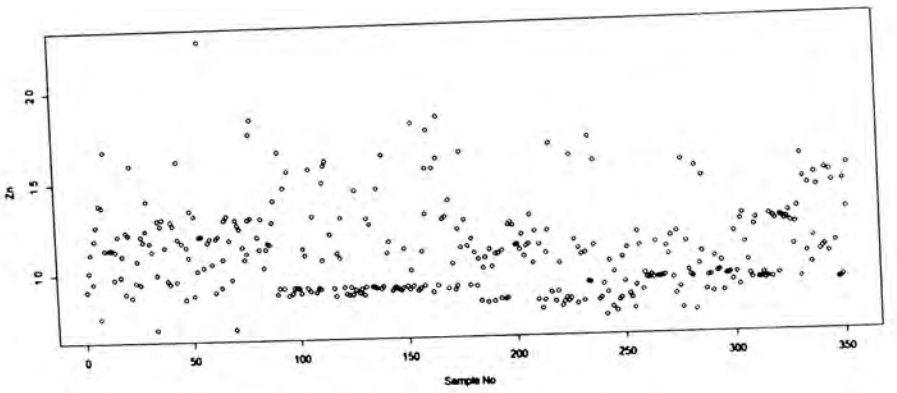


Figure 50 Scatter plot of Available Zinc (Zn) in Terathum District

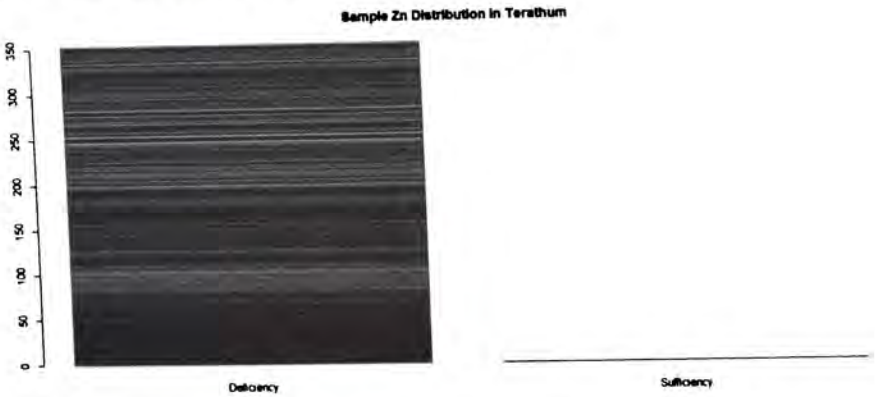


Figure 51 Available Zinc (Zn) Distribution Bar Chart of Terathum District

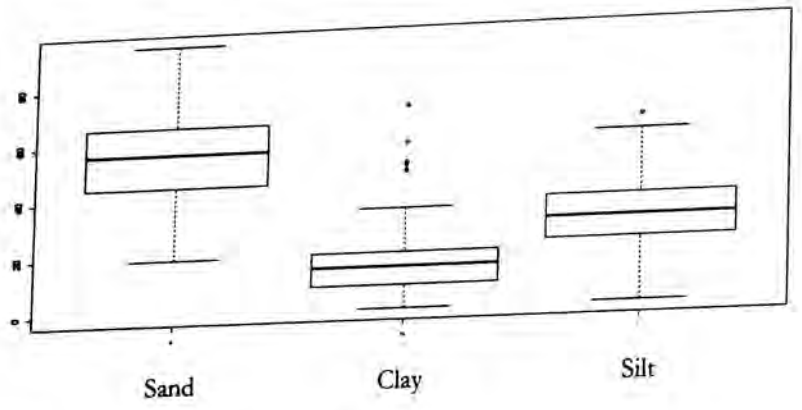


Figure 48 Box Plot of Sand Clay Silt in Terathum

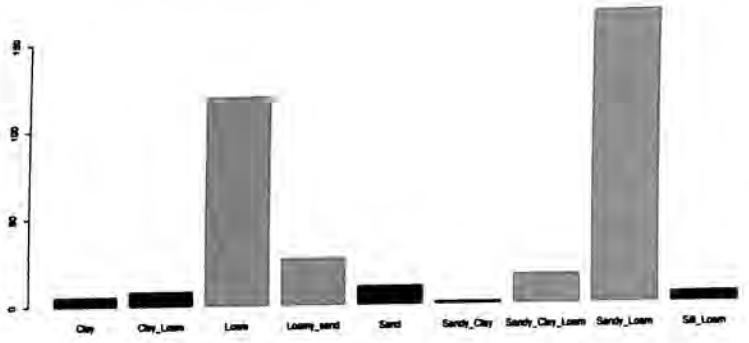


Figure 49 Soil Texture of Soil Sample found in Terathum

The Scatter plot of Sand, Clay and Silt and its combine 3D plot shows that the maximum cluster of samples lies between 50 to 70 % of Sand, 5 to 20 % of Clay and 20 to 40 % silt respectively. It also shows that majority of the sample has dominant proportion of Sand. The histogram plot of Sand, Clay and Slit shows Sand composition ranges from 19.0% to 95.10% with mean and median of 56.37 and 56.60, Clay composition ranges from 0% to 71% with mean and median of 14.45 and 14.65 and Silt composition ranges from 0.25 % to 22.50% with mean and median of 29.15 and 30.0. Further, In Normal Q-Q plots the majority of the sample points departs from the theoretical line in all three cases of Sand, Clay and Silt. The comparative box plot of the Sand Silt and Clay shows that Sand occupy higher composition and Clay occupy lower composition in the soil samples of Terathum. The composition of Sand, Clay and Silt form the basis of Texture nomenclature. The Bar Chart of the texture classification of soil samples of Terathum shows to have Sandy loam texture in more than 150 samples and loam texture in more than 100 samples.

Soil texture and soil structure are both unique properties of the soil that will have a profound effect on the behavior of soils, such as water holding capacity, nutrient retention and supply, drainage, and nutrient leaching. In soil fertility, coarser soils generally have a lesser ability to hold and retain nutrients than finer soils. However, this ability is reduced as finely-textured soils undergo intense leaching in moist environments.

The texture of the soil is dominated by sand followed by silt. The mean value of particle size is 56.37% sand, 14.45% clay and 29.15% silt falling into the sandy loam group. Sandy loams are productive soil but their capacity to hold nutrients and moisture is limited (Silver et al., 2000). These soils have good aeration and water movement. Infiltration in these soil will be higher, increasing higher drainage class (Bronick and Lal, 2005). These soils dry up fast and for good crop production

4.3.8 Boron (B) in Terathum District

The basic statistic of the Boron in mg per Kg (B) in Terathum district is presented below along with its Scatter plot, Sample distribution bar chart, Histogram chart, Normal Q-Q plot and box plot.

Table 27 Summary Statistic of Boron (B) in Terathum

Minimum	1st Quartile	Median	Mean	3rd Quartile	Maximum	Variance	Standard Deviation
0.170	0.620	1.05	1.00	1.38	1.93	0.19	0.44

Deficient	Sufficient	High	Total
63	252	37	352

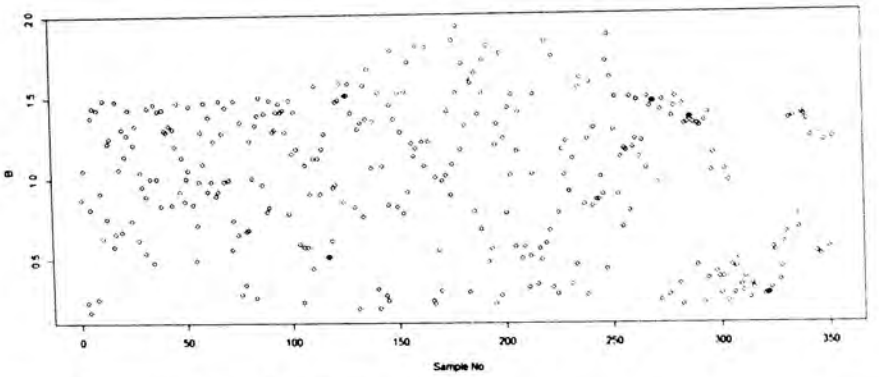


Figure 55 Scatter plot of Boron (B) in Terathum District

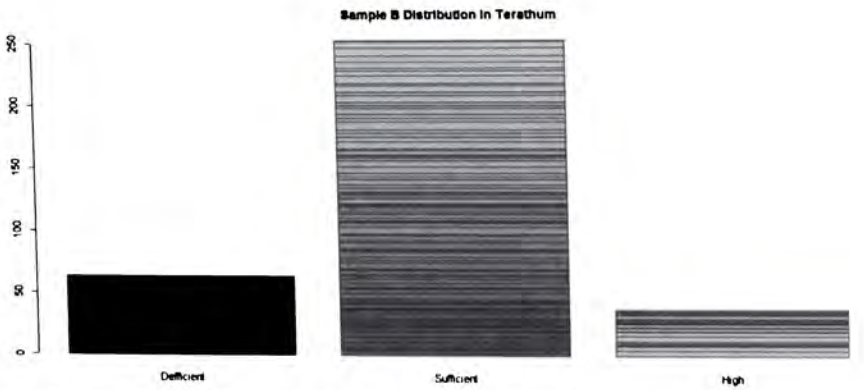


Figure 56 Sample Boron (B) Distribution Bar Chart of Terathum District

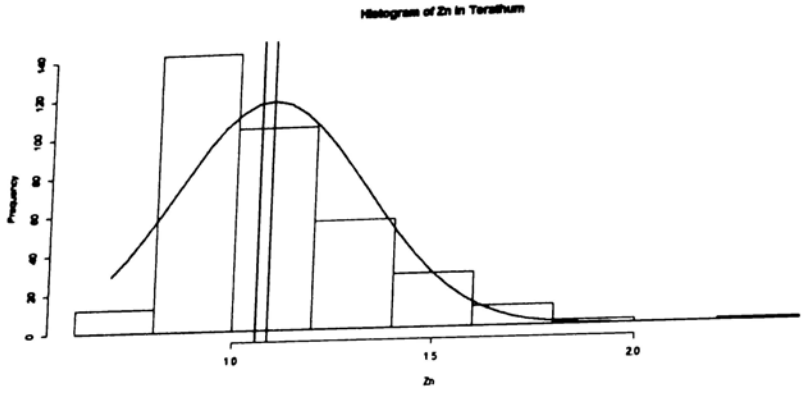


Figure 52 Histogram of Available Zinc (Zn) in Terathum

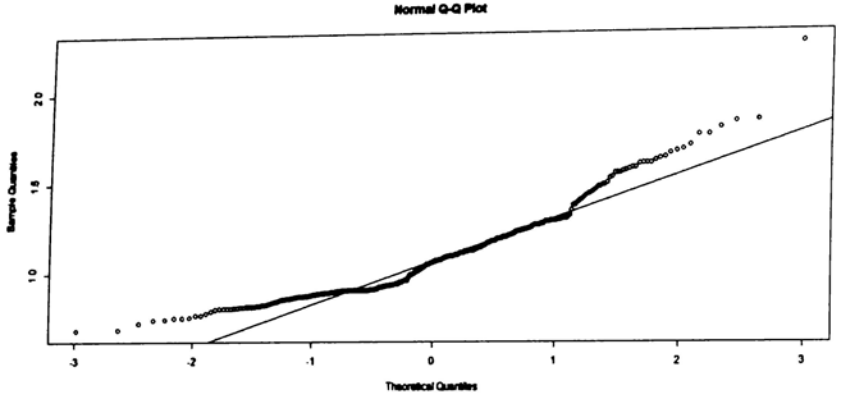


Figure 53 Normal Q-Q Plot of Available Zinc (Zn) in Terathum

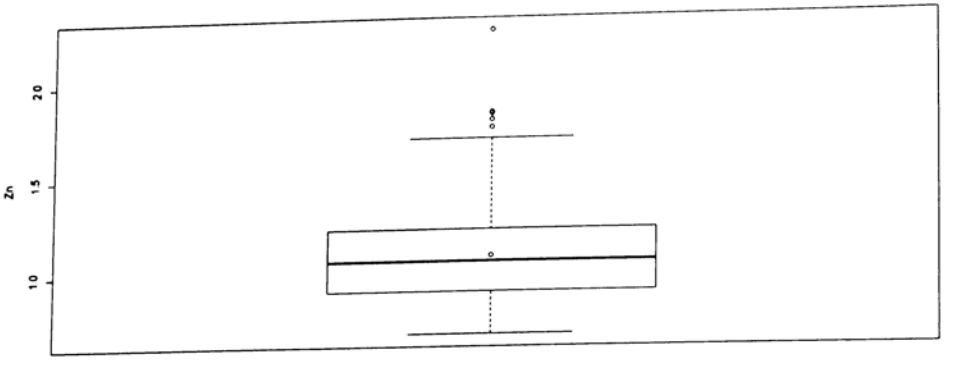


Figure 54 Box Plot of Available Zinc (Zn) in Terathum

The Scatter plot of Available Zinc (Zn) shows that the maximum cluster of samples lies less than 1 mg per Kg. The Bar Chart of Available Zinc (Zn) of soil samples categorized according to the rating specified in Section 4.2.1 shows that all 350 soil samples have Zinc Deficiency. The histogram plot shows Available Zinc (Zn) range from 0.686 mg per kg to 2.26mg per kg with mean and median of 1.09 and 1.06, hence mean is almost equal to median. The shape of the graph resembles typical positively skewed distribution. Further, In Normal Q-Q plots the majority of the points depart from the theoretical line, this suggests that sample data are not normally distributed. The box plot of the Available Zinc (Zn) also shows that the mean is little bit higher than median. Thus from these entire statistic we can conclude that the sample data are more likely positively skewed.

4.4 Fertilizer Requirement Analysis and Recommendation

Fertilizer is one of the critical inputs used in improving smallholder food and agricultural productivity. Based on the targeted yield fertilizer is applied. In Nepalese context, the agriculture is controlled by several environmental factors and targeted is seldom achieved. Additionally, analytical studies to identify factors influencing fertilizer adoption have so far never been conducted in Nepal. It is very difficult to recommend fertilizer just on the basis of soil test. General procedure for fertilizer requirement is done through the calibration (Colwell and Esdaile, 1968). Joshi and Deo (1976) have followed all the procedures and explain their recommendation in term of high, medium and low rating of soil analysis. According to them, for high rating of P_2O_5 and K_2O content, only 25% of the recommended dose is prescribed. Similarly, for medium rating 50% of the recommended dose is prescribed and for low rating all the recommended dose of fertilizer should be applied for good yield. However, nobody so far has verified these results; rather followed the same procedure for fertilizer recommendation till date. Division of Soil Science Khumaltar, launched a Fertilizer and Related Input Program (FRIP) and conducted fertilizer experiment in the middle hill districts. More than four thousand sites were selected in 22 hill districts of Nepal. They were selected from Ilam to Gulmi districts and field experiments were conducted for six years on rice, wheat, maize and Potato. A general recommendation suitable for the hill districts is made by (Pandey and Joshy, 2000). In this recommendation site specific recommendation were also included. The recommendation made by Joshi and Deo (1976) cannot be ignored though it is an old publication but still equally valid. This recommendation was for all the ecological regions but Pandey and Joshi's recommendation is only for hill districts. Hence fertilizer calculation is made on Pandey and Joshi's recommendation in this project.

Nitrogen is very dynamic element and does not remain in soil for long time. It is lost through leaching, evaporation, de-nitrification, fixed and also formation of greenhouse gas such as N_2O. Considering all these losses nitrogen application should be made in several split doses. If these losses could be minimized, crop production could be increased. However, availability of right type of fertilizer in right time is very rare case in Nepal; farmers have no choice but rather buy whatever amount of fertilizer they have in access. It could be said that the principle of fertilizer does not apply in practice to Nepal.

There is a common practice that the Junior Technicians liaise with the farmer concerning fertilizer in Nepal. Farmers are often advised to top dress urea on wet field after irrigation. This practice is in wide use in the most districts of Nepal. Top dressing urea in wet surface helps the nitrogen to evaporate along with the evaporating moisture. Also, if there is enough moisture in the soil, it will move dissolved nitrogen to subsurface with leaching process. Move it away from the rhyzo-sphare and contaminating ground water. Whether the nitrogen from urea is evaporated or leached it is lost to the environment and crop cannot use it. Moreover, Soils of the study area are sandy and losses of nitrogen are higher. In the contrary, when urea is applied on dry surface and supply light irrigation the irrigated water dissolves the urea and remain in rhyzo-sphare and plant could take it up. If only the knowledge of soil moisture and fertilizer relationship is parted to the farmers, nitrogen efficiency would be increased and food production would be boosted.

The following is the fertilizer recommended for different crops in the district.

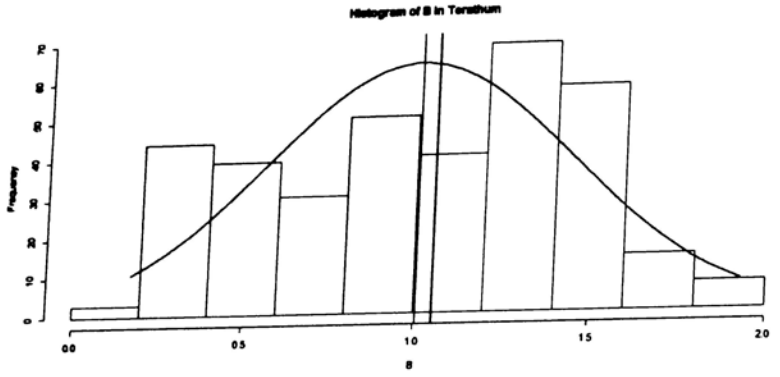


Figure 57 Histogram of Boron (B) in Terathum

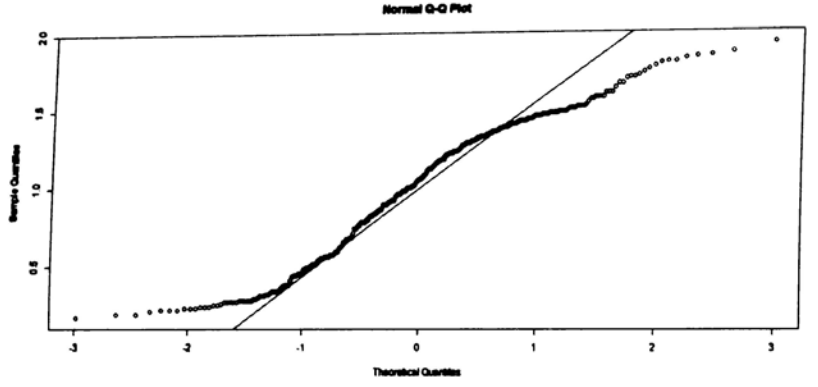


Figure 58 Normal Q-Q Plot of Boron (B) in Terathum

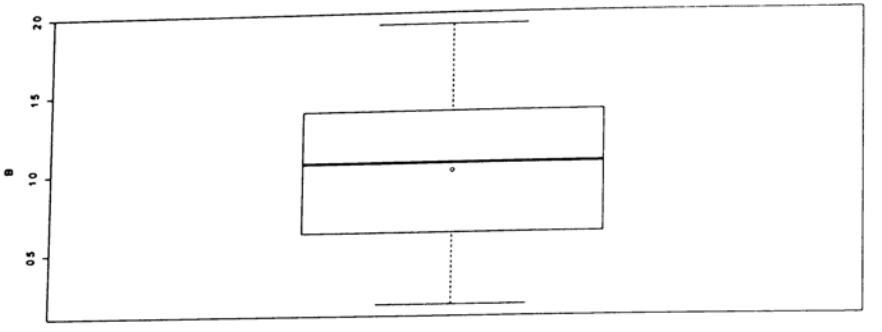


Figure 59 Box Plot of Boron (B) in Terathum

The Scatter plot of Boron (B) shows that the maximum cluster of samples lies between 0.5 to 1.5 mg per Kg. The Bar Chart of Boron (B) of soil samples categorized according to the rating specified in Section 4.2.1 shows that around 250 soil samples have sufficient rating and around 60 Samples have Deficiency rating. The histogram plot shows Boron (B) range from 0.170 mg per kg to 1.93 mg per kg with mean and median of 1.0 and 1.05, hence mean is equivalent to median. The shape of the graph resembles typical normal distribution. Further, In Normal Q-Q plots the majority of the points depart from the theoretical line, this suggests that sample data are not normally distributed. The box plot of the Boron (B) shows that the mean is lower than median. Thus from these entire statistic we can conclude that the sample data are more likely negatively skewed.

Wheat	2650.00	130241.48	1562897.73	103892.05	2493409.09	30866.48	1481590.91	5537897.73
Maize	12300.00	604517.05	13601633.52	482215.91	21699715.91	143267.05	12894034.09	48195383.52
Potato	2725.00	133927.56	2678551.14	106832.39	4273295.45	31740.06	2539204.55	9491051.14
Vegetables	1540.00	75687.50	1135312.50	60375.00	1811250.00	17937.50	1076250.00	4022812.50
Total	28807.00	1415798.58	24494067.39	1129365.34	39302870.45	335536.08	23242154.55	87039092.39

	Available Potassium (K_2O)						
Rating	High		Medium		Low		Total
Sample Distribution	179		133		40		352
Distribution Composition (%)	50.85		37.78		11.36		100
Agriculture Products	Total Area	Proportionate Area (ha)	Required K_2O (Kg)	Proportionate Area (ha)	Required K_2O (Kg)	Proportionate Area (ha)	Required K_2O (Kg)	Total (Kg)
Rice	9592.00	487775.00	7316625.00	362425.00	8335775.00	109000.00	3815000.00	19467400.00
Wheat	2650.00	134758.52	2021377.84	100127.84	2302940.34	30113.64	1294886.36	5619204.55
Maize	12300.00	625482.95	9382244.32	464744.32	13942329.55	139772.73	8386363.64	31710937.50
Potato	2725.00	138572.44	3464311.08	102961.65	4633274.15	30965.91	2786931.82	10884517.05
Vegetables	1540.00	78312.50	1174687.50	58187.50	1745625.00	17500.00	1050000.00	3970312.50
Total	28807.00	1464901.42	23359245.74	1088446.31	30959944.03	327352.27	17333181.82	71652371.59

Table 29 Summary of Fertilizer requirement in Terathum district

Fertilizer	Requirement (kg)	Requirement (Metric Tons)
Total Nitrogen (TN)	268858565.34	268.86
Available Phosphorus (P_2O_5)	87039092.39	87.04
Available Potassium (K_2O)	71652371.59	71.65

Table 28 Fertilizer nutrients required in Terathum District

		Total Nitrogen						
Rating		High		Medium		Low		Total
Sample Distribution		28		57		267		352
Distribution Composition (%)		7.95		16.19		75.85		100
Agriculture Products	Total Area	Proportionate Area (ha)	Required Nitrogen (Kg)	Proportionate Area (ha)	Required Nitrogen (Kg)	Proportionate Area (ha)	Required Nitrogen (Kg)	Total (Kg)
Rice	9592.00	76300.00	1907500.00	155325.00	7766250.00	727575.00	72757500.00	82431250.00
Wheat	2650.00	21079.55	495369.32	42911.93	1029886.36	201008.52	18693792.61	20219048.30
Maize	12300.00	97840.91	2935227.27	199176.14	8962926.14	932982.95	111957954.55	123856107.95
Potato	2725.00	21676.14	650284.09	44126.42	1765056.82	206697.44	24803693.18	27219034.09
Vegetables	1540.00	12250.00	367500.00	24937.50	748125.00	116812.50	14017500.00	15133125.00
Total	28807.00	229146.59	6355880.68	466476.99	20272244.32	2185076.42	242230440.34	268858565.34

		Available Phosphorus (P_2O_5)						
Rating		High		Medium		Low		Total
Sample Distribution		173		138		41		352
Distribution Composition (%)		49.15		39.20		11.65		100
Agriculture Products	Total Area	Proportionate Area (ha)	Required P_2O_5 (Kg)	Proportionate Area (ha)	Required P_2O_5 (Kg)	Proportionate Area (ha)	Required P_2O_5 (Kg)	Total (Kg)
Rice	9592.00	471425.00	5515672.50	376050.00	9025200.00	111725.00	5251075.00	19791947.50

Annex I: Fertility Maps

5 CONCLUSION

This chapter concludes this publication with the descriptive conclusion on the project work and its findings. It also presents the future recommendation for similar project.

5.1 Conclusion

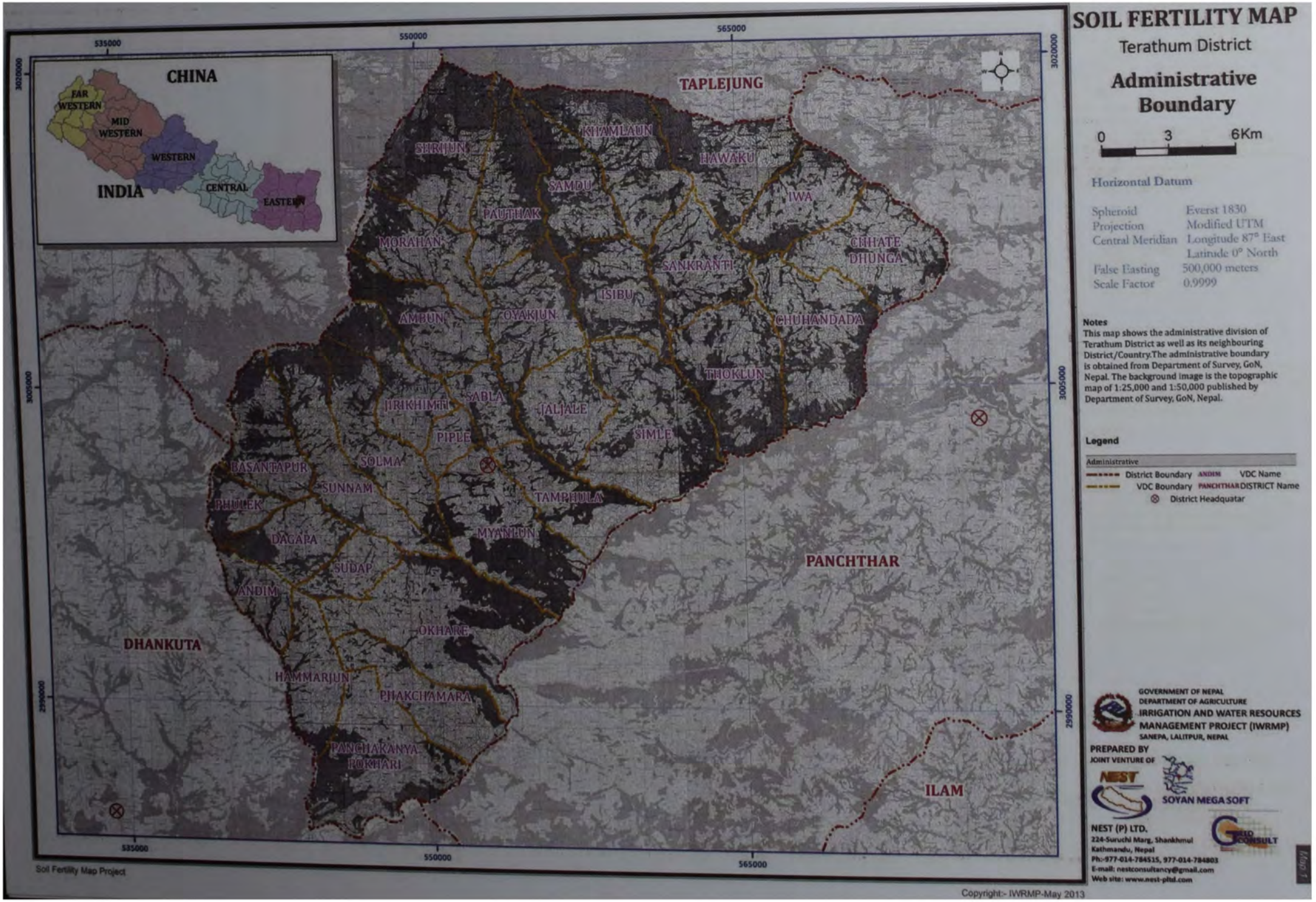
Soil fertility of Terathum district is evaluated by collecting soil samples and analyzing them in the laboratory. The soil analysis results for the district are presented in tables and figures in this publication. The map showing pH, Organic matter, Total nitrogen, Available Phosphorus, Available Potassium, Available Zinc, Available Boron and Texture status is prepared based on the lab results of the sampling pit applying Kigring interpolation method in GIS environment. All these maps are presented in the Annex I along this publication. On the whole for the district, majority of soils are loamy in texture, slightly acidic to near neutral in soil reaction, low in total nitrogen, available zinc and boron. Soil organic matter falls under medium to low categories. Available phosphorus and potassium varies and fall under all the categories.

The farm yard manure (FYM) is the main source of organic matter supplement in the farm. Although farmers fertilize their field with heavy amount of FYM that they produce in their yard, heavy soil erosion caused by torrential rain washes away the applied organic manure from their field and hence it is medium to low in the soil. Total nitrogen which is mainly associated with the organic matter is also low. Since nitrogen is a mobile element; even if found in higher amount in soil, farmers are advised to apply full rate of nitrogen to their crops. Available P_2O_5 and K_2O vary and the calculation of fertilizer requirement is done mainly based on the P_2O_5 and K_2O. Plant available Zn and B are mostly deficient. Where these elements are found in higher amount care should be taken to apply these elements to the soil. The range of toxicity, sufficiency and deficiency is so narrow, if Zn and B are applied in its higher containing soil, it could prove to be toxic and amelioration would be very difficult.

The soil fertility of the district could be rated as medium to low categories. Farming is based on organic manure produced in their yard. Although farmers use heavy amount of FYM massive soil loss by water erosion washes away the applied manure and soil fertility is deteriorated. Farmers are found using mineral fertilizer only in the accessible area that too is not proportionally balances. Timely and adequate amount of fertilizer availability is being a major constraint in the remote districts and technical advice by qualified manpower is also very limited. In the hills soil moisture is always deficit and gravity irrigation is only feasible in the valleys, and hence application of soil moisture conservation and adapting water harvesting technology to improve crop production is very much needed for these hill districts.

5.2 Recommendation

The fertility maps produced in the project are based on Kigring interpolation method. These methods have a tendency to overestimate and underestimate the extreme value. This is in fact not a problem for the district level fertility status. However, for field level application, it is advised to test the field soil chemical property before application of the fertilizer. Further, the GIS database prepared under this project is extendable for future monitoring of soil fertility of the district. This will help to prepare different time series fertility data of the district which can be used to analyze the fertility tendency of soil in the district. Thus will help is long term agriculture planning of the district.



SOIL FERTILITY MAP

Terathum District

Administrative Boundary

0 3 6Km

Horizontal Datum

Spheroid	Everst 1830
Projection	Modified UTM
Central Meridian	Longitude 87° East Latitude 0° North
False Easting	500,000 meters
Scale Factor	0.9999

Notes

This map shows the administrative division of Terathum District as well as its neighbouring District/Country.The administrative boundary is obtained from Department of Survey, GoN, Nepal. The background image is the topographic map of 1:25,000 and 1:50,000 published by Department of Survey, GoN, Nepal.

Legend

Administrative

- District Boundary — ANDIM VDC Name
- VDC Boundary — PANCHTHAR DISTRICT Name
- District Headquatar

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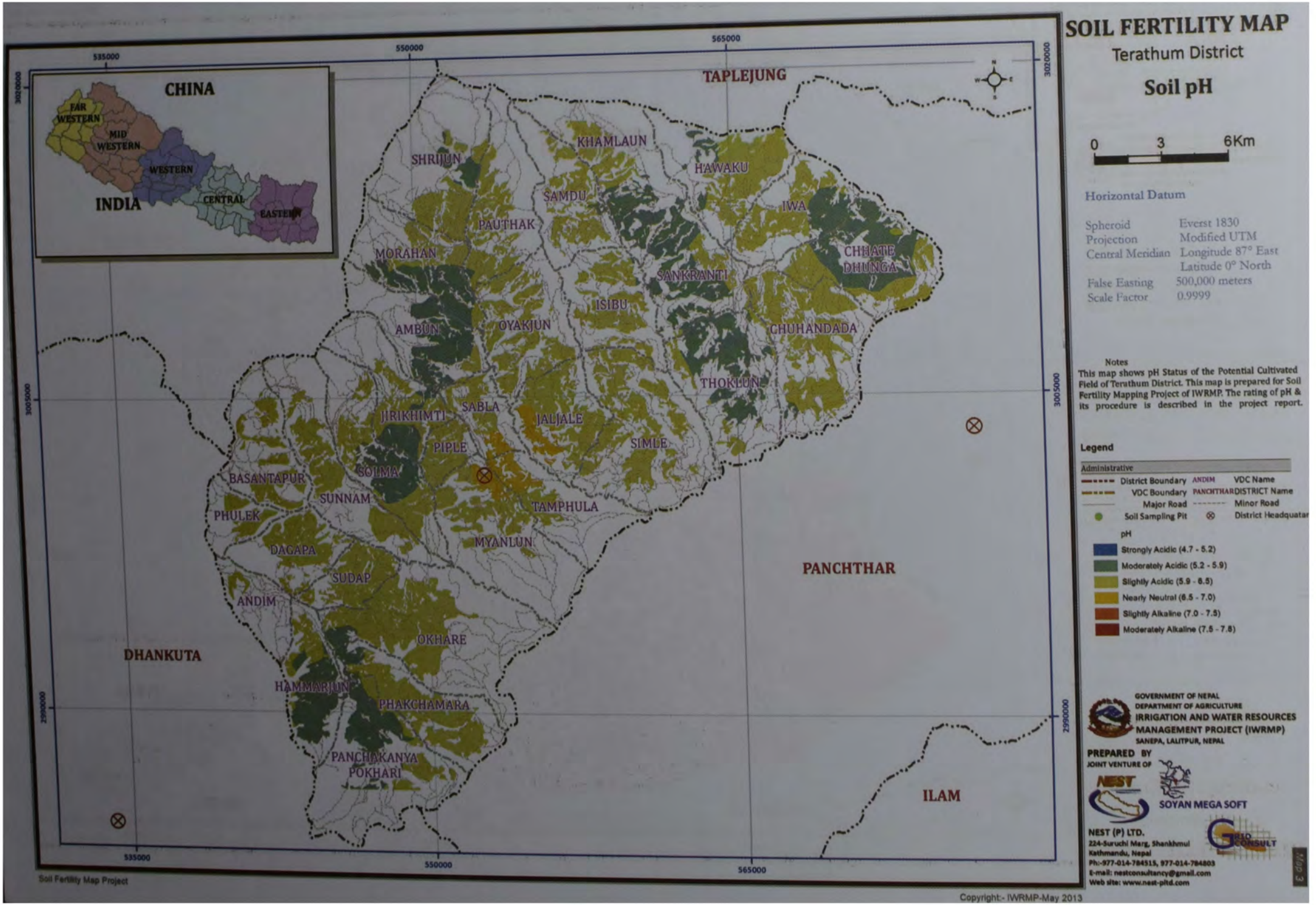
Map 1

Soil Fertility Map Project


SOIL FERTILITY MAP
Terathum District
Soil pH
0 3 6Km
Horizontal Datum
Spheroid Everst 1830
Projection Modified UTM
Central Meridian Longitude 87° East
Latitude 0° North
False Easting 500,000 meters
Scale Factor 0.9999
Notes
This map shows pH Status of the Potential Cultivated Field of Terathum District. This map is prepared for Soil Fertility Mapping Project of IWRMP. The rating of pH & its procedure is described in the project report.
Legend
Administrative
District Boundary
VDC Boundary
Major Road
Minor Road
Soil Sampling Pit
District Headquatar
pH
Strongly Acidic (4.7 - 5.2)
Moderately Acidic (5.2 - 5.9)
Slightly Acidic (5.9 - 6.5)
Nearly Neutral (6.5 - 7.0)
Slightly Alkaline (7.0 - 7.5)
Moderately Alkaline (7.5 - 7.8)
CHINA
INDIA
FAR WESTERN
MID WESTERN
WESTERN
CENTRAL
EASTERN
TAPLEJUNG
PANCHTHAR
ILAM
DHANKUTA
SHRIJUN
KHAMLAUN
HAWAKU
SAMDU
IWA
PAUTHAK
MORAHAN
CHHATE DHUNGA
SANKRANTI
ISIBU
AMBUN
OYAKJUN
CHUHANDADA
THOKLUN
JIRIKHIMTI
SABLA
JALJALE
PIPLE
SIMLE
BASANTAPUR
SOLMA
SUNNAM
TAMPHULA
PHULEK
MYANLUN
DAGAPA
SUDAP
ANDIM
OKHARE
HAMMARJUN
PHAKCHAMARA
PANCHAKANYA POKHARI
535000
550000
565000
3020000
3005000
2990000
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Map 3
Soil Fertility Map Project
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SOIL FERTILITY MAP

Terathum District

Soil Pit Overlaid in Satellite Image

0 3 6Km

Horizontal Datum

Spheroid	Everst 1830
Projection	Modified UTM
Central Meridian	Longitude 87° East Latitude 0° North
False Easting	500,000 meters
Scale Factor	0.9999

Notes

This map shows location of Soil Pit in Terathum District for Soil Fertility Mapping Project of IWRMP overlaid on the Multi Spectral Satellite Image. The Satellite Image Used in the project is of Rapid Eye with 5m Spatial Resolution. The imagery is of acqusition date 2010.

Legend

Administrative

- District Boundary ANDIM VDC Name
- VDC Boundary PANCHTHAR DISTRICT Name
- District Headquatar
- Soil Sampling Pit

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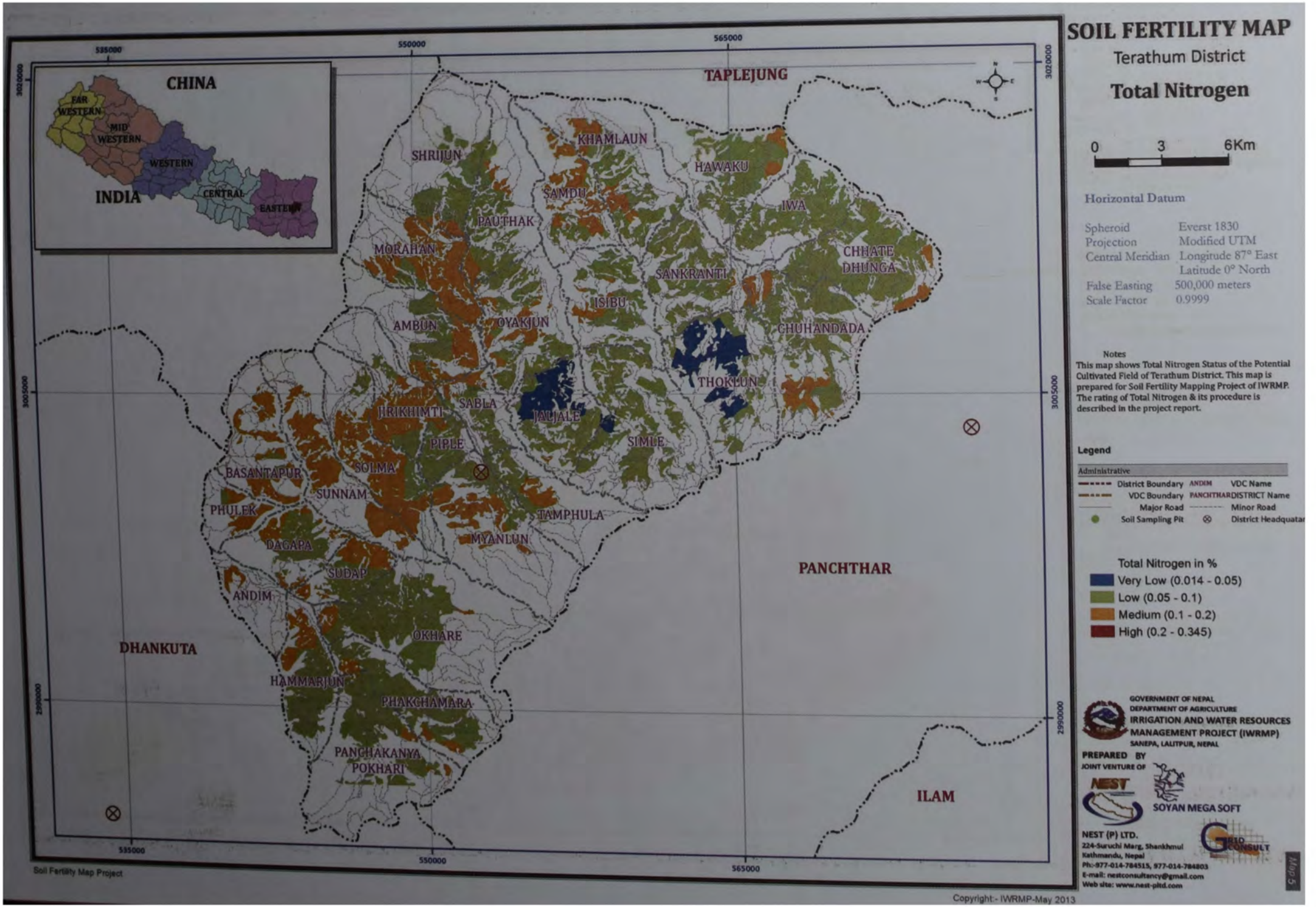
Map 2

Soil Fertility Map Project


SOIL FERTILITY MAP
Terathum District
Total Nitrogen
0 3 6Km
Horizontal Datum
Spheroid Everst 1830
Projection Modified UTM
Central Meridian Longitude 87° East
Latitude 0° North
False Easting 500,000 meters
Scale Factor 0.9999
Notes
This map shows Total Nitrogen Status of the Potential Cultivated Field of Terathum District. This map is prepared for Soil Fertility Mapping Project of IWRMP. The rating of Total Nitrogen & its procedure is described in the project report.
Legend
Administrative
District Boundary
VDC Boundary
Major Road
Minor Road
Soil Sampling Pit
District Headquatar
ANDIM VDC Name
PANCHTHAR DISTRICT Name
Total Nitrogen in %
Very Low (0.014 - 0.05)
Low (0.05 - 0.1)
Medium (0.1 - 0.2)
High (0.2 - 0.345)
CHINA
INDIA
FAR WESTERN
MID WESTERN
WESTERN
CENTRAL
EASTERN
TAPLEJUNG
PANCHTHAR
ILAM
DHANKUTA
SHRIJUN
KHAMLAUN
HAWAKU
SAMDU
IWA
PAUTHAK
MORAHAN
CHHATE DHUNGA
SANKRANTI
ISIBU
AMBUN
OYAKJUN
CHUHANDADA
THOKLUN
JIRIKHIMTI
SABLA
JALJALE
SIMLE
PIPLE
SOLMA
BASANTAPUR
SUNNAM
PHULEK
TAMPHULA
MYANLUN
DAGAPA
SUDAP
ANDIM
OKHARE
HAMMARJUN
PHAKCHAMARA
PANCHAKANYA
POKHARI
535000
550000
565000
3020000
3005000
2990000
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Map 5
Soil Fertility Map Project
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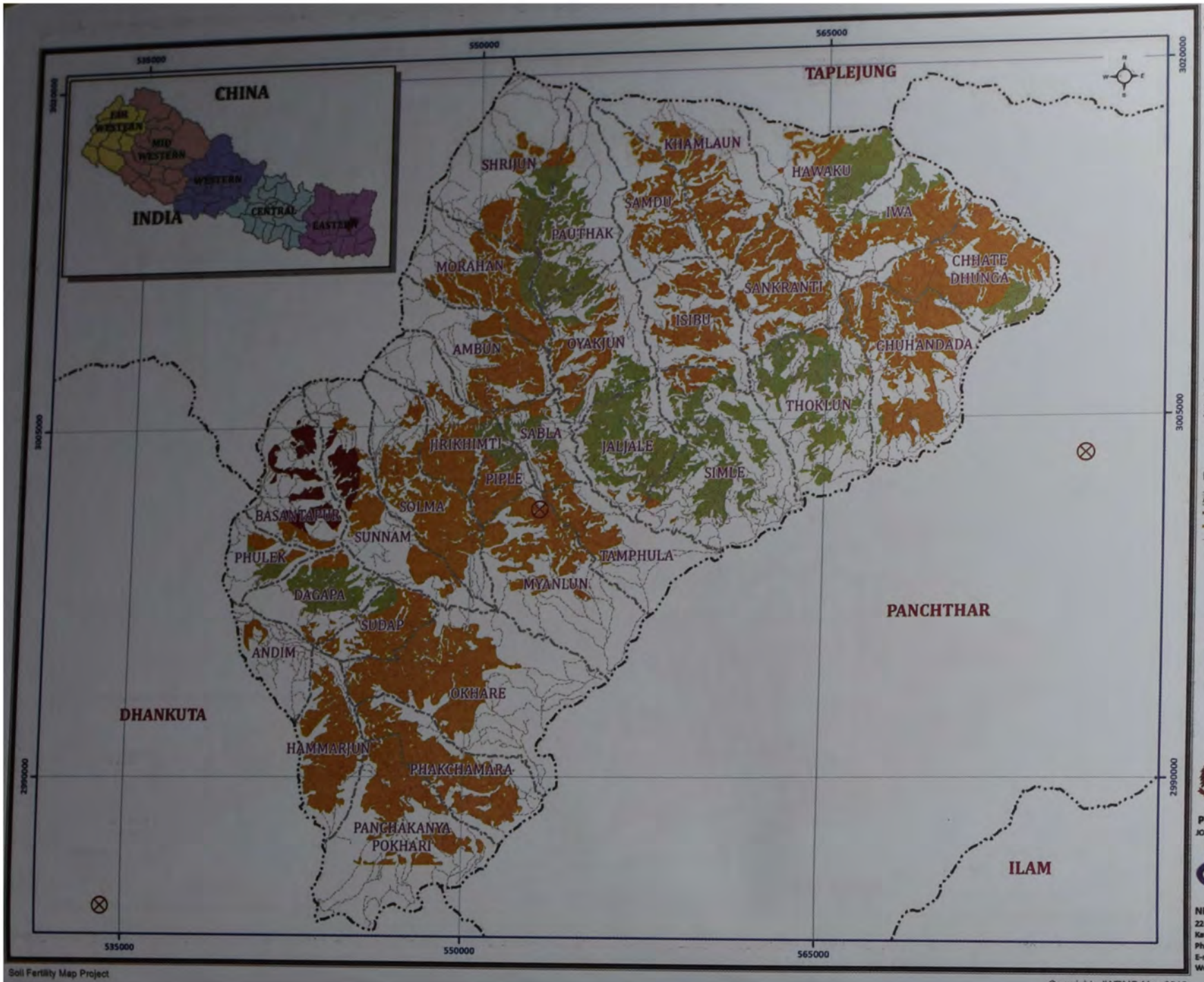

SOIL FERTILITY MAP

Terathum District

Organic Mater

0 3 6Km

Horizontal Datum

Spheroid	Everst 1830
Projection	Modified UTM
Central Meridian	Longitude 87° East Latitude 0° North
False Easting	500,000 meters
Scale Factor	0.9999

Notes

This map shows Organic Mater Status of the Potential Cultivated Field of Terathum District. This map is prepared for Soil Fertility Mapping Project of IWRMP. The rating of OM & its procedure is described in the project report.

Legend

Administrative

- District Boundary — ANDIM — VDC Name
- VDC Boundary — PANCHTHAR — DISTRICT Name
- Major Road — Minor Road
- Soil Sampling Pit — District Headquatar

Organic Matter in %

- Very Low (0.3 - 1.0)
- Low (1.0 - 2.5)
- Medium (2.5 - 5.0)
- High (5.0 - 8.0)

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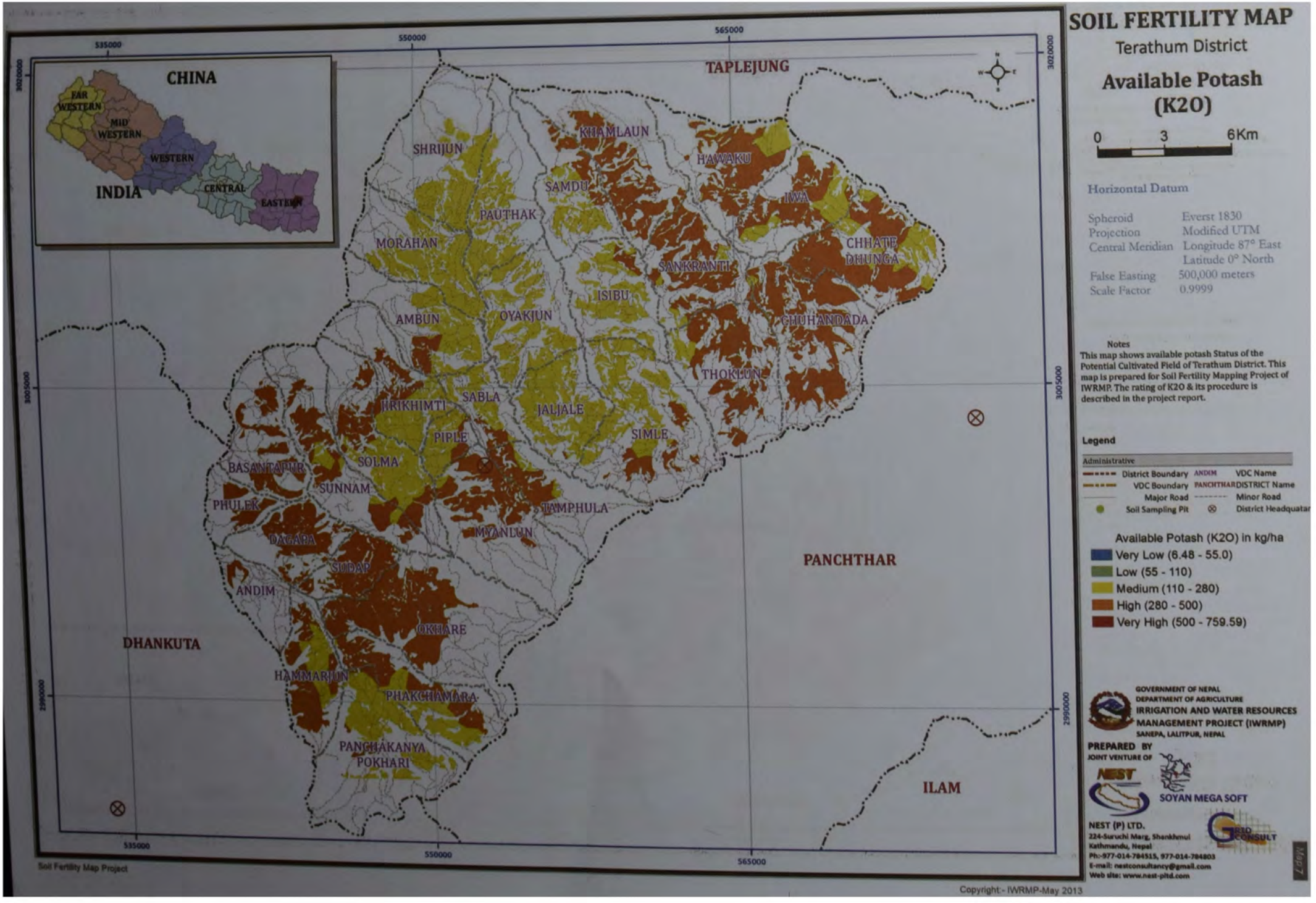
Map 4

Soil Fertility Map Project



SOIL FERTILITY MAP

Terathum District

Available Potash (K2O)

0 3 6Km

Horizontal Datum

Spheroid	Everst 1830
Projection	Modified UTM
Central Meridian	Longitude 87° East Latitude 0° North
False Easting	500,000 meters
Scale Factor	0.9999

Notes

This map shows available potash Status of the Potential Cultivated Field of Terathum District. This map is prepared for Soil Fertility Mapping Project of IWRMP. The rating of K2O & its procedure is described in the project report.

Legend

Administrative

- District Boundary — ANDIM — VDC Name
- VDC Boundary — PANCHTHAR — DISTRICT Name
- Major Road — Minor Road
- Soil Sampling Pit — District Headquatar

Available Potash (K2O) in kg/ha

- Very Low (6.48 - 55.0)
- Low (55 - 110)
- Medium (110 - 280)
- High (280 - 500)
- Very High (500 - 759.59)

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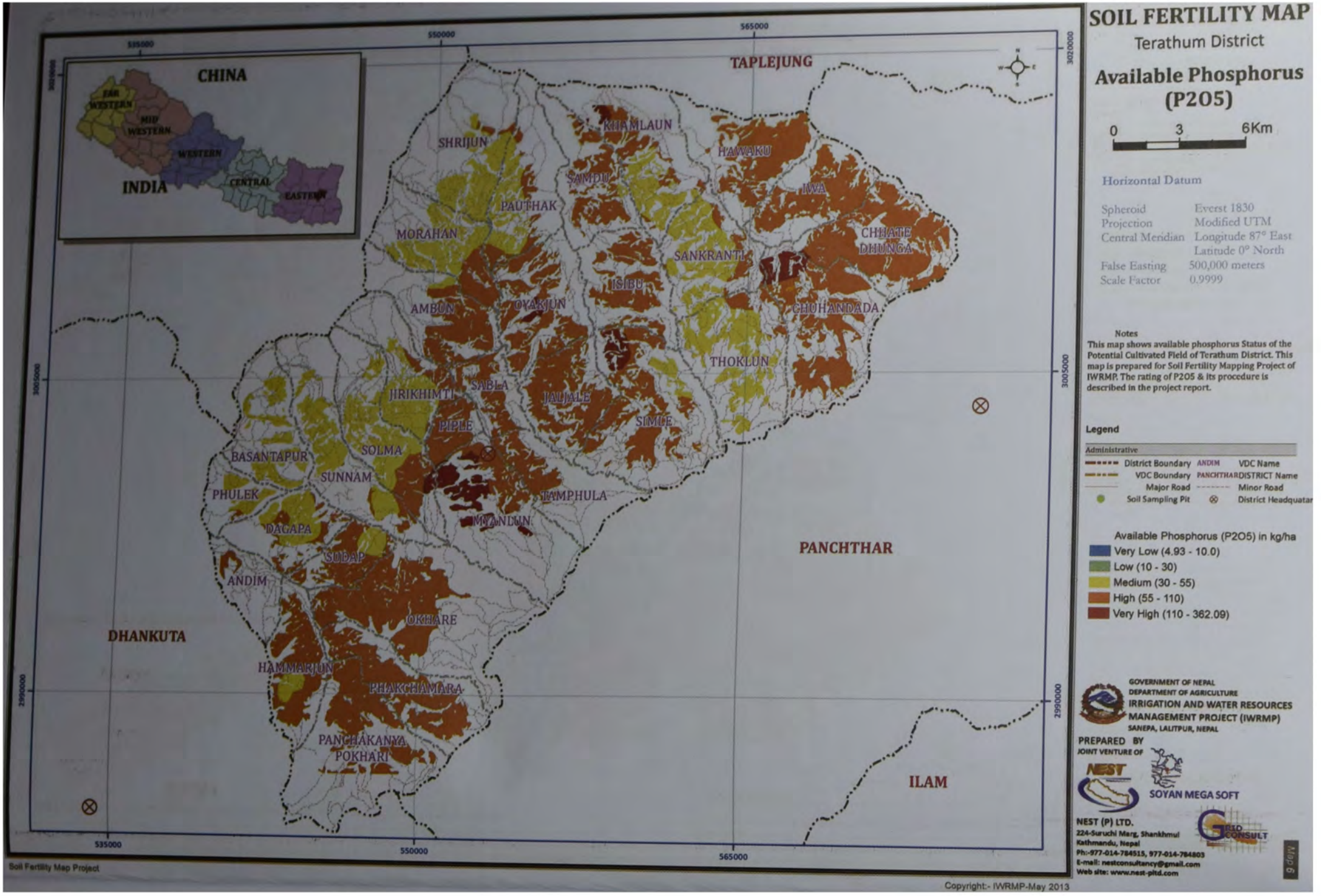
Map 7


SOIL FERTILITY MAP
Terathum District
Available Phosphorus (P2O5)
0 3 6Km
Horizontal Datum
Spheroid Everst 1830
Projection Modified UTM
Central Meridian Longitude 87° East
Latitude 0° North
False Easting 500,000 meters
Scale Factor 0.9999
Notes
This map shows available phosphorus Status of the Potential Cultivated Field of Terathum District. This map is prepared for Soil Fertility Mapping Project of IWRMP. The rating of P2O5 & its procedure is described in the project report.
Legend
Administrative
District Boundary
VDC Boundary
Major Road
Minor Road
Soil Sampling Pit
District Headquatar
ANDIM VDC Name
PANCHTHAR DISTRICT Name
Available Phosphorus (P2O5) in kg/ha
Very Low (4.93 - 10.0)
Low (10 - 30)
Medium (30 - 55)
High (55 - 110)
Very High (110 - 362.09)
CHINA
INDIA
EAR WESTERN
MID WESTERN
WESTERN
CENTRAL
EASTERN
TAPLEJUNG
PANCHTHAR
ILAM
DHANKUTA
SHRIJUN
KHAMLAUN
HAWAKU
SAMDU
IWA
PAUTHAK
MORAHAN
CHHATE DHUNGA
SANKRANTI
ISIBU
AMBUN
OYAKJUN
CHUHANDADA
THOKLUN
JIRIKHIMTI
SABLA
JALJALE
SIMLE
PIPLE
BASANTAPUR
SOLMA
SUNNAM
PHULEK
TAMPHULA
MYANDUN
DAGAPA
SUDAP
ANDIM
OKHARE
HAMMARJUN
PHAKCHAMARA
PANCHAKANYA
POKHARI
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2990000
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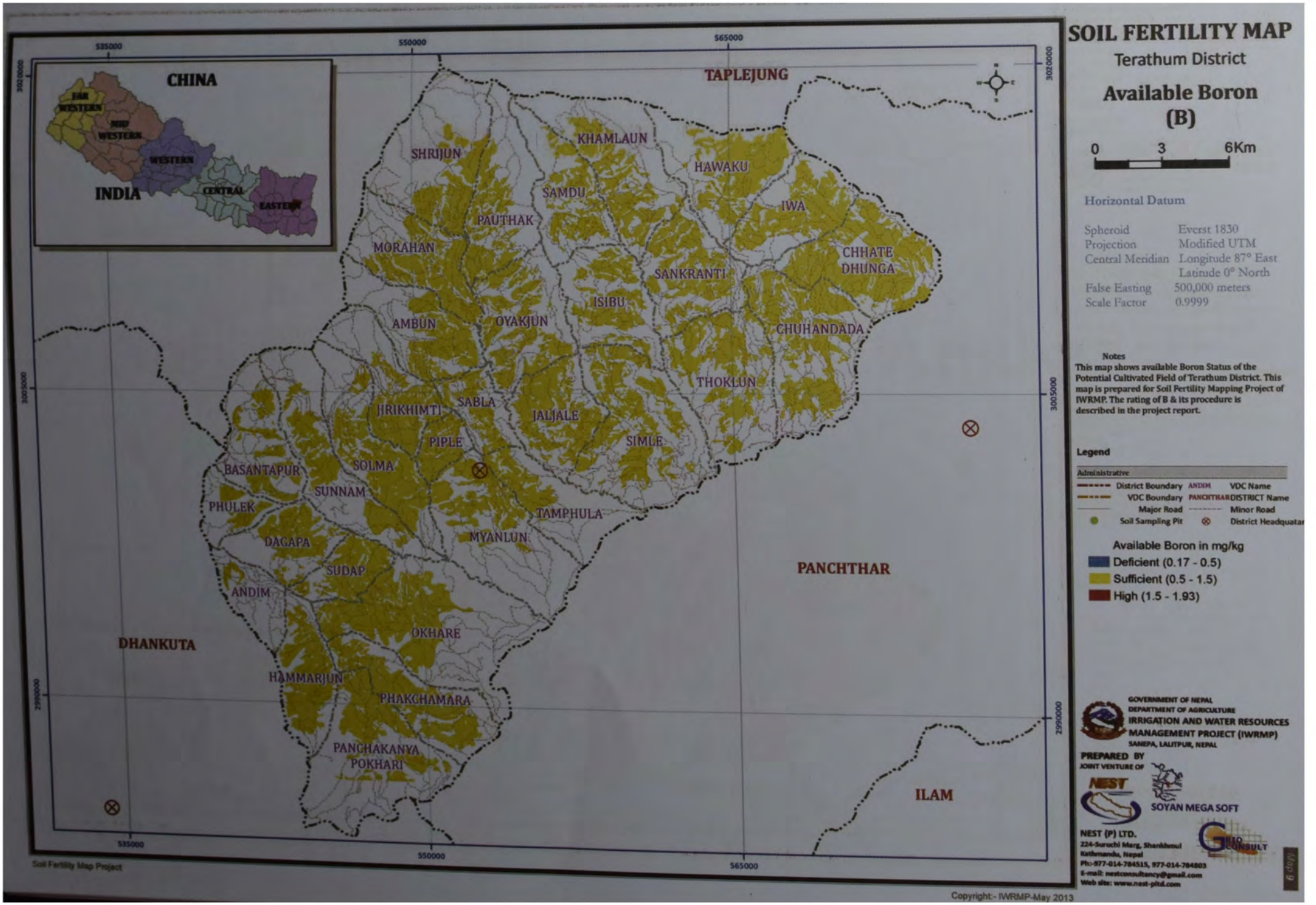
SOIL FERTILITY MAP
Terathum District
Available Boron
(B)
0 3 6Km
Horizontal Datum
Spheroid Everst 1830
Projection Modified UTM
Central Meridian Longitude 87° East
Latitude 0° North
False Easting 500,000 meters
Scale Factor 0.9999
Notes
This map shows available Boron Status of the Potential Cultivated Field of Terathum District. This map is prepared for Soil Fertility Mapping Project of IWRMP. The rating of B & its procedure is described in the project report.
Legend
Administrative
District Boundary
VDC Boundary
Major Road
Minor Road
Soil Sampling Pit
District Headquatar
ANDEM VDC Name
PANCHTHAR DISTRICT Name
Available Boron in mg/kg
Deficient (0.17 - 0.5)
Sufficient (0.5 - 1.5)
High (1.5 - 1.93)
CHINA
INDIA
FAR WESTERN
MID WESTERN
WESTERN
CENTRAL
EASTERN
TAPLEJUNG
PANCHTHAR
ILAM
DHANKUTA
SHRIJUN
KHAMLAUN
HAWAKU
SAMDU
IWA
PAUTHAK
MORAHAN
CHHATE DHUNGA
SANKRANTI
ISIBU
AMBUN
OYAKJUN
CHUHANDADA
THOKLUN
JIRIKHIMTI
SABLA
JALJALE
PIPLE
SIMLE
BASANTAPUR
SOLMA
SUNNAM
PHULEK
TAMPHULA
MYANLUN
DAGAPA
SUDAP
ANDIM
OKHARE
HAMMARJUN
PHAKCHAMARA
PANCHAKANYA
POKHARI
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2990000
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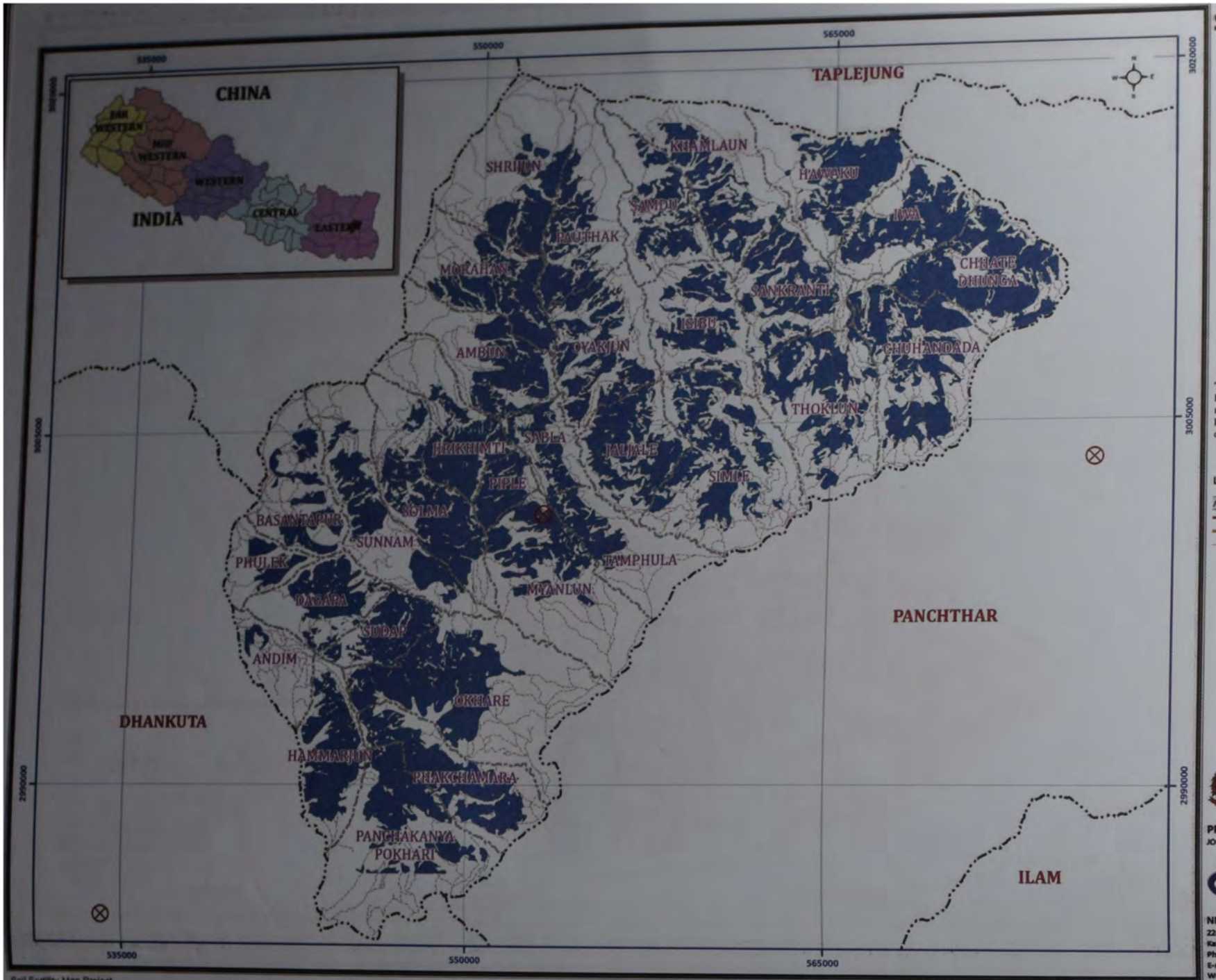

SOIL FERTILITY MAP

Terathum District

Available Zinc (Zn)

0 3 6Km

Horizontal Datum

Spheroid	Everst 1830
Projection	Modified UTM
Central Meridian	Longitude 87° East Latitude 0° North
False Easting	500,000 meters
Scale Factor	0.9999

Notes

This map shows available Znic Status of the Potential Cultivated Field of Terathum District. This map is prepared for Soil Fertility Mapping Project of IWRMP. The rating of Zn & its procedure is described in the project report.

Legend

Administrative

- District Boundary
- VDC Boundary
- Major Road
- Minor Road
- Soil Sampling Pit
- District Headquatar
- ANDIM — VDC Name
- PANCHTHAR — DISTRICT Name

Available Zinc in mg/kg

- Deficient (0.686 - 2.266)

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IRRIGATION AND WATER RESOURCES MANAGEMENT PROJECT (IWRMP)
SANEPA, LALITPUR, NEPAL

PREPARED BY
JOINT VENTURE OF
NEST
SOYAN MEGA SOFT
GEO CONSULT

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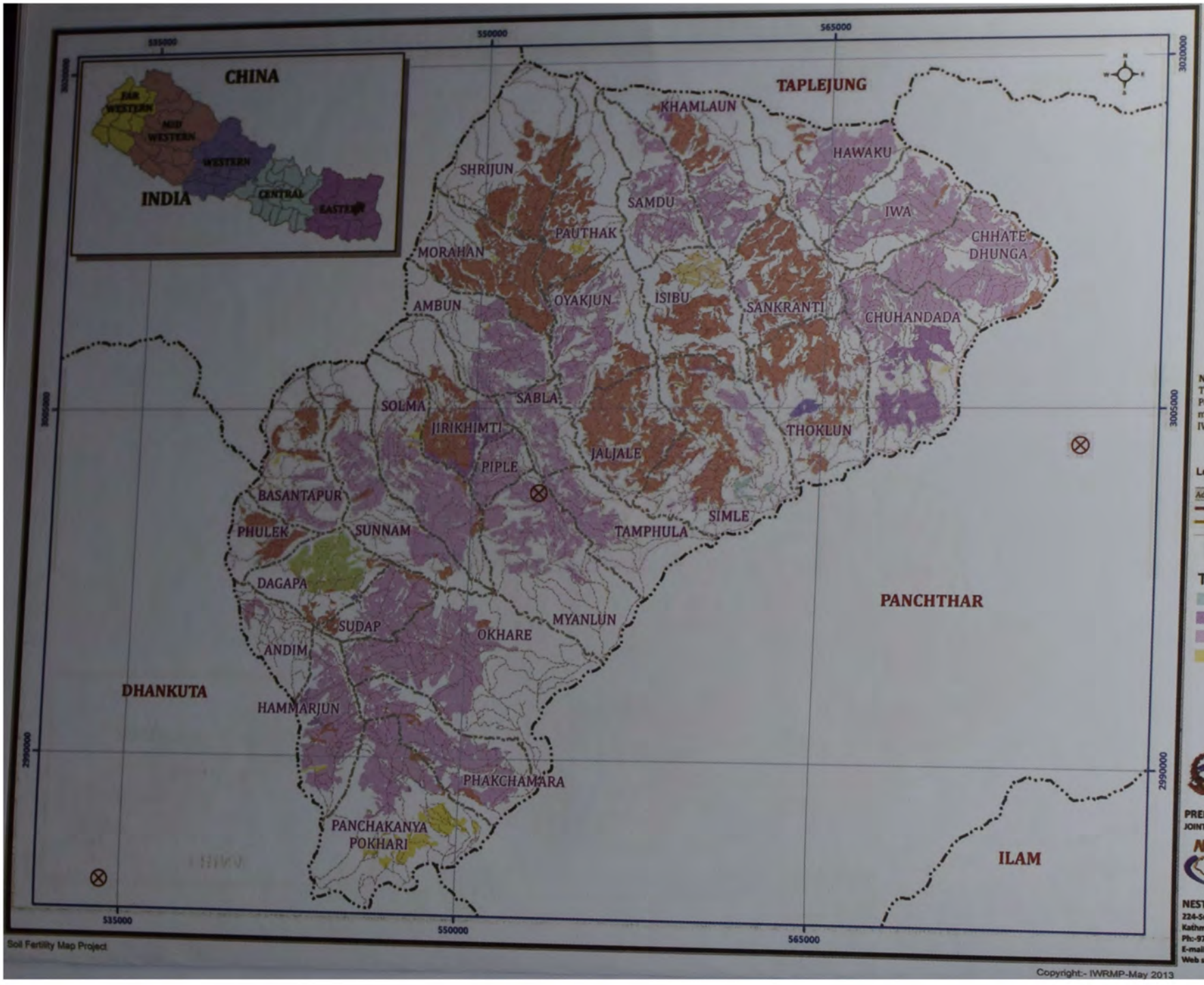
Map 8

Soil Fertility Map Project

Annex II: Soil Chemical Analysis Results



SOIL FERTILITY MAP

Terathum District

Soil Texture

0 3 6Km

Horizontal Datum

Spheroid	Everst 1830
Projection	Modified UTM
Central Meridian	Longitude 87° East Latitude 0° North
False Easting	500,000 meters
Scale Factor	0.9999

Notes

This map shows Soil texture Status of the Potential Cultivated Field of Terathum District. This map is prepared for Soil Fertility Mapping Project of IWRMP.

Legend

Administrative

- District Boundary — ANDIM VDC Name
- VDC Boundary — PANCHTHAR DISTRICT Name
- Major Road — Minor Road
- Soil Sampling Pit — District Headquatar

Texture

- Clay
- Clay Loam
- Loam
- Loamy sand
- Sand
- Sandy Clay
- Sandy Clay Loam
- Sandy Loam
- Silt Loam

GOVERNMENT OF NEPAL
DEPARTMENT OF AGRICULTURE
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Map 10

Annex II: Soil Chemical Analysis Results

Soil Fertility Mapping Project

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Terathum District

Lab Code	Soil Pit Identity	VDC	Ward No.	Farmer Name	Location	pH	Organic Matter (OM)	Total Nitrogen (TN)	Available Phosphorus (P_2O_5)	Available Potash (K_2O)	Zinc (Zn)	Boron (B)	Soil Texture
Ter_001	Ter_Shr_G02_01/01_002	SHRIJUNG	2	Piyou Limbu	Asine	Moderately Acidic	Medium	Low	Medium	Medium	Deficient	Sufficient	Loamy sand
Ter_002	Ter_Amb_G02_02/01_011	AMBUNG	7	Pembu Limbu	Dandagaun	Moderately Acidic	Medium	Low	Low	Medium	Deficient	Sufficient	Loam
Ter_003	Ter_Mor_G02_01/04_009	MORAHANG	9	Sumi Thapa	Bhoteghaderi	Moderately Acidic	Low	High	Medium	Very Low	Deficient	Deficient	Sandy Loam
Ter_004	Ter_Pip_G02_02/01_013	PIPLE	8	Dhurba Gurung	Piple	Moderately Acidic	Low	Medium	High	Medium	Deficient	Deficient	Sandy Loam
Ter_005	Ter_Amb_G02_01/04_002	AMBUNG	7	Mahesh Bahadur Giri	Phamphewa	Moderately Acidic	Medium	Low	Low	Low	Deficient	Sufficient	Loamy sand
Ter_006	Ter_Sol_G02_03/03_002	SOLMA	7	Nabin Bhattarai	Kaphelgaun	Moderately Acidic	High	Medium	Medium	Low	Deficient	Sufficient	Loam
Ter_007	Ter_Mor_G02_01/04_008	MORAHANG	9	Arjun Budhathoki	Majhigaun	Moderately Acidic	Medium	Low	Medium	Medium	Deficient	Sufficient	Sandy Loam
Ter_008	Ter_Amb_G02_02/01_009	AMBUNG	4	Aang Chheri Sherpa	Bhotechap	Strongly Acidic	Medium	Low	High	High	Deficient	Deficient	Sandy Loam
Ter_009	Ter_Bas_G02_04/03_001	BASANTAPUR	3	Anju Thapa	Gairigaun	Moderately Acidic	High	Medium	Medium	High	Deficient	Sufficient	Loamy sand
Ter_010	Ter_Sol_G02_03/02_001	SOLMA	4	Hom Kumari Limbu	Kande	Moderately Alkaline	High	Medium	Medium	Medium	Deficient	Sufficient	Sandy Loam
Ter_011	Ter_Bas_G02_04/02_001	BASANTAPUR	3	Yogendra Subedi	Dadakharka	Nearly Neutral	High	Medium	Very Low	Medium	Deficient	Sufficient	Sandy Loam
Ter_012	Ter_Amb_G02_01/03_001	AMBUNG	7	Bishnu Rai Magar	Ambun	Moderately Acidic	Medium	Low	Medium	Medium	Deficient	Sufficient	Sandy Loam
Ter_013	Ter_Jir_G02_03/02_007	JIRIKHIMTI	8	Suman Gurung	Amphuwa	Strongly Acidic	Medium	Medium	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_014	Ter_Amb_G02_02/02_004	AMBUNG	5	Ambika Subedi	Ambun	Slightly Acidic	Medium	Medium	Medium	Medium	Deficient	Sufficient	Sandy Loam
Ter_015	Ter_Pau_G02_01/03_006	PAUTHAK	4	Sabina Limbu	Dandagaun	Slightly Acidic	Very Low	Very Low	Medium	Very High	Deficient	Sufficient	Loamy sand
Ter_016	Ter_Sun_G02_03/03_001	SUNGNAM	4	Rabina Gurung	Nagartapa	Moderately Acidic	Medium	Low	Medium	Medium	Deficient	Sufficient	Sandy Loam
Ter_017	Ter_Amb_G02_02/01_012	AMBUNG	7	Dipendra Apagai	Dandagaun	Slightly Acidic	Low	High	Very High	Medium	Deficient	Sufficient	Silt Loam
Ter_018	Ter_Amb_G02_01/04_005	AMBUNG	8	Lal Ratna Limbu	Kobek	Moderately Acidic	Medium	Low	Medium	Medium	Deficient	Sufficient	Clay
Ter_019	Ter_Mor_G02_01/04_006	MORAHANG	6	Basanta Guragain	Ninlekhu	Moderately Acidic	Low	Very Low	Medium	Medium	Deficient	Sufficient	Sandy Loam
Ter_020	Ter_Sol_G02_03/02_002	SOLMA	4	tara Bhat Subba	Kande	Nearly Neutral	Medium	Low	Medium	Very High	Deficient	Sufficient	Sandy Loam

Soil Fertility Mapping Project

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Terathum District

Lab Code	Soil Pit Identity	VDC	Ward No.	Farmer Name	Location	pH	Organic Matter (OM)	Total Nitrogen (TN)	Available Phosphorus (P_2O_5)	Available Potash (K_2O)	Zinc (Zn)	Boron (B)	Soil Texture
Ter_021	Ter_Jir_G02_03/02_006	JIRIKHIMTI	8	Nigma Galsebau Sherpa	Jirikhimti	Moderately Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_022	Ter_Mor_G02_01/04_013	MORAHANG	6	Murari Gautam	Skidim	Moderately Acidic	Medium	Low	Medium	Medium	Deficient	Sufficient	Loamy sand
Ter_023	Ter_Bas_G02_03/03_002	BASANTAPUR	5	Asmita Limbu	Musangkhel	Moderately Acidic	High	Very Low	Low	High	Deficient	Sufficient	Loam
Ter_024	Ter_Sab_G02_02/01_005	SAWALA	8	Nilmani Basnet	Gairigaun	Strongly Acidic	Low	Very Low	Medium	Medium	Deficient	Sufficient	Clay
Ter_025	Ter_Amb_G02_01/04_001	AMBUNG	7	Loam Nath Bhattarai	phamphewa	Strongly Acidic	Medium	Low	High	High	Deficient	Sufficient	Sandy Loam
Ter_026	Ter_Amb_G02_01/04_003	AMBUNG	7	Sandesh Ghimire	phamphewa	Strongly Acidic	Low	Very Low	Very High	High	Deficient	Sufficient	Loamy sand
Ter_027	Ter_Pip_G02_02/04_004	PIPLE	1	Keshap Timilsina	Tilingar	Moderately Acidic	Medium	Low	Very High	Medium	Deficient	Sufficient	Sandy Loam
Ter_028	Ter_Mor_G02_01/04_014	MORAHANG	2	Hemant Budhathoki	Morahang	Slightly Acidic	Medium	High	Medium	Medium	Deficient	Sufficient	Sandy Loam
Ter_029	Ter_Sun_G02_03/03_006	SUNGNAM	5	Manbahadur Khadka	chamchim	Slightly Acidic	High	Medium	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_030	Ter_Jir_G02_02/01_002	JIRIKHIMTI	7	Lal Nath Apagain	Narkate	Slightly Acidic	Low	Very Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_031	Ter_Mor_G02_01/03_002	MORAHANG	4	Khem limbu	Sallari	Strongly Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_032	Ter_Jir_G02_03/03_005	JIRIKHIMTI	2	Tep Gurung	Pinguwa	Moderately Acidic	Medium	Medium	Medium	Very Low	Deficient	Sufficient	Sandy Loam
Ter_033	Ter_Shr_G02_01/01_001	SHRIJUNG	1	Narayan Basnet	Asine	Slightly Acidic	Medium	Low	Medium	Medium	Deficient	Sufficient	Sandy Loam
Ter_035	Ter_Amb_G02_01/04_004	AMBUNG	8	Bikram Bhandari	Kobek	Moderately Acidic	Medium	Low	Low	Medium	Deficient	Sufficient	Sandy Loam
Ter_036	Ter_Pau_G02_01/03_004	PAUTHAK	2	Purna Sherpa	khakhora	Nearly Neutral	Medium	High	Very High	Medium	Deficient	Deficient	Sandy Loam
Ter_037	Ter_Jir_G02_03/02_005	JIRIKHIMTI	8	Rojan Bista	Katmata	Moderately Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Loamy sand
Ter_038	Ter_Shr_G02_01/01_005	SHRIJUNG	8	Lakpa Sherpa	Bhagtar	Moderately Acidic	Low	Very Low	Low	Medium	Deficient	Sufficient	Sandy Loam
Ter_039	Ter_Pau_G02_01/03_005	PAUTHAK	4	Somley Limbu	Dandagaun	Moderately Acidic	Very Low	Very Low	Medium	Medium	Deficient	Sufficient	Sandy Loam
Ter_040	Ter_Shr_G02_01/02_002	SHRIJUNG	4	Yashmin Bhattarai	Khrunga-Khola	Slightly Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Sand
Ter_041	Ter_Amb_G02_02/01_010	AMBUNG	4	Singyay Sherpa	Ambun	Moderately Acidic	Low	Very Low	Very High	Medium	Deficient	Sufficient	Loam

Soil Fertility Mapping Project

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Terathum District

Lab Code	Soil Pit Identity	VDC	Ward No	Farmer Name	Location	pH	Organic Matter (OM)	Total Nitrogen (TN)	Available Phosphorus (P_2O_5)	Available Potash (K_2O)	Zinc (Zn)	Boron (B)	Soil Texture
Ter_042	Ter_Shr_G02_01/02_006	SHRIJUNG	9	Harka Man Tamang	Bhotegaun	Moderately Acidic	Medium	Low	Low	High	Deficient	Sufficient	Sandy Loam
Ter_043	Ter_Sun_G02_03/01_002	SUNGNAM	9	Dal Bahadur Rana Magar	Daywad	Moderately Acidic	Medium	Medium	Medium	Very High	Deficient	Sufficient	Sandy Loam
Ter_044	Ter_Pip_G02_02/04_007	PIPLE	9	Bibhor Nisuli	Khatrigaun	Moderately Acidic	Medium	Low	Medium	Medium	Deficient	Sufficient	Sandy Loam
Ter_045	Ter_Sun_G02_03/01_001	SUNGNAM	8	Nakha Bahadur Shrestha	Lasune	Slightly Acidic	High	Medium	Medium	Medium	Deficient	Sufficient	Loam
Ter_046	Ter_Pip_G02_02/04_006	PIPLE	1	Payal Apagain	Kalimiti	Strongly Acidic	Low	Very Low	Medium	Medium	Deficient	Sufficient	Loam
Ter_047	Ter_Pau_G02_01/02_009	PAUTHAK	9	Hukman Sherpa	Poktana	Moderately Acidic	Very Low	High	Medium	Medium	Deficient	Sufficient	Sandy Clay Loam
Ter_048	Ter_Mor_G02_01/03_003	MORAHANG	1	Prahlad Khadka	Gaukheri	Strongly Acidic	Medium	High	High	Very Low	Deficient	Sufficient	Loam
Ter_049	Ter_Sol_G02_02/04_001	SOLMA	8	Jay Govinda Rai	Solma	Strongly Acidic	High	Medium	Medium	Low	Deficient	Sufficient	Sandy Loam
Ter_050	Ter_Pau_G02_01/02_007	PAUTHAK	9	Indra Limbu	Pauthak	Slightly Acidic	Very Low	Very Low	Medium	Low	Deficient	Sufficient	Sandy Loam
Ter_051	Ter_Sun_G02_03/03_003	SUNGNAM	5	Lakpa Sherpa	Menduk	Moderately Acidic	High	Low	Medium	Low	Deficient	Sufficient	Loam
Ter_052	Ter_Mor_G02_01/04_015	MORAHANG	8	Shree Bhakta Khapung	Jante	Nearly Neutral	Medium	High	Medium	Low	Deficient	Sufficient	Sandy Loam
Ter_053	Ter_Shr_G02_01/02_005	SHRIJUNG	7	Santanu dahal	Ajira	Slightly Acidic	Very Low	Medium	Low	Very Low	Deficient	Sufficient	Sandy Loam
Ter_054	Ter_Mor_G02_01/04_011	MORAHANG	9	Krishna Ram Niraula	Skidim	Strongly Acidic	Medium	Low	Medium	Medium	Deficient	Sufficient	Sandy Loam
Ter_055	Ter_Shr_G02_01/01_004	SHRIJUNG	2	Ruchin Khadka	Asine	Moderately Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_056	Ter_Bas_G02_03/03_001	BASANTAPUR	5	Dilmaya Tamang	Musangkhel	Moderately Acidic	High	Medium	Medium	Low	Deficient	Deficient	Loam
Ter_057	Ter_Amb_G02_02/01_007	AMBUNG	2	Sammunat Limbu	Patigaun	Slightly Acidic	Medium	Low	Very High	High	Deficient	Sufficient	Sandy Clay Loam
Ter_058	Ter_Pip_G02_02/04_005	PIPLE	1	Suraj Limbu	Kalimiti	Moderately Acidic	Medium	Medium	Low	Very Low	Deficient	Sufficient	Loam
Ter_059	Ter_Sol_G02_03/02_003	SOLMA	4	Hari Pokherel	Kande	Moderately Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_060	Ter_Jir_G02_02/01_003	JIRIKHIMTI	8	Purna Man Limbu	Okharbot	Slightly Acidic	Low	High	Medium	Very Low	Deficient	Sufficient	Clay Loam
Ter_061	Ter_Pau_G02_01/02_008	PAUTHAK	9	Lokendra Man Sherpa	bhasme	Slightly Acidic	Very Low	Very Low	Medium	High	Deficient	Sufficient	Loam

Soil Fertility Mapping Project

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Terathum District

Lab Code	Soil Pit Identity	VDC	Ward No.	Farmer Name	Location	pH	Organic Matter (OM)	Total Nitrogen (TN)	Available Phosphorus (P_2O_5)	Available Potash (K_2O)	Zinc (Zn)	Boron (B)	Soil Texture
Ter_062	Ter_Amb_G02_02/01_006	AMBUNG	1	Nigma Galsebau Sherpa	Chaite	Nearly Neutral	Low	Low	Very High	Medium	Deficient	Sufficient	Loam
Ter_063	Ter_Sol_G02_03/02_004	SOLMA	4	Sujita Gurung	Kande	Slightly Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Sand
Ter_064	Ter_Mor_G02_01/03_007	PAUTHAK	6	Gyanu Maya Tamang	Khesera	Slightly Acidic	Very Low	Very Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_066	Ter_Mor_G02_01/04_010	MORAHANG	9	Sonam Thapa	Bhoteghaderi	Nearly Neutral	Low	Low	Medium	High	Deficient	Sufficient	Loamy sand
Ter_067	Ter_Amb_G02_02/02_002	AMBUNG	6	Juthe Sherpa	Ambung-Puchhar	Moderately Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_068	Ter_Shr_G02_01/01_003	SHRIJUNG	2	Chandra Gurung	Asine	Moderately Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_069	Ter_Jir_G02_02/01_001	JIRIKHIMTI	7	Kancha Sherpa	Narkate	Nearly Neutral	Medium	Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_070	Ter_Sol_G02_03/03_003	SOLMA	5	Chyung Lama	Bokre	Slightly Acidic	Medium	Medium	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_071	Ter_Sab_G02_02/01_004	SAWALA	9	Harka Bahadur Limbu	Jirikhimti	Moderately Acidic	Low	Very Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_072	Ter_Mor_G02_01/04_007	MORAHANG	9	Bhim Rai	Majhigaun	Moderately Acidic	Medium	Low	Medium	Medium	Deficient	Sufficient	Sandy Loam
Ter_073	Ter_Sun_G02_03/03_004	SUNGNAM	7	Kul Bahadur Limbu	Pingdanda	Moderately Acidic	Medium	Medium	Medium	Medium	Deficient	Sufficient	Sandy Loam
Ter_074	Ter_Sun_G02_03/03_005	SUNGNAM	5	Tej Gurung	Chamchim	Moderately Acidic	Low	High	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_075	Ter_Mor_G02_01/04_012	MORAHANG	9	Bimala Rai	Skidim	Nearly Neutral	Medium	Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_076	Ter_Sun_G02_03/01_003	SUNGNAM	9	Kul Bahadur Thapa	Chyakche	Slightly Acidic	High	Medium	Medium	Medium	Deficient	Sufficient	Sandy Loam
Ter_077	Ter_Shr_G02_01/02_004	SHRIJUNG	3	Govinda Bhattarai	Phyiyo	Moderately Acidic	Low	Medium	Medium	Very Low	Deficient	Sufficient	Loam
Ter_078	Ter_Sol_G02_03/03_004	SOLMA	6	Amar Bhandari	solma	Moderately Acidic	Medium	Low	Medium	Medium	Deficient	Deficient	Sandy Loam
Ter_079	Ter_Sol_G02_02/04_002	SOLMA	8	Dinesh Limbu	Kalimiti	Strongly Acidic	Medium	Low	Very High	Medium	Deficient	Sufficient	Sandy Loam
Ter_080	Ter_Amb_G02_02/02_003	AMBUNG	6	Bamdev Gautam	Ambung-Puchhar	Moderately Acidic	Medium	Medium	High	Medium	Deficient	Deficient	Sandy Clay Loam
Ter_081	Ter_Amb_G02_02/01_008	AMBUNG	2	Akash Bhattarai	Patigaun	Moderately Acidic	High	High	High	Low	Deficient	Sufficient	Sandy Loam
Ter_082	Ter_Bas_G02_04/02_002	BASANTAPUR	3	Tej Bahadur Khadka	Dadakharka	Slightly Acidic	High	Medium	High	Very High	Deficient	Sufficient	Sandy Loam

Lab Code	Soil Pit Identity	VDC	Ward No.	Farmer Name	Location	pH	Organic Matter (OM)	Total Nitrogen (TN)	Available Phosphorus (P_2O_{05})	Available Potash (K_2O)	Zinc (Zn)	Boron (B)	Soil Texture
Ter_083	Ter_Shr_G02_01/02_003	SHRIJUNG	3	Pasang Sherpa	Phyiyo	Slightly Acidic	Medium	Low	Medium	Medium	Deficient	Sufficient	Sand
Ter_084	Ter_Jir_G02_03/02_008	JIRIKHIMTI	4	Kumari Gurung	Amdim	Slightly Acidic	Medium	Medium	Medium	High	Deficient	Sufficient	Loamy sand
Ter_085	Ter_Pau_G02_01/02_010	PAUTHAK	9	Jabung Sherpa	Poktana	Slightly Acidic	Very Low	Low	High	Low	Deficient	Deficient	Sandy Loam
Ter_086	Ter_Amb_G02_02/02_001	SAWALA	8	Lakpa Limbu	Dandakhet	Moderately Acidic	Low	High	Medium	Low	Deficient	Sufficient	Sandy Loam
Ter_087	Ter_Shr_G02_01/02_001	SHRIJUNG	5	Gyanendra Basnet	Shrijung	Moderately Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_088	Ter_Sol_G02_02/04_003	SOLMA	8	Dolpa Sherpa	Dopkile	Moderately Acidic	High	Low	Medium	High	Deficient	Sufficient	Loamy sand
Ter_089	Ter_Sun_G01_01/01_005	SUNGNAM	4	Mahesh Khadka	Nagartapa	Slightly Acidic	High	Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_090	Ter_Sun_G01_01/04_003	SUNGNAM	4	Min Bahadur thapa	Majkharka	Nearly Neutral	Medium	High	Medium	Medium	Deficient	Sufficient	Loam
Ter_091	Ter_Pan_G01_03/03_023	PANCHAKANYA POKHARI	1	Aashis Limbu	Wasika	Nearly Neutral	Medium	Low	High	Medium	Deficient	Sufficient	Loamy sand
Ter_092	Ter_Pha_G01_03/02_019	PHAKCHAMARA	4	Ram Bohara	Singewa	Strongly Acidic	Medium	Low	Medium	Medium	Deficient	Sufficient	Loam
Ter_093	Ter_Pha_G01_03/02_020	PHAKCHAMARA	4	Roshan Limbu	Singewa	Moderately Acidic	Medium	Low	Very High	High	Deficient	Sufficient	Clay
Ter_094	Ter_Dag_G01_02/01_007	DAGAPA	6	Bishwo Limbu	Sewa	Moderately Acidic	Low	Very Low	Low	Medium	Deficient	Sufficient	Sand
Ter_095	Ter_Okh_G01_01/03_044	OKHRE	8	Jhamak Basnet	Thakugaun	Moderately Acidic	Medium	Low	Very High	Medium	Deficient	Sufficient	Sandy Clay Loam
Ter_096	Ter_Pan_G01_03/04_015	PANCHAKANYA POKHARI	4	Bal Bahadur Thapa	Bagret	Strongly Acidic	Medium	Low	High	High	Deficient	Sufficient	Sand
Ter_097	Ter_Ham_G01_03/01_006	HAMARJUNG	1	Krishna Niraula	khaireni	Nearly Neutral	Medium	Low	Medium	High	Deficient	Sufficient	Loam
Ter_098	Ter_Dag_G01_02/01_008	DAGAPA	5	Bhim Bahadur Limbu	Thulogaun	Nearly Neutral	Medium	Low	Low	High	Deficient	Sufficient	Sand
Ter_099	Ter_Sud_G01_01/04_012	SUDAP	9	Manju thapa	Katuwalgaun	Nearly Neutral	Medium	Low	Medium	High	Deficient	Sufficient	Sandy Clay Loam
Ter_100	Ter_Pha_G01_01/03_039	PHAKCHAMARA	9	Bhoj Pathak	Karkigaun	Moderately Acidic	Medium	Low	Medium	Medium	Deficient	Sufficient	Sandy Clay Loam
Ter_101	Ter_Pha_G01_03/02_018	PHAKCHAMARA	4	Hari Lamjel	Walamba	Slightly Acidic	Medium	Low	High	Medium	Deficient	Sufficient	Sandy Clay Loam
Ter_102	Ter_Okh_G01_01/02_025	OKHRE	2	Chandra Iywagun	Okhre	Slightly Acidic	Medium	Low	High	Medium	Deficient	Sufficient	Sandy Clay Loam

Soil Fertility Mapping Project

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Terathum District

Lab Code	Soil Pit Identity	VDC	Ward No.	Farmer Name	Location	pH	Organic Matter (OM)	Total Nitrogen (TN)	Available Phosphorus (P_2O_5)	Available Potash (K_2O)	Zinc (Zn)	Boron (B)	Soil Texture
Ter_103	Ter_Pha_G01_03/02_021	PHAKCHAMARA	4	Dipak Limbu	Bhirgaun	Nearly Neutral	Medium	Low	Medium	High	Deficient	Sufficient	Loam
Ter_104	Ter_Sun_G01_01/01_001	SUNGNAM	3	Mahendra B.K	Sungnam	Slightly Acidic	High	Medium	Medium	Very High	Deficient	Sufficient	Sandy Loam
Ter_105	Ter_Dag_G01_02/01_006	DAGAPA	8	Suren Limbu	Sewa	Moderately Acidic	Medium	High	High	High	Deficient	Sufficient	Loam
Ter_106	Ter_Ham_G01_02/02_017	HAMARJUNG	5	Naren Limbu	Phejung	Moderately Acidic	Medium	Low	Very High	High	Deficient	Sufficient	Clay Loam
Ter_107	Ter_Ham_G01_02/02_018	HAMARJUNG	4	Kedar Dhungana	Phejuri	Moderately Acidic	Medium	Low	Medium	Medium	Deficient	Deficient	Loam
Ter_108	Ter_And_G01_02/04_015	ANGDIM	7	Subash Thapa	Kharbari	Moderately Acidic	Medium	Medium	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_109	Ter_Pan_G01_03/01_001	PANCHAKANYA POKHARI	6	Hammarjun	Phayak	Slightly Acidic	Low	Very Low	Low	High	Deficient	Sufficient	Sandy Loam
Ter_110	Ter_Ham_G01_03/01_001	HAMARJUNG	3	Sankar Dhungana	Damaigaun	Nearly Neutral	Medium	Low	Medium	High	Deficient	Sufficient	Loam
Ter_111	Ter_Pha_G01_03/02_017	PHAKCHAMARA	4	Kapil limbu	Walambu	Moderately Acidic	Medium	Low	Very High	High	Deficient	Sufficient	Loam
Ter_112	Ter_Okh_G01_01/03_045	OKHRE	8	Yam Bahadur Thapa	Thakurigaun	Moderately Acidic	Medium	Low	Very High	High	Deficient	Deficient	Loam
Ter_113	Ter_Phu_G01_02/04_001	PHULEK	9	Yam Bahadur Gurung	Champhula	Moderately Acidic	Low	Very Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_114	Ter_Pan_G01_03/03_013	PANCHAKANYA POKHARI	1	Arun Bahadur Chand	Himandin	Slightly Acidic	Medium	Very Low	High	Medium	Deficient	High	Loamy sand
Ter_115	Ter_Dag_G01_01/04_017	DAGAPA	2	Khadka Katuwal	Singthapa	Slightly Acidic	Very Low	Very Low	Low	High	Deficient	Sufficient	Loamy sand
Ter_116	Ter_Dag_G01_02/01_012	DAGAPA	2	Shambu Khadka	Dagapa	Slightly Acidic	Medium	Low	Medium	Medium	Deficient	Sufficient	Sand
Ter_117	Ter_Sun_G01_01/01_006	SUNGNAM	4	Bikash Sapkota	Nagartapa	Slightly Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_118	Ter_Okh_G01_01/03_030	OKHRE	6	Hemant Rai	Sundarichap	Slightly Acidic	Medium	Low	High	Medium	Deficient	Sufficient	Clay Loam
Ter_119	Ter_Okh_G01_01/02_026	OKHRE	4	Hari Dhamala	Sundarichap	Nearly Neutral	Medium	Low	Medium	High	Deficient	Sufficient	Loam
Ter_120	Ter_Phu_G01_02/04_002	PHULEK	8	Mitra lal Pun	Champhula	Strongly Acidic	Low	Very Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_121	Ter_Okh_G01_01/03_042	OKHRE	9	Sandeep Poudel	Bhotegaun	Strongly Acidic	Medium	High	Very High	High	Deficient	Sufficient	Loam
Ter_122	Ter_Sud_G01_02/02_016	SUDAP	3	Yubraj Thapa	Chipuwa	Slightly Acidic	Medium	Medium	Medium	High	Deficient	Sufficient	Sandy Loam

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Lab Code	Soil Pit Identity	VDC	Ward No.	Farmer Name	Location	pH	Organic Matter (OM)	Total Nitrogen (TN)	Available Phosphorus (P_2O_5)	Available Potash (K_2O)	Zinc (Zn)	Boron (B)	Soil Texture
Ter_123	Ter_Okh_G01_01/03_031	OKHRE	6	Dinesh Limbu	Lumgkha	Moderately Acidic	Medium	Low	Very High	High	Deficient	Sufficient	Clay
Ter_124	Ter_Ham_G01_03/01_004	HAMARJUNG	2	Kopila tamang	Bhairse	Strongly Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Loam
Ter_125	Ter_Okh_G01_01/03_020	SUDAP	7	Jhamak Khulal	Marse	Moderately Acidic	Medium	Low	Medium	Medium	Deficient	Sufficient	Sandy Loam
Ter_126	Ter_Pha_G01_01/03_035	PHAKCHAMARA	7	Dipak Gajamer	Melbote	Moderately Acidic	Medium	Low	Very High	High	Deficient	High	Sandy Clay Loam
Ter_127	Ter_Pan_G01_03/01_009	PANCHAKANYA POKHARI	6	Mayadevi limbu	Panchakanya-Pokhari	Strongly Acidic	Medium	Low	Medium	Medium	Deficient	Sufficient	Sandy Loam
Ter_128	Ter_Ham_G01_03/01_003	HAMARJUNG	1	Srijan Sharma	Tunnama	Moderately Acidic	Medium	Low	Medium	High	Deficient	High	Sandy Clay Loam
Ter_129	Ter_Pan_G01_03/04_014	PANCHAKANYA POKHARI	3	Sujan Limbu	Bagret	Moderately Acidic	Medium	Low	High	Medium	Deficient	High	Loamy sand
Ter_130	Ter_Sun_G01_01/01_015	OKHRE	3	Sailesh Limbu	Lamkhatari	Moderately Acidic	Medium	Low	Medium	Medium	Deficient	High	Sandy Clay Loam
Ter_131	Ter_Pha_G01_03/02_022	PHAKCHAMARA	3	Laxmi tamang	Batase	Moderately Acidic	Medium	Low	Very High	Medium	Deficient	Sufficient	Sandy Clay Loam
Ter_132	Ter_Pan_G01_03/01_010	PANCHAKANYA POKHARI	6	Narayan Pandey	Panchakanya-Pokhari	Moderately Acidic	Medium	Low	Medium	Medium	Deficient	Sufficient	Sandy Loam
Ter_133	Ter_Pan_G01_03/01_012	PANCHAKANYA POKHARI	6	Gopi Khatiwada	Khauwa	Moderately Acidic	Medium	Low	Very High	Medium	Deficient	Deficient	Clay Loam
Ter_134	Ter_Pan_G01_03/02_016	PANCHAKANYA POKHARI	6	Bharat Dhamal	Khauwa	Moderately Acidic	Low	High	Very High	Very Low	Deficient	Sufficient	Sandy Loam
Ter_135	Ter_Sun_G01_01/04_002	SUNGNAM	4	Bishnu Lamjel	Majhkharka	Moderately Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_136	Ter_Ham_G01_03/01_005	HAMARJUNG	2	Narayan Subba	Khaireni	Moderately Acidic	Medium	Low	Very High	High	Deficient	Sufficient	Loamy sand
Ter_137	Ter_Ham_G01_01/03_041	HAMARJUNG	6	Mankumar Chhyantal	Charkune	Moderately Acidic	Medium	Low	Very High	High	Deficient	High	Loamy sand
Ter_138	Ter_Okh_G01_01/03_027	OKHRE	7	Subash Limbu	Sundarichap	Nearly Neutral	Medium	Low	Very High	Medium	Deficient	Sufficient	Sandy Loam
Ter_139	Ter_Dag_G01_02/01_009	DAGAPA	5	Janak Bahadur Basnet	Thulogaun	Slightly Acidic	Low	Low	High	Low	Deficient	High	Sand
Ter_140	Ter_Okh_G01_01/03_034	OKHRE	7	Him Bahadur Karki	Okhre	Slightly Acidic	Low	Low	Very High	High	Deficient	Sufficient	Sandy Loam
Ter_141	Ter_Okh_G01_01/03_028	OKHRE	2	Jyoti Basnet	Sundarichap	Slightly Acidic	Medium	Low	High	High	Deficient	Sufficient	Sandy Loam
Ter_142	Ter_Dag_G01_02/01_013	DAGAPA	3	Aashish Limbu	Dagapa	Slightly Acidic	Low	Very Low	Low	High	Deficient	Deficient	Sandy Loam

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Ter_143	Ter_Phu_G01_02/01_005	PHULEK	3	Harka Bohara	Phulek	Slightly Acidic	Low	High	Medium	Medium	Deficient	Deficient	Sandy Loam
Ter_144	Ter_Pha_G01_01/03_036	PHAKCHAMARA	7	Amar Limbu	Melbote	Nearly Neutral	Medium	Medium	Medium	High	Deficient	High	Sandy Loam
Ter_145	Ter_Sud_G01_01/04_010	SUDAP	9	Netra Bahadur Thapa	Kolabung	Slightly Acidic	Low	Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_146	Ter_Pan_G01_03/01_007	PANCHAKANYA POKHARI	9	Pushpadip Thapa	Jyamire	Slightly Acidic	Medium	Low	High	Medium	Deficient	Deficient	Sandy Loam
Ter_147	Ter_Okh_G01_01/03_033	OKHRE	5	Ravindra Sherpa	Lumkha	Nearly Neutral	Medium	Low	High	Low	Deficient	Deficient	Sandy Loam
Ter_148	Ter_Sun_G01_01/01_014	SUDAP	8	Prabin Basnet	Barbote	Moderately Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_149	Ter_Okh_G01_01/03_032	OKHRE	5	Rajesh Rai	Lumkha	Slightly Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Loam
Ter_150	Ter_Sud_G01_01/04_019	SUDAP	6	Phulang Thapa	Jodisalla	Slightly Acidic	Medium	Low	Very High	High	Deficient	High	Sandy Loam
Ter_151	Ter_Sun_G01_01/01_004	SUNGNAM	4	Sagar Adhikari	Majhkharka	Nearly Neutral	Medium	Medium	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_152	Ter_Okh_G01_01/03_046	OKHRE	6	Dev Bahadur Subedi	Khanapung	Slightly Acidic	Medium	Low	Very High	High	Deficient	Sufficient	Loam
Ter_153	Ter_Okh_G01_01/03_021	OKHRE	2	Bishnu Bhattarai	Dumre	Slightly Acidic	Medium	Low	Medium	High	Deficient	High	Loam
Ter_154	Ter_Sud_G01_01/04_011	SUDAP	9	Sandeep pokherel	Kolabun	Moderately Acidic	Very Low	High	Medium	Medium	Deficient	Sufficient	Loam
Ter_155	Ter_Okh_G01_01/03_029	OKHRE	5	Nabin Thapa	Lumkha	Slightly Acidic	Medium	Low	Very High	High	Deficient	Sufficient	Loam
Ter_156	Ter_Ham_G01_02/04_014	ANGDIM	7	Kapil Limbu	Khorbari	Moderately Alkaline	Low	Medium	Very High	High	Deficient	High	Loam
Ter_157	Ter_Sud_G01_01/04_018	SUDAP	6	Bala ram Limbu	Bikhe	Slightly Alkaline	Medium	Low	Medium	Medium	Deficient	Sufficient	Loam
Ter_158	Ter_Pan_G01_01/03_038	PANCHAKANYA POKHARI	7	Hari Khadka	Thulagaun	Slightly Acidic	Low	Low	Medium	Low	Deficient	High	Loam
Ter_159	Ter_Pha_G01_01/03_037	PHAKCHAMARA	9	Saroj KC	Phakchamara	Moderately Acidic	Medium	High	Medium	Very Low	Deficient	Sufficient	Sandy Loam
Ter_160	Ter_Okh_G01_01/03_043	OKHRE	8	Surendra Basnet	Thakurigaun	Slightly Acidic	Medium	Low	Very High	Medium	Deficient	Sufficient	Sandy Loam
Ter_161	Ter_Dag_G01_01/04_009	DAGAPA	1	Sita Lamjel	Lambukhola	Nearly Neutral	Very Low	High	Very High	High	Deficient	Sufficient	Sandy Loam
Ter_162	Ter_Dag_G01_02/01_010	DAGAPA	7	Dorje Limbu	Sewa	Slightly Acidic	Medium	Low	High	High	Deficient	High	Sandy Loam

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Ter_163	Ter_Bas_G01_02/01_003	BASANTAPUR	9	Maya Sripali	Salleri	Nearly Neutral	High	Medium	Low	High	Deficient	Sufficient	Loamy sand
Ter_164	Ter_Okh_G01_01/03_040	OKHRE	9	Krishna Thapa	Okhre	Strongly Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Loam
Ter_165	Ter_Sud_G01_01/04_007	SUDAP	9	Shyam Hari Thapa	Sakhma	Nearly Neutral	Medium	High	Medium	Medium	Deficient	Sufficient	Sandy Loam
Ter_166	Ter_Sud_G01_01/04_016	SUDAP	6	Shree Pandit	Katuwalgaun	Moderately Acidic	Medium	Low	Very High	High	Deficient	High	Sandy Clay Loam
Ter_167	Ter_Dag_G01_02/01_011	DAGAPA	6	Govinda Karki	Sewa	Slightly Acidic	Very Low	Very Low	Low	High	Deficient	Sufficient	Sandy Loam
Ter_168	Ter_Sud_G01_01/04_008	SUDAP	9	Nirpa Basnet	Kolabung	Nearly Neutral	Medium	High	Medium	Medium	Deficient	Deficient	Sandy Loam
Ter_169	Ter_Ham_G01_03/01_002	HAMARJUNG	3	Mina Karki	Phayak	Moderately Acidic	Medium	Medium	Medium	Low	Deficient	Deficient	Sandy Loam
Ter_170	Ter_Okh_G01_01/02_024	OKHRE	3	Tanka Basnet	Dhakalgaun	Moderately Acidic	Medium	Low	Low	High	Deficient	Sufficient	Sandy Loam
Ter_171	Ter_Okh_G01_01/03_022	OKHRE	7	Hemraj Subedi	Sageri	Moderately Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Loam
Ter_172	Ter_Okh_G01_01/02_023	OKHRE	2	Ganga Hari Thapa	Dhakalgaun	Slightly Acidic	Medium	Low	Low	Medium	Deficient	Deficient	Sand
Ter_173	Ter_Phu_G01_02/01_004	PHULEK	3	Sunmaya Gurung	Phulek	Slightly Acidic	Low	Low	Medium	Very Low	Deficient	Sufficient	Sandy Loam
Ter_174	Ter_Sud_G01_01/04_013	SUDAP	9	Tek Bahadur Khadka	Suderp	Nearly Neutral	Medium	Low	Medium	High	Deficient	High	Sandy Loam
Ter_175	Ter_Pan_G01_03/01_007	PANCHAKANYA POKHARI	5	Puspadip Thapa	Jyamire	Moderately Acidic	Medium	Low	Very High	High	Deficient	Sufficient	Loam
Ter_176	Ter_Chh_G04_02/02_046	CHHATEDHUNGA	6	Ram Prashad Oli	Hoda	Moderately Acidic	Medium	Low	High	High	Deficient	Sufficient	Sandy Loam
Ter_177	Ter_Kha_G04_05/01_001	KHAMLALUNG	6	Rakesh Limbu	Khamalung	Strongly Acidic	Medium	Medium	Medium	High	Deficient	Sufficient	Loam
Ter_178	Ter_Haw_G04_01/01_032	HWAKU	5	Gangaram Devkota	Chilaunebesi	Strongly Acidic	Medium	Low	High	Low	Deficient	Sufficient	Loam
Ter_179	Ter_Chh_G04_02/03_089	CHHATEDHUNGA	9	Dhana Bahadur Majhi	Majhigaun	Slightly Acidic	Medium	Medium	High	High	Deficient	High	Sandy Loam
Ter_180	Ter_San_G04_04/02_006	SANKRANTIBAJAR	3	Bal Bahadur Tamang	Pokhari	Slightly Acidic	Medium	Low	Low	High	Deficient	High	Sandy Loam
Ter_181	Ter_Haw_G04_01/01_029	HWAKU	1	Puj Bahadur Aale	Khurpathok	Nearly Neutral	Medium	Medium	Low	High	Deficient	High	Sandy Loam
Ter_182	Ter_Chh_G04_02/02_044	CHHATEDHUNGA	9	Tara Moktan	Tundikhel	Moderately Acidic	Medium	Low	High	Medium	Deficient	Sufficient	Sandy Loam

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Ter_183	Ter_San_G04_04/02_007	SANKRANTIBAJAR	2	Prakash Bhattarai	Nasibung	Moderately Acidic	Medium	Low	Low	Very High	Deficient	High	Sandy Loam
Ter_184	Ter_Haw_G04_01/01_018	HWAKU	4	Bikram Limbu	Maula	Strongly Acidic	Low	Very Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_185	Ter_Chu_G04_03/02_059	CHUHANDANDA	4	Dambar Gurung	Mathilo-Hattikharka	Moderately Acidic	Low	High	High	Medium	Deficient	Deficient	Loam
Ter_186	Ter_Chu_G04_03/02_064	CHUHANDANDA	5	Sabitri Ghising	Mangsari	Moderately Acidic	Medium	Low	High	High	Deficient	High	Loam
Ter_187	Ter_Haw_G04_01/01_016	HWAKU	7	Bishwo Kalikote	Paiyabota	Nearly Neutral	Low	Very Low	Medium	Medium	Deficient	High	Loam
Ter_188	Ter_Chh_G04_02/02_042	CHHATEDHUNGA	8	Ramesh Tamang	Tundikhel	Slightly Acidic	Low	Low	High	Medium	Deficient	Sufficient	Sandy Loam
Ter_189	Ter_Iwa_G04_01/01_027	IWA	5	Ishwor Bahadur Ingnam	Keling	Slightly Acidic	Medium	Low	High	High	Deficient	High	Loam
Ter_190	Ter_San_G04_04/03_012	SANKRANTIBAJAR	7	Kamal Phambu	Sodan-Bhirmuni	Slightly Acidic	Medium	Low	Low	High	Deficient	Sufficient	Sandy Loam
Ter_191	Ter_Chh_G04_02/02_043	CHHATEDHUNGA	8	Mankumari Moktan	Jagihappa	Moderately Acidic	Medium	Low	High	Medium	Deficient	Sufficient	Sandy Loam
Ter_193	Ter_Iwa_G04_01/04_036	IWA	5	Ganga Ingnam	Barbote	Slightly Acidic	Medium	Low	High	Medium	Deficient	High	Loamy sand
Ter_194	Ter_San_G04_01/04_015	SANKRANTIBAJAR	6	Harka Bahadur Tamang	Puranogaun	Moderately Acidic	Medium	Low	Low	Medium	Deficient	High	Sandy Loam
Ter_195	Ter_San_G04_04/02_008	SANKRANTIBAJAR	2	Khadka Katuwal	Nasibung	Moderately Acidic	Medium	Low	Low	High	Deficient	Deficient	Sandy Loam
Ter_196	Ter_Chu_G04_03/02_058	CHUHANDANDA	4	Bed Bahadur Gurung	Tallo-Hattikharka	Nearly Neutral	Medium	Low	High	High	Deficient	High	Sandy Loam
Ter_197	Ter_Kha_G04_04/01_003	KHAMLALUNG	6	Mankumari Limbu	Khamlaun	Slightly Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Loam
Ter_198	Ter_Chu_G04_03/02_057	CHUHANDANDA	4	Dharma Raj Poudel	Mathilo-Hattikharka	Slightly Acidic	Medium	Medium	High	High	Deficient	Deficient	Loam
Ter_199	Ter_Chu_G04_01/04_001	CHUHANDANDA	1	Tulsa Sitaula	Phakchuwa	Slightly Acidic	High	High	Very High	High	Deficient	Sufficient	Loam
Ter_200	Ter_Haw_G04_01/02_033	HWAKU	8	Sharmila Gurung	Bijore	Moderately Acidic	Low	High	Very High	Very Low	Deficient	Sufficient	Loam
Ter_201	Ter_Chh_G04_02/02_045	CHHATEDHUNGA	6	Kehav Prashad Oli	Hoda	Moderately Acidic	Medium	Medium	Very High	Medium	Deficient	Deficient	Sandy Loam
Ter_202	Ter_Chh_G04_01/03_050	CHHATEDHUNGA	1	Rina Magar	Kharbote	Slightly Acidic	Medium	Low	Very High	Medium	Deficient	High	Loam
Ter_203	Ter_San_G04_04/02_014	SANKRANTIBAJAR	1	Mane Phambu	Dadagaun	Strongly Acidic	Medium	Medium	Low	Medium	Deficient	Sufficient	Sandy Loam

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Ter_204	Ter_San_G04_04/02_009	SANKRANTIBAJAR	4	Purja Katuwal	Musegaira	Moderately Acidic	Medium	Low	Low	Medium	Deficient	Sufficient	Sandy Loam
Ter_205	Ter_Haw_G04_01/02_034	HWAKU	8	Harka Bahadur Limbu	Bijore	Slightly Acidic	Low	Very Low	Medium	High	Deficient	Sufficient	Loam
Ter_206	Ter_Chh_G04_02/02_041	CHHATEDHUNGA	8	Gita Magar	Archale	Moderately Acidic	Medium	Low	High	High	Deficient	Sufficient	Sandy Loam
Ter_207	Ter_Kha_G04_04/02_005	KHAMLALUNG	1	Dil Bahadur Tamang	Bheharbote	Moderately Acidic	Medium	Medium	Medium	High	Deficient	High	Sandy Loam
Ter_208	Ter_San_G04_01/04_010	SANKRANTIBAJAR	4	Shankar Sitaula	Mulpani	Slightly Acidic	Medium	Low	Low	Medium	Deficient	Sufficient	Loamy sand
Ter_209	Ter_Haw_G04_01/01_030	HWAKU	4	Nar Bahadur Kalikoti	Odere	Moderately Acidic	Medium	Low	Very High	Medium	Deficient	Sufficient	Loam
Ter_210	Ter_Chh_G04_02/02_083	CHHATEDHUNGA	7	Bhimraj Majhi	Khaireni	Slightly Acidic	Very Low	Medium	Medium	Very Low	Deficient	Sufficient	Sandy Loam
Ter_211	Ter_Chh_G04_02/02_047	CHHATEDHUNGA	7	Mohan Rai	Yakhagaun	Slightly Acidic	Low	Very Low	Very High	High	Deficient	Deficient	Loam
Ter_212	Ter_Haw_G04_01/01_020	HWAKU	7	Arjun Limbu	Maula	Slightly Alkaline	Low	Very Low	Very High	High	Deficient	Sufficient	Loam
Ter_213	Ter_Chu_G04_03/02_063	CHUHANDANDA	5	Bhim Prashad Ghising	Mangsari	Slightly Acidic	Medium	Low	High	Medium	Deficient	High	Loam
Ter_214	Ter_San_G04_01/04_024	SANKRANTIBAJAR	4	Ramu Sitaula	Mulpani	Slightly Acidic	Medium	Low	Low	Very High	Deficient	Deficient	Sandy Loam
Ter_215	Ter_Chh_G04_02/03_088	CHHATEDHUNGA	7	Binod Limbu	Bokre	Moderately Acidic	Low	Medium	High	Medium	Deficient	Sufficient	Loam
Ter_216	Ter_Chu_G04_03/02_056	CHUHANDANDA	8	Bir Bahadur Limbu	Chalise	Slightly Acidic	Medium	Low	High	Medium	Deficient	Sufficient	Loamy sand
Ter_217	Ter_Chh_G04_02/02_040	CHHATEDHUNGA	8	Tejman Kandawa	Dadagaun	Moderately Acidic	Low	Low	High	Medium	Deficient	High	Loamy sand
Ter_218	Ter_Iwa_G04_01/02_039	IWA	2	Tara Sangraula	Simle	Moderately Acidic	Medium	Low	High	High	Deficient	Deficient	Sandy Loam
Ter_219	Ter_Haw_G04_01/01_017	HWAKU	6	Ramesh Kalikote	Bagalegaun	Slightly Acidic	Medium	Low	Very High	Medium	Deficient	Sufficient	Sandy Loam
Ter_220	Ter_Haw_G04_01/01_031	HWAKU	5	Bandana Kalikote	Chilaunebesi	Slightly Acidic	Medium	Low	High	Low	Deficient	Deficient	Loam
Ter_221	Ter_Haw_G04_01/01_021	HWAKU	7	Ram Bahadur Gurung	Hangeppa	Moderately Acidic	Medium	Low	Very High	Medium	Deficient	Sufficient	Loam
Ter_222	Ter_Tho_G04_03/01_051	THOKLUNG	4	Devman Kandawa	Bhalukhop	Moderately Acidic	Low	Very Low	Low	High	Deficient	Sufficient	Sandy Loam
Ter_223	Ter_Chh_G04_02/02_048	CHHATEDHUNGA	7	Mahesh Rai	Nageshori	Slightly Acidic	Medium	Low	Very High	High	Deficient	High	Sandy Loam

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Ter_224	Ter_San_G04_04/03_011	SANKRANTIBAJAR	7	Dambar Phambu	Sodan	Strongly Acidic	Low	Very Low	High	Medium	Deficient	Sufficient	Sandy Loam
Ter_225	Ter_Chu_G04_03/02_053	CHUHANDANDA	3	Bhimmaya Tamang	Ahale	Slightly Acidic	Medium	Low	Very High	Low	Deficient	Deficient	Loamy sand
Ter_226	Ter_Chu_G04_03/02_055	CHUHANDANDA	7	Yamnath Dhungana	Simhakharka	Nearly Neutral	Medium	Medium	High	High	Deficient	High	Clay Loam
Ter_227	Ter_Iwa_G04_01/02_084	IWA	3	Mailendra Kandharwa	Hiundrybesi	Slightly Acidic	Low	Very Low	Medium	Medium	Deficient	Deficient	Loam
Ter_228	Ter_Chu_G04_03/02_054	CHUHANDANDA	3	Nirmala Dhungel	Beteni	Nearly Neutral	Medium	Low	High	Very High	Deficient	Sufficient	Loam
Ter_229	Ter_Haw_G04_01/02_086	HWAKU	9	Khadka Bahadur Limbu	Chisapani	Moderately Acidic	Medium	Low	High	High	Deficient	Sufficient	Loam
Ter_230	Ter_Iwa_G04_01/02_032	IWA	4	Krishna Bahadur Limbu	Tinsalle	Moderately Acidic	Medium	Low	High	Medium	Deficient	Sufficient	Sandy Loam
Ter_231	Ter_Tho_G04_03/01_052	THOKLUNG	5	Sriman Tamang	Bhalukhop	Nearly Neutral	Very Low	Very Low	High	Medium	Deficient	Sufficient	Sandy Clay
Ter_232	Ter_San_G04_04/03_013	SANKRANTIBAJAR	7	Gopal Tamang	Sodan-Bhirmuni	Slightly Acidic	Medium	Low	Low	Very High	Deficient	Sufficient	Sandy Loam
Ter_233	Ter_Kha_G04_05/01_004	KHAMLALUNG	3	Dil Bahadur Subba	Phambu	Moderately Acidic	Medium	Low	Medium	Very High	Deficient	Sufficient	Sandy Loam
Ter_234	Ter_Haw_G04_01/01_022	HWAKU	6	Kumar Ingnam	Ahale	Moderately Acidic	Medium	Low	Very High	High	Deficient	Deficient	Loam
Ter_235	Ter_Haw_G04_01/01_028	HWAKU	2	Keshav Baniya	Hegi	Slightly Acidic	Medium	Low	Very High	High	Deficient	Sufficient	Loamy sand
Ter_236	Ter_Haw_G04_01/01_019	HWAKU	8	Tek Bahadur Gurung	Maula	Slightly Acidic	Low	Very Low	Medium	Very High	Deficient	Deficient	Loamy sand
Ter_237	Ter_Chu_G04_01/03_065	CHUHANDANDA	3	Keshav Bhattarai	Aambote	Moderately Acidic	Medium	Low	Very High	High	Deficient	Sufficient	Loam
Ter_238	Ter_Haw_G04_01/02_085	HWAKU	9	Kajiman Thapamagar	Chisapani	Slightly Acidic	Low	Low	High	Medium	Deficient	High	Loam
Ter_239	Ter_Iwa_G04_01/02_038	IWA	2	Radha Devi Thapaliya	Simle	Slightly Acidic	Low	Very Low	High	Medium	Deficient	High	Sandy Loam
Ter_240	Ter_Haw_G04_01/02_087	HWAKU	9	Umesh Tamang	Chisapani	Slightly Acidic	Medium	High	High	Very High	Deficient	Sufficient	Loam
Ter_241	Ter_Iwa_G04_01/04_023	IWA	5	Chandra Bahadur Tamang	Kalipa	Slightly Acidic	Medium	Low	High	High	Deficient	Deficient	Loam
Ter_242	Ter_Tho_G04_01/04_079	THOKLUNG	6	Buddhiman Tamang	Kerepa	Moderately Acidic	Medium	Low	High	Medium	Deficient	Sufficient	Loam
Ter_243	Ter_Tho_G04_03/01_072	THOKLUNG	8	Puran Limbu	Khalde	Moderately Acidic	Low	Very Low	Low	High	Deficient	High	Silt Loam

Lab Code	Soil Pit Identity	VDC	Ward No.	Farmer Name	Location	pH	Organic Matter (OM)	Total Nitrogen (TN)	Available Phosphorus (P_2O_5)	Available Potash (K_2O)	Zinc (Zn)	Boron (B)	Soil Texture
Ter_245	Ter_Tho_G04_04/03_081	THOKLUNG	4	Hari Krishna Kandel	Yankhuwa	Moderately Acidic	Low	Very Low	High	High	Deficient	Sufficient	Sandy Loam
Ter_246	Ter_Tho_G04_03/01_070	THOKLUNG	7	Biru tamang	Apthyore	Moderately Acidic	Low	Very Low	Low	High	Deficient	Sufficient	Sandy Loam
Ter_247	Ter_Chh_G04_01/03_068	CHHATEDHUNGA	3	Bannu Tamang	Wallo-Iwa	Strongly Acidic	Medium	Low	High	High	Deficient	Sufficient	Sandy Loam
Ter_248	Ter_Tho_G04_03/03_077	THOKLUNG	8	Kasiya Limbu	Karkale	Strongly Acidic	Low	Very Low	High	High	Deficient	Sufficient	Sandy Loam
Ter_250	Ter_Chu_G04_01/03_061	CHUHANDANDA	9	Harkabir Ghising	Bhalukhop	Slightly Acidic	Medium	Low	Very High	Medium	Deficient	Sufficient	Loam
Ter_251	Ter_Tho_G04_03/01_071	THOKLUNG	9	Narayan Tamang	Ranichautara	Strongly Acidic	Low	Very Low	High	High	Deficient	Sufficient	Sandy Loam
Ter_252	Ter_Chu_G04_01/03_062	CHUHANDANDA	9	RamBabu ghale	Bhalukhop	Nearly Neutral	Low	Low	High	Very High	Deficient	Deficient	Loam
Ter_253	Ter_Chu_G04_01/03_060	CHUHANDANDA	7	Sita Dhungel	Simhakharka	Slightly Acidic	Medium	Low	High	Very High	Deficient	High	Silt Loam
Ter_254	Ter_Iwa_G04_01/03_067	IWA	9	Chitra Karki	Hairigaun	Moderately Acidic	Medium	Low	High	High	Deficient	High	Sandy Loam
Ter_255	Ter_Tho_G04_03/01_073	THOKLUNG	8	Ganesh Limbu	Dhodeni	Strongly Acidic	Low	Very Low	Low	Medium	Deficient	High	Loam
Ter_256	Ter_Chh_G04_02/01_075	IWA	2	Ghare Tamang	Dhodeni	Nearly Neutral	Low	Low	High	High	Deficient	Sufficient	Sandy Loam
Ter_257	Ter_Tho_G04_03/03_076	THOKLUNG	8	Mahendra Majhi	Karkale	Slightly Alkaline	Very Low	Very Low	Low	High	Deficient	Sufficient	Sandy Loam
Ter_258	Ter_Tho_G04_03/01_069	THOKLUNG	6	Pasang Tamang	Dhalekhor	Strongly Acidic	Very Low	Very Low	Very Low	Medium	Deficient	Sufficient	Sandy Loam
Ter_259	Ter_Tho_G04_04/03_080	THOKLUNG	1	Padmalal Dhungel	Piple	Strongly Acidic	Low	Very Low	High	High	Deficient	Sufficient	Loamy sand
Ter_260	Ter_Tho_G04_03/01_074	THOKLUNG	8	Maila Limbu	Dhodeni	Strongly Acidic	Very Low	Very Low	Low	Very High	Deficient	Sufficient	Sandy Clay Loam
Ter_261	Ter_Chu_G04_01/03_066	CHUHANDANDA	2	Sanubhai Tamang	Dadahari	Slightly Acidic	Medium	Low	Very High	Medium	Deficient	Sufficient	Loam
Ter_263	Ter_San_G04_01/04_025	SANKRANTIBAJAR	4	Bir Bahadur Sitaula	Singtape	Nearly Neutral	Medium	Low	Low	Medium	Deficient	Sufficient	Sand
Ter_264	Ter_Chh_G04_02/02_049	CHHATEDHUNGA	6	Prem Paudel	Banjhe	Strongly Acidic	Very Low	Medium	High	Medium	Deficient	Sufficient	Loam
Ter_265	Ter_Jal_G03_03/02_029	JALJALE	5	Ghanashyam Nirwala	Paudin	Nearly Neutral	Low	Very Low	High	Low	Deficient	Sufficient	Sandy Loam
Ter_266	Ter_Jal_G03_02/04_031	JALJALE	9	Ramsaran luitel	Jaljale	Moderately Acidic	Low	Low	High	Low	Deficient	Sufficient	Sandy Loam

Lab Code	Soil Pit Identity	VDC	Ward No.	Farmer Name	Location	pH	Organic Matter (OM)	Total Nitrogen [TN]	Available Phosphorus (P_2O_5)	Available Potash (K_2O)	Zinc (Zn)	Boron (B)	Soil Texture
Ter_267	Ter_Jal_G03_02/01_033	JALJALE	2	Him Bahadur Limbu	Poklawang	Slightly Acidic	Low	Low	High	Low	Deficient	Sufficient	Sandy Loam
Ter_268	Ter_Jal_G03_03/02_030	JALJALE	6	Nirmala Limbu	Paudin	Nearly Neutral	Low	Very Low	High	Medium	Deficient	Sufficient	Sandy Loam
Ter_269	Ter_Jal_G03_03/02_022	JALJALE	4	Sima Tamang	Tokma	Slightly Acidic	Low	Low	High	Medium	Deficient	Sufficient	Sandy Loam
Ter_270	Ter_Sab_G03_03/01_019	SAWALA	3	Narayan Prashad koirala	Gadhigaun	Moderately Acidic	Medium	Low	Very High	High	Deficient	Sufficient	Sandy Loam
Ter_271	Ter_Jal_G03_03/02_026	JALJALE	4	Hemraj Limbu	Nigale	Nearly Neutral	Low	Low	High	High	Deficient	Sufficient	Sandy Loam
Ter_272	Ter_Jal_G03_03/02_028	JALJALE	6	Bishnu Prashad Acharya	Petwari	Nearly Neutral	Low	Low	High	High	Deficient	Sufficient	Sandy Loam
Ter_273	Ter_Jal_G03_03/03_023	JALJALE	7	Rajendra Shrestha	Balaute	Nearly Neutral	Low	Low	High	High	Deficient	Sufficient	Loam
Ter_274	Ter_Sab_G03_03/01_020	SAWALA	4	Raj Kumar Ghising	Wallo-Sabla	Slightly Alkaline	Low	Low	Very High	High	Deficient	Sufficient	Loam
Ter_275	Ter_Mya_G03_03/04_005	MYANGLUNG	7	Sita Rasaili	Nagdoha	Slightly Acidic	Medium	Low	High	High	Deficient	Sufficient	Loam
Ter_276	Ter_Mya_G03_03/04_010	MYANGLUNG	8	Tilak Ram Basnet	Majhikharka	Slightly Acidic	Medium	Low	Low	High	Deficient	Sufficient	Loam
Ter_277	Ter_Tam_G03_03/03_011	TAMPHULA	9	Khadga Bahadur Limbu	Pokhari	Slightly Alkaline	Medium	Low	Medium	High	Deficient	Sufficient	Loam
Ter_278	Ter_Jal_G03_03/02_025	JALJALE	4	Bhim raj Karki	Tokma	Slightly Acidic	Low	Very Low	High	High	Deficient	Deficient	Sandy Loam
Ter_279	Ter_Mya_G03_03/04_008	MYANGLUNG	4	Ram Bahadur Thapa	Katahare	Nearly Neutral	Medium	High	Very High	High	Deficient	Sufficient	Loam
Ter_280	Ter_Sab_G03_03/01_017	SAWALA	2	Ramesh Limbu	Kopche	Slightly Alkaline	Medium	Low	Medium	High	Deficient	Sufficient	Loam
Ter_281	Ter_Sab_G03_03/01_018	SAWALA	2	Shiva Koirala	Kopche	Nearly Neutral	Low	Very Low	Very High	High	Deficient	Sufficient	Loam
Ter_282	Ter_Jal_G03_03/03_024	JALJALE	7	Hari Thapa	Balaute	Slightly Acidic	Low	Medium	High	Medium	Deficient	Deficient	Sandy Loam
Ter_283	Ter_Sab_G03_03/01_016	SAWALA	2	Bishnu Kumar Limbu	Kopche	Nearly Neutral	Medium	Medium	Very High	Medium	Deficient	Sufficient	Loam
Ter_284	Ter_Sab_G03_03/03_015	SAWALA	2	Jay Nath Limbu	Kopche	Nearly Neutral	Medium	Low	Medium	Medium	Deficient	Sufficient	Sandy Loam
Ter_285	Ter_Jal_G03_03/02_021	JALJALE	4	Khub Bahadur Tamang	Tokma	Moderately Acidic	Low	Very Low	High	High	Deficient	Sufficient	Sandy Clay Loam
Ter_286	Ter_Jal_G03_03/02_027	JALJALE	4	Bhim Raj Limbu	Taktim	Moderately Acidic	Low	Very Low	High	High	Deficient	Sufficient	Sandy Loam

Lab Code	Soil Pit Identity	VDC	Ward No.	Farmer Name	Location	pH	Organic Matter (OM)	Total Nitrogen (TN)	Available Phosphorus (P_2O_5)	Available Potash (K_2O)	Zinc (Zn)	Boron (B)	Soil Texture
Ter_287	Ter_Jal_G03_02/01_032	JALJALE	3	Keshav Rimal	Mirbung	Slightly Acidic	Low	Very Low	High	Medium	Deficient	Deficient	Sandy Loam
Ter_288	Ter_Mya_G03_03/04_009	MYANGLUNG	3	Posta Bahadur Limbu	Majhikharka	Nearly Neutral	Medium	Medium	Very High	Medium	Deficient	Deficient	Loam
Ter_289	Ter_Tam_G03_03/03_014	TAMPHULA	3	Ganesh Magar	suslin	Slightly Acidic	Medium	Medium	High	High	Deficient	Sufficient	Loam
Ter_290	Ter_Tam_G03_03/03_012	TAMPHULA	6	Birdhwas Limbu	Pokhari	Nearly Neutral	Medium	Low	Medium	Medium	Deficient	Sufficient	Loam
Ter_291	Ter_Pip_G03_03/04_001	PIPLE	4	Chandra Prashad Ghimire	Dandakharka	Nearly Neutral	Medium	Low	Low	Medium	Deficient	Sufficient	Loam
Ter_292	Ter_Mya_G03_03/04_004	MYANGLUNG	2	Nagendra Rasaili	Myanglung-Bazar	Moderately Acidic	Medium	Low	High	Medium	Deficient	Sufficient	Loam
Ter_293	Ter_Pip_G03_03/04_003	PIPLE	3	Man Bahadur Tamang	Piple	Slightly Acidic	Low	Very Low	Very High	High	Deficient	Sufficient	Sandy Clay Loam
Ter_294	Ter_Tam_G03_03/03_013	TAMPHULA	8	Som Bahadur Limbu	suslin	Slightly Acidic	Medium	Low	Very High	Medium	Deficient	Sufficient	Sandy Loam
Ter_295	Ter_Mya_G03_03/04_006	MYANGLUNG	7	Tika Basnet	Ratanpur	Nearly Neutral	Low	Very Low	Very High	High	Deficient	Deficient	Loam
Ter_296	Ter_Mya_G03_03/04_007	MYANGLUNG	7	Balram Tamang	Tinkhorpe	Nearly Neutral	Medium	Low	Very High	High	Deficient	Sufficient	Loam
Ter_297	Ter_Pip_G03_03/04_002	PIPLE	4	Tika Ram Ramtel	Piple	Slightly Alkaline	Medium	Low	Low	High	Deficient	Sufficient	Loam
Ter_298	Ter_Oya_G03_03/02_045	OYAKJUNG	1	Padam Man Singh	Hatisar	Slightly Acidic	Low	Very Low	High	Medium	Deficient	Deficient	Sandy Loam
Ter_299	Ter_Oya_G03_04/01_041	OYAKJUNG	3	Jay Man Limbu	Hangsurung	Nearly Neutral	Medium	Medium	High	Medium	Deficient	Sufficient	Loam
Ter_300	Ter_Oya_G03_04/01_038	OYAKJUNG	7	Gangadhar Baskota	Paragaun	Moderately Acidic	Very Low	Very Low	Medium	Low	Deficient	Deficient	Loam
Ter_301	Ter_Oya_G03_04/01_046	OYAKJUNG	3	Tor Narayan Dhakal	Hangsurung	Nearly Neutral	Medium	Low	High	Low	Deficient	Sufficient	Loam
Ter_302	Ter_Oya_G03_04/01_042	OYAKJUNG	1	Gangadhar Baskota	Asua	Moderately Acidic	Low	Low	High	Very Low	Deficient	Sufficient	Sandy Loam
Ter_303	Ter_Oya_G03_03/02_044	OYAKJUNG	1	Dil Bahadur Tamang	Hatisar	Moderately Acidic	Low	Very Low	High	Medium	Deficient	Sufficient	Loam
Ter_304	Ter_Oya_G03_04/01_043	OYAKJUNG	1	Bhim Prashad Tamang	Asua	Slightly Acidic	Low	Very Low	High	High	Deficient	Deficient	Sandy Loam
Ter_305	Ter_Oya_G03_03/02_049	OYAKJUNG	4	Kashi Nath Dhakal	Imek	Slightly Acidic	Medium	Low	High	High	Deficient	Deficient	Loam
Ter_306	Ter_Oya_G03_04/01_036	OYAKJUNG	8	Lok Limbu	Kholma	Nearly Neutral	Medium	Low	High	Medium	Deficient	Deficient	Loam

Soil Fertility Mapping Project

IWRMP

Terathum District

Lab Code	Soil Pit Identity	VDC	Ward No.	Farmer Name	Location	pH	Organic Matter (OM)	Total Nitrogen (TN)	Available Phosphorus (P_2O_5)	Available Potash (K_2O)	Zinc (Zn)	Boron (B)	Soil Texture
Ter_307	Ter_Oya_G03_04/01_037	OYAKJUNG	9	Bhola Nath Dhakal	Lumba	Nearly Neutral	Medium	Low	High	Medium	Deficient	Deficient	Loamy sand
Ter_308	Ter_Oya_G03_04/01_039	OYAKJUNG	5	Shiva Karki	Newai	Slightly Acidic	Medium	Low	High	Medium	Deficient	Sufficient	Loam
Ter_309	Ter_Pau_G03_04/02_034	PAUTHAK	2	Som Nath Dulal	Khakhare	Moderately Acidic	Low	Very Low	Medium	Medium	Deficient	Deficient	Sandy Loam
Ter_310	Ter_Oya_G03_04/01_040	OYAKJUNG	5	Dip Bahadur Limbu	Newai	Nearly Neutral	Medium	Medium	Very High	High	Deficient	Sufficient	Sandy Loam
Ter_311	Ter_Oya_G03_04/01_035	OYAKJUNG	7	Om Prakash Bhusal	Ale	Nearly Neutral	Low	Very Low	Medium	High	Deficient	Deficient	Sandy Loam
Ter_312	Ter_Oya_G03_04/02_047	OYAKJUNG	5	Dinesh Ghale	Loguwa	Slightly Acidic	Medium	Low	High	Medium	Deficient	Deficient	Loam
Ter_313	Ter_Oya_G03_03/02_048	OYAKJUNG	4	Surendra Kunwar	Loguwa	Nearly Neutral	Medium	Low	High	Low	Deficient	Deficient	Sandy Loam
Ter_314	Ter_Isi_G03_01/03_071	ISIBU	4	Dharmesh Limbu	Naminta	Strongly Acidic	Medium	Low	High	Medium	Deficient	Deficient	Loam
Ter_315	Ter_Sim_G03_02/02_060	SIMLE	4	Yuvraj Dhungel	Eruwa	Slightly Alkaline	Low	Very Low	Medium	Medium	Deficient	Deficient	Loam
Ter_316	Ter_Isi_G03_02/02_065	ISIBU	2	Rasimaya Tamang	Puldung	Moderately Acidic	Low	Low	High	Low	Deficient	Deficient	Loam
Ter_317	Ter_Isi_G03_01/04_069	ISIBU	7	Gautam Gurung	Panchami	Slightly Acidic	Medium	Medium	High	Very High	Deficient	Deficient	Loam
Ter_318	Ter_Isi_G03_01/03_073	ISIBU	4	Baburaj Khadka	Losa	Slightly Acidic	Medium	Low	High	High	Deficient	Sufficient	Silt Loam
Ter_319	Ter_Sim_G03_02/04_050	SIMLE	5	Dharma Sundar Limbu	Bhanjyang	Moderately Acidic	Low	Low	High	High	Deficient	Deficient	Clay Loam
Ter_320	Ter_Isi_G03_01/04_068	ISIBU	7	Prakash Seswal	Panchami	Slightly Acidic	Medium	Low	High	Medium	Deficient	Deficient	Sandy Loam
Ter_321	Ter_Isi_G03_01/03_070	ISIBU	7	Hemraj Gurung	Rithe	Slightly Acidic	Medium	Medium	High	Medium	Deficient	Deficient	Sandy Loam
Ter_322	Ter_Sim_G03_02/01_062	SIMLE	9	Bishal Tamang	Sakphara	Moderately Alkaline	Low	Very Low	Very High	Medium	Deficient	Deficient	Sandy Loam
Ter_323	Ter_Isi_G03_02/01_066	ISIBU	6	Hing Kumar Limbu	Melbote	Moderately Acidic	Medium	Medium	High	High	Deficient	Sufficient	Sandy Loam
Ter_324	Ter_Sim_G03_02/02_056	SIMLE	1	Aangchhiring Sombambe	Guakate	Nearly Neutral	Low	Very Low	Medium	Medium	Deficient	Deficient	Sandy Loam
Ter_325	Ter_Sim_G03_02/01_054	SIMLE	1	Kiran Bhattarai	Okhre	Slightly Alkaline	Low	Low	High	High	Deficient	Sufficient	Sandy Loam
Ter_326	Ter_Sim_G03_02/04_051	SIMLE	5	Prem Limbu	Poklawang	Slightly Alkaline	Low	Very Low	High	Very High	Deficient	Deficient	Sandy Loam

Lab Code	Soil Pit Identity	VDC	Ward No.	Farmer Name	Location	pH	Organic Matter (OM)	Total Nitrogen (TN)	Available Phosphorus (P_2O_5)	Available Potash (K_2O)	Zinc (Zn)	Boron (B)	Soil Texture
Ter_327	Ter_Sim_G03_02/02_061	SIMLE	4	Khem Raj Thapa	Eruwa	Nearly Neutral	Low	Very Low	Medium	Medium	Deficient	Deficient	Sandy Loam
Ter_328	Ter_Sim_G03_02/01_063	SIMLE	6	Binod Limbu	Sakphara	Moderately Acidic	Low	Low	Medium	Low	Deficient	Deficient	Clay Loam
Ter_329	Ter_Sim_G03_02/02_057	SIMLE	1	Dil Bahadur Regmi	Tamebung	Strongly Acidic	Low	Very Low	Medium	Medium	Deficient	Deficient	Sandy Loam
Ter_330	Ter_Sim_G03_02/02_058	SIMLE	1	Dhana Prashad Samenga	Tamebung	Slightly Alkaline	Low	Low	Medium	Medium	Deficient	Sufficient	Loam
Ter_331	Ter_Sim_G03_02/01_064	SIMLE	8	Chandra kumari Dahal	Puldung	Moderately Acidic	Low	Medium	High	Medium	Deficient	Sufficient	Sandy Loam
Ter_332	Ter_Sim_G03_02/01_055	SIMLE	1	Khim Man Tumbambe	Guakate	Slightly Acidic	Medium	Low	High	Low	Deficient	Sufficient	Silt Loam
Ter_333	Ter_Isi_G03_01/04_067	ISIBU	6	Naresh Pachhai	Melbote	Slightly Acidic	Medium	Medium	High	Medium	Deficient	Deficient	Loam
Ter_334	Ter_Sim_G03_02/03_053	SIMLE	2	Rishi Oli	Tahari	Nearly Neutral	Medium	Low	Medium	High	Deficient	Deficient	Clay
Ter_335	Ter_Sim_G03_02/03_052	SIMLE	2	Chitra Bahadur G.C	Tahari	Slightly Acidic	Low	Very Low	High	Medium	Deficient	Sufficient	Sandy Loam
Ter_336	Ter_Isi_G03_01/03_072	ISIBU	4	Kamal KC	Gairital	Slightly Acidic	Medium	Low	High	Medium	Deficient	Sufficient	Sandy Loam
Ter_337	Ter_Sim_G03_02/03_059	SIMLE	4	Bishnumati Rai	Paire	Slightly Acidic	Low	Medium	Medium	Low	Deficient	Sufficient	Loam
Ter_338	Ter_Sam_G03_01/04_076	SAMDU	1	Fuba Tamang	Samdu	Slightly Acidic	Medium	Medium	High	Medium	Deficient	Sufficient	Loam
Ter_339	Ter_Kha_G03_01/01_085	KHAMLALUNG	8	Him Samenga	Khamlun	Moderately Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Sandy Loam
Ter_340	Ter_Sam_G03_01/01_080	SAMDU	8	Sharma Limbu	Sangapu	Moderately Acidic	Medium	Low	High	High	Deficient	Sufficient	Loam
Ter_341	Ter_Sam_G03_01/02_077	SAMDU	5	Hime tumbambe	Sudaspur	Moderately Acidic	Medium	High	Low	Medium	Deficient	Sufficient	Loam
Ter_342	Ter_Kha_G03_01/01_086	KHAMLALUNG	8	Dharma Sundar Limbu	Khungring	Nearly Neutral	Medium	High	Very High	Medium	Deficient	Sufficient	Clay Loam
Ter_343	Ter_Sam_G03_01/01_081	SAMDU	9	Nabin Limbu	Kerabari	Nearly Neutral	Medium	Low	High	High	Deficient	Sufficient	Loam
Ter_344	Ter_Sam_G03_01/04_075	SAMDU	1	Krishna Chandra Suwal	Samdu	Nearly Neutral	Medium	Low	High	High	Deficient	Sufficient	Loam
Ter_345	Ter_Kha_G03_01/01_084	KHAMLALUNG	8	Sangam Limbu	Khamlun	Slightly Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Loam
Ter_346	Ter_Kha_G03_01/01_087	KHAMLALUNG	8	Toya Nath Dhungana	Khamlun	Nearly Neutral	Medium	Medium	Medium	High	Deficient	Sufficient	Loam

Lab Code	Soil Pit Identity	VDC	Ward No.	Farmer Name	Location	pH	Organic Matter (OM)	Total Nitrogen (TN)	Available Phosphorus (P_2O_5)	Available Potash (K_2O)	Zinc (Zn)	Boron (B)	Soil Texture
Ter_347	Ter_Kha_G03_01/02_083	KHAMLALUNG	2	Sanjay Lama	Waipung	Slightly Acidic	Medium	Low	Medium	Medium	Deficient	Sufficient	Loam
Ter_348	Ter_Sam_G03_01/04_074	SAMDU	2	Jyangbu Limbu	Pultikharka	Slightly Acidic	Medium	Low	High	Medium	Deficient	Sufficient	Loam
Ter_349	Ter_Kha_G03_01/02_082	KHAMLALUNG	2	Mohan Limbu	Sathdhaiya	Moderately Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Loam
Ter_350	Ter_Sam_G03_01/01_078	SAMDU	6	Basanta Limbu	Paipung	Moderately Acidic	Medium	Medium	High	Medium	Deficient	Sufficient	Loam
Ter_351	Ter_Sam_G03_01/01_079	SAMDU	7	Jiuam Limbu	Sangapu	Moderately Acidic	Medium	Low	High	High	Deficient	Sufficient	Loam
Ter_352	Ter_Kha_G03_01/01_088	KHAMLALUNG	8	Subhod Rai	Chisapani	Slightly Alkaline	Medium	Low	Medium	Very High	Deficient	Sufficient	Sandy Loam
Ter_500	Ter_Okh_G01_01/01_100	OKHRE	1	0	Okhre	Slightly Acidic	Medium	Low	Medium	High	Deficient	Deficient	Loam
Ter_501	Ter_Okh_G01_01/03_101	OKHRE	6	0	Okhre	Slightly Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Loam
Ter_502	Ter_Chu_G04_01/04_100	CHUHANDANDA	2	0	Chuhandada	Slightly Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Loam
Ter_503	Ter_San_G04_04/02_101	SANKRANTIBAJAR	9	0	Sankranti	Slightly Acidic	Medium	Low	Medium	High	Deficient	Sufficient	Loam
Ter_504	Ter_Tho_G04_03/03_078	THOKLUNG	8	0	Thoklun	Slightly Acidic	Medium	Low	High	High	Deficient	Sufficient	Loam
Ter_505	Ter_Sun_G02_03/01_100	BASANTAPUR	1	0	Sunnam	Slightly Acidic	Medium	Medium	High	High	Deficient	Sufficient	Sandy Loam

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