Soil Fertility Survey And Mapping of Syangja District

His Majesty's Government
Ministry of Agriculture and Co-operatives
Department of Agriculture
Crop Development Directorate
Soil Testing And Service Section
2059 Ashad (2002)

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Soil Fertility Survey and Mapping
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Syangja District

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Foreword

Soil fertility is the key factor for Crop production. By knowing the soil fertility status of a field and recommending the chemical fertiliser and organic manure along with soil amendment, the production and productivity can be increased. So to achieve this sustainable soil fertility recommended dose of fertiliser and organic manure need to be applied. For this purpose, the soil analysis is most essential. Soil Testing and Service Section (STSS) has started the fertility survey and fertility mapping of districts in its regular programs. This fiscal year Syangja and Mahottary district were in target. STSS has completed the survey work and has prepared Soil fertility maps of these two districts.

I hope this map may be useful for the planner, extension workers, farmers and other stakeholders as well.

Lastly I thank Mr. S.N. Jaishy and all his staffs of the STSS, RSTL, DADO, and farmers for their valuable contribution.

Thanks.

2059/3/20

K.K. Shrestha
Crop Development Directorate
Harihar Bhawan

Content

Soil Fertility Survey And Mapping of Syangja District

Location:

Syangja is located 27^0 52" N to $28^0$13"latidue and $83^0$27" E to $84^0$46" longitude. Area of the Syangja district is 1164 Sq.Kms. Elevation of the district is 366 m to2515 m.

Boundary of the district

East: Tanahun
West: Parbat and Gulmi
North: Kaski and Parbat
South: Palpa

Tabel 1 Topographical distribution

Physical condition	Agriculture					
Mid mountain	Cultivated	Non cultivated	Pasture	Forest	Others	Total
	37718	22300	10265	31691	1713	103687

Source: District Development Profile of Nepal 2001

Tabel 2 Political distribution

Electorate region	Ilaka	Municipalities	VDC
3	15	2	60

Source: District Development Profile of Nepal 2001

Climate

Influenced by diverse topography and elevation the district has diverse. So climate is also vary. The height of district is varying from 366 to2515meter. Syangja Putali Bajar is located at the height of 850-meter height. This district has tropical climate (about 15%) sub tropical climate (about 70%) and temperate climate (about. 15%) The district receives an annual rainfall about 2999 mm (1996).

Tabel 3 Demography

year and Item	1981Census	1991 Census	2001 Targeted	Remark
Total Population	271824	293526	315714	
Male	129666	136269	146570	
Female	142158	157257	169144	
Total Household	48415	55497	59612	
Average Household	5.6	5.3	5.3	
Literacy rate of 6 years and above	28.1	52.6		
Population density per sq. Km	233.5	252.2	271.2	

Source: District Development Profile of Nepal 2001

Agriculture

Land surveys Record: According to district profile of Nepal (2001) the following data are recorded for land survey classification.

Tabel 4

Total area	Total no. of plot.	Total tenant	Total land owners	Total Discounted	Total cultivated
94876	687926	19	94598	28259	66617

Wet land classification				Dry land classification			
Abal	Doyam	Seem	Chahar	Abal	Doyam	Seem	Chahar
279	3236	7673	3028	324	3785	24168	24124

Source: District Development Profile of Nepal 2001

Major Crops of the District

Rice, Wheat, maize, millet, barley, Potato Vegetable, oilseed, lentil, chickpea and black grams, are growing in Syangja district.

Major Cropping Patterns of the district

Irrigated	Non Irrigated
Rice - Fallow - Rice	Maize- finger millet -Fallow
Rice- Wheat- Rice	Potato- Wheat- Fallow.
Rice-Wheat - Maize	Maize - Mustard -fallow
Rice- Wheat- Fallow	Maize -Soybean
Rice- Vegetable	Maize- Winter Vegetable
Rice- Potato- Fallow	Millet -Mustard - Fallow
Rice- Vegetable	Maize - Legume
Rice - Potato - Maize	
Rice – Lentil - Rice	
Rice- Lentil- Fallow	
Rice – Oil seed- Maize	

Cereals crops:

According to Statistical information of Nepal (2000/2001) the following area and production of various crops are given as below.

Tabel 5

Cereals (Area & production in Ha. & MT)

Crops	Paddy		Maize		Millet		Wheat		Barley	
Year	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
2000/2001	14300	31460	28600	44100	15565	15500	7000	11900	90	90

Source ABP&SD 2000/2001

Tabel 6

Cash Crop (Area & production in Ha. & MT)

Crops	Oil seed		Potato		Tobacco		sugarcane		Jute	
Year	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
2000/2001	140	110	480	4140			15	260		

Source ABP&SD 2000/2001

Tabel 7

Pulses (Area & production in Ha. & MT)

Crops	Lentil		Chick pea		Pigeon pea		Black gram		Grass pea	
Year	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
2000/2001	10	13	10	10	15	19	100	125		

Source ABP&SD 2000/2001

Tabel 8 Irrigation Facility

Dept of Irrigation	ADB/N	Total
Area (Ha)	Area (Ha)	Area (Ha)
3342.50	279.80	3622.30

Source ABP&SD 2000/2001

OBJECTIVE

The main objective of the project is to assess the chemical characteristics of the soils of Syangja district and prepare soil fertility map. The specific objectives are:

i. Conduct soil survey and collect soil samples from different representative locations
ii. Analyse the collected soil samples for soil reaction (pH), organic matter, total nitrogen, available phosphorus and potassium.
iii. Based on the soil reaction and nutrient status recommend sound and sustainable soil management practices
iv. Prepare soil fertility maps showing occurrence and distribution of soil reaction and major nutrient statuses in the district.

3. METHODOLOGY

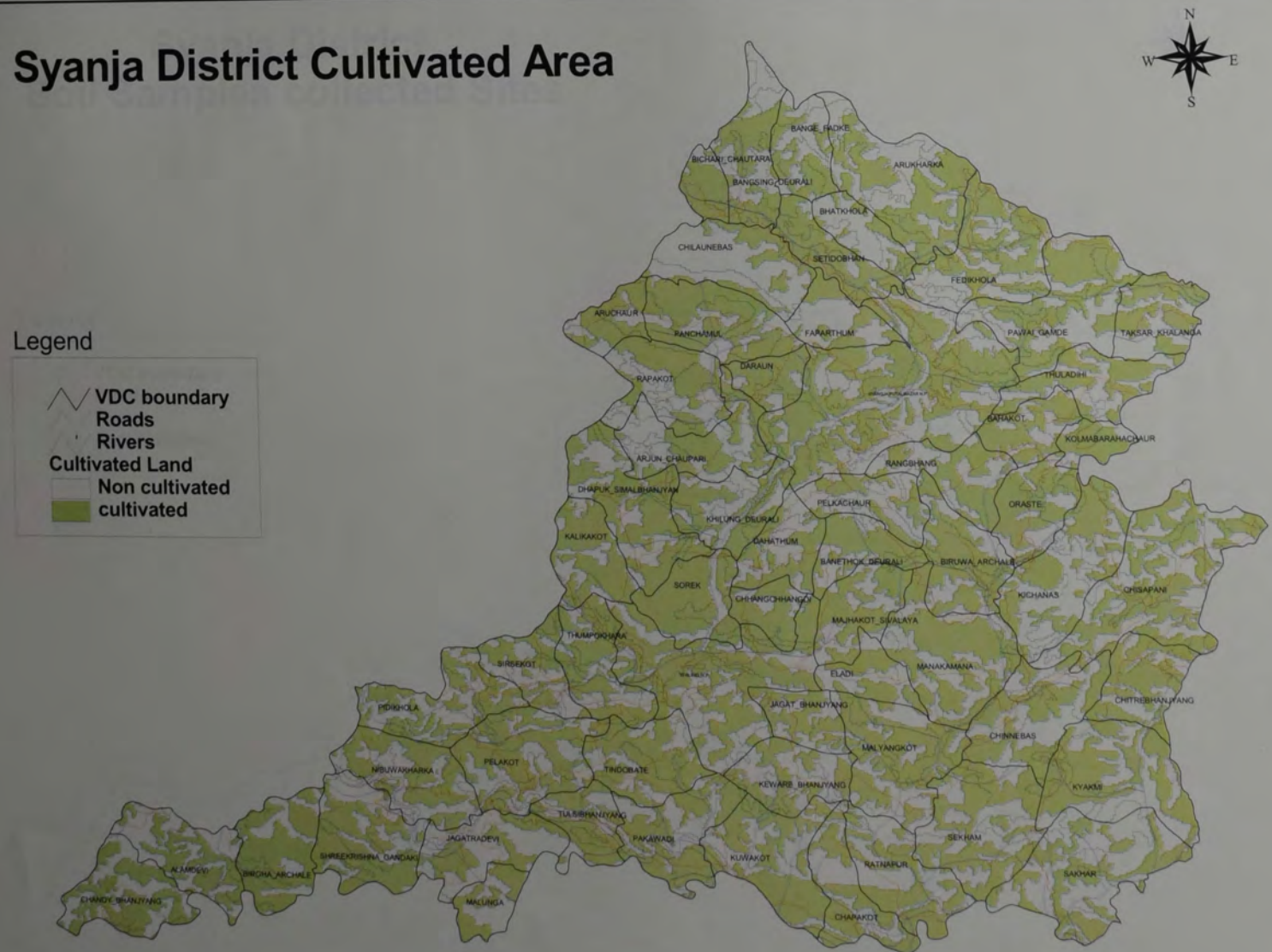
Table work

Kenting earth science ltd. Canada under Land Resources Mapping Project (LRMP) in 1986 has prepared Land Systems Maps of the whole country. These maps show extent and distribution of different land systems and land types. These maps with physiographic details published at the scale of 1:50000 have been used as the base maps for conducting the field survey works. Prior to the actual fieldwork, tentative sampling sites were fixed on the base maps. These sampling sites were set and distributed in such a way that all the agriculturally important land system units are proportionately represented.

Fieldwork

Following the sampling sites fixed in the base map, field works were conducted and surface soil samples were collected by using soil auger and packed in plastic sample bags with proper labels. The samples were collected only from the presently cultivated areas. Soil samples were collected from DADO, STSS and RSTL staffs.

Syanja District Cultivated Area



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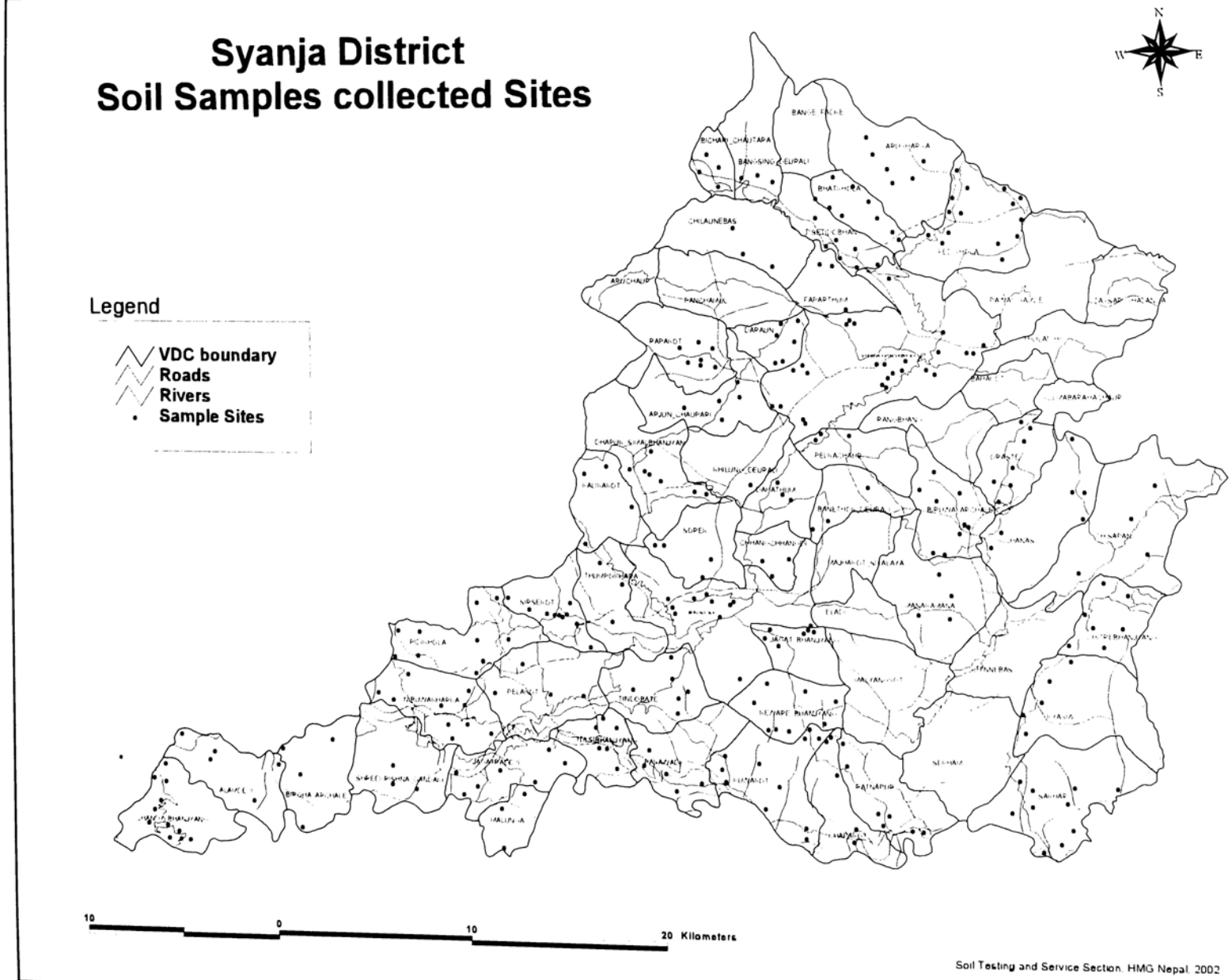
Syanja District
Soil Samples collected Sites



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Laboratory work:
Soil samples received from the field were air dried first by spreading in shade. These air-dried samples were then crushed with a wooden pestle and mortar and sieved through 2-mm sieve. Part of the soil samples less than 2 mm diameters were again sieved through 0.2 mm sieve, which were used for the determination of organic matter and total content. Following chemical properties were assessed using the standard laboratory methods.

Soil reaction (pH):
Soil reaction was determined by measuring 1: 1 Soil: Water suspension with the calibrated pH meter.

Organic matter:
Organic matter content was determined by following modified Walkley- Black method.

Available Phosphorus:
Available phosphorus was determined by modified Olsen's bicarbonate method. This available phosphorus is expressed in P_2O_5 by using conversion factor.

Available Potash:
Available potash was determined by extracting the sample with neutral ammonium acetate and the K content was determined by flame photometer. The available potassium is expressed in K_2O by using the conversion factor.

Data compilation and Mapping:

The laboratory data were linked with the corresponding auger points in the digitised land systems maps and soil reaction and nutrient status maps were prepared using GIS techniques. While assessing the soil reaction and nutrient status the following standard rating chart of the Soil Science Division of NARC were followed.

Soil Reaction class	pH
Acidic	**<4.5**
Strongly acid	4.5-5.2
Moderately acid	5.3-5.9
Slightly acid	6.0-6.5
Nearly neutral	6.6-7.0
Slightly alkaline	7.1-7.5
Moderately alkaline	7.6-8.3
Strongly alkaline	8.4-9.0
Extremely alkaline	>9.0

Note: Although this rating chart is widely accepted and used for interpreting the soil reaction status, in our project considering the soil analysis report and limited number of sample the following category have been made viz.

Soil Reaction	*pH*
Acidic	<5.
Slightly acidic	5.5-6.5
Nearly neutral	6.5-7.5

Tabel 9 Nutrient Rating

Nutrient status	OM%	total N %	Avail. Phosphorus (P_2O_5 Kg/ha)	Avail. Potash (K_2Okg/ha)
Very low	<0.1	<0.05	<10	<55
Low	1-2.5	0.05-0.1	10-30	55-110
Medium	2.5-5	0.1-0.2	30-55	110-280
High	>5	>0.2	55-110	280-500
Very high			>110	>500

As stated earlier, physiography and land systems within each of this physiography were considered as the major basis for conducting field survey and assessment of the present soil fertility status of the district. The brief descriptions and characteristic features of these land types occurring in the district are as follows:

Description of Physiography and Land systems

LRMP (1986) have identified five physiographic regions in the country based on the repeating patterns of landforms. Of these five physiographic regions Syangja district falls within: Middle Mountain region.

LANDF SYSTEM LEGGEND

Tabel 10 MAPPING APPROACH

C. MIDDLE MOUNTAIN REGION Precambrian to Eocene Phyllites, quartzite's, schist, limestone and Gneisses, generally deeply weathered, Subtropical to warm Temperate.							
9	Alluvial Plains and Fans (depositional)	9a river channel	Psamments Ustorthents	<1°	Fragmental Sandy	0-2 m	Variable
		9b alluvial plains	Ustifluvents Fluvaquents Ustochrepts	<1°	Loamy/ Bouldery	0-2 m	Well
		9c alluvial fans	Ustochrepts Haplustalfs	1-5°	Loamy/ Bouldery	1-15m	Well
10	Ancient Lake and River Terraces (Tars) (erosional)	10a non dissected	Typic & Rhodic Haplustalfs Ustochrepts	0-5°	Loamy	>2m	Well
		10b dissected	"	0-5°	Loamy	>2m	Well
11	Moderately to Steeply Sloping Mountainous Terrain		Typic, Rhodic, Udic, Anthropic Subgroups of & Ustochrepts Dystrochrepts Haplumbrepts	<30°	Loamy Skeletal	> 50 cm to bedrock	Moderately well to well
12	Steeply to Very Steeply Sloping Mountainous Terrain		Lithic Subgroups of II and Ustorthents	>30°	Loamy Skeletal	> 50 cm to bedrock	well

Soil Reaction status of the district

Soil reaction situation is given in soil fertility map of Syangja. The soil reaction of Shyanja is varied from very highly acidic to about to alkaline. Among 254 samples the soil reaction situation is as below in table.

Table 11 Soil reaction situation

<4pH	4 to 5	5.1 to 6.0	6.1 to 6.5	6.5 to 7.5	7.5 to 7.9
21	68	104	22	27	11

21 samples are below 4.0 pH. Very few samples are in alkali.

Strong soil management practices should adopt to make the soil productive.

Acid soil management

The pH requirement of different crop is different. Therefore, it is difficult to say anything about correction of soil pH unless we know about the crop farmers grow. However extreme soil pH, either acidic or alkaline, limits the crop growth in various ways. For example in highly weathered acid soil with high iron (Fe) and aluminium (Al) oxides, crops may suffer due to unavailability of phosphorus due to high rate of fixation of soil phosphorus and applied phosphoric fertiliser too. Under such condition rice crops may suffer due to toxicity of iron and aluminium because of high solubility. In highly acidic condition crops also suffer due to deficiency and unavailability of calcium and magnesium. Similarly in highly alkaline soil with pH more than 8, crops may suffer due to deficiency of micronutrient like Fe, Mn, Zn and Cu. In highly alkaline soil phosphorus availability is also reduced due to fixation by calcium compounds in soil. In general a soil having pH from 6.5 to 7.5 (nearly neutral) is considered best for growing almost all of the crops. The soil with pH 5.5 to 6.5 although categorised slightly acidic are safe for growing most of the crops except a few high calcium requiring plants. The soil with pH < 5.5 are considered acidic and requires liming. At this pH range liming gives very good result. Under such condition pH might be the major limiting factor of crop production. Under such condition amelioration of soil pH is a must for soil fertility management and higher crop production.

Liming:

Agriculture lime application is highly recommended for the soils with acidic reaction. Lime application dose is recommended based on the pH reading. The recommendation chart is given in annex no 1. Careful attention should be paid about the time and dose of lime application. Standing crops should never be limed, as land should be left fallow for at least about 2-3 weeks after liming. In case of higher dose split application is recommended.

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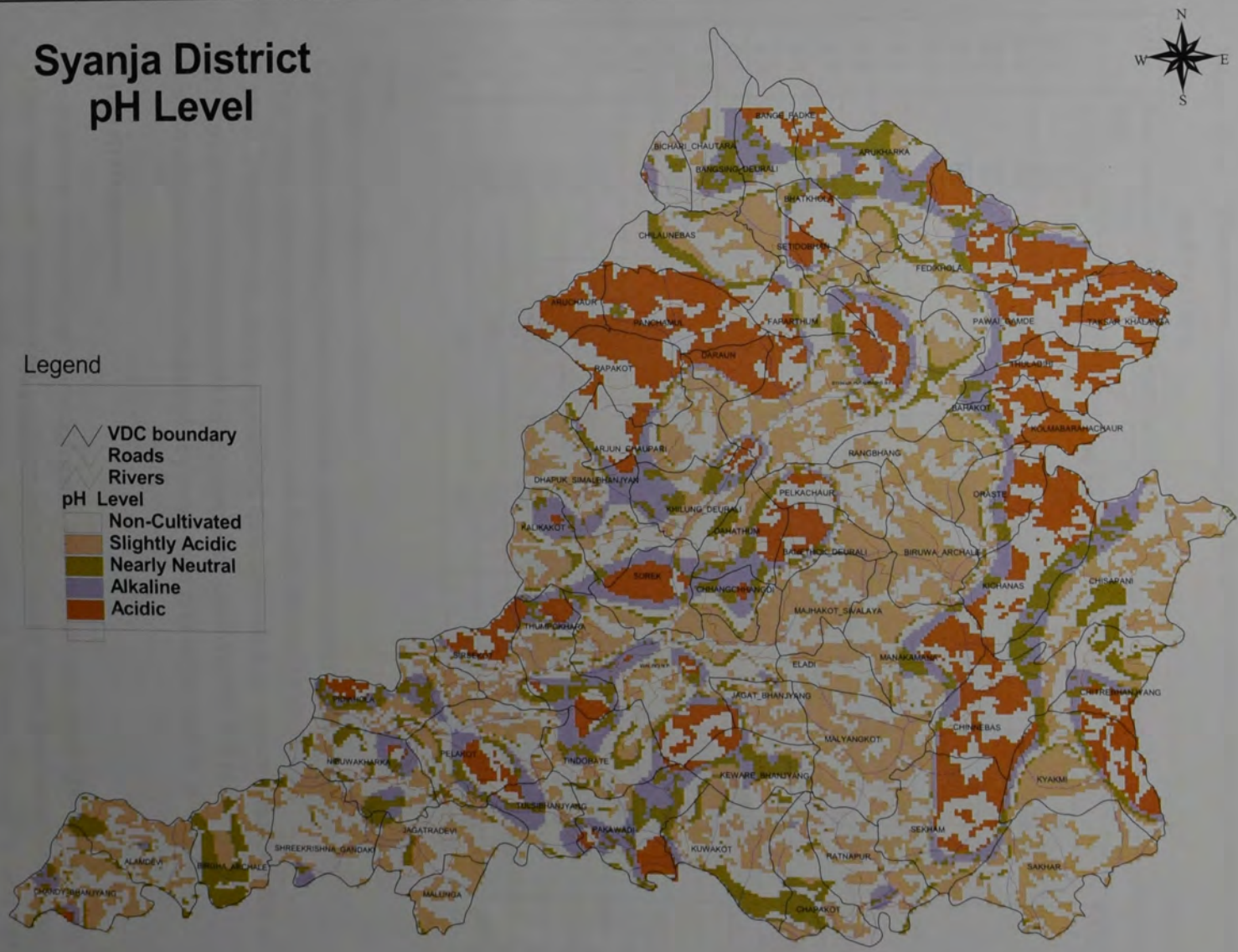
Table 12 a. Optimum pH range for some major crops

Crop	Optimum pH range	Crop	Optimum pH range
Asparagus	5.5-7.0	Oat	5.0-7.5
Banana	6.0-7.5	Olive	6.0-8.0
Barley	6.5-8.0	Onion	5.5-6.5
buck wheat	5.5-7.0	Pea	6.0-7.5
Cabbage	6.0-7.0	Pine apple	5.0-6.5
Chilly	5.5-6.5	Pome fruit	6.0-8.0
Citrus	5.5-6.5	Potato	4.8-6.5
Coconut	6.0-7.5	Radish	6.5-7.5
Coffee	4.5-7.0	Rape	6.0-7.5
Cauliflower	6.5-7.5	Rice	5.0-6.5
Coriander	6.0-7.0	Rubber	4.5-7.5
Cotton	5.0-6.0	Rye	5.0-7.0
Cow pea	5.0-6.5	Soybean	6.0-7.0
Cowpea	5.0-6.5	stone fruit	6.5-8.0
Cardamom	4.5-5.5	Sugar beat	6.5-8.0
Cucumber	6.0-7.3	Sugar can	6.0-8.0
Fenugreek	6.0-7.0	Sun flower	6.0-7.5
Field beans	6.0–7.5	Sweet potato	5.8-6.0
Flax	5.0-7.0	Tea	4.0-5.5
Garlic	6.5-7.0	Tobacco	5.5-7.5
Ground nut	5.3-6.6	Tomato	5.5-7.0
Hemp	6.0-7.0	Turmeric	5.5-6.5
Lma bean	6.0-7.0	Turnip	5.5-6.8
Lucerne	6.2-7.8	Velvet bean	5.5-7.0
Maize	5.5-7.5	wheat	5.5-7.5
mango	5.5-7.0	Zinger	6.8-7.0

Liming:

Agriculture lime application is highly recommended for the soils with acidic reaction. Lime application dose is recommended based on the pH reading. The recommendation chart is given in table 10.b. Careful attention should be paid about the time and dose of lime application. Standing crops should never be limed, as land should be left fallow for at least about 2-3 weeks after liming. In case of higher dose split application is recommended.

Syanja District
pH Level



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Increasing the pH by more than one unit at a time is not desirable because sudden increase in soil pH may affect the soil environment affecting the growth of soil microorganisms and availability of plant nutrients.

Table 12.b. Recommendation of agricultural lime for different pH level, for different soil texture

pH	Recommended dose of Agri lime (kg / ropani)					
	Hills			Terai		
	Sandy loam	Loam	Clay loam	Sandy loam	Loam	Clay loam
6.5	15	20	24	8	14	22
6.3	29	40	48	15	24	44
6.2	43	60	72	23	34	64
6.1	58	78	98	30	44	86
6.0	71	92	120	38	52	106
5.9	85	110	146	45	62	128
5.8	97	128	166	52	72	146
5.7	108	142	188	58	82	166
5.6	119	158	208	64	90	184
5.5	130	170	230	70	100	200
5.4	140	188	252	76	110	220
5.3	150	204	274	81	118	238
5.2	160	218	294	86	126	254
5.1	169	228	314	91	136	270
5.0	176	240	334	96	142	286
4.9	184	252	354	101	150	302
4.8	191	262	374	106	158	316
4.7	199	272	390	111	166	330
4.6	205	280	406	115	174	340
4.5	210	290	420	120	180	350

Note:

Test your soil before applying lime.

Use agricultural lime 2-3 weeks before plantation or sowing the seed.

If high dose of lime is recommended, use in split dose of twice.

If pH is less than 4.5, apply agricultural lime according to recommendation for pH 4.5 and application should be repeated as required after checking the soil pH.

It is not advised to raise the soil pH by more than one unit at a time or a season.

Crop management

Amelioration of acidic soil, although pays with higher crop production, is a costly process. Under resource poor farming condition and in remote areas lime recommendation may not be very much practicable because of inability of farmers to buy it and difficulty in transportation. Therefore, low cost alternative solution is required to such condition. In recent

years, the concept of "fitting the soil as per crop requirement" has been changed to " fitting the crop as the soil" to solve this problem.

The pH requirement of different crop is different. With proper crop management practice liming may not be necessary, as there are some acid loving plants, which grow well on acid soils. So it would be desirable to manage crops according to pH. However soil pH from 6.0 to 7.5 is considered to be suitable for most of the crops. Acid soils can be used for tea, coffee, pineapple, and blue berry. Black berry, cabbage, corn, peanut, sweet potato, tobacco, wheat are medium lime desiring plants. Incas of lowland irrigated rice the field is flooded, hence the soil chemistry is different than that of upland crops. Rice can tolerate wide range of soil pH but in highly acidic soil the crop may suffer due to iron and aluminium toxicity and unavailability of phosphorus and other plant nutrients. Classification of crops according to soil pH is given in table 11.

Table 13. Classification of crops according to lime requirement.

high	medium	low	Very low
Sun flower, Alfalfa, barley, asparagus, bean pea, soybean, spinach, sugar beet,	Black berry, cabbage, peanut, maize, lettuce, gram, sweet potato, tobacco, wheat,	Buck wheat, oat, rice, potato, and strawberry.	Tea, coffee, , pineapple, Nepier grass, crane berry,

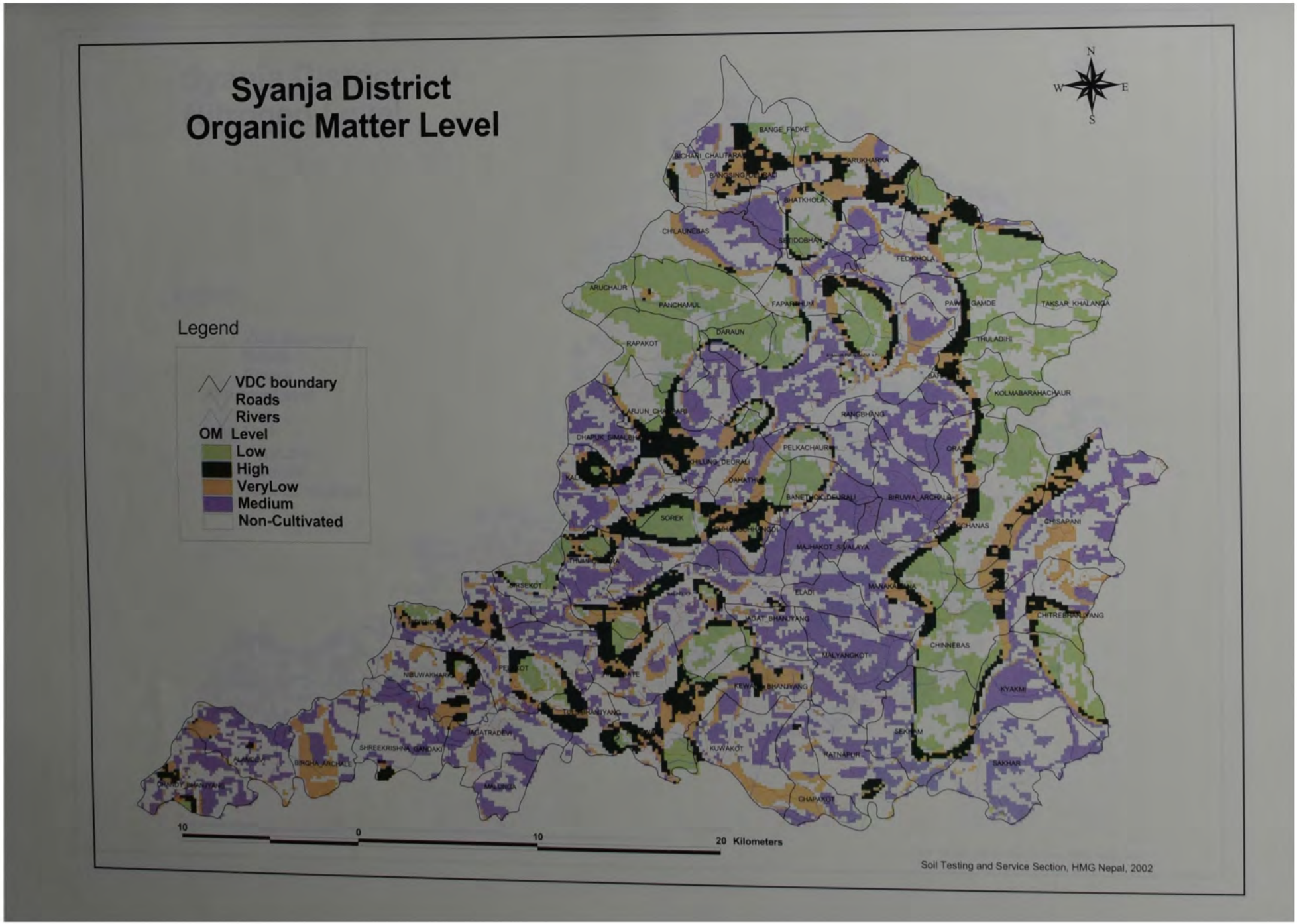
In acid soil management the type of nitrogenous fertiliser that farmers use is also very important. In general the ammoniacal and urea nitrogen aggravate the soil acidity. Therefore, use of nitrate nitrogen instead of these ones, if available, will help to reduce the problem. Organic manure have high buffering capacity and help to maintain the soil reaction. They always keep the soil reaction near neutral range. Therefore, both in acidic and alkaline soil use of high dose of organic manure helps to ameliorate the problem.

Organic matter status of the District

The table below summarizes organic matter status and area covered by each in the district. Organic matter variation is varied very low to high in Syangja District . Range variation is 0.06 t0 6.65%

Tabel 14 Organic matter level and area covered

Organic matter level	Total samples
High	15
Medium	153
low	81
Very low	5


Syanja District
Organic Matter Level
N
W
E
S
Legend
VDC boundary
Roads
Rivers
OM Level
Low
High
VeryLow
Medium
Non-Cultivated
BANGE_PADKE
BICHARI_CHAUTARA
ARUKHARKA
BHATKHOLA
CHILAUNEBAS
FEDIKHOLA
ARUCHAUR
PANCHAMUL
TAKSAR_KHALANGA
DARAUN
RAPAKOT
THULADIH
KOLMABARAHACHAUR
RANGBHANG
PELKACHAUR
SOREK
BIRUWA_ARCHALE
CHISAPANI
MAJHAKOT_SIVALAYA
ELADI
CHITREBANJYANG
CHINNEBAS
MALYANGKOT
KYAKMI
KUWAKOT
RATNAPUR
SAKHAR
CHAPAKOT
10
0
10
20 Kilometers
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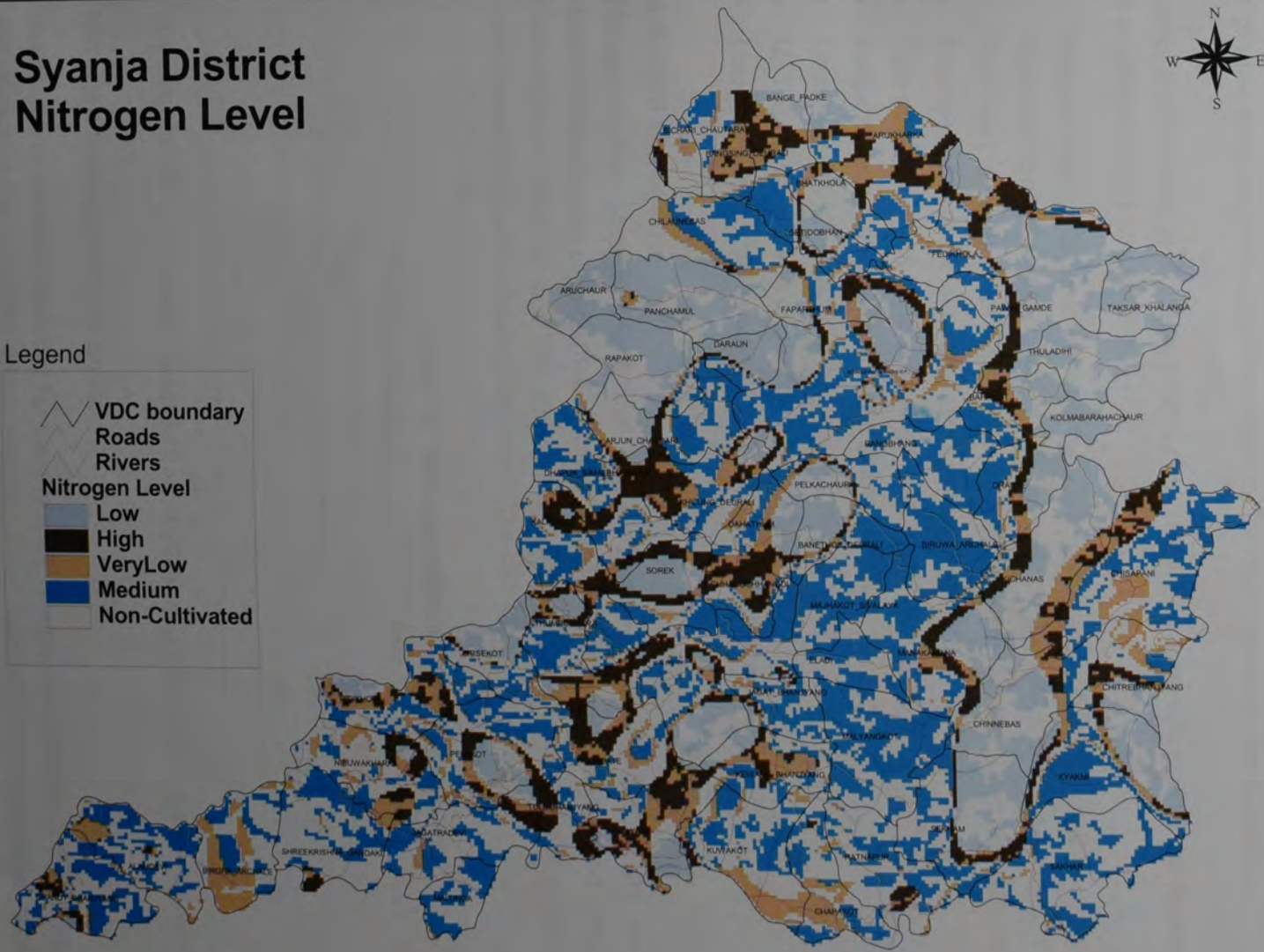
Syanja District
Nitrogen Level



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Management of soil organic matter:

Considering the fact that major parts of the area in the district were put to cultivation relatively very recently this high rate of depletion in organic matter content in the soil seem quite alarming. Highly intensive cultivation of land without the application of adequate amount of organic manure seems to be the major factor responsible for this situation.

Hence the following practices are highly recommended to be followed by the farmers in order to enhance the OM level in the soils.

- Promote use of organic manure by utilising all types of biodegradable wastes through improved composting techniques and through the promotion of biogas plants.
- Promote the inclusion of legumes in cropping sequences and green Manuring practices.
- Emphasise more on integrated plant nutrients system
- Plan and implement integrated crops and livestock programs.
- Follow conservation farming in the sloping lands.
- Legume cultivation with rhizobium inoculation
- Use azolla as a green manure in the paddy field.
- Use green Manuring as sole crop or relay crop in maize.

4.3 Total Nitrogen

Nitrogen is the most important plant nutrient that limits crop production. Its deficiency is directly related to the organic matter status. Nitrogen deficiency is widespread where organic manure are in short supply. The table below summarises different N status in the soils and area covered by each of these categories in the district.

Table 15 Nitrogen status and area coverage

Total Nitrogen Level	Total Samples
High	53
Medium	140
Low	56
Very Low	5

The range of nitrogen content is varied from 0.003% to 0.33%. This is a wide variation.

Nitrogen management in soils

Out of all the nutrients essential for plant growth, Nitrogen is by far the most important one and almost all the cultivated areas experience the deficiency of this essential nutrient with varying degree of magnitude. In lower level of productivity since nitrogen removal is low, it is replenished by local fixation atmospheric nitrogen. Nitrogen is also fixed to some degree by

Table 16 Available Phosphorus level and covered area

Phosphorus level	SAMPLES
Very High	63
High	39
Medium	62
Low	64
Very low	26

Potash Status of district soil

Table 17 Available Potash level and covered area

Potash level	Samples.
Very High	26
High	54
Medium	110
Low	59
Very low	5

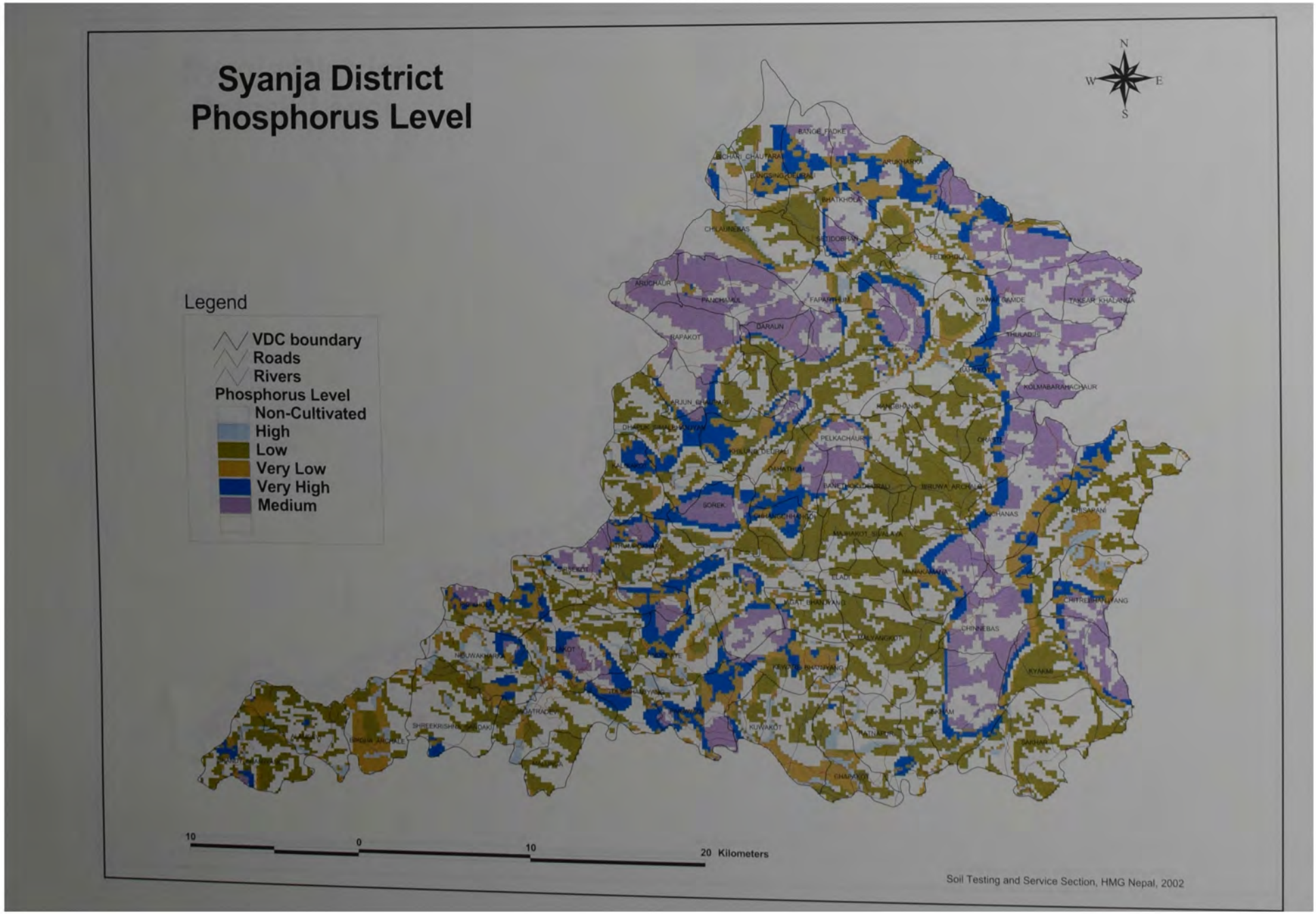
Table 18. Fertiliser Recommendation for fruit Crops:

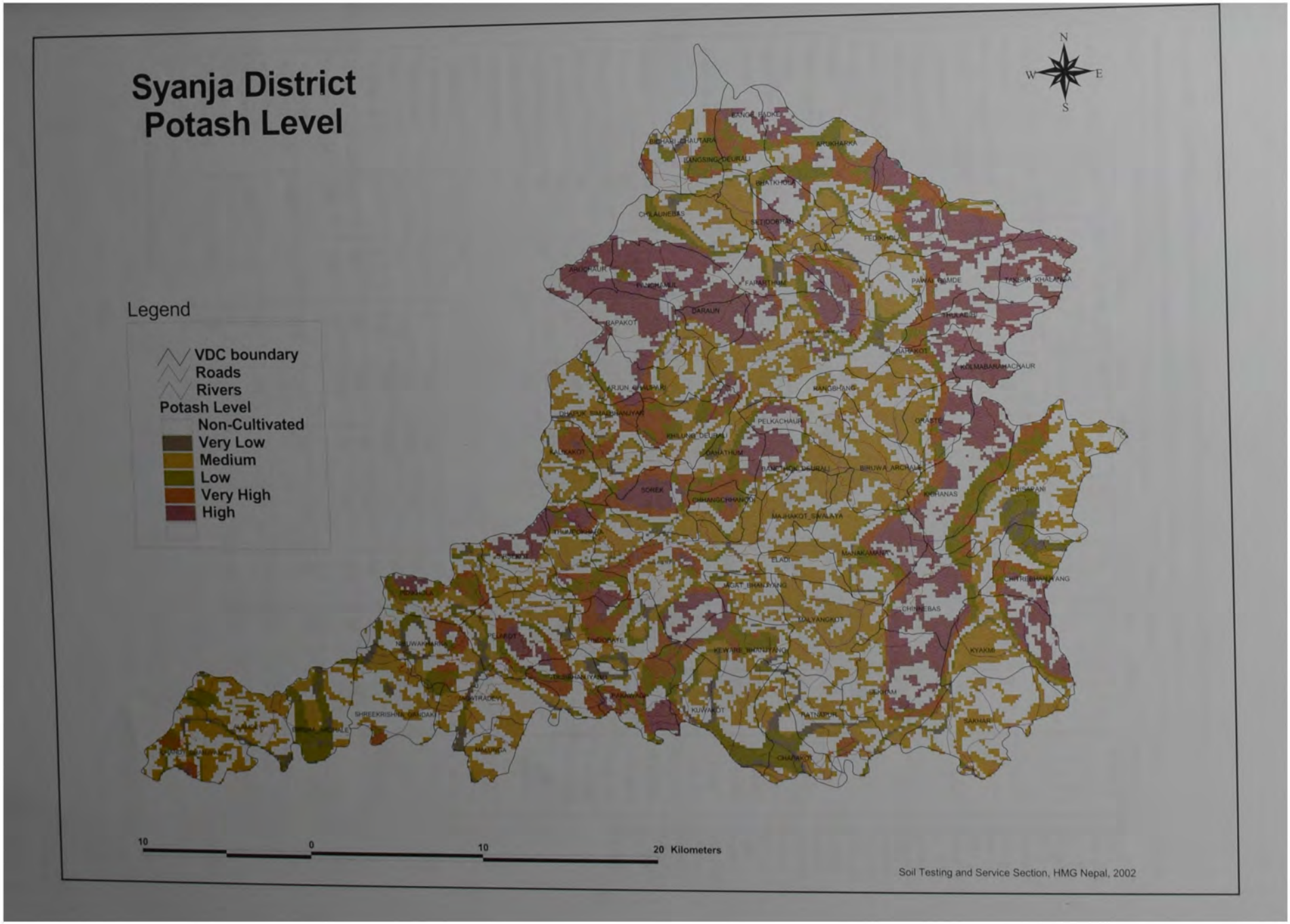
Age	1	2	3	4	5	6	7	8 and above
1. FYM (Kg/tree)	25	30	40	50	60	60-100	60-100	60-100
2. Nitrogen N (g/tree)	-	100	125	150	200	300	400	500
3. Phosphorus P2O5 (g/tree)	-	50	75	100	150	200	200	200
4. Potash K2O (g/tree)	-	20	30	40	50	5	100	100

It is highly advised to the farmers to use high amount of organic manure in their field. Integrated application of chemical fertiliser along with organic manure is the best way to maintain and sustain the soil fertility. On the basis of soil analysis result, the recommendation is full dose for low nutrients content, if the nutrients content of any soil samples is medium then the recommendation of fertiliser is half dose. Similarly high nutrient content in any soil then one-fourth (1/4) dose is recommended. Fertiliser dose of any field varied with the soil fertility status, crop types, varietal characteristics, cropping intensity, irrigation facility, root system of the crops, crops duration etc affect the fertiliser dose of any soil

Manure and fertiliser recommendations:

Manure and fertiliser recommendation on the basis of soil fertility status of a place is not so easy but the laboratory recommendation is given as below in table 19.


Syanja District
Phosphorus Level
N
W
E
S
Legend
VDC boundary
Roads
Rivers
Phosphorus Level
Non-Cultivated
High
Low
Very Low
Very High
Medium
10
0
10
20 Kilometers
Soil Testing and Service Section, HMG Nepal, 2002


Syanja District
Potash Level
N
W
E
S
Legend
VDC boundary
Roads
Rivers
Potash Level
Non-Cultivated
Very Low
Medium
Low
Very High
High
10
0
10
20 Kilometers
Soil Testing and Service Section, HMG Nepal, 2002

Soil Test Result:

Table 19. Fertiliser Recommendation Sheet based on Soil Annual Analysis

General Recommendation of fertiliser and Manure Kg/ha (20 Ropani or 30 Kattha)

Crop	Nitrogen (Kg/ha)			Phosphorus (Kg/ha)			Potash (Kg/ha)			FYM (t/ha)	Remarks
	Low	Med	High	Low	Med	High	Low	Med	High		
Paddy irrigated	100	50	25	30	15	8	30	15	8	6 ton/ha (240 Doka)	1 kg Nitrogen = 4.8 kg Ammonium Sulfate = 2.2 Kg Urea 1 kg phosphate = 6.25 kg sing super phosphate = 3.12 kg Double Super phosphate = 2.1 Kg Triple Super Phosphate 1 Kg Potash =1.67 Kg Muriate of Potash,
Paddy un irrigated	60	30	15	20	10	5	20	10	5	"	
Wheat irrigated	100	50	25	50	25	13	25	12	6	"	
wheat unirrigated	50	25	13	50	25	13	20	10	5	"	
Maize (summer + winter)	60	30	15	30	15	8	30	15	8	"	
Barley + naked barley	30	15	7.5	20	10	5	10	5	205	"	
Millet	20	10	5	10	5	2.5	10	5	205	"	
Sugarcane Raton	150	75	37.5	60	30	15	40	20	10	"	
sugarcane (main)	120	60	30	60	30	15	40	20	10	10 ton/ha (200 Doko)	
Buck wheat	30	15	7.5	20	10	5	10	5	2.5	6 ton/ha (240 Doko)	
Ginger	30	15	7.5	30	15	7.5	60	30	15	24 ton/ha	
Potato	70	35	17.5	50	25	12.5	40	20	10	30 ton/ha	
Tobacco	35	17.5	8.75	23	11.5	5.75	60	30	15	10 ton/ha	
Mustard	60	30	15	40	20	10	20	10	5	6 ton /ha	
Sunflower	60	30	15	40	20	10	20	10	5	6 ton/ha	
Vegetable crop	70	35	17.5	50	25	12.5	40	20	10	32 ton/ha	
Lentil, Black gram, green gram	20	10	5	20	10	5	20	10	5	4-6 ton/ha	
Cowpea, Pigeon pea	20	10	5	40	20	10	30	150	7.5		
Chick pea	20	10	5	40	20	10	20	10	5	"	
Pea	15	7.5	3.75	40	20	10	10	5	2.5	"	
Soybean	10	5	2.5	40	20	10	30	15	7.5	"	
Ground nut	40	20	10	60	30	15	20	10	5	6 ton/ha	
Mulberry Terai un irrigated	300	150	75	140	70	35	180	90	45		
Mulberry Terai irrigated	150	75	37.5	70	35	17.5	90	45	22.5		
Mulberry Hill irrigated	200	100	50	80	40	20	120	60	30		
Mulberry Hill unirrigated	100	50	25	40	20	10	60	30	15		

L = Low, M = Medium, H = High

Annex 1.

Syangja District Soil Fertility Mapping
FY 2058/059

Farmer's name	VDC	Ward	Soil type	Land type	pH	level	OM %	level	level	level
Bodhnath Regmi	Arjunchaupari	2	Loam	Khet	6.5	NN	M	H	L	H
Omprakash Paudel	Arjunchaupari	1	Clay loam	Khet	6.1	SA	M	M	M	M
					6.1	SA	M	M	M	M
					5.8	SA	H	H	H	H
Nandkala Adhikari	Arjunchaupari	3	Clay loam	Bari	7.2	NN	M	M	L	M
Shova kant Deokota	Arjunchaupari	5	Sandy loam	Khet	5.3	A	H	H	L	M
Shova kant Deokota	Arjunchaupari	5	Clayey	Bari	5.7	SA	H	H	M	M
Biswa k Paudel	Rapakot	7	Loam	Bari	5.8	SA	H	H	H	VH
Ganga Pd Paudel	Rapakot	7	Clayey	Khet	6.4	SA	H	H	L	H
Gangadhar Kafle	Rapakot	8	Clayey	Bari	7.3	NN	H	H	H	VH
Rukmagat kafle	Rapakot	6	Loam	Bari	5.3	A	H	H	H	H
Cholakant kafle	Rapakot	5	Loam	Khet	5.1	A	H	H	VH	M
Chintamani Aryal	Daraun	4	Clayey	Bari	5.7	SA	H	H	VH	M
Mati Lal Tiwari	Daraun	4	Loam	Khet	5.8	SA	M	M	L	M
Bhawani shankar Deokota	Daraun	5	Clay loam	Bari	5.3	A	M	M	M	M
Uday Pd Deokota	Daraun	6	Clay loam	Bari	5.4	A	H	H	M	M
Bhim Bd Godar	Daraun	7	Loam	Bari	5.2	A	H	H	VH	H
kamal Pd Gurung	Daraun	9	Loam	Bari	5.3	A	H	H	L	H
Ramesh Adhikari	Daraun	1		Bari	7.3	NN	H	H	M	H
Deo k Rana	Mankamna	6	Clayey	Pakho	5.2		L	L	L	M
Jeet Bd Thapa	Mankamna	6	Sandy	khet	5.6		L	M	M	L
Damber Bd kC	Mankamna	4	Sandy	Pakho	5		M	M	VH	L
Smt Ranifa Karki	Mankamna	4	Sandy	khet	6.3		L	M	L	L
Chitra Bd Rana	Biruwa Archale	6	Sandy	Pakho	5.4		VL	VL	L	L
Gyan Bd khatri	Biruwa Archale	8	Loam	Pakho	4.4		L	M	VH	L
Indra Bd KC	Biruwa Archale	8	Loam	khet	5.3		L	M	L	M
Dan Bd khatri	Biruwa Archale	7	Loam	khet	4.2		M	M	H	M
Jamansin Adhikari	Biruwa Archale	6	Sandy	Pakho	5.2		M	M	VH	M
Damber Bd kC	Biruwa Archale	6	Loam	khet	5.4		L	M	M	L
Pahalsin Bik	Biruwa Archale	5	Clayey	Pakho	4.5		L	L	M	L
Bhesh Bd Bik	Biruwa Archale	6	Clayey	Pakho	4.8		M	M	VH	M
Yudhishtir Raymajhi	Biruwa Archale	8	Loam	Pakho	5.8		H	H	L	H
Bishnu Pd Wagle	Kichnas	1	Clayey	khet	6.4		L	L	VH	M
Bhim lal Bhandary	Kichnas	2	Loam	Pakho	5.3		M	M	M	VH
Matrika Pd Wagle	Kichnas	2	Clayey	khet	4.3		L	L	M	L
Ramakant koirala	Kichnas	2	Sandy	Pakho	5.2		VL	VL	L	L
Amardhwaj khati	Kichnas	8	Clayey	Pakho	5.5		L	L	L	L
Shova Kant Paudel	Kichnas	5	Loam	khet	5.7		L	L	VL	M
Durga Pd Sharma	Oraste	2	Sandy	Pakho	5.2		M	M	M	H
Durga Pd Sharma	Oraste	2	Sandy	khet	5.2		M	M	M	M
Judh Bd KC	Oraste	4	Loam	Pakho	5.2		L	L	VL	VH

Rim Bd KC	Oraste	3	Loam	Pakho	4.9		M	M	L	H
Narayan Dutta Sharma	Oraste	3	Clayey	Pakho	4.4		L	L	L	M
Tej Bd Thapa	Oraste	8	Loam	khet	5.8		M	M	VH	M
Rajansin Thapa	Oraste	9	Loam	Pakho	5.7		L	M	L	M
Ramprasad Upadhya	Chisapani	7	Sandy	Pakho	4.8		L	L	VH	M
Jog Raj Lamsal	Chisapani	5	Loam	khet	5.5		M	M	H	M
Khema Nand Lamsal	Chisapani	6	Sandy	Pakho	5.7		L	L	VL	M
Hum Bd GC	Chisapani	8	Sandy	Pakho	5.8		L	L	M	L
Ram Bd Malla	kuwakot	1	Clayey	khet	6	SA	M	M	M	M
Nar Bd Rijal	kuwakot	1	Sandy loam	Pakho	5.8	SA	M	M	L	M
Thag Bd Thapa	kuwakot	1	Sandy loam	Pakho	5.9	SA	M	M	L	M
Sat Bd Sen	Chapakot	8	Sandy loam	Pakho	6	SA	H	H	H	H
Chitra Bd Sen	Chapakot	8	Sandy loam	Pakho	5	A	M	M	L	M
Hom Bd Shrestha	Ratnapur	2	Sandy loam	Pakho	5.6	SA	H	H	H	VH
Bal Bd Bik	Ratnapur	2	Sandy loam	Pakho	5.4	A	M	M	L	M
Man Dhara Bik	Ratnapur	3	Clayey	Pakho	5.6	SA	M	M	L	H
Man kumari Shrestha	Ratnapur	3	Sandy loam	Pakho	5.5	SA	M	M	M	M
Jhabi lal Bik	Chapakot	2	Clayey	khet	6.7	NN	M	M	L	H
Dilli Raj Gaire	Ratnapur	4	Clayey	khet	6	SA	M	M	L	M
Tank bd Kumal	Ratnapur	4	Clayey	khet	6.6	NN	L	L	L	H
Yub Raj Paudel	Chapakot	4	Clayey	Pakho	6.8	NN	M	M	L	VH
Ishwar K Khamya	Chapakot	5	Clayey	Pakho	5.1	A	M	M	L	H
Balram Nepali	Chapakot	7	Clayey	Pakho	6.6	NN	M	M	M	VH
Khim Bd Phal	kuwakot	3	Sandy loam	khet	6.8	NN	M	M	L	VH
Lal Pd Neupane	kuwakot	2	Sandy loam	khet	6.4	SA	M	M	L	L
Jay lal Bhandary	kuwakot	9	Sandy loam	khet	5.6	SA	H	H	M	M
Sar bd Ale	kuwakot	9	Sandy loam	khet	6	SA	M	M	M	M
Bhup Raj Thapa	kuwakot	9	Clayey	Pakho	5.5	SA	M	M	H	VH
Top lal Bhandary	kuwakot	8	Clayey	Pakho	5.9	SA	H	H	M	M
Pabisra Ale	kuwakot	6	Clayey	Pakho	6.5	NN	M	M	H	VH
Shovakar Bhandary	kuwakot	6	Clayey	Pakho	6	SA	H	H	H	M
Ramesh Lamsal	Chitrebhanjyang	1		Khet	6.2	SA	M	M	M	L
Bhoj Bd GC	Chitrebhanjyang	4		Pakho	6.6	NN	M	M	H	L
Chandra Bd Bhujel	Chitrebhanjyang	4		Pakho	6.2	SA	M	M	M	L
Om Bd Manandhar	Chitrebhanjyang	5		Pakho	6	SA	M	M	M	L
Gun Bd thapa	Chitrebhanjyang	5		Pakho	6	SA	M	M	H	L
Harideo Manandhar	Chitrebhanjyang	3		Pakho	5.9	SA	L	M	H	L
Hom Bd Manandhar	Chitrebhanjyang	3		Pakho	5.9	SA	L	L	H	L
Sita Subedi	Kyakmi	8		Khet	5.8	SA	L	L	H	L
Deepak Manandhar	Kyakmi	7		Pakho	6.2	SA	L	M	VH	M
Sher Bd Thapa	Kyakmi	9		Pakho	5.9	SA	L	L	VH	L
Nam Bd thapa	Kyakmi	1		Pakho	4.9	A	M	M	H	L
Bimala Bik	Kyakmi	2		Pakho	5.3	A	L	L	M	M
Dal Bd Thapa	Sakhar	1		Pakho	6.5	NN	M	M	L	L
Tem Bd Rana	Sakhar	1		Pakho	6.7	NN	M	M	VH	L
Tak Bd Sahu	Sakhar	7		Pakho	5.5	SA	L	M	M	L
Lakshmi Srestha	Sakhar	7		Pakho	5.7	SA	M	M	M	M
Deo Bd Gurung	Sakhar	8		Khet	5.3	A	L	L	L	L
Bhm iraj gaire	Sakhar	8		Khet	5.7	SA	L	M	M	M
Dhan Bd Bik	Sakhar	9		Pakho	5.9	SA	L	L	VH	L

Tulasi Ram Dakal	Sakhar	9		Khet	5.7	SA	L	M	M	M
Bir Bd Thapa	Sakhar	3		Khet	5.7	SA	L	L	H	M
Ashok Rana	Sakhar	3		Khet	5.8	SA	L	L	H	M
Lekh Bd Bhedi	Chandibhanjyang	1	Clayey	Sim	6.7	NN	H	H	H	M
Dhan Bd pulami	Chandibhanjyang	8	Loam	Sim	5.8	SA	M	M	VH	H
Kharak Bd Gaha	Alamdevi	9	Clayey	Sim	6	SA	H	H	H	VH
Mrs Bina Thapa	Alamdevi	6	Clayey	Sim	6.5	NN	H	H	VH	H
Amar Bd Reshmi	Chandibhanjyang	8		Pakho	5.3	A	H	H	VH	VH
Indra lal Subedii	Chandibhanjyang	7		Pakho	5.5	SA	H	H	M	VH
Narayan Pd Pandey	Birgha	6	Clayey	Sim	6.5	NN	M	M	L	M
khimanand Pandey	Birgha	2		Pakho	5.2	A	H	H	VH	VH
Dinanath Neupane	Chandibhanjyang	7		Pakho	5	A	M	M	M	H
Bhim Bd Darji	Chandibhanjyang	5		Pakho	5.3	A	M	M	M	H
Dam Bd Samai	Chandibhanjyang	4		Pakho	5.2	A	M	M	L	H
Damarsin Rana	Chandibhanjyang	5		Pakho	6	SA	L	L	L	H
Thaneshar Pandey	Chandibhanjyang	6		Pakho	5.8	SA	L	L	L	M
Gomata Bhandary	Birgha	1		khet	6	SA	M	M	M	M
Sher Bd jhyangi	Chandibhanjyang	4		Pakho	5.3	A	M	M	M	H
Tikaram Pandey	Birgha	5		Pakho	5.8	SA	H	H	VH	VH
Daya Nidhi Dhakal	Chandibhanjyang	9	Clayey	Sim	7	NN	M	M	M	H
Bir Bd Ale	Alamdevi	1		Sim	6.5	NN	L	L	L	L
Lakshmipati Pandey	Alamdevi	4	Loam ket	Sim	7.2	NN	M	M	VH	M
kishan Bd Thapa	Alamdevi	6	Clayey	Sim	5.7	SA	H	H	M	VH
Khem Raj Basyal	Malunga	2	Sandy loam	Khet	7.7		H	H	VH	
Rukmagat Basyal	Malunga	6	Clayey	Bari	5.5		M	M	VH	
Ram kant Basyal	Malunga	1	Clay loam	Pakhobari	6.1		M	M	M	
Fatta Bd Rakhali	Phedikhola	4	Loam	Bari	7.6		M	H	VH	
Tul Bd Thapa	Phedikhola	4	Loam	Bari	7.6		M	M	M	
Ram Bd Rakhali	Phedikhola	7	Loam	Bari	7.9		M	M	M	
Tul Bd Thapa	Phedikhola	2	Loam	khet	7.9		M	M	M	
Msr Dem kala Pandey	Phedikhola	3	Loam	Bari	7.6		L	L	VH	
Nilkanth Chapagyan	Phedikhola	6	Loam	khet	7.4		L	M	L	
Lilladhar bhusal	Phedikhola	6	Loam	khet	7.5		M	H	M	
Dal Bd Thapa Chetri	Phedikhola	8	Loam	khet	7.6		M	M	H	
Mohanlal Basyal	Phedikhola	9	Loam	Bari	6.2		M	M	L	
Kashiram paudel	Nibubakharka	3	Loam	Bari	7.5		M	M	VH	
Ram Pd Dhakal	Nibubakharka	3	Sandy loam	khet	7.2		M	H	H	
Hari kala Dhakal	Nibubakharka	3	Clay loam	khet	7.6		M	H	L	
Anand Raj Neupane	Nibubakharka	5	Clay loam	khet	6.5		M	M	L	
Tara Pd Neupane	Nibubakharka	5	Sandy loam	khet	7.9		M	H	H	
Om Pd Neupane	Nibubakharka	5		khet	7.7		M	M	H	
Dublal Neupane	Nibubakharka	6		Bari	6.5		M	M	H	
Lal Bd Luetel	Thunpokhara	7	Loam	khet	6		M	H	H	
Tej bd Shrestha	Thunpokhara	9	Loam	khet	7.5		L	L	H	
Bhavi lal Thapa	Thunpokhara	5	Loam	khet	7.8		M	M	M	
Til chandra Gaire	Thunpokhara	2	Sandy loam	khet	6.6		M	M	H	
Ganga Bd Magar	Thunpokhara	5	Sandy loam	khet	7.5		M	H	VH	
Dum Bd Magar	Sirsekot	4	Sandy loam	khet	7.9		M	H	L	
Nar Bd Parajuli	Sirsekot	7	Sandy loam	khet	7		L	M	H	
Tej Bd Magar	Sirsekot	5	Sandy loam	khet	6		M	M	L	

Lal Bd Magar	Sirsekot	2	Sandy	Pakho	6.7		M	M	VH	
Chuda Mani Parajuli	Sirsekot	9	Sandy	Pakho	7.6		M	M	L	
Narayan pd Parajuli	Sirsekot	7	Sandy	Pakho	6.8		M	M	L	
Dhan Bd Gurung	Sirsekot	7	Sandy	Pakho	6.4		M	M	H	
Yukta Narayan Pangeni	Walling	9	Clayey	khet	7		M	M	L	
Mani Pd Pangeni	Walling	9	Clayey	khet	6.1		L	M	VH	
Padma Pd Pangenki	Walling	9	Sandy loam	khet	6.1		M	M	H	
Narayan pd Pangeni	Walling	9	Sandy loam	khet	5.4		M	H	H	
Tej Narayan Shrestha	Tindobato	4	Sandy loam	khet	6.6		M	M	H	
krishana Bd palli	Pakbadi	6	Ratomato	Bari	7		M	H	M	
Toman Singh	Pakbadi	6	Kalomato	Bari	5.9		M	H	H	
kamal palli Magar	Pakbadi	6	Loam	Bari	6.2		M	M	VH	
Devi Pd Bagale	Walling	1	Sandy loam	Bari	6.5		M	M	M	
Hom Narayan Dungana	Walling	11	Sandy loam	khet	5.9		L	M	M	
Netra Bd Thapa	Walling	11	Sandy loam	khet	6.2		M	H	L	
Tek Bd Thapa	Tindobato	6	Ratomato	Bari	5.6		L	M	VH	
Bodhraj Gautam	Tindobato	5	Sandy loam	Bari	5.6		M	M	L	
Bodhraj Gautam	Tindobato	5	Ratomato	Bari	6.8		L	L	L	
Ram Bd Palli	Pakbadi				7		L	M	M	
Smt Shova Koirala	Walling	7	Loam	Bari	6.9		M	M	M	
Chetkant Bagale	Walling	3	Sandy loam	khet	6.9		L	M	VH	
Krishan Pd Regmi	Syangjabhanjyang	4	Ratomato	Bari	6		L	L	VH	
Bhuvansin Ale	Syangjabhanjyang	3	Ratomato	Bari	5.6		H	H	L	
Tikkaram Neupane	Nibuwakharka	6	Clayey	khet	6.5		L	L	VH	
Prem Narayan Neupane	Nibuwakharka	7	Sandy loam	khet	6.5		M	M	M	
Moani lal Neupane	Nibuwakharka	7	Loam	khet	6.7		VL	VL	M	
Khim Bd Thapa	Jagatradevi	3	Loam	Bari	7		M	M	L	
Prem Bd Thapa	Jagatradevi	4	Loam	Bari	5.3		VL	VL	M	

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