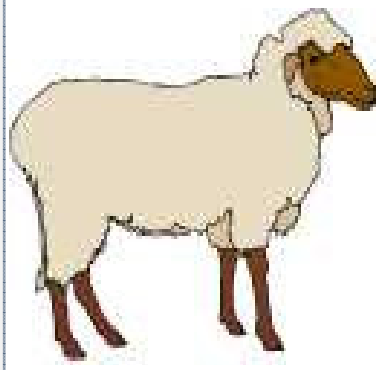
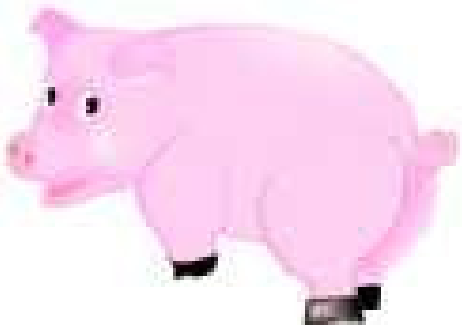
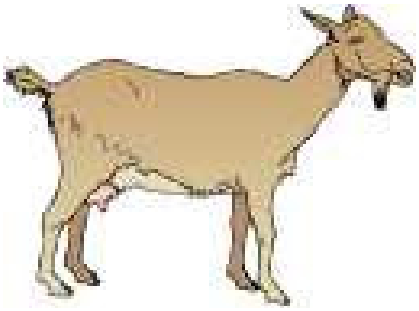
RESOURCE INVENTORY OF DISTRICT PHEK - NAGALAND







Krishi Vigyan Kendra Phek

National Research Center on Mithun ICAR.

Resource Inventory of

District Phek - Nagaland

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Preface

Natural and human resources are the primary resources essential for production of goods and services. The third kind of resource is process resource that also has significance in production of some kind of goods. Proper listing of the resources helps in making the decisions for production, thus resource inventory becomes an essential document. In the present manuscript we have tried to list all the resources required by the farmers in taking the production related decisions. Here we have taken the stock of not only the physical resources but also the cultural aspect of the people of the Phek. The information about human resources has also been enlisted here as they play important role in production, there skills, energies, talents, abilities and knowledge are used for the production of goods or rendering of services. So data related the size of the population with capabilities of the population has also recorded here.

Authors-.

Content

Prologue

The word **resource** has originated from French dialect *resourdre*, 'rise again, or recover' and **inventory** has originated from Latin word *inventarium* 'a list of what is found'. So resource is any physical or virtual entities of limited availability that help one earn a living. Resources are very useful to produce goods so they possess economic value. Inventory is a list for articles, goods and materials available in the stock at particular period of time. Thus **resource inventory** can be defined as "list of contents of a physical or virtual entity required for production of goods having economic value".

Resources have three main characteristics; quantity, utility and availability and these characters gives value to it. The value and importance of the resource depends upon its need, level of technology available and time. Resources can be classified as natural resources, human resources and process resources. Natural resources may be biotic as they are obtained from biosphere or abiotic as they comprise of non living things. Human beings are also considered as resource as they have ability to increase the value of the material. Processes are important to convert the raw material into final product so availability of certain kind of plants, equipments, IT infrastructure, etc. is also considered as resource. So the inventory of resources helps in taking the production related decisions.

Phek is one the remotely located district of Nagaland, which is full with natural wealth and keeping the inventory of the resources available, will help in taking the production related decisions. The Phek District is classified as rural district in the state as majority of the people are living in villages. Previously Phek and Pfutsero were only having the status as town but recently the Government of Nagaland has declared all the other three Sub-Divisions; Chizami, Chozuba and Meluri and the Mini Cement Plant of Weziho as full-fledged townships. Geographically Phek lies in the South-East of Nagaland, between 94^0- 35'- 18" to 94^0- 38'-09" E (L) longitude and 25^0 - 37'-37" to 25^0-39'-47" N (LT) latitude and bounded by Kohima District in the West, Zunheboto and Kiphire Districts in the North, Myanmar in the South East and Manipur State in the South. The distance of the Phek district head quarter from the state capital Kohima is about 145 km. Phek is inhabited by the Chakhesang and Pochury tribes of Mongoloid race. Khezha, Chokri and Pochury are three main linguistic groups of Phek. The linguistic accent differs from village to village even among these three main linguistic groups also.

The district is spread over in a geographical area of about 2026 sq. km, with altitude ranging from 520 to 2900m above mean sea level (MSL). It has a total population of 148246 (2001 census) with population density of 73 person/sq. km and literacy rate is 71.35%. The climate of

Phek district is temperate to sub-tropical. Winter is cold at higher elevation with warm summer and seasonal rainfall of about 200 cm. Phek is rich in natural flora and fauna. The hilly region comprises of evergreen vegetation whereas lower region is comprised of deciduous forests. The important rivers are Tizu, Lanye. Administratively the district is divided in three(3) sub divisions; Meluri, Chuzoba and Chizami, and sub divisions are headed by SDOs.

Agriculture in Phek is rainfed and it is the mainstay of the people of Nagaland. Shifting cultivation is prevalent here and it occupies 12160 ha area in the district. The total cropped area of the district is 27500 ha (inclusive of fruit crops) however the net area sown is 25521 ha with net irrigated area of 12700 ha. The Chakhesang farmers are excellent in terrace cultivation. A traditional farming system called 'Zabo' is practiced in the Kikruma area of the district. Paddy, maize, beans, pea, cowpea, arhar and nagadal are the common agronomical crops whereas cabbage banana, orange, passion fruit, guava, garlic, potato, ginger and cardamom are the common horticultural crops. Besides this pig, goat, backyard poultry, mithun and cattle are important livestock of the district.

Krishi Vigan Kendra: A Knowledge and Resource Centre

Krishi Vigyan Kendra (Farm Science Center) is a noble concept developed by Indian Council of Agricultural Research (ICAR) as primary links for the farmers to know about the agricultural technologies being generated by National Agricultural Research System (NARS). Krishi Vigyan Kendra (KVK) works at the grass-root level as vocational training institution to bridge the gap between the available technologies at one end and to their application for increased production and productivity at the other. The activities of the KVK include on-farm testing to assess and refine the technologies to develop location specific agricultural technologies, frontline demonstrations to exhibit production potentials of the technologies on the farmers' fields, training of farmers to update their knowledge and skills in improved agricultural technology, and training of extension personnel to orient them in the frontier areas of technological development. Phek district has an average altitude between 1000 -2500 m above MSL. It falls under Eastern Himalayan agro-climatic zone with temperate climate. Agriculture is the main occupation of the district and about 80.84% of the total population depends on it. Production and productivity of the district is too low than national average.

Krishi Vigyan Kendra in Phek district was established by the ICAR under the aegis of NRC on Mithun, Jharnapani, Nagaland in 2003 to augment the farmers with latest technological knowledge at Porba village in Pfutsero subdivision of the district with the aim of reducing the time lag between technology generation and it's transfer to the farmer's field for increasing production and achieving sustainability.

1. Thrust Area Identified by KVK for the Phek

1.1. Introduction of quality livestock germplasm.
1.2. Vaccination and health coverage measures of pig and poultry.
1.3. Deworming of mithun at regular intervals and feeding of compounded mineral mixture instead of common salt to mithun.
1.4. Introduction of high yielding varieties of cereals, pulses and oilseeds.
1.5. Soil and seed treatment.
1.6. Control of weeds.
1.7. Introduction of high yielding varieties of fruits and vegetables.
1.8. Improved production technology of fruits and vegetables.
1.9. Introduction of biofertilizers e.g. Rhizobium, Azotobacter, Azospirillum, Blue green algae, Azolla for nutrient management.
1.10. Use of suitable plant protection measures against pest and diseases of crops.
1.11. Proper design of terrace, water harvesting and designing diversions for irrigation and drainage for proper management of watershed area.
1.12. Introduction of improved storage structure for cereals, pulses and finished products.
1.13. Development of capabilities of rural youth and women in the field of fruits and vegetables processing and value addition.
1.14. Adequate and hygienic shelter/housing.

1.15. Introduction of common carps and other exotic carps in paddy cum fish farming and fish ponds.
1.16. Strengthening integrated farming system approach with advanced scientific inputs.

2. Focus areas of the KVK Phek

2.1. To identify the important problems of that area as per the need of the farmers and prioritization of the identified problems as per their importance.
2.2. Planning & conducting on farm trial to assess the technologies in farmer's situation in the district and refine it, if required.
2.3. Demonstrating new and improved technologies to the farmers as well as to the extension agencies directly in the farmer's field with their active participation for promotion and large scale adoption.
2.4. Planning & conducting production oriented need based long and shorts duration on campus and off campus training.
2.5. Providing training and information about latest developments in agricultural technologies to extension personnel to orient and update their knowledge.
2.6. Developing and organizing non-formal education programs by way of field days, farm visits, farmers fair, radio talk, film shows etc.
2.7. Organizing Farm Science Clubs in Rural Schools and Villages to induce liking and interest for Agricultural & Allied sciences in younger generation.
2.8. Developing and promoting small village organizations like Self Help Groups (SHGs), Farmer Interest Groups (FIGs), Kisan Clubs etc.
2.9. Developing and maintaining farms and Demonstration Units on scientific lines to facilitate work experience to the trainees and also to put a show case of latest technical know how.
2.10. Imparting some basic education to rural illiterates and school drop-outs in order to make them not only good farmers but also better citizens.
2.11. Providing added training facilities in the areas of rural home science and nutritional education for community.
2.12. Collecting feed back from the farmers and extension agencies and communicating these massages to research scientists for modification of technology.

3. Resources Available with KVK

Resources are essential as they not only enhances the efficiency of programme implementation, but they also increases the penetration and effectiveness of the technologies. The following resources are available with KVK.

3.1. Physical Resources:

3.1.1. Demonstration units:

Mithun farm:

The KVK is housed at Porba station of the National Research Centre on Mithun and a mithun farm is being maintained there having 65 mithuns.

Rabbitry unit:

KVK is maintaining a rabbitry unit where 20 pairs of rabbits are being raised. We are putting all the efforts to popularize rabbitry in the region as rabbits being prolific in nature has great potential.

Apiary:

An apiary unit of Apis serena sp. has been maintained for training and demonstration purpose of the farmers.

Poultry:

A poultry unit comprising of dual purpose bird "Vanaraja" has been established with all the brooding facilities for training and distribution purpose.

Vermicomposting & Nadep compost unit:

Organic crop production has been encouraged in the district, therefore, vermicomposting unit using Esinia foetida spp. is being developed for training and demonstration.

Nursery: A small vegetable nursery is developed for quality seedling production and distribution to the farmers.

Water harvesting Structure:

A water harvesting structure has been developed to store rain water and water is used for producing vegetables during winter.

Polyhouse and Shed net:

Two low cost poly houses and a shade net have been constructed for nursery and off season vegetable cultivation.

3.1.2. Machineries and Farm tools:

For smooth functioning of the KVK activities following machineries are available such as tractor, Jeep, power tiller, thresher, spades, improved manually operated tools, crown corking machine, polythene sealing machine, sewing machine, oven, Refractometer etc.

3.1.3. Office equipments:

Computer, Furniture and furnishing, Fax, Telephone, Digital Camera, Documentary CDs and films, Books, Bulletins, Journals, Exhibition pandals, Models, Training aids, Poster, Banners, Charts etc.

3.2. Human Resources:

Director of the host institute is the administrative head of the KVK, but at the centre level Programme Coordinator plans and executes the programmes of the KVK. Each KVK has a team of six subject matter specialist (SMS) to provide technological support in planning and execution. Agronomy, soil science, horticulture, plant protection, animal science and agricultural engineering are the core areas which are manned by the SMS. Home science is found to be another area of importance and activities of this

discipline is taken care by a programme assistance. Farm manager is responsible to manage the KVK farm and demonstration units, where the latest technologies are demonstrated. Information technology has a great deal in today's world so KVK has a computer programmer. He is responsible to provide soft skill support to people of other discipline. Office superintendent cum accountant and steno cum clerk is the administrative staff to assist in maintaining the records for smooth conduction of the activities. Two drivers have been provided in the KVK to drive the jeep/tractor and two supporting staff has been provided to maintain cleanliness and to provide physical support at the time of demonstration of technologies at farmer's field by SMSs.

3.3. Process resources:

Minimal food processing equipments, Computer and IT equipments, Soil testing kits, Softwares etc. are available with the KVK.

District Profile

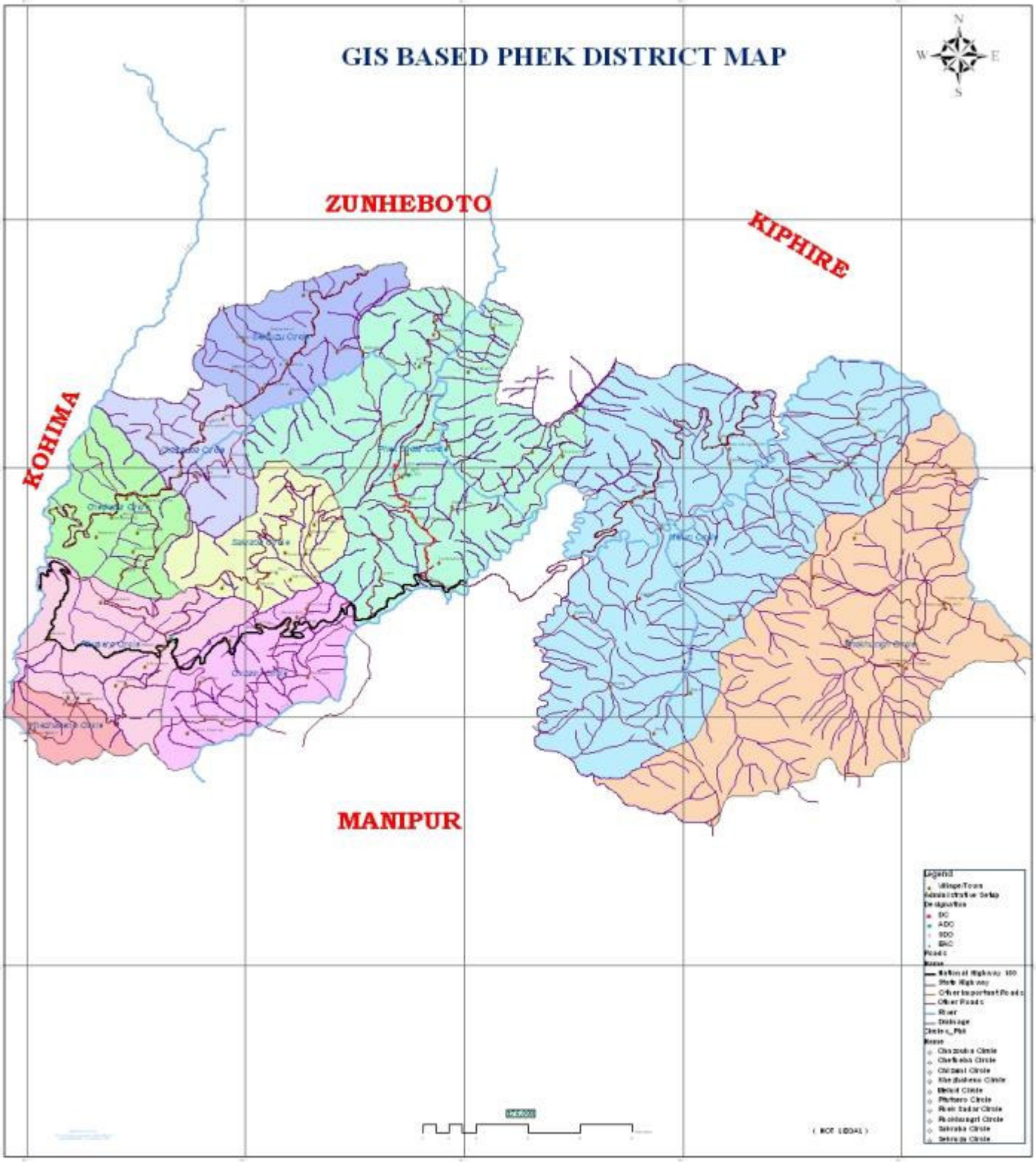


Fig 2.1 Map of Phek

1. Historical genesis of the district:

Phek District was bifurcated in 1973 from Kohima district. It lies in the South-East of Nagaland, bounded by Kohima District in the West, Zunheboto and Kiphire Districts in the North, Myanmar in the South East and Manipur State in the South. The name of the district Phek is derived from the word *"Phekrekedze"* meaning watch tower. Earlier it was a part of Kohima district, but separated as a district on December 21, 1973. The district inhabited by the Chakhesangs and Pochurys tribes of Mongoloid race. The word "Chakhesang" an amalgamation of the names of three sub-tribes - "cha" from

"Chokri", "khe" from "Chesham (Kuzha)" and "Sang" from "Sangtam (Pochury)". The medium of communication with others are mainly *Tenyidie* and *Nagamese,* however among the elderly people, Tenyidie is still a convenient language to communicate. There are three main linguistic groups in the Phek such as Chokri with a population of 95,576, Khezha with a population of 34,363 and Pochury with a population of 18,307 making total population of 1,48,246(2001 census). The accent difference varies from village to village even among these three linguistic groups. For an example, even among the Pochury speaking group, there are at least eight different dialects which varies from one village to another.

Phek is a hilly district rich in flora and fauna. There are three important rivers namely Tizu, Lanye, and Sedzu and three important lakes called Shilloi, Chida and Dzudu. Summer is moderately warm and winter is cold. Monsoon sets in by the last week of May and retreats by the end of September. Agriculture is the main occupation with 80.84 % of the population engaged in agriculture. Terrace Rice Cultivation (TRC) is predominant. Besides agriculture people engage in salt making (in Meluri area) weaving, bamboo and wood carving, and in making fruit juice.

The National Highway No.150 crosses certain part of the District from Kohima to Jessami (under Manipur, on the way to Meluri) and N.H.155 from Jessami to Tuensang via Meluri, Akhegwo and Kiphire. The only Cement factory in the State, i.e. Weziho Cement Factory, which can produce 150 TPD, is in Meluri Sub-Division. Decorative Stone Factory is now in function at Weziho. Most of the village are linked with electricity.

Natural flowing Brine water is available in about 7 villages of the district. The locally baked salt; as per medical experts is goiter-free and is good for health. Even Brine can be kept in stock in quantity for sale in the market. There are other small-scale industries, like basket making and different weaving centers which can bring sustainable development to small entrepreneurs of the district. These small-scale industries need to be modernized with modern scientific machineries to make it recurrent income generating industries. Phek District is regarded as the richest areas of mineral deposits such as limestone, Decorative marbles, Crystallized, etc.

2. A brief description of the district -

2.1 Position in relation to longitude and latitude :

Longitude: 94^0- 35'- 18" to 94^0- 38'-09" E (L)

Latitude : 25^0-37'-37" to 25^0-39'-47" N (LT)

2.2 Altitude from MSL : Highest-2133 m MSL (Pfutsero)

Lowest-520 m MSL (Lanyie)

2.3 Boundaries of your district :

E: Kiphre/Myanmar W: Kohima N: Zunheboto/Kiphre S: Manipur

NE: Kiphre SE: Manipur SW: Manipur NW: Zonobhoto & Myanmar

2.4 Total population : 1,48,246 (2001 census)

2.5 Area of the district : 2026 sq.km or 202600 ha

2.6 Population density : 73 person/sqkm

2.7 Literacy percentage : 71.35%

2.8 Status of agriculture : Rain fed and shifting

2.9 Farmers

a) Big farmers : 40315
b) Small : 10419

c) Marginal farmers

d)Agricultural laborers : 1361

2.10 Farm Labour mobility : Minimum

2.11 Block wise information:

Demographic of Phek

Sl. No	Name of the Block	Population (as per 2001 census. Total)	% of literacy	Male (No)	Female (No)
1	Phek	26392	71.35	13787	12605
2	Kikruma	31812	71.35	16497	15315
3	Pfutsero	41455	71.35	21322	20133
4	Meluri	20872	71.35	11028	9844
5	Sekrezu	27715	71.35	14448	13267
	Total	**148246**	71.35	**77082**	**71164**

Source : SREP, ATMA, Phek

No of Agriculture worker

Sl. No.	Name of the Block	Worker Nos.				Categories No.			
		Agri		Non-agri					
		Male	Female	Male	Female	SC	ST	OBC	General
1	Phek	11775	11993	2012	612	Nil	ST	Nil	Nil
2	Kikruma	11045	14887	1560	428	Nil	ST	Nil	Nil
3	Pfutsero	18808	19493	2514	640	Nil	ST	Nil	Nil
4	Meluri	10369	9485	659	359	Nil	ST	Nil	Nil
5	Sekrezu	12556	12446	1892	821				
	Total	**64551**	**68304**	**8637**	**2860**	**Nil**	**ST**	**Nil**	**Nil**

Source : SREP, ATMA, Phek

2.12 Pattern of rainfall in different months (Provide as high, medium or low)

Jan.	Feb.	Mar.	April.	May.	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
low	low	low	medium	High	High	High	High	High	medium	low	low

2.13 Critical periods for plant growth in Phek

Sl.No	Crop	Critical period of growth	Coinciding Calendar month (s)
1	Paddy	Tillering and Panicle stage	Aug-Sept
2	Maize	Tasselling stage	May- June
4	Soyabean	Flowering stage	Aug-sept
5	Naga dal	Flowering stage	April-May
6	Cow pea	Flowering stage	April-May
7	Kholar bean	Flowering stage	April-May
8	Passion fruit	Flowering stage	April-may, November-Dec
9	Pear	Flowering stage	April-May
10	Peach	Flowering stage	Feb-March
11	Banana	Initiation of bunch	Nov-Dec
12	Guava	Flowering stage	Mar-April, Sept-Oct
13	Plum	Flowering stage	Feb-March

14	Cabbage	Head formation	May-July, Nov-Jan
16	Local garlic	Bulb formation	Oct-Nov
17	Ginger	Rhizome formation	Oct-Nov

2.14. Soils : Classes of the soil groups present in the district Phek:

1. Black soil: 36468ha
2. Red soil: 24312 ha
3. Alluvial soil: 18234ha
4. Sandy soils: 6078ha
5. Red laterite soil: 117508 ha

2.15 Soil fertility status (in general) : Medium

2.16 Irrigation

Area under Irrigation	:	15450 ha
Irrigation potential	:	20000 ha
Source of Irrigation		
1. Rivers	:	5 nos.
2. Tanks	:	96 nos.
3. Open wells	:	Nil
4. Bore wells	:	Nil
5. Any other Sources (Lake)	:	3 nos

2.17 Land use and cropping intensity

Gross cropped area	:	44870 ha
Net Area sown	:	42950 ha
Fallow lands	:	NA
Cultivable waste lands	:	38630 ha
Forest cover	:	56589 ha
Barren Land	:	NA
Cropping intensity	:	120%

2.18 Socio-economic Characteristics, Land holding Pattern

Average size of land holdings	:	3.88 ha
Average fragmentation intensity	:	2-3 nos
Existing land tenure for farming	:	3-6 yrs
Source(s) of finance for farming	:	Rank.1 SBI-5nos
		Rank.2 State Cooperative Bank-3 nos
		Rank.3 Nagaland Rural- 2 nos
Main source of income for farmers	:	Rank.1 Agriculture
		Rank.2 Livestock
Commercial commodities produced	:	Rank.1 Ginger
		Rank.2 Large cardamom
		Rank 3. Cabbage
		Rank 4. Passion fruit
		Rank 5. Plum

2.19 Farm Machinery and implements available in Phek

Number of tractors	:	8	nos
Number of Power Tillers	:	95	nos
Number of Carts	:	nil	nos
Types of implements- ploughs	:	240	nos
Cultivators	:	103	nos
Discs	:	28	nos
Harrows	:	8	nos
Others	:	nil	nos
Pumps (oil and electrical)	:	nil	
Harvesters and Threshers	:	Thresher- 1892	
Sprayers and Dusters	:	520 nos	

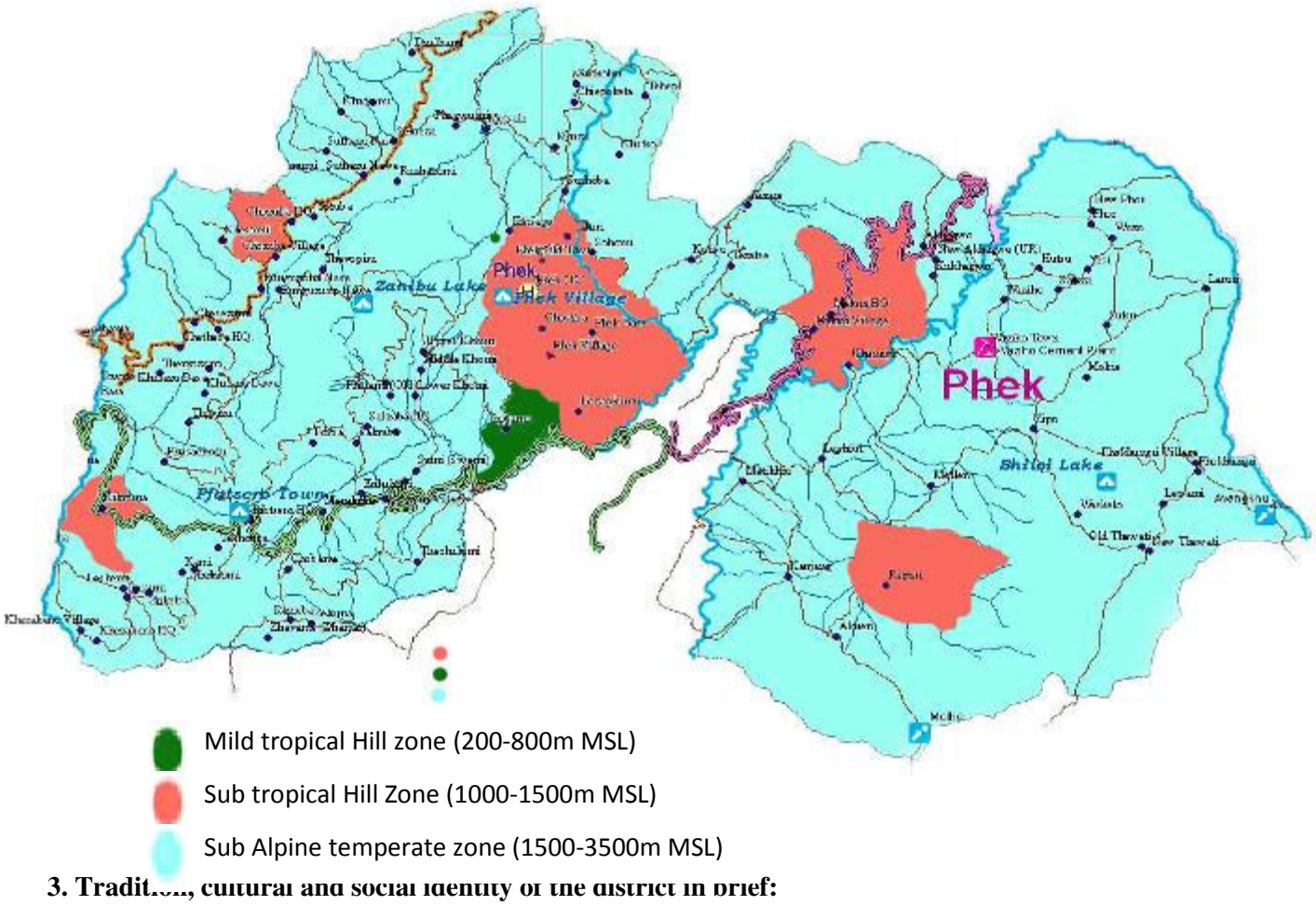
2.20. Agro-climatic Zones

Zones in Nagaland state

1. Sub Alpine temperate zone (1500-3500m MSL)
2. Sub tropical Hill Zone (1000-1500m MSL)
3 Sub tropical Plain zone (400-1000m MSL)
4. Mild tropical Hill zone (200-800m MSL)

Agro-climatic Zones in Phek

1. Sub tropical Hill Zone (1000-1500m MSL)
2. Sub Alpine temperate zone (1500-3500m MSL)
3. Mild tropical Hill zone (200-800m MSL)



3. Tradition, cultural and social identity of the district in brief:

The Chakhesangs and Pochurys are known for their rich cultures and traditions. There are varieties of traditional attires and ornaments. The melodies folk songs and the lively folk dances are feast for the ears and eyes. The people are expert craftsmen and excellent in making pots, baskets, sculptures and furniture. The society is patrimonial but women enjoy a high status in their families. The customary laws are unwritten but practiced by all villages. These laws are binding to members of the society and are being passed on from generation to generation by the words of mouth. The elderly people of the village decide and pass the judgment on disputes and matters concerning the village.

4. Festivals observed in Phek District

Phek is land of festivals, one festival celebrated after other round the year. The main inhabitant, chakhesang have one of the most beautiful culture and festivals in the state. The festival revolves around agriculture which is the important source of income to the most of the people of the district. Those who hold prestigious status in the community such as brave warriors and persons who could arrange feast of

merit are looked up and honoured. These people earn the beautiful and symbolic shawl and their houses are decorated with horns in front and at the back. The villages have slight difference of timing for festivals due to climatic conditions, yet the reason and the mode of festivals are basically same. The following festivals are celebrated one after the other through out the year.

Folk dance of Chakhesang tribe

Khuthonye (July): It is celebrated during July after completion of the terraced field cultivations. The farmers work and toil hard for a month to procure a year provisions. Having completed the work of cultivation everyone poor or rich eat and drink heartily to regain the lost energies. This is also a time for harvesting millet therefore coinciding with Khuthonye the millet festival, "CHUNYE" is also celebrated.

Turhinye (August): This is a festival with the objective of preserving the crops from wild animals which may destroy the labours and their hard work. During this festival community work such as repairing, cleaning of roads and their village paths are done before the festival. It is celebrated during the month of August.

Thurinye (December): This festival is celebrated in December, after all the harvest, when the granaries are full of grain. A chaste bachelor has to perform a ceremonial rite called "MUDZU", wherein a spotless piglet will be killed first. This will be followed by the rest of the villagers killing their own domestic animals and start the feast. People are jubilant they offer thanks to the Gods for protecting their crops from sowing to the stage of harvest.

Sukrunye (January): It is celebrated during the middle of January. Of all the festivals it is the most important because it is the ceremony to ensure good health of the community during the coming year. The main highlight of the festival is "SUKRU" meant for the menfolk. It implies the sanctification of the young boys. Earlier in the morning all menfolk visit the village spring, where they wash themselves, their weapons and tools and cloth in fresh water before any animals touch the water. They believe all misfortunes and physical ailments have been washed away. On return, every male who is old enough to do so kills an unblemished cock, but it must be killed by throttling it with his hand only. Thus, it stretches to days of celebration by feasting, dancing and singing through out the day and night till dawn.

Ngunye (February): This festival falls in February. It is a festival for rejoicing where traditional games and sports are played. It is marked with singing indigenous songs, folk dances and wrestling. People from all khels march in procession in their traditional attires.

Tukhanye (April): This is the last festival celebrated during April. This festival marks the beginning of the yearly routine of hard work cultivation. Now that all the festivals are over the people are not at rest. They become more active for the cultivation activities. The Chakhesang people celebrate festivals from 1 to 11 days with outmost gaiety. People put on new cloth and decorate themselves with priceless traditional ornaments. They eat and drink and have a sense of hospitality far beyond his resources. Participation of men and women is the most prominent feature. They sing songs, dance and recite about their ancestor's meritorious velour and participate in the festival with a sense of unity and equality. The chakhesang has many peculiarities among them, *Muchi (Yelling), Dothi (High Kicking), Kunu (Wrestling), Kutsushu* (*Stone Pulling Monolith*) etc. are of the peculiar features of this area.

5. Agricultural marketing system:

Marketing of agriculture produce of some of the village is done by APMC. But due to remoteness and poor connectivity of roads to urban areas the department is unable to market the produce of majority of the villages. Marketing of village produce is mostly done by the farmers themselves.

Table 1. Ways of disposal of farm produce and by products

Sl.No	Major Farm produce	Marketing channel	Bye Product (if any)	Marketing channel
1	Paddy	Not Marketed	Rice police & broken rice	Use as Pig feed
2	Maize	Self marketing	No	NA
3	Cabbage	Self marketing	No	NA
4	Large cardamom	APMC	No	NA
5	Ginger	APMC	No	NA
6	Passion fruit	APMC	No	NA
7.	Plum	Self marketing	No	NA
8.	Peach	Self marketing	No	NA
9.	Pear	Self marketing	No	NA
10.	Apple	Self marketing	No	NA

Source : Farming System Analysis,KVK, Phek

Market types – whole sale and retail markets in your district (As of 2005-06)

A. Wholesale Markets : : 2 Nos (Pfutsero and Phek)

B. Retail Markets : 14 nos in five sub divisions.

C. Apani Mandi : 4 Nos.

Major modes of transport to market. : Road

1. Hired LMVs

2. State transport

Table 2. Information regarding markets for the district PHEK

Sl. No.	Name of the block	Name of the market centre	Periodicity (Weekly/ Daily)	Important commodi-ties handled	Commodity wise quantity handled (Annual)	Area covered
1	Phek	Phek Town	Daily	Groceries, Vegetables, Fish, Meats etc.	Not assessed	Phek district
2	Kikruma	Kikruma Town	Weekly	Groceries, Vegetables, Fish, Meats etc.	Not assessed	Kikruma Block
3	Pfütsero	Pfütsero market	Seasonal/ Daily	Vegetables & fruits	Not assessed	Pfütsero Block
4	Meluri	Meluri Town	Roadside daily market	Groceries, Vegetables, Fish, Meats etc.	Not assessed	Meluri Block
5	Sekrezu	Sukrezu Town				Sukrezu Block

Source : SREP, ATMA, Phek

Table 3. Public- Private Partnership in Market related initiatives in the district

Sl. No.	Type of partner-ship	Partners			Activity undertaken	Volume of trade (Tons)	Value of trade (in Rs)
		I	II	III			
1	Public + Private	Horticulture	Farmer		Floriculture	N.A	N.A
2	Private + Private	Input dealer	Farmer		Seeds inputs	N.A	N.A
3	Public + Private	Agriculture	Farmer	Inputs supplier	Providing quality seeds to farmers through certified suppliers	1000 M.T	100 lakhs

** N.A= Not Accounted, Source : SREP, ATMA, Phek*

Table 4. Information on Market Infrastructure facilities available in the district PHEK

Sl. No	Name of location	Name of Structure	Type of Service	Location
1	Phek	Phek Town	Daily	Phek district
2	Kikruma	Kikruma Town	Weekly	Kikruma Block
3	Pfütsero	Pfütsero market	Seasonal/ Daily	Pfütsero Block
4	Meluri	Meluri Town	Roadside daily market	Meluri Block
5	Sekrezu	Sukrezu Town		Sukrezu Block

Source : SREP, ATMA, Phek

6. Farmers organizations in the district including ATMA like society

Cooperative Society (As of July 2008) : 322,

Farmers' Organisation - : 99 (Apex body CPO)

7. Agro Ecological Situations (AESs) of the district

Agro Ecological Situations (AESs) have been identified based on soil, rainfall, physiography, altitude, irrigation pattern and temperature and identified AESs have been classified into the homogeneous farming situations for the district Phek, Nagaland. Identified AESs and farming situations grouped as Farming systems are being furnished in the following tables.Based on the Agro-Ecological Situation the district has been divided into two zones as AES-I & AES-II.

AES-I: The AES-I is spread over in two blocks namely Phek and Kikruma Blocks of the Phek district. The altitude of this AES ranges from 900 – 1500 MSL. The average annual rainfall is above 1000mm. Undulating topography with sandy loam to fine loamy rich humus soil. The major crops grown are Paddy, Maize, Potato, temperate fruits, Kholar, Soyabean, floriculture, animal husbandry, Paddy cum fish culture & forestry.

AES-II: AES-II is spread over in two blocks namely Pfütsero, Melluri and Sekrezu blocks of Phek district. The annual rainfall is above 1500 mm and soil is sandy to clay loam. Altitude ranges from 1500 – 3000 MSL. Major enterprises under this AES are Agriculture and Animal Husbandry. Major crops grown are paddy, maize, ginger, banana, chilly, rice bean, passion fruit etc., however piggery, cattle, mithuns and poultry are commomnly raised livestock.

Table No 5. Spread of AES in the District

Sl. No	Name of the Block	Area (Ha)	% of the Geographical area of the district	Name of AES
1	Phek	30900	19.37	AES-I
2	Kikruma	21700	13.6	AES-I
3	Pfutsero	50500	31.66	AES-II
4	Meluri	56400	35.37	AES-II
5	Sekrezu			

Source : SREP, ATMA, Phek

Farming systems in the district Phek, Nagaland

Agro-ecological situation (AES) have been identified on the basis of Soils, Rainfall, Physiography, Altitude, Irrigation pattern and Temperature and identified AESs have been classified into the homogeneous farming situations for the district Phek, Nagaland. Identified farming situations grouped as Farming systems are being furnished in the following table.

Farming System	Soils	Rainfall (cm/annum)	Altitude (M)	Principal Crops/breeds	Important features	Location Area(ha)
Zabo system (Integrated Farming system)	Clay loam to clay	150- 170	1500-1800	Forest cover, Paddy, Maize Beans, Pea, Cowpea, Arahar, Nagadal, Cabbage Banana, Pear, Peach, Plum, Garlic, Potato, Buffalo, Cattle and Fish	Integration of different components, viz. Forestry, Cereals, Pulses, Vegetable, Livestock and Fisheries	Kirkuma R D Block (6500 ha)
Agrisilvihortipastural farming system	Sandy loam, to Clay loam	180-200	1500-2000	Forest & Fodder trees like Ficus spp, Bauhinia spp., Legistroma etc., Fodder grasses like Broom grass, Napier etc.Maize Banana, Pear, Peach, Plum, Mandarin, Passion fruit Mithun, Cattle	Integration of forest, fodder crops, fruit trees and Livestock	Pfutsero, Chozuba and Milluri sub-divisions (13,500 ha)
Alder based farming	Loam	160-180	1000-1600	Maize, Millets, Jobstears, Potato Chillies, Pumpkin Mandarin, Passion fruit Large cardamom	Replenishing the nitrogen requirement of the crops with Alder trees	Pfutsero, Chozuba and Milluri sub-divisions

				Tea,		(5,600 ha)
Jhum (Agri+Horti)	Sandy loam to loam	160-180	1000-1600	Jhoom Paddy, Maize, Millets Banana, Papaya, Beans, Cowpea, Chow chow Pea, Garlic, Potato, Cabbage	Slash and burn the vegetation and now jhooming cycle has reduced to 3-6 yrs from 15-25yrs	In entire district (22,500 ha)
Pani-kheti System	Clay loam to clay	150-180	600-1400	Paddy, Pea, Summer vegetables, Fish	Paddy cum fish farming	Entire district (13,520 ha)

Agricultural characteristics of each farming System

1. ZABO system (Integrated Farming system)

1.1 Boundaries of the FS: Zabo literally means "*impounding of water*" also known as "RUZA" is prevalent in Kikruma Development Block of the Phek district.The area surrounded by two rivers "Seidzu" and "Khuzha" is traditionally under this system. In this farming system combination of forest, livestock and fisheries are integrated with well founded conservation base.

1.2 Soils under the FS: Red and red laterite soil group is predominantly available, which texturally varies from clay to clay loam.

1.3 Climates under the FS: Rain fall is moderate to high with average rainfall of 150-170 cm per annum. Temperature is moderate with high humidity. Average temperature in winters is about 4-6 ^{0}C and in summers it ranges from 18 - 26^{0}C.

1.4 Physiography under the FS: Moderate hills with gentle slope have been observed.

1.5 Irrigation facilities under the FS: Construction of water harvesting pond is an important feature of this farming system. The pond generally constructed in middle adjacent to the catchment area. Certain farmers also go for construction of water harvesting pond in lower area where it is being used for fish farming and irrigating to paddy fields. Indigenously bamboo was being used to carry the water from pond to the fields but nowadays pipes are also being commonly used.

1.6 Major crops and cropping intensity under the FS: Zabo is one of the indigenous farming systems which have combination of forest, agriculture, livestock and fisheries. Trees of forest species like Alder, Oak, *Ficus spp. Albizia spp. Bahunia spp. Pinus spp. Delbergia spp.* Bamboo spp. etc. are

commonly taken on the top of the slope. Fruit plants like Banana, Pear, Peach, Plum, Passion fruit are also grown. Maize, Millets and Paddy are the common cereal crops which are being grown in this farming system. Maize is taken on the slope however paddy is taken on terraces and foot hills. Among the pulses Nagadal, Beans, Pea, Cowpea, are commonly grown. Vegetables like Potato, Cabbage, Sweet potato, Chillies etc. are also taken. Livestock is an important component of this system. Buffalo and cattle specifically Thotho are the main livestock, which are taken adjacent to the pond in a confined area. Local and exotic carp spp. are raised in ponds and common carps and local fishes are taken in paddy fields.

In most of the area mono cropping is practiced but in certain area where the irrigation facilities are available, pulses like pea and vegetables such as potato, cabbage, mustard leaf, sweet potato, chillies etc. are being taken. The overall cropping intensity of the Zabo farming system is about 140%.

1.7 Major cropping systems under the FS: Mono cropping- Rice, Rice-Pea, Maize +Beans, Maize +Cabbage – Potato, Maize +Beans - Potato

1.8 Land use pattern under the FS: The land use pattern of the farming system is divided into Forest area, Orchards, Agri-Horti. crops, Livestock and Fishery.

1.9 Land holding pattern under the FS: Zobo system of farming is mainly practiced by the big and marginal farmers as it is cost intensive. This system is also practiced on community land where the small and marginal farmers are the main stake holder.

1.10 Populations and Socio-economic characteristics under FS: About 7 % of the total population of the district is engaged in Zabo farming system comprising big and marginal farmers.

1.11 Adoption pattern for each crop/ breed/other technology under the FS: Zabo is one of the indigenous farming system prevalent in Nagaland and the adoption pattern of the components such as forest, agricultural crops, livestock are traditional whereas improved technology for water harvesting and fish culture is being adopted. Now the resource rich farmers are also using high yielding and hybrid varieties seeds particularly in vegetables.

1.12 General production constraints for Zabo farming system..

Crops	Constraints
Paddy	• Poor nursery raising technique • High seed rate • Low yield of local varieties • Non availability of high yielding/hybrid varieties • Improper weed management • Insect, pest and diseases infestation • No use of organic/inorganic amendments against insect, pest and diseases.
Maize	• Low yield of local varieties • Non availability of high yielding/hybrid varieties

	• High seed rate
	• Cob borer infestation
	• Stem borer infestation
	• Nutrient deficiency
Arahar	• Low yield of local varieties
	• Non availability of high yielding varieties
	• Wilting of seedlings
	• Inadequate pest and disease management
Peas	• Low yield of local varieties
	• Non availability of high yielding varieties
	• Powdery mildew occurrence during winter
Sweet potato	• Low yield of local varieties
	• Non availability of high yielding varieties
Cabbage	• Insect, pest and diseases infestation like cabbage butterfly larvae, aphids, cut worm
	• No use of organic/inorganic amendments against insect, pest and diseases.
Potato	• Low yield of local varieties
	• Non availability of high yielding varieties
	• No seed treatment
	• Red ant infestation
	• Late blight disease infestation
Banana	• Poor quality of fruit of local varieties
	• Non availability of quality planting material of better marketable quality varieties
	• Pseudostem rot of banana
	• Sigatoka leaf spot
	• Pseudostem borer and weevil infestation
	• Nutrient deficiency
Passion fruit	• Improper training resulting in low yield
	• Collar rot disease
	• Infestation of woodiness virus
	• Bacterial leaf spot
	• Insect infestation like mite, fruit borer
	• Nutrient deficiency
Pear	• Non availability of quality planting material
	• Leaf spot
	• Poor marketing facility
Peach	• Non availability of quality planting material
Plum	• Non availability of quality planting material
Mithun	• Deforestation and shrinking of forest area
	• Parasitic infestation
	• Attack from wild animals
	• Occurrence of epidemics like FMD

Buffalo	• Poor genetic make up of milk production trait • Epidemics of infectious diseases like FMD • High rate of worm infestation in buffalo calves
Cattle	• Low milk yield in local breed "Thotho" • Poor body weight gain in local breed. • Non availability of better germplasm • Epidemics of infectious diseases like FMD
Fish	• Non availability of quality fingerlings • Occurrence of skin disease • Unawareness about Physico- Chemical parameters of soil and water of fishponds. • Improper Pre stocking measures

2. Agrisilvihortipastural farming system

2.1 Boundaries of the FS: Agrisilvihortipasture is a traditional farming system where various components of farming like crops and animal husbandry are blended with forest environment to get the maximum output. This farming system is prevalent in all the four sub division i.e. Pfutsero, Chozuba, Phek, and Melluri and is practiced on the hillocks. In this farming system integration of livestock and crops with natural forest cover is followed.

2.2 Soils under the FS: Sandy loam - loam textured soil is predominantly available.

2.3 Climates under the FS: Moderate to high with average rainfall of 170-200 cm per annum. Temperature is low with high humidity.

2.4 Physiography under the FS: This system is practiced on high hills with moderate to steep slopes

2.5 Irrigation facilities under the FS: No specific irrigation facilities are normally available in this system but the water from the streams is channelized and used for irrigation.

2.6 Major crops and cropping intensity under the FS: Agrisilvihortipasture is an indigenous system of farming practiced by the local people from time immemorial. In this system, crops and livestock component are taken along with natural forest cover. Maize is major cereal crop grown in the system, however Banana, Mandarin, Passion fruit, Pear, Peach, Plum are the main horticultural crops. In certain pockets cabbage and beans are also being taken as mixed crop with maize. Forest & Fodder trees like Ficus spp, Bauhinia spp., Legistroma etc. and Fodder grasses like Broom grass, Napier and Guinea grass. are also grown with Livestock component like Mithun and Cattle. Cropping intensity in this system is 100%.

2.7 Major cropping systems under the FS: Mono cropping and mixed cropping system is followed in Agrisilvihortipastural system.

2.8 Land use pattern under the FS: The land use pattern of the farming system is divided into Forest area which normally being used for grazing of Mithun and cattle. Orchards and Livestock.

2.9 Land holding pattern under the FS: Agrisilvihortipastural system of farming is mainly practiced by the big farmers. This system is also practiced on village community land.

2.10 Populations and Socio-economic characteristics under FS: About 15 % of the total population of the district is engaged in Agrisilvihortipastural system. Mainly the resource rich and marginal farmers adopt this system .

2.11 Adoption pattern for each crop/ breed/other technology under the FS: Agrisilvihortipastural is an indigenous farming system practiced by the local people in the district and the adoption pattern of the components such as forest, agricultural crops, livestock are traditional.

2.12 General production constraints for Agrisilvihortipastural system

Crops	**Constraints**
Maize	• Low yield of local varieties • Non availability of high yielding/hybrid varieties • High seed rate • Cob borer infestation • Nutrient deficiency
Beans	• Low yield of local varieties • Non availability of high yielding varieties
Cabbage	• Insect, pest and diseases infestation • Non availability of organic/biological control agent against insect, pest and diseases. • Poor marketing
Banana	• Poor quality of fruit of local varieties • Non availability of quality planting material of better marketable quality varieties • Pseudostem rot of banana • Sigatoka leaf spot • Pseudostem borer • Nutrient deficiency
Passion fruit	• Improper training resulting in low yield • Collar rot disease • Infestation of woodiness virus • Bacterial leaf spot • Insect infestation like mite, fruit borer • Nutrient deficiency
Mandarin	• Poor nursery raising technique • Poor weed management • Poor insect and disease management • Severe nutrient deficiency • Non availability of high quality planting material
Pear	• Non availability of quality planting material • Leaf spot • Poor marketing facility

Peach	• Non availability of quality planting material • Poor marketing facility
Plum	• Non availability of quality planting material • Poor marketing facility
Mithun	• Deforestation and shrinking of forest area • Parasitic infestation • Attack from wild animals • Occurrence of epidemics like FMD
Cattle	• Low milk yield in local breed "Thotho" • Poor body weight gain in local breed. • Non availability of better germplasm • Epidemics of infectious diseases like FMD

3. Alder based farming system

3.1 Boundaries of the FS: Alder based farming system is mainly practiced in Pfutsero and Chozuba sub division. In this system crops are grown along with alder trees which supply atmospheric nitrogen to the crop.

3.2 Soils under the FS: Loam soil is widely available under this system.

3.3 Climates under the FS: Moderate rainfall of 160-180 cm per annum. Temperature is low with high humidity.

3.4 Physiography under the FS: Moderate to steep terrain, mid hills to high hills.

3.5 Irrigation facilities under the FS: No specific irrigation facilities are normally available in this system but the water from the streams are channelized by bamboo and used for irrigation.

3.6 Major crops and cropping intensity under the FS:

Maize, Millets, Potato, Sweet potato, Pumpkin, Large cardamom and Tea are grown along with alder trees. Cropping intensity in this system is 110%.

3.7 Major cropping systems under the FS: Mono cropping system, Mixed cropping system is followed in this system.

3.8 Land use pattern under the FS: The land use pattern of the farming system comprises of agricultural and horticultural crops integrated with alder trees.

3.9 Land holding pattern under the FS: Alder based farming system is mainly practiced by the big and marginal farmers. This system is also practiced on community land by the village people.

3.10 Populations and Socio-economic characteristics under FS: About 6 % of the total population of the district is engaged in Alder based farming system. Alder based farming system is mainly practiced by the big and marginal farmers.

3.11 Adoption pattern for each crop/ breed/other technology under the FS: Alder based farming system is a primitive farming system practiced by the local people in the district and the adoption pattern of the components are traditional.

3.12 General production constraints for Alder based farming system.

Crops	Constraints
Maize	• High seed rate • Non availability of high yielding/hybrid varieties • Cob borer infestation • Nutrient deficiency
Millets	• Low yield of local varieties • Non availability of high yielding/hybrid varieties • Nutrient deficiency
Potato	• Low yield of local varieties • Non availability of high yielding varieties • Red ant infestation
Sweet potato	• Low yield of local varieties • Non availability of high yielding varieties
Pumpkin	• Low yield of local varieties • Non availability of high yielding varieties • Insect, pest disease infestation
Large cardamom	• High insect , pest and diseases • Deficiency of nutrients
Tea	• Poor weed management in the garden • Heavy insect pest and disease occurrence • Poor nutritional management
Passion fruit	• Improper training system • Collar rot disease • Infestation of woodiness virus • Grease spot on leaf • Bacterial leaf spot • Insect infestation like mite and fruit borer • Nutrient deficiency

4. Jhum system

4.1 Boundaries of the FS: Jhum or shifting cultivation which was considered as an promising system of cultivation in olden days, lately due to population pressure on land the jhuming cycle has reduced to 3-5 years from earlier jhuming cycle of 15-25 years. This farming system is prevalent in all the four sub division i.e. Pfutsero, Chozuba, Phek, and Melluri and is practiced on slopes of the hills. It is still the main cultivation practice of the local inhabitant occupying the major area under cultivation. In this system number of crops are grown on the same piece of land at the same time.

4.2 Soils under the FS: Sandy loam to loam are the predominant textural class of soil present in this system.

4.3 Climates under the FS: Moderate rainfall of 160-180 cm per annum. Temperature is moderate with high humidity.

4.4 Physiography under the FS: Jhum cultivation is practiced in low to high hills with moderate to steep terrain.

4.5 Irrigation facilities under the FS: This system is solely dependent upon rainfall.

4.6 Major crops and cropping intensity under the FS: Mixed cultivation of various cereal crops like Paddy, Maize, Millets etc., pulses like Beans, Cowpea, Pea, fruits and vegetables like Banana, Papaya, Cabbage, Potato Ginger, Garlic, Turmeric etc. are grown. Cropping intensity of this farming is 120%.

4.7 Major cropping systems under the FS: Mixed and relay cropping systems are followed in this farming system.

4.8 Land use pattern under the FS: The land use pattern of the farming system comprises of agricultural and horticultural crops.

4.9 Land holding pattern under the FS: Jhum cultivation is mainly practiced on community land by small and marginal farmers. However, certain resource rich farmers also go for jhuming.

4.10 Populations and Socio-economic characteristics under FS: About 35% of the total population of the district is engaged jhum cultivation. Jhum cultivation is mainly practiced on community land by small and marginal farmers

4.11 Adoption pattern for each crop/ breed/other technology under the FS: Jhum cultivation is a primitive farming system practiced by the local people in the district and state as a whole. The adoption pattern of the various components is traditional and primitive.

4.12 General production constraints for Jhum system

Crops	**Constraints**
Paddy	• Poor nursery raising technique • High seed rate • Low yield of local varieties • Non availability of high yielding/hybrid varieties • Insect, pest and diseases infestation • Non availability of organic/biological control agent against insect, pest and diseases.

Maize	• High seed rate • Low yield of local varieties • Non availability of high yielding/hybrid varieties • Cob borer infestation • Nutrient deficiency
Millets	• Low yield of local varieties • Non availability of high yielding/hybrid varieties • Nutrient deficiency • Crop damage by birds
Cabbage	• Insect, pest and diseases infestation • Non availability of organic/biological control agent against insect, pest and diseases. • Poor marketing
Potato	• Low yield of local varieties • Non availability of high yielding varieties • Red ant infestation
Beans	• Low yield of local varieties • Non availability of high yielding varieties
Cowpea	• Low yield of local varieties • Non availability of high yielding varieties
Peas	• Low yield of local varieties • Non availability of high yielding varieties • Powdery mildew occurrence during winter
Banana	• Poor quality of fruit of local varieties • Non availability of quality planting material of better marketable quality varieties • Pseudostem rot of banana • Sigatoka leaf spot • Pseudostem borer • Nutrient deficiency
Papaya	• Low yield of local varieties • Non availability of high yielding varieties • Nutrient deficiency • Incidence of viral diseases
Ginger	• Soft rot disease • Nutrient deficiency

5. Panikheti

5.1 Boundaries of the FS: Panikheti system is also known as wet land terrace cultivation is an indigenous system of cultivation in the district. This system of cultivation developed by Chakhesang tribe of Phek district, Nagaland and is being practiced in all the four sub division i.e. Pfutsero, Chozuba, Phek, and Melluri on mid and low hills. This is bacically rice based cropping system where paddy is grown on terraces. Bunds and terraces control soil erosion, loss of top soil and nutrients.

5.2 Soils under the FS: Clay loam to clay soil texture are the predominant textural class of soil present in this system.

5.3 Climates under the FS: High rainfall of 160-200 cm per annum. Temperature is moderate with high humidity.

5.4 Physiography under the FS: Foot hills and terraces with low to gentle slope.

5.5 Irrigation facilities under the FS: Paddy is basically high water requiring crop, though rain water is sufficiently available but where paddy cum fish culture is taken in this system, water is brought from high hills by diverting through main channels/sub channels ensuring 10-15cm water depth. Sometimes bamboo channels are also used to divert/carry water to terraces.

5.6 Major crops and cropping intensity under the FS: Paddy is the major crop but on bunds colocasia and yams are also cultivated. Fish culture in small water ponds dig out in the middle of terraces is used for rearing of common carps to fetch additional income and water management. This is most significant aspect of panikheti system.

5.7 Major cropping systems under the FS: Mono cropping is the significance of this system and only rice is taken.

5.8 Land use pattern under the FS: The land use pattern of the farming system comprises of paddy cultivation and fish farming.

5.9 Land holding pattern under the FS: Panikheti is mainly practiced by all group of farmers having small to large holdings.

5.10 Populations and Socio-economic characteristics under FS: About 30 % of the total population of the district is engaged in panikheti. This system is basically followed by farmers of all socioeconomic categories.

5.11 Adoption pattern for each crop/ breed/other technology under the FS: Panikheti is a traditional farming system developed by Chakhesang tribe in the district and now being practiced by all the tribes. The adoption pattern of the various components is traditional and primitive.

5.12 General production constraints for Panikheti

Crops	**Constraints**
Paddy	• Poor nursery raising technique • High seed rate • Low yield of local varieties • Non availability of high yielding/hybrid varieties • Insect, pest and diseases infestation • Non availability of organic/biological control agent against insect, pest and diseases.

Fish	• Non availability of quality fingerlings • Occurrence of skin disease

Zabo System

Agrisilvihortipastoral

Alder based farming

Jhum maize

Pani kheti

Agriculture in Phek

The terrain of the Phek district is very severely undulating, full of high hills and deep gorges. Most of the high hills are steep. Mid hills having the slope of 50-100% are suitable for orchards and plantation crops. Jhuming is also practice in midhills however low lands having the slope of 20-50% are best suited for paddy cultivation. In foot hills paddy is predominantly being taken, however nowadays area under paddy cum fish culture is also increasing. The monsoon rain starts from the early May and continues till September end. Agriculture is the main occupation and 80.84 % of the total population is engaged in farming. However, most of the cultivated lands are steep to marginal slope, except the narrow strip bank on either side of Lanye, Tizü and Sedzü rivers. The main crops are rice, maize, millet, cabbage, yam, pulses, ginger, bananas, etc. However, passion fruit, peach, plum and large cardamom is also gaining momentum in the district.

Mono cropping system is common and the land holding is generally fragmented and scattered. Jhum cultivation is still widely practiced due to non-availability of sufficient water for Terrace cultivation. Paddy-cum-fish culture in the terrace fields is also encouragingly practiced in recent years by the farmers. Terrace Rice Cultivation (TRC) is the common practice except certain villages under Meluri Sub-Division where primitive method of jhum cultivation is still in practice leading to wastage of time, energy and environmental degradation. However, with exposure to new technologies people of this area have also started TRC. Use of power tillers is becoming popular now days in the district.

1. Agriculture Policy of the Nagaland:

Agriculture is a way of life that is deeply interwoven with the Naga culture and tradition which define the very aspect of economy in the state. This clearly indicates the dependency on agricultural sector and therefore, we need a shift in all spheres of developmental activities in the state adjunct to emerging advances in knowledge. Building on these background realities, Agriculture Department seeks to promote a technically sound, economically viable, environmentally non- degrading and socially acceptable Sustainable Agriculture Development in the state using the natural resources: land, water and genetic endowment. Keeping these in view the department has made a major shift in its policy of subsistence level to a commercial oriented production programme involving the whole farming community in all the commercially potential arrears of the state.

2. Schemes/Programme:

2.1. Integrated Cereal Development Programme (ICDP):

This is a national programme with major objective to increase the production of cereal crop (Rice and Wheat) by introducing high yielding and improved local cultivars.

2.2 Balanced and Integrated Use of Fertilizers:

This is an ongoing centrally sponsored scheme under macro management mode. Under this scheme various components viz. green manuring, compost making, training and demonstration and trails in farmer's field are implemented. The main emphasis under this programme is to encourage farmers to use organic manures along with chemical fertilizers in crop production.

2.3. Integrated Pest Management (IPM):

This programme is in progress and effectively implemented in the district. Under plant protection scheme, IPM is one of the most important components and forms the main plank, where various field activities are taken up with the farming community. IPM advocates the minimum use of chemicals, promotes indigenous healthy farming practices which is in tune with the concept on organic farming for a healthy crop production and a sound economy.

2.4. Seed Production Programme:

The infrastructure requirement for the state seed farm viz. Merapani, Tizit and Yisemyong have been strengthened and equipped to some extent for undertaking seed production programme during the 10th plan.

2.5 Sustainable Development Of Sugarcane Based Cropping System Areas (SUBACS):

To improve the economy and living standard of small and marginal cane growers in the state, the following incentive components such as procurement of high quality setts for multiplication/planting, sugarcane crushers and also incentives to farmers by providing animal/power operated implements including boring of tube/production wells to meet growers demand is proposed. A part from this imparting trainings/demonstration and farmers exposure visit to farms, research station, institutions of the district will also be taken up.

2.6. Indigenous Fallow Management System:

This is a new initiative taken up during the 10th plan. Pressure on land because of population has increase and the Jhum cycle has reduced to 5-7 years in which soil fertility gained is not enough for sustainable production. Incorporation of multipurpose tree species will enhance the productivity by way of adding more bio mass and natural di- nitrogen fixation into the soil. Hence, in view of sustainable land use system, proper "Fallow Management" becomes important for upland agro-ecosystems.

2.7. Maize Development Programme:

Maize is second largest crop in the state in respect of area and production. Out of total area, 80% of area is under local maize and 20% is under high yielding and hybrid maize cultivation.

2.8. Farm Mechanization:

Agriculture operations in the state are still labour intensive with traditional process holding away over modern methods of farming. With practically no industrial or manufacturing activity agriculture constitute the mainstay of the states economy involving about 70% of the population.

2.9. National Watershed Development Projects for Rainfed Areas (NWDPRA):

During XI th five year plan, 120 micro-watershed projects are taken up covering 51 blocks and 157 villages in the state. The total area targeted for entire projects period (5 years) for treatment is 60,000 ha out of which an area of 23,695 ha including notional area of 15,475 ha could be treated as on 31st March 2009.

2.10. Oil Seeds Development Programme:

The main objective of this programme is to increase the production of oilseed and to meet its requirement in the state. Earlier the programme was taken under NOVOD Board but as per the direction of the Government of India, the programme has been taken up under Macro management of Agriculture since 2004-05.

2.11. Pulse Development Programme:

The objective of the programme is to popularize the non-traditional Pulse crop for increasing foodgrain production. The programme was implemented under the centrally sponsored Scheme (CSS) TMOP &M. The programme is included under Management from 2004-05.

2.12. Development of Agriculture Marketing

Nagaland now produces various crops on commercial scale which are now available as marketable surplus produces. Crops identified for commercial production are:

i) Spices like Ginger, Turmeric, Chillies (Raja chilly), Large cardamom etc.

ii) Pulses like kholar (Local Rajma)

iii) Cereals like maize, sticky rice and brown rice

iv) Fruits like citrus, pine apple, passion fruits, Banana, Jack fruits etc.

v) Vegetables like cabbage, tomato, pumpkin, Gourd, Colocasia, Chow-chow

vi) Oil seeds like mustard oil, Lentil etc.

vii) Others like potato, tapioca, medicinal herbs and plants.

3. Agricultural statistics crops, area, production, productivity etc.

Table 1. Principal crops, area, production and productivity during 2006-07 of district Phek

Sl.No	Principal Crops	Area(in ha)	Production tones(MT)	Productivity (Kg/ha)
A.	**Cereals :**			
1	Jhum Paddy	7940	13420	1690.00
2	TRC Paddy	13050	21200	1624.00
3	Maize	9550	15990	1674.00
4	Wheat	150	130	866.00
5	Small Millet	3260	2280	699.00
6	Jowar	120	90	750.00
	Total Cereals :	**34070**	**53110**	**1558.84**
B.	**Pulses:**			
1	Arahar	520	610	1173.00
2	Nagadal	470	570	1212.00
3	Kholar	110	140	1272.00
4	Black Gram	40	50	1250.00
5	Moong	90	110	1222.00
6	Gram	70	90	1285.00
7	Pea	1220	1470	1204.00
8	lentil	390	470	1205.00
9.	Beans	220	280	1272.00
10.	Other rabi pulses	640	780	1218.00

11.		Other kharif	370	460	1243.00
		Total Pulses :	**4140**	**5030**	**1214.97**
C.	**Oilseeds :**				
	1	Soybean	2120	2560	1207.54
	2	Sesamum	640	420	656.25
	3	Groundnut	160	170	1062.50
	4	Mustard	2030	1440	709.35
	5	Sunflower	250	170	680.00
	6	Linseed	950	600	631.57
		Total Oilseeds	**6150**	**5360**	**871.54**
D.	**Commercial crops:**				
	1	Potato	460	4090	8891.30
	2	Ginger	440	3930	8931.81
	3	Cotton	20	10	500.00
	4	Tea	60	40	666.66
	5	Large Cardamom	160	260	1625.00
		Total	**1140**	**8330**	**7350.87**

Source: State Agriculture Department, Nagaland

Horticulture in Phek

Fruits and vegetable are the chief source of essential minerals and vitamins in human diet. Horticultural crops occupy nearly 2337 ha area in Phek district. Geographical conditions of the district are well suited for the production of horticultural crops and they can be grown as cash crops. The major fruit crops of the district is orange, passion fruit, kiwi, guava, lemon, papaya and banana etc., however potato, cabbage, tomato, tapioca, colacassia, leafy vegetable etc. are the main vegetable crops of the district.

1. Horticulture Potential of the district

Geographical and climatic condition of the Phek well suits for the production of the horticultural crops. These crops have good market potential, but due to their perishable nature they can not be kept for longer time. Cold storage, transportation, cool chain facialities are the basic need to develop the horticulture in the district.

Kiwi

Peach

Passion fruit

Pea

Cabbage

Chow-chow

2. Area, production and productivity of horticulture crops (2006-07)

Table 1. Area, Production and Productivity of Fruits in Phek

SI No	Fruits	Area(ha)	Production(MT)	Productivity (Kg/ha)
1.	Apple	30	10	333.33
2.	Pear	30	55	1833.33
3.	Plum	26	40	1538.46
4.	Peach	40	18	450.00
5.	Orange	327	160	489.29
6.	Lemon	51	--	--
7.	Papaya	100	120	1200.00
8.	Banana	128	500	3906.25
9.	Guava	40	290	7250.00
10.	Mango	40	20	500.00
11.	Pineapple	150	350	2333.33
12.	Passion fruit	50	10	200.00

Table 2. Area, Production and Productivity of in Vegetables Phek

SI No	Vegetable	Area(ha)	Production(MT)	Productivity Kg/ha)
1.	Cabbage	20	41	2050
2.	Cauliflower	10	15	1500
3.	Brinjal	10	15	1500
4.	Chillies	110	180	1720

5.	Pea	10	70	7000
6.	Beans	50	65	1300
7.	Tomato	60	70	1167
8.	Ginger	260	600	2310
9.	Garlic	20	28	1400
10.	Colocassia	180	1000	5555
11.	Tapioca	100	1000	10000
12.	Chowchow	105	1040	9980
13.	Turmeric	10	60	6000
14.	Tree Tomato	20	158	7900
15.	Leafy vegetable	300	200	667
16.	Others	60	600	1000

Source: Statistical hand book of Nagaland, 2007

Livestock and Fisheries in Phek

Animal husbandry plays a vital role in socio-economic life of Phek district people and they rear domestic animals – pig, poultry, cattle, buffalo, goat etc. They also keep Mithun in semi-wild condition. Majority people of the district are non vegetarian and hence having high demand of meat and egg. Due to low production performance of the local animals with traditional rearing practices, production performance of livestock in the district is not up to the mark to fulfill the meat, egg and milk demand of the district. Hence, this sector has great prospect and potentiality for development in the district.

Mithun grazing

Pig rearing in local housing system

Dog rearing for meat purpose

Duck rearing in Khomi village

Rearing of local birds in backyard system

Local broody hen

1. Distribution of circle-wise livestock population in Phek district

Table 1. Block/Circle-wise of Cross-bred Cattle population of Phek district (17th Quinquennial Livestock Census, 2003)

S.N	DISTRICT: PHEK NAME OF BLOCK/CIRCLE	No. of households covered	CROSS – BRED CATTLE														
			MALE							FEMALE							Total Cross-bred
			Under 1 year	1 to 1½ years	Over 2 ½ years				Total Cross-Bred Male	Under 1 year	1 to 1½ years	Over 2 ½ years				Total Cross-Bred Female	
					Used for breeding only	Used for work only	Used for both work & breeding	Used for neither breeding work				In milk	Dry	Not Yet calved	Others		
1.	Sekrezu	1784	88	100	52	2	10	22	274	80	98	86	60	61		385	659
2.	Phek	4507	7	8	1			2	18	33	24	48	7	16		128	146
3.	Zuketsa	77	-	-													

4.	Phokhungri	597	32	29	33	24	52	3	173	51	22	71	16	50		210	383
5.	Meluri	1825	19	18	26	10	46	1	120	39	26	72	17	29	9	192	312
6.	Chizami	2420	25	16	13				54	27	17	52	43	33		172	226
7.	Sakraba	1739	3		1				4	5	1	11	1	7		25	29
8.	Chazouba	1925	33	37	25		5	6	106	15	22	46	22	27	19	151	257
9.	Chetheba	1568	125	153	303		24		605	86	118	400	115	82	7	808	1413
10.	Khezakeno	702	64	185	16	26	73	2	366	54	86	113	79	75	2	409	775
11.	Pfutsero	4495	54	28	24		3		109	45	76	128	27	29	4	309	418
	Phek Total	**21639**	**450**	**574**	**494**	62	**213**	**36**	**1829**	**435**	**490**	**1207**	**387**	**409**	**41**	**2789**	**4618**
	Urban	2054	14	14	104				132	14	18	38	5	4		79	211
	Rural	19585	436	560	390	62	213	36	1697	421	472	989	382	405	41	2710	4407

Table 2. Block/Circle-wise of Indigenous Cattle population of Phek district (17th Quinquennial Livestock Census, 2003)

S.N	DISTRICT: PHEK NAME OF BLOCK/CIRCLE	No. of households covered	Indigenous CATTLE														
			MALE							FEMALE							Total Indigenous cattle
			Under 1 year	1 to 3 years	Over 3 years				Total Indigenous male	Under 1 year	1 to 3 years	Over3 years				Total Indigenous Female	
					Used for breeding only	Used for work only	Used for both work & breeding	Used for neither breeding work				In milk	Dry	Not Yet calved	Others		
1.	Sekrezu	1784	101	184	-	-	-	52	337	34	46	1	1	1	-	83	420
2.	Phek	4507	43	216	40	9	15	4	327	54	77	119	15	49	3	317	644
3.	Zuketsa	77	1	36		40	6	-	83	21	15	17	17	-	-	70	153
4.	Phokhungri	597	9	142	19	20	17	3	210	24	7	30	8	19	-	88	298
5.	Meluri	1825	165	148	75	100	16	16	520	63	132	99	57	13	23	387	907

6.	Chizami	2420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.	Sakraba	1739	4	219	16	-	-	-	239	3	17	12	47	40	-	119	358
8.	Chazouba	1925	124	224	166	14	17	49	594	137	62	279	58	71	2	609	1203
9.	Chetheba	1568	267	292	496	-	20	-	1075	168	198	620	190	215	12	1403	2478
10.	Khezakeno	702	40	102	-	4	75	13	234	29	127	62	126	89	-	433	667
11.	Pfutsero	4495	81	245	96	223	244	**72**	961	127	208	256	73	204	2	870	1831
	Phek Total	**21639**	**835**	**1808**	**908**	410	**410**	209	**4580**	**660**	**889**	**1495**	**592**	**701**	**42**	**4379**	**8959**
	Urban	2054	3	1	2		-	-	6	1	-	6	1	1	-	9	15
	Rural	19585	832	1807	906	410	410	209	4574	659	889	1489	591	700	42	4370	8944

Table 3. Block/Circle-wise of Buffaloes population of Phek district (17th Quinquennial Livestock Census, 2003)

S.N	DISTRICT: PHEK NAME OF BLOCK/CIRCLE	No. of households covered	BUFFALOES														
			MALE							FEMALE							Total Buffa-loes
			Under 1 year	1 to 3 years	Over 3 years				Total Male Buffa-loes	Under 1 year	1 to 3 years	Over 2 ½ years				Total Female Buffaloes	
					Used for breeding only	Used for work only	Used for both work & breeding	Used for neither breeding work				In milk	Dry	Not Yet calved	Others		
1.	Sekrezu	1784	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.	Phek	4507	-	1	3	2	5	-	11	-	-	-	-	-	51	51	62
3.	Zuketsa	77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.	Phokhungri	597	-	-	-	19	38	136	193	-	3	-	35	24	-	62	255
5.	Meluri	1825	34	149	61	81	57	306	688	21	88	32	157	13	12	323	1011

6.	Chizami	2420	-	4	-	-	-	-	4	-	4	5	11	-	-	20	24
7.	Sakraba	1739	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8.	Chazouba	1925	-	1	-	10	4	-	15	1	-	1	-	-	-	2	17
9.	Chetheba	1568	45	73	54	51	81	-	304	42	53	120	80	83	46	424	728
10.	Khezakeno	702	4	90	-	89	45	-	228	2	63	4	30	12	50	161	389
11.	Pfutsero	4495	57	38	11	22	135	-	263	84	45	202	6	18	-	355	618
12.	**Phek Total**	**21639**	**140**	**356**	**129**	**274**	**365**	**442**	**1706**	**150**	**256**	**364**	**319**	**150**	**159**	**1398**	**3104**
	Urban	2054	24	7	5	4	48	-	88	27	14	63	1	2	-	107	195
	Rural	19585	116	349	124	270	317	442	1618	123	242	301	318	148	159	1291	2909

Table 4. Block/Circle-wise of Pig population of Phek district (17th Quinquennial Livestock Census, 2003)

S.N	DISTRICT: PHEK NAME OF BLOCK/CIRCLE	NO. OF HOUSEHO-LDS COVERED	PIG														
			CROSS-BRED / EXOTIC							INDIGENOUS / LOCAL							Total Pig
			MALE			FEMALE			Cross-Bred Total	MALE			FEMALE			Indige-nous Total	
			Below 6 months	6 Months & above	Total	Below 6 months	6 Months & above	Total		Below 6 months	6 Months & above	Total	Below 6 months	6 Months & above	Total		
1.	Sekrezu	1784	888	635	1523	660	441	1101	2624	286	155	441	332	170	502	943	3567
2.	Phek	4507	1972	2272	4244	1225	792	2017	6261	8129	1715	9844	375	952	2327	12171	18432
3.	Zuketsa	77	36	121	157	33	28	61	218	844	601	1445	687	449	1136	2581	2799
4.	Phokhungri	597	570	453	1023	674	397	1071	2094	353	388	741	394	318	712	1453	3547
5.	Meluri	1825	1272	1172	2444	1139	377	1516	3960	1477	1764	3241	1126	961	2187	5428	9388
6.	Chizami	2420	-	1345	1345	10	47	57	1042	-	-	-	-	-	-	-	1402
7.	Sakraba	1739	186	826	1012	58	84	142	1154	59	42	101	52	59	111	212	1366

8.	Chazouba	1925	426	1204	1630	383	326	709	2339	400	836	1236	395	306	701	1937	4276
9.	Chetheba	1568	902	514	1416	846	540	1386	2802	1292	744	2036	1239	583	1822	3858	6660
10.	Khezakeno	702	344	500	844	171	219	390	1234	44	13	57	13	20	33	90	1384
11.	Pfutsero	4495	966	1480	2446	1186	1092	2274	4724	769	918	1687	946	1143	2089	3776	8500
12.	**Phek Total**	**21639**	**7562**	**10522**	**18084**	**6385**	**4343**	**10728**	**28812**	**13653**	**7176**	**20829**	**6659**	**4961**	**11620**	**32449**	**616261**
	Urban	2054	143	244	387	89	48	137	524	-	-	-	-	-	-	-	524
	Rural	19585	7419	10278	17697	6296	4295	10591	28288	13653	7176	20829	6659	4961	11620	32449	60737

Table 5. Block/Circle-wise of Fowls population of Phek district (17th Quinquennial Livestock Census, 2003)

S.N	DISTRICT: PHEK NAME OF BLOCK/CIRCLE	NO. OF HOUSEHO-LDS COVERED	FOWLS											
			Cocks			Hens			Chickens (Below 5 months)					Total Fowls
			Desi	Improved	Total	Desi	Improved	Total	Desi		Improved		Total	
									For Eggs	For Meat	For Eggs	For Meat		
1.	Sekrezu	1784	1221	2086	3307	1542	3545	5087	120	3426	61	2490	6097	14491
2.	Phek	4507	17980	1848	19828	21730	3606	25336	16838	31816	2545	1802	53001	98165
3.	Zuketsa	77	2686	137	2823	3925	227	4152	4703	11129	-	-	15832	22807
4.	Phokhungri	597	931	2380	3311	751	2374	3125	1008	1314	2160	4119	8601	15037
5.	Meluri	1825	7943	505	8448	7935	473	8408	3946	24429	451	1787	30613	47469
6.	Chizami	2420	-	2340	2340	-	3501	3501	-	-	-	24418	24418	30259
7.	Sakraba	1739	5067	223	5290	6135	268	6403	150	8707	450	1976	11283	22976
8.	Chazouba	1925	3898	71	3969	2953	106	3059	10451	8904	258	303	19916	26944
9.	Chetheba	1568	1780	2463	4243	1922	2920	4842	4261	4319	7519	7456	23555	32640
10.	Khezakeno	702	2345	374	2719	4645	488	5133	514	5517	46	5093	11170	19022

11.	Pfutsero	4495	1730	2343	4073	2975	4000	6975	2816	1822	1630	8587	14855	25903
12.	**Phek Total**	**21639**	**45581**	**14770**	**60351**	**54513**	**21508**	**76021**	**44807**	**101383**	**15120**	**58031**	**219341**	**355713**
	Urban	2054	6057	2278	8335	6061	3864	9925	5219	11213	2083	4899	23414	41674
	Rural	19585	39524	12492	52016	48452	17644	660196	39588	90170	13037	53132	195927	314039

Table 6. Block/Circle-wise of Goat and Rabbit population of Phek district (17th Quinquennial Livestock Census, 2003)

S.N	DISTRICT: PHEK NAME OF BLOCK/CIRCLE	NO. OF HOUSEHO-LDS COVERED	GOAT								RABBIT						
			Male			Female				Total Goat	Angora			Other breeds			Total Rabbit
			Under 1 year	1 year & over	Total	Under 1 year	1 year & over		Total		Male	Female	Total	Male	Female	Total	
							In Milk	In Dry									
1.	Sekrezu	1784	54	37	91	65	38	19	122	213	-	-	-	18	19	37	37
2.	Phek	4507	79	67	146	78	64	76	218	364	13	19	32	1296	2095	3391	3423
3.	Zuketsa	77	141	94	235	227	118	108	453	688	-	-	-	31	47	78	78
4.	Phokhungri	597	230	354	584	264	265	154	683	1267	-	-	-	-	-	-	-
5.	Meluri	1825	306	422	728	300	249	249	798	1526	-	18	18	245	256	501	519
6.	Chizami	2420	3	4	7	2	3	4	9	16	5	10	15	8	6	14	29
7.	Sakraba	1739	27	28	55	79	24	44	147	202	2	4	6	-	-	-	6
8.	Chazouba	1925	95	91	186	55	116	50	221	407	114	153	267	92	141	233	500
9.	Chetheba	1568	241	378	619	330	347	260	937	1556	340	790	1130	84	86	170	1300
10.	Khezakeno	702	9	22	31	7	12	17	36	67	-	-	-	11	14	25	25

11.	Pfutsero	4495	21	23	44	10	12	2	24	68	13	12	25	-	-	-	25
12.	**Phek Total**	**21639**	**1206**	**1520**	**2726**	**1417**	**1248**	**983**	**3648**	**6374**	**487**	**1006**	**1493**	**1785**	**2664**	**4449**	**5942**
	Urban	2054	-	4	4	-	6	-	6	10	-	-	-	-	-	-	-
	Rural	19585	1206	1516	2722	1417	1242	983	3642	6364	487	1006	1493	1785	2664	4449	5942

Table 7. Block/Circle-wise of Duck population of Phek district (17th Quinquennial Livestock Census, 2003)

S.N	DISTRICT: PHEK NAME OF BLOCK/CIRCLE	NO. OF HOUSEHO-LDS COVERED	DUCK									
			Ducks			Drakes			Duckling below 6 months			Total Ducks
			Desi	Improved	Total	Desi	Improved	Total	Desi	Improved	Total	
1.	Sekrezu	1784	65	126	191	37	908	945	76	-	76	1212
2.	Phek	4507	1024	159	1183	321	176	497	183	130	313	1993
3.	Zuketsa	77	827	4	831	107	-	107	386	-	386	1324
4.	Phokhungri	597	126	328	454	143	425	568	325	881	1206	2228
5.	Meluri	1825	342	868	1210	351	167	518	990	328	1318	3046
6.	Chizami	2420	-	-	-	-	55	55	-	103	103	158
7.	Sakraba	1739	1103	-	1103	-	-	-	-	-	-	1103
8.	Chazouba	1925	116	9	125	183	-	183	924	24	948	1256
9.	Chetheba	1568	98	316	414	114	325	439	172	468	640	1493
10.	Khezakeno	702	150	13	163	67	10	75	-	-	-	240

11.	Pfutsero	4495	24	28	52	21	22	43	98	72	170	265
12.	**Phek Total**	**21639**	**3875**	**1851**	**5726**	**1344**	**2088**	**3432**	**3154**	**2006**	**5160**	**14318**
	Urban	2054	50	82	132	165	187	352	330	650	980	1464
	Rural	19585	3825	1769	5594	1179	1901	3080	2824	1656	4180	12854

Table 8. Block/Circle-wise of Sheep population of Phek district (17th Quinquennial Livestock Census, 2003)

S.N	DISTRICT: PHEK NAME OF BLOCK/CIRCLE	NO. OF HOUSEHO-LDS COVERED	SHEEP														
			CROSS-BRED							INDIGENOUS							Total Sheep
			MALE			FEMALE			Total Cross-Bred sheep	MALE			FEMALE			Total Indige-nous sheep	
			Upto 3 years	Over 3 years	Total	Upto 3 years	Over 3 years	Total		Upto 3 years	Over 3 years	Total	Upto 3 years	Over 3 years	Total		
1.	Sekrezu	1784	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Nil
2.	Phek	4507	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Nil
3.	Zuketsa	77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Nil
4.	Phokhungri	597	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Nil
5.	Meluri	1825	31	5	36	2	3	5	41	-	-	-	-	-	-	-	Nil
6.	Chizami	2420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Nil
7.	Sakraba	1739	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Nil
8.	Chazouba	1925	33	-	33	-	-	-	33	-	-	-	-	-	-	-	Nil
9.	Chetheba	1568	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Nil

10.	Khezakeno	702	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Nil
11.	Pfutsero	4495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Nil
12.	**Phek Total**	**21639**	64	5	69	2	3	5	74	-	-	-	-	-	-	-	74
	Urban	2054	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Nil
	Rural	19585	64	5	69	2	3	5	74	-	-	-	-	-	-	-	74

Table 9. Block/Circle-wise of Mithun population of Phek district (17th Quinquennial Livestock Census, 2003)

S.N	DISTRICT: PHEK NAME OF BLOCK/CIRCLE	NO. OF HOUSEHO-LDS COVERED	Mithun			
			Upto 3 years		Over 3 year	
			Male	Female	Male	Female
1.	Sekrezu	1784	18	21	16	18
2.	Phek	4507	59	58	43	44
3.	Zuketsa	77	-	-	-	-
4.	Phokhungri	597	95	66	130	81
5.	Meluri	1825	253	202	264	447
6.	Chizami	2420	94	106	222	249
7.	Sakraba	1739	230	138	173	161
8.	Chazouba	1925	160	58	291	345
9.	Chetheba	1568	72	24	162	48
10.	Khezakeno	702	-	2	1	2
11.	Pfutsero	4495	12	4	28	19
12.	**Phek Total**	**21639**	**993**	**679**	**1330**	**1414**
	Urban	2054	-	-	-	-
	Rural	19585	993	679	1330	1414

Table 10. Total Production of milk, meat and eggs in Phek district production and short fall

Product	Projected requirement	Current production	Short fall
Meat (Tonnes)	9962.602	3440.000	6522.602
Milk (Tonnes)	11495.310	3974.000	7521.310
Egg (nos)	191588050	131340040	60248010

(Reference:Report on Integrated sample survey,2007-08. Deptt. Of Vety. & A.H, Govt. of Nagaland)

2. Carcass Yield of meat animals

On an average, slaughter of livestock and poultry in Phek district has been recorded to be 700-800 kg/day for beef, 800-900 kg/day of pork and 100-200 kg/day for chicken and duck account for 50-60 kg/day. The people of the district prefer pork more than any other animal products. However, unhygienic slaughter of pigs is a common practice in the district. The average slaughter age of different livestock and poultry is mentioned below-

Table 11. Carcass yield of meat animal

Species	Avg. Slaughter age (months)	Avg. live weight (Kg)	Avg. Carcass Wt (kg)
Cattle (Indigenous)	24 - 36 months	150-200 kg	150 kg
Pig	12-18 months	100-150 kg	120 kg
Chicken	30-45 days	1.5 – 2 kg	1.5 kg
Goat	12 – 18 months	20-30 kg	25 kg
Duck	2 – 3 months	2-3 kg	2 kg

(Source: Estimation of major livestock products, District. Veterinary & A. H office, 2008)

3. Milk yield

In Phek district few farmers' rear cattle for milk purpose. Average milk production has been recorded to be 7-8 lit/day. Apart from milch cattle, majority of the cattle population in the district are of indigenous non-descript type. Some farmers also kept the indigenous breed for milk purpose. Most of the indigenous cattle are reared in primitive traditional ways of free-range system of management. The female animals are usually kept to produce off springs.

Table 12. Milk yield

Type of Animal	Milk Yield (liters/day)
Jersey cattle	6-7 liters/day
Holstein Friesian cattle	7-8 liters/day
Indigenous cattle	0.5 - 0.7 litre/day

4. Cattle Production System

There is no recognized breed of cattle in the district. The crossbred animals are generally imported from other states. The local cows of Phek district are poor in milk production and mainly reared for beef. There is also high demand for beef in the district, but the production is not sufficient to meet out the total requirement. The indigenous cattle rearing system in Phek district is mostly open grazing system, where the cattle are kept loose in the open fields, road side, reserve forests and river banks for grazing. They are brought back home in the evening and tied in locally made cattle shed.

For most of the crossbred cattle reared for milk purpose, the farmers built cow shed of low input by using locally available material roofed with CGI sheets. Majority of the farmers prefer to feed their cattle by their own feed composition. The common feed ingredients that are fed to the cows are wheat bran, broken rice and mustard oil cake. Some farmers mix vegetable along with the feed ingredients and fed two times a day. Apart from the feed ingredients green grasses and forages are provided daily. Paddy straw is used as dry roughages and is provided to the cattle *ad lib*.


Thotho cattle

5. Mithun Production System

Mithun the pride animal of north-eastern states are reared in jungles under very low input system. Since they are not taken care properly so the productivity of this animal is not upto its potential. Small interventions like shades in jungle, plantation of fodder trees, mineral supplementation and health care will boost the productivity of this animal.

6. Goat production system

Very few households rear goats in their backyard in the district. They are reared mainly for meat purpose. Only non-descript goat is found in the district. Goat farming is not so popular in the district compared to other livestock and poultry. The goats are reared in open grazing system, with least attention towards their feeding, housing, disease control and other managemental aspect. Local goats give at least two kidding per year. Though they are small in size, the better fecundity characteristics can be considered to exploit this animal by the farmers for better economic return.

7. Pig production system

Pig rearing is traditional and very common among the farmers which play a very important role in livelihood security of the farmers, even the urban households rear 1-2 pigs in their house. Majority of the pigs reared in Phek district are non-descript .Pig feeds are mainly the byproducts of paddy, maize, vegetables and gathered forages. The major constraint in piggery development is the lack of adequate quality breeding stock, non availability of quality piglets, feed ingredients, technical knowledge etc.

Piglets in local housing system

8. Poultry Production system

The consumption of poultry meat and egg is considerably high among the meat consumers in Phek district. Almost all the farm families in the district rear poultry birds mostly *desi* birds under backyard system. However, performance of these *desi* birds has been found to be lower which could be improved by popularization of improved breeds suitable for backyard farming like Vanaraja, Giriraja Grampriya etc.

Local birds in backyard system

9. Marketing of livestock, poultry and their products in Phek district

There is no organized system of marketing of livestock and poultry in the district, price also varies from place to place and time to time. Livestock and poultry are transported with less care and with inhumane manner. Quite often in case of cattle transportation is on foot where they are led to walk hundreds of kilometers to reach their destination. Though, meat consumption is high in this district; the animals are not slaughtered in hygienic manner. The meat markets have inadequate infrastructure facilities where meats are sold in open air. The traders don't have knowledge on food safety standards.

Table 13. Prices of meat as on Nov. 2008 in Phek district

S.N	Item	Market Rate (Rs.)/kg
1.	Beef	Rs. 70
2.	Pork	Rs. 110
3.	Broiler chicken	Rs. 110
4.	Indigenous chicken (*Desi*)	Rs. 120
5.	Chevon	Rs. 150

(Source: Field survey)

Table 14. Constraints, Strategies, technological intervention and action plan of different livestock production system

Production system	Constraints	Strategies	Technological intervention & Action plan
Cattle	Low cattle population because of poor liking for milk	Creating awareness about value of milk and milk products	To carry out extensive training and awareness programme on nutritional value of milk and importance of milk consumption.
	Non-descript breeds with poor production performance	Introduction of improved breeds and up gradation through artificial	To impart training and field level demonstration programme
		Immunization	
	Epidemics of FMD		Vaccination programme is to be carried out regularly
Pigs	Poor performance of local pigs	Lack of outstanding breeds	Introduction of quality germplasm and up gradation of local pigs with high performance breeds
	Improper housing and feeding	Proper housing and feeding management	Documentation on housing and feeding
	High frequency of occurrence of disease	Health coverage	To acquaint farmers with health coverage measures through training and demonstration.
Poultry	Zero or negligible feeding	To follow proper feeding schedule	At least 40-50gms grains/grain by-products/bird/day for backyard rearing
	High epidemics of RD	Immunization programme	Adaptation of vaccination programme
	Low production performance of	Introduction of quality germplasm	Popularization of high performance quality birds

	existing birds		
Mithun	High epidemics of FMD	Immunization	Adaptation of preventive measures through vaccination
	Compensation of mineral deficiency in high hill fodders by providing common salt only	Mineral feeding	Supplementation of compounded mineral mixture along with salt
	Parasitic infestation in young calves		
	Shortage of fodder during off season		To follow deworming schedule
		Anthelmintic medication	
		Plantation of identified fodder trees	Plantation of fodder crops/trees
Rabbitry	Very few nos. of rabbit farmers	To popularize backyard rabbitry	Extensive training and demonstration to explore as conventional meat species.

10. Fisheries in Phek District

In Phek very less numbers of farmers involve in pure fish farming. Paddy cum fish culture is the common fish farming scenario of the district. Fish plays an important role in supplementing the nutritional requirement, but the fish production of the district is less compared to requirement. Therefore, fish farmers should be encouraged to practice more fish farming through awareness programmes like conducting trainings, scientific demonstration etc.

10.1 Potentials of the district – rivers, lakes, dams, ponds, paddy cum fish and other resources

Paddy cum fish is the common and familiar picture of fish farming in the district. Though the district has great potentiality to utilize its water bodies for fish farming, but there are many hindrances which should be mitigated to uplift fish farming like regular supply and availability of fingerlings, impart skillness to the farmers, establishment of fingerling production centre etc.

Table 26. Current area under fisheries, production and productivity block wise

S.N	Phek District Block/Circle	Total no. of villages covered	Total no. of farmers/ beneficiaries	Total no. of water area (hectare)	Total production kg/year in Phek district	Total state production

1	NA	NA	64	80 nos.of pond	804 MT	4900 MT

(Source: Statistical Handbook of Nagaland 2007)

Paddy cum fish culture

Fish pond

Forest and forest Produces in Phek

Out of 202600 hectares of total land area of Phek District, forests occupy an area of approximately 56593.36 ha. Forests continue to acquire increasing importance for their role in meeting the human material needs and also for their ecological and environmental services. Therefore, sustainable use of forest resources with strong conservation approaches is the key elements for current forestry management practices.

The Forestry Sector has been one of the main source of providing livelihood and revenue, however, of late, the forest has been badly affected by several factors namely, rapid increase in population, insufficient infrastructure, diversion of forest area for developmental activities, inadequate public awareness about the forest functions and its administrations, etc.

1. Forest types in phek, Nagaland:

1.1. *Northern sub-tropical pine forest (9/C2):* These types of forest are found in hills with elevation of 1000m to 1500m in parts of Phek and Tuensang district. Pine is the dominant species and is found mixed with QUERCUS, Schima, Prunus, Betula and Rhododendron.

1.2. *Northern Mountain Wet –Temperate Forest (11B):* These types of forest are found on the higher reaches of the tallest mountains (above 2500m) like Saramati and Dzukou area. The species that dominate are Rhododendron, Oaks, Birch and Juniperus sp.

1.3. *Alpine Forest (15):* Alpine vegetation is found at high altitude in ridges of Saramati range, which remains covered with snow for major part of the year from October to April. Species of Rhododendron, Albies, and Juniperus are found in sub alpine area.8.1 Types of forest

2. Protected forest:

3. Forest cover in Phek district (in sq km) in 2003:

District	Geographical	Forest Cover	%	Change	Scrub

Division	Name of The Protected forest	Area(ha)
Phek	Shilloi	8857.80
	Sangtam-Kuki	8401.97
	Athumza	1472.00
	Chipoketami	2000.00
	Total	**20731.77**

	area of forest	Very dense	Moderately dense	Open	Total			
Phek	2026	65	835	786	1686	83.22	30	1

4. Management Of Forests:

In Nagaland, due to the peculiar patter of land ownership, the land is owned either by the village community as a whole or by a clan within the village or by an individuals. There are no records for conferring such ownership rights, but the individuals right are exclusively determined by tradition which is also referred to as "customary laws". The forest departments owns certain category of areas classified as Reserved forest, Protected forests, Wildlife sanctuaries, National Parks and Botanical gardens.

5. Joint Forest Management:

In Nagaland around 83.3% of forests are owned by the villagers and Government has no control over the felling of trees in the areas. Therefore, in order to achieve the objectives of the Afforestation Programme in consonance with the National Forest policy, the Government has accepted the Joint Forest Management (JFM) with the landowners where the Government shall bear the financial burden of creation and technical management with the active participation of the land owning communities who shall be responsible for the protection of the plantation so created and the Government shall collect Royalty value at the current rate as its share.

6. National Forest Policy, 1988:

Objectives:

- Maintenance of environment stability through preservation and, where necessary restoration of the ecological balances that has been adversely disturbed by the serious depletion of the forests of the country.
- Conserving the natural heritage of the country by preserving the remaining natural forest with the vast variety of flora and fauna, which represent the remarkable biological diversity and genetic resource of the country.
- Checking soil erosion and denudation in the catchment areas of rivers, lakes reservoirs in the interest of soil and water conservation, for mitigating floods and droughts and for the retardation of siltation of reservoirs.
- Checking the extension of sand dunes in the deserts areas of Rajasthan and along the coastal tracts.
- Increasing substantially the forest/tree cover in the country through massive afforestation and social forestry programmes, especially on all denuded, degraded and unproductive lands.
- Meeting the requirement of fuel-wood, fodder, minor forest produce and small timber of rural and tribal populations.
- Increasing the productivity of forests to meet essential national needs.
- Encouraging efficient utilization of forest produce and maximizing substitution of wood.
- Creating a massive peoples movement with the involvement of women, for achieving these objectives and to minimize pressure on existing forests.

7. Programmes and Schemes Being Implemented in State:

7.1. National Affoestation Programme (NAP):

National Aforestation Programme has been formulated by merger of 4 9^{th} plan Centrally sponsored Afforestation Schemes of the ministry of Environment and forests, namely Integrated Afforestation and Eco- Development Projects Scheme (IAEPS), Area oriented Fuel wood and Fodder Projects Scheme (AOFFPS), Conservation and Development of Non- Timber Forest Produce including Medicinal Plants Scheme (NTFP) and Association of Scheduled Tribes and rural Poor in Regeneration of Degraded Forests (ASTRP).

Objectives:

- Effective utilization of Jhumland
- Ensure supply of fuel wood and small timber
- Checking of land erosion through soil conservation measures.
- Generation of income and employment.
- Development of common property recourses.
- Conservation and promotion of non timber forest produces
- Improve quality of life for the forest dependent community
- Capacity building
- Use of improve technologies.

7.2. National Air Quality Monitoring Programme (NAMP):

Under this programme, 2 nos of air stations are maintained by the NPCB at Dimapur.

7.3. Natioal Water Quality Monitoring Programme (NWMP):

A total of 8 nos. of stations has been established under this programme. The rivers are monitored on a quarterly basis and the results are forwarded to the EDB.

7.5. National Green Corps (NGC):

The NGC programme is aimed at spreading environmental awareness by setting up Eco-clubs amongst school children and involving them in environmental related activities.

7.6. NEC Sponsored Schemes:

1. Eco- Tourism and
2. Community Biodiversity

7.7. Centrally Sponsored Scheme:

1. Community biodiversity conservation project
2. Bamboo project
3. Project Elephant
4. Eco- tourism
5. Integrated Forest Development Project (IFPS)
6. Development of National parks and Sanctuaries

7.8. Forest tree species of Nagaland:

Special class:

Scientific Name	Common Name	Rate
1. *Tectona granfdis*	Teak	Rs.1483/cubic meter

Class A-I (Constructional and Decorative timber)

Scientific Name	Common Name	Rate
1. Michelia champaca	Tita sopa	Rs. 678/cubic meter
2.Morus lavaegata	Bhola	

3.Gmelina arborea	Gamari
4.Phoebe goalparensis	Bonsum
5. Mansonia dipika	Badam
6. Delbergia sissoo	Sissoo
7. Shorea robusta	Sal
8. Termininalia myriocarpa	Hollock

Class A-1 (Plywood Timber)

Scientific Name	Common Name	Rate
1.Dipterocarpus macrocarpus	Hollong	Rs. 678/cubic meter
2.Juglans regia	Walnut	
3. Shorea assamica	Makai	
4. Phoebe goalparensis	Bonsum	

Class A-II (Constructional and Decorative timber)

Scientific Name	Common Name	Rate
1. Albezzia lebbec	Kala Siris	Rs. 594/cubic meter
2.Algezzia procera	Koroi	
3.Amoora wallichii	Amari	
4.Artocarpus chaplasha	Sam	
5. Altingia excelsa	Jutuli	
6. Betula alnoides	Betula	
7. Chikraisa tabularis	Bogipoma	
8. Cedrella toona	Jatipoma	
9. Cinnamum cecicodaphne	Consoroi	
10. Canarium resiniforum	Dhuna	
11. Endospermum chinensis	Phulgamari	
12.Eugenia jambolana	Jamun	
13. Magnolia rubra	Sopa	
14. Mesua ferrea	Nahor	

15.Schima wallichi	Gogra
16. Pinus Khasiya	Pine
17. Terminalia chebula	Helika
18. Taluma phelocarpa	Gahori sopa

Class A-II (Plywood Timber)

Scientific Name	Common Name	Rate
1.Axillaris spondix		Rs. 16.8/cubic foot
2.Bombax malabaricum	Simul	
3. Mangifera indica	Aam	
4.Tetrameles nudiflora	Bhelu	

Class B-I (Constructional Timber)

Scientific Name	Common Name	Rate
1. Acrocarpus fraxinifolius	Mandhani	Rs.508.80/cubic meter
2.Artocarpus integrifolia	Kothal sam	
3.Adina cordifolia	Haldu	
4. Alnus nepalensis	Alder	
5. Bischofia javanica	Urium	
6. Dellenia indica	Outenga	
7. Duabanga sonneroides	Khokon	
8.Cassia fistula	Sonari	
9. Garuga pinnata	Thumala	
10. Lagerstroemia flosregina	Ajhar	
11. Lagerstroemia parviflora	Sida	
12. Linnea grandis	Jiapoma	
13. Sterospermum chelenoides	Paroli	
14. terminalia belerica	Behera	

Class B-I (Plywood Timber)

Scientific Name	Common Name	Rate

1. Anthrocephalus kadamba	Kodam	Rs.508.80/cubic meter
2.Aistonia schlaris	Satiana	
3.Ficus spp	Rubber	
4. Pterospermum spp	Hatipoila	
5. Pterospermum lanciofolium	Bonboguri	
6. Podocarpus nerifolia	Jinari	
7. Phoebe cooperiana	Mekai	
8.Spondias mangifera	Amra	

Sericulture in Phek

The agro-climatic condition of Phek is very favorable for the development of Sericulture. There are 1 Sericulture office and on going project which provide technical and other supports like training of farmers, distribution of improved varieties of saplings/seedlings/supply of disease free layings (DFLs) etc. The Government has identified Eri Culture as the thrust area for development of sericulture in the State by bringing 2000 acres of land under Eri culture .The scientific name of the Oak Tasar silkworm is known as Antherea prolyei. It is one of the four kinds of silkworm that reared by the rural people of India to produce silk fabric. This silkworm rearing is practise in temperate and sub tropical region only. The department have three nos. of Oak Tasar farms at Kidema, Chesima and Kikruma along with seeds cocoons preservation center for the production of Dfl's (silkworm eggs) assisted by the Central agencies stationed at Kikruma. This silkworm is wild type. They feed on the leaf of Oak tree (in local dialect is known as naga khat).

To rear this silkworm, firstly a plot of land is required for the plantations of Oak trees (or even the silkworm can be reared in the wildly available oak trees in the forest). There after, the silkworm eggs can be procured through the department agencies. Then, the hatched silkworms is reared inside the room or in the selected trees covered by Nylon Net meant for rearing of young silkworms with utmost care, upto the III stage/instars and then the matured worms i.e. IV & V stage/ instars is allow to feed on matured leaves on the tree itself so that when they become ripe it will cocoon itself on the tree. After 4-5 days the cocoons on the tree is collected. The Farmers can sell the cocoons or they can produce reeled silk yarn or produce gicha silk yarn through traditional method.

Aromatic and Medicinal Plants of Phek

Informations regarding Aromatic and medicinal plants of Phek district is not well documented. However, villagers use various plants having medicinal value for treatment of diseases like diarrhoea, bloody dyssentry, bleeding, wound healing, asthma, gastritis, influenza etc. Some of the commonly used plant species with their uses are mentioned below. Cultivation of medicinal plants will not only provide employment to the rural youth but will also bring in a chain of development activities through setting up of processing and value additional.

Sl.No	**Local Name**	**Uses**
1	Nhana	Boil leaves for curing appendix problem
2	Ciirhu	Leaf extract for blood clotting
3	Vesuhnieliishe	Fruits are eaten raw against diarrhea
4	Gakra	Boiled leaf for gastritis
5	Thupupina	Raw leaf extract against influenza
6	Liimunga (banana)	Pseudo stem juice against loose motion

Looking Ahead

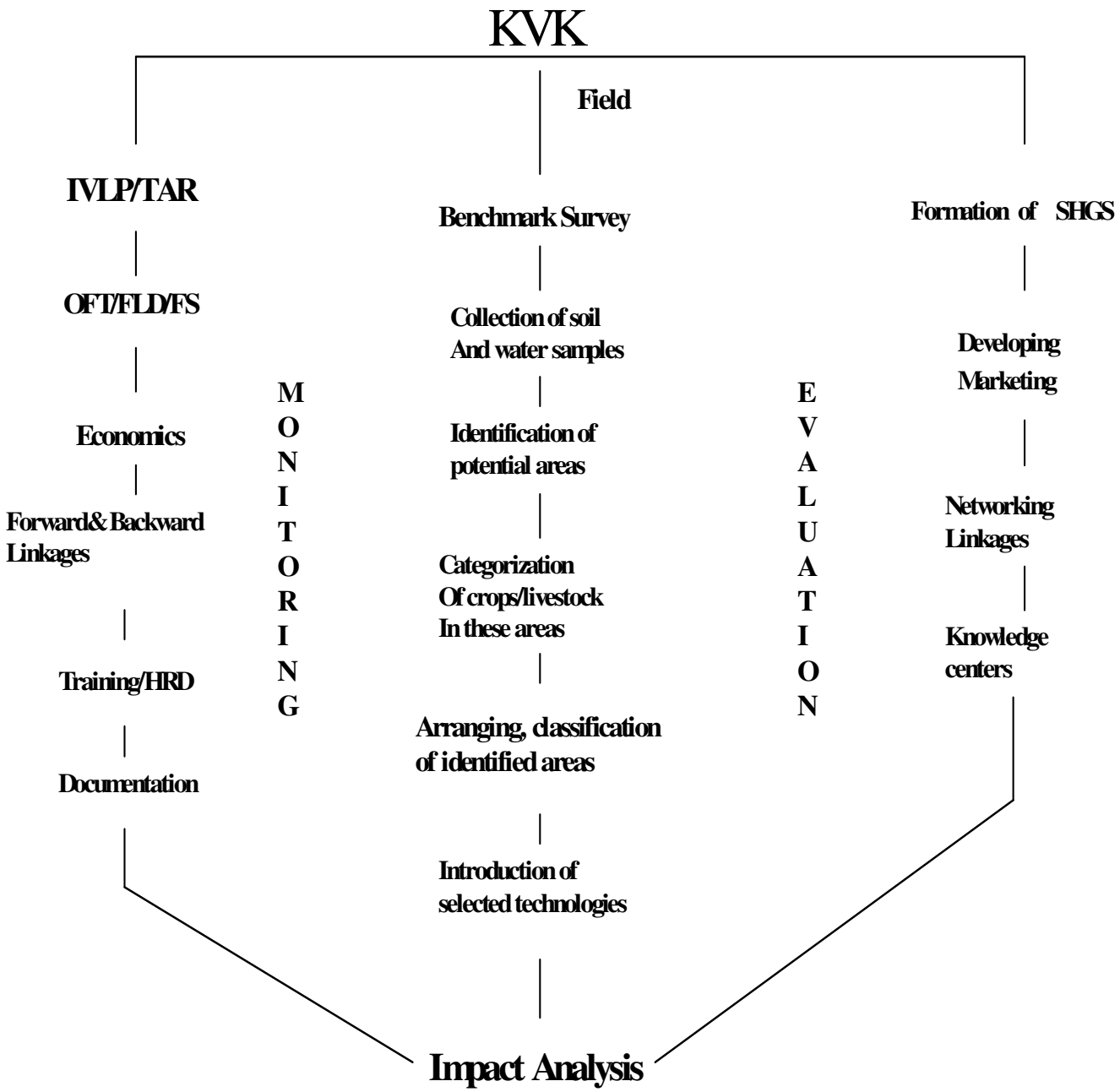
1. Road map of KVK Phek

1. Benchmark survey, PRA, RRA to document the existing traditional farming practices, production technology and cropping systems.
2. Identification and validation of the potential farming system of the district and finding the technological gap, reasons for the gap in adoption and the technological interventions that can be initiated. Identification of measure problems related to Agriculture.
3. Natural and human resource mapping.
4. Documentation of the traditional tools and implements of the district and identifying the scope for farm mechanization
5. Promotion of Organic cultivation in the district
6. Improvement of Jhum cultivation system for sustained production in Phek district and convergence of jhum system to permanent farming system
7. Soil and water conservation for different land use of Phek,
8. Soil mapping of the district in collaboration with District Soil and Water Conservation Officer, Phek
9. Documentation of the indigenous wild edibles of the district.
10. Collection, selection and screening of the local variety of crops particularly rice.
11. Collection, selection and screening of the major insect pests and diseases of different crops.
12. Post harvest processing and value addition in important commodities
13. Demonstrations on low cost water harvesting structures for live saving irrigation.
14. Trials and demonstrations on high yielding and disease resistant crop varieties for increasing the agricultural productivity of the district.
15. Trials and demonstration for improvement of productive performance of livestock.
16. Development of Integrated Farming System Models in the district.
17. Promotion of local entrepreneurs for agricultural and allied sectors enterprise and creating marketing channels and credit linkages.
18. Demonstration on paddy cum fish culture

2. Proposed programme for infrastructural development of KVK Phek:

Sl. No.	Year	Infrastructural development
1.	2009	Administrative building,
2.	2010	Establishment of KVK demonstration farm, construction of mist house and nursery, development of vermi-composting unit and E- connectivity
3.	2011	Staff residence, demonstration unit for Piggery and Azolla producing unit,
4.	2012	Farmers hostel, demonstration unit for poultry and development of handloom for weaving
5.	2013	Soil testing laboratory, construction of shade house, poly house for nursery raising and development of seed farm, honey bee unit
6.	2014	Rain water harvesting structure (Drip irrigation), fruit and vegetable processing, developing meat processing and packaging unit
7.	2015	Establishment of Fishery unit, Developing sericulture facilities
8.	2016	Hatchery unit for Poultry and development of tissue culture lab. for multiplication of quality planting materials
9.	2017	Development of fish fingerling production unit and bio -fertilizer producing unit, developing milk processing unit
10.	2018	Development of small scale fruit and vegetable preservation and processing unit and development of Home science lab.
11.	2019	Development of Mushroom production unit and development of medicinal garden
12.	2020	Bio – dynamic unit and development of farm creche

An overview of activities to be taken up by the KVK:



Our Vision

Sustainable development of farming community by infusing the latest advancement in agriculture and allied with indigenous technical knowledge being practiced from time immemorial. Sustainable development implies the management of resources for agriculture to satisfy changing human needs, while maintaining or enhancing the quality of the environment and conserving the natural resources.

A compilation of available resources of District Phek

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