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History of Agricultural Development in Sikkim

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Introduction

Sikkim, a tiny Himalayan State which lies between 27°00'46" to 28°07'48" North latitude and 88°00'58' 'to 88°55'25"East longitude and it is the considered as second smallest State in India after Goa. The total population of Sikkim is 6.11 lakhs according to 2011 census. State having total area of only 7096 sq km. and is just 114 km long North to South and 64 km East to West, but bounded by three neighboring countries i.e. China, Nepal and Bhutan. Sikkim occupies only 0.2 percent of geographical area of the country. However, some hill slopes have been converted into terrace farms for agricultural activities. Agriculture is mostly concentrated in the lower mountain ranges, mainly in the East and South districts.

The thumb-shaped state of Sikkim is characterized by wholly mountainous terrain. Almost the entire state is hilly; with the elevation ranging from 280 metres (920 ft) to 8596 metres (28000 ft). The pinnacle of the Khangchendzonga is the highest point. Numerous snow-fed streams in Sikkim have engraved out river valleys in the west and south of the state. These streams combine into the Tista and its tributary, the Rangit. The Tista can be called as the "lifeline of Sikkim", flows through the state from north to south.

The following tables illustrated the land elevation, ranges of climate and vegetation zones in Sikkim.

Table 1.1: Land Elevation of Sikkim

Type of land	**Elevation of land**
Lower Hills	Altitude ranging from 270m to 1500m.
Mid Hills	Altitude ranging from 1500m to 2000m.
Higher Hills	Altitude ranging from 2000m to 3000m.
Alpine Zone	Altitude above 3900m with vegetation
Snow Bound Land	Very high mountains without vegetation and with perpetual snow cover up to 8580m.

Source: Statistical Profile, 2004.

Table 1.2: Five Ranges of Climate in Sikkim

Range	**Altitude**
Tropical	Below 610m.
Sub-Tropical	610m to 1524m.
Temperate	1524m to 2743m.
Sub-Alpine	2743m to 3962m.
Alpine	3962m to 5182m.

Source: Statistical Profile, 2004.

Table 1.3: Vegetation Zones in Sikkim

Zones	**Altitude**
Tropical	From sea level to 1700m.
Temperate	From 1700m to 4300m.
Alpine	From 4300mtrs to 5000m.

Source: Statistical Profile, 2004.

The state having five types of land has been found such as lower hills, mid hills, higher hills, alpine hills and snow bound land. The land elevation ranges between 270 metres to 8580 metres. Similarly climatic zone of Sikkim has been divided into five ranges i.e. tropical, sub-tropical, temperate, sub-alpine and alpine and these climatic zones cover from below 610 metres to 5182 metres. Moreover, there are three vegetation zone has been found likewise tropical, temperate and alpine and which engulf between 1700 metres to 5000 metres from sea level.

Sikkim state has been divided into four districts according to administrative convenience and regional location as follows:

1. East District
2. West District
3. North District
4. South District

The districts are further fragmented into smaller administrative division as sub-divisions i.e. East district has four sub-divisions viz. i) Gangtok, ii) Pakyong, iii) Rongli and iv) Rangpo. West district has four sub-divisions viz. i) Gyalshing, ii) Soreng, iii) Yuksam and iv) Dentam. North district has four sub-divisions viz.i Kabi,ii) Dzongu, iii) Mangan and iv) Chungthang. South district also has four sub-divisions viz. i) Namchi, ii) Ravangla, iii Jorethang and iv) Yangang. There is two tiers system of Panchayati Raj in the state known as 'Ziila Panchayat' at the district level and the 'Gram Panchayat' at the village level. Each district has one Zilla Panchayat', which is headed by an 'Adhyakshya' and 'Up-Adhyakshya who are elected from within members of Zilla territorial constituencies. There are 989 Gram Panchayat Wards (including *Dzumsa*) which constitutes 176 Gram Panchayat Units (GPUs). Each district has different numbers of Gram Panchayat Units, such as in East district has 52 GPUs, West district has 55 GPUs, North district has only 22 GPUs (including *Dzumsa*) and in the South district 47 GPUs.

The habitable areas cover up to 2100m, which covers about 23.9% of the total geographical area; settlements are mainly confined to the area lying below 1800m and are generally found concentrated on the southern part of the state, following the wide river valleys and sometimes reaching up to the adjoining ridge tops. Due to the absence of any sizable flat land the distribution of population is sparse throughout the slopes, without forming any village in true sense (Boot, 1988). The population of Sikkim comprises conspicuously three ethnic communities i.e. Nepalese, Lepcha and Bhutia. Sikkim economy is mainly dependent on agriculture. Almost 85% of the population of Sikkim lives in rural areas and only the improvement in agriculture can better their lot. Agriculture, horticulture, livestock, fisheries and agro-forestry can be integrated to give viable farming systems to farmers (Lama, 2003).

Among other land resources agricultural land has played a crucial role since time immemorial. Due to alarming rate of increasing population pressures on land and constantly growing demands of food and raw materials, the history of agricultural development in the state as a whole can be flashed back to the beginning of planned economic development in Sikkim. The first planned period is visualized in 1954 with the support of a technical team of planning commission of India. Planned development of agriculture in Sikkim started in early fifties during the rule of the last king of Sikkim, Late Palden Thopdun Namgyal. It was seven years planned period of state from 1954 to 1961. Through this period, a split Directorate of Agriculture and Horticulture was formed. The Directorate of Agriculture started functioning in Sikkim in 1954 under the leadership of Dr. K.L. Narsingham as the first Director of Agriculture and Animal Husbandry. These first seven years plan was confined by three five years plan viz. 1961-66, 1966-71 and 1971-76. At the time of three five years plans the main focus was on the infrastructural development, except some improvement in the land tenure system.

Agricultural development in the state as a whole had gained momentum immediately after the merger of Sikkim with India. The department of Animal Husbandry was separated from the Directorate of Agriculture in 1974. After the formation of new state this started experimenting with regional concept of agricultural development in the fifth plan period. The state, in order to run the department, was divided into nine Regional Centres and a number of sub-centres as well as V.L.W. circles. The policies like regional concept of agricultural development were initiated, dividing the whole state into various regional centres. The south district had been divided into two regional centres and one sub-regional centre with 20 VLW centres.

The Seven Year Development plan of Sikkim had specific schemes for Agriculture & Rural Development and Horticulture. The government of Sikkim allocated Rs. 12, 99,983/- for the scheme of Agriculture & Rural Development and Rs. 11, 20,075/- for Horticulture during the first plan period. The first seven–year plan was followed by eight successive five-year plans during the period 1961-2001. By the time Sikkim became a state of Indian Union (May 1975), the fourth plan of Sikkim was nearing its completion. There was a massive increase in the budget allocation for agriculture and allied activities. The fifth plan allocated Rs. 16,08,27,000/- for agricultural development in the state. Ever since the merger of Sikkim with India, separate head wise attention to crop husbandry, soil and water conservation, animal husbandry, dairy development, fisheries, forestry and wildlife, food, storage and warehousing, agricultural research and education, marketing and quality control, and co-operation accelerated development in the agriculture sector. The quantum leap can be assessed from the fund allocation for agriculture in the annual plan of Sikkim during the year 2001-02. The total lay out for annual planning in the sector of agriculture and allied activities in the year 2001-02 was to the tune of Rs. 25,55,00,000. As an outcome of planned economic development, agriculture sector has become one of the most well-established and well-organised sectors in the state of Sikkim (Choudhury, 2004:25).

Before the merger in 1975, the agriculture sector was characterized by uncertainty about land tenure rights, negligible public investment and over-dependence on traditional technologies. This sector has recorded considerable progress during the last two decades. In the past low productivity, negligible marketable surplus and other institutional inadequacies which plagued the economy, led to agricultural backwardness. Some of the reasons which are responsible for agricultural backwardness in Sikkim in pre-merger period are the physical features of the state necessitating terrace cultivation, extreme concentration in land-holding patterns, low cropping intensity due to mono-cropping, outmoded technologies of production, inadequate thrust on agriculture in terms of investment and planning, inadequate infrastructure support in transportation, communication, irrigation, technical research and marketing etc. (Lama, 2001).

The details of the investment on agriculture and horticulture during the period 1954 to 1960 are presented below:

Table 1.4: Statement Expenditure (1954-1960)

A. Agriculture and Rural Development

Sl. No.	Different Sectors of Expenditure	Total Expenditure (in Rs.) Mean ±S.D.(Standard Deviation)	Standard Error
1.	Demonstration Farms at Gangtok	5,41,449±11.9163	4.8648
2.	Demonstration Farm at Lachung	11,482±15.4531	6.3087
3.	Seed Certification Farm, West District	73,452±29.3734	11.9916
4.	Cardamom Installation of an Entomological and Pest Control Lab.	1,849 ± 25.0519	10.2274
5.	Training	14,040±21.6333	8.8317
6.	Agriculture Loans	49,209±33.3586	13.6189
7.	Agriculture Information Service, Staff, Equipment	5,000±35.8664	14.6424
8.	Acquisition of Land for Cardamom Nurseries	2,349±32.2676	13.1732
9.	Fair Price Shops	2,04,198±58.4260	23.8523
10.	National Extension Service Organization	3,96,955±35.0314	14.3015
	Total	12, 99,983±17.0080	6.9761

Source: J.R.Subba, 1984.

The table 1.4 shows percentage wise distribution of expenditure on Demonstration Farm at Gangtok, Demonstration Farm at Lachung, Seed Certification Farm, West District, Cardamom Installation of an Entomological and Pest Control Laboratory, Training, Agriculture Loans, Acquisition of Land for Cardamom Nurseries, Fair Price Shops and National Extension Service Organization in table. The highest Expenditure was recorded in Demonstration Farms at Gangtok sector (41.65 percent). Second highest expenditure sector is National Extension Service Organization (30.54 percent). The third position is occupied by Fair Price Shops (15.71 percent) and rests have less than 10 percent of expenditure.

Table 1.5: Statement Expenditure (1954-1960)

B. Horticulture

Sl. No.	Different Sectors of Expenditure	Total Expenditure (in Rs.) Mean ±S.D. (Standard Deviation)	Standard Error
1.	Staff Quarters	34,613±37.4058	15.2708
2.	Pay of Staff etc	81,262±60.3523	24.6387
3.	Cost of Equipment, Seed, Fertilizers, Insecticides etc.	1,74,439±34.3918	14.0404
4.	Rent of Store, Godowns for Manure etc.	2,393±44.7794	18.2811
5.	Loans to Fruit Growers	300±68.9260	28.1389
6.	Training	1,863±28.0285	11.4426
7.	Fruit Preservation & Canning Factory	7,05,224±41.6173	16.9901
8.	Horticultural Nurseries	25,221±52.8053	21.5576
9.	Plant Protection – cum Horticultural mobile items	94,760±26.2754	10.7269
	Total	11, 20,075±52.5753	21.4637

Source: J.R.Subba, 1984.

The table 1.5 shows that the highest expenditure is recorded in Fruit Preservation & Canning Factory sector, the significant mean is 7,05,224±41.6173 and its corresponding error is calculated as 16.9901. The second highest expenditure sector comprises of the Cost of Equipment, Seed, Fertilizers, and Insecticide etc. which has the significant mean ± S.D. of 1,74,439±34.3918 and standard error is 14.0404. The other sector of expenditure are Plant Protection–cum Horticultural Mobile Items (mean ± S.D 94,760±26.2754 and standard error as 10.7269), Pay of Staff etc. (mean, S.D. 81,262±60.3523

and standard error as 24.6387), Staff Quarters (mean ± S.D 34,613±37.4058 and standard error as 15.2708). The lowest expenditure sector, i.e. Loans to Fruit Growers shows the significant mean ± S.D. is 300±68.9260 and standard error is calculated as 28.1389.

In the post-merger period, the strategy was to provide a package of services aimed at consolidating peasant economy. This covered land reforms, agricultural credit and marketing, provision of inputs like seeds, fertilizers, minor irrigation, and encouragement to horticulture and cash crops. Thus, despite the limited cultivable land in Sikkim, agricultural development has made considerable progress during last two decades (Lama, 2001).

Table 1.6: Budget Expenditure on Agriculture (1975-76 to 1999-00)

(In Rs.000)

Year	**State Budget**			
	Plan Mean±S.D. (Standard Deviation)	**Standard Error**	**Non-Plan Mean±S.D. (Standard Deviation)**	**Standard Error**
1975-76	4128±45.1043	18.4137	3304±48.5592	19.8242
1980-81	2190±48.8917	19.9599	3247±38.8690	15.8682
1985-86	24300±64.6436	26.3906	8047±32.5515	13.2890
1990-91	25825±48.0707	19.6248	17885±52.3717	21.3806
1995-96	25440±45.0066	18.3738	23557±37.2182	15.1943
1999-2000	36400±64.9461	26.5141	44675±42.1663	17.2143

Source: Lama, 2001.

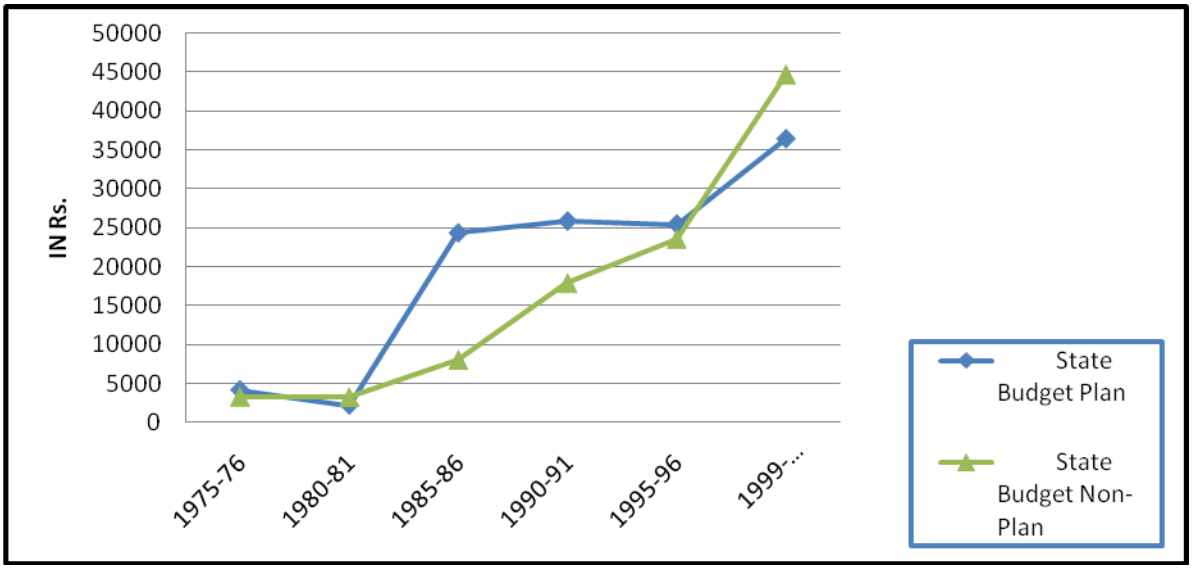

Figure 1.1: Budget Expenditure on Agriculture (1975-76 to 1999-00)

The Budget Expenditure on Agriculture (1975-76 to 1999-00) in different Plan and Non-Plan year, the comparison between State Budget Plan and Non-Plan year 1975-76, 1980-81,1985-86, 1990-91, 1995-96 and 1999-2000 shows the positive aspect for agriculture development. From the above figure it is clearly seen that Budget Expenditure (State Budget) on Agriculture in both Plan and Non-Plan period increasing in every five year plan (1975-76, 1980-81,1985-86, 1990-91, 1995-96 and 1999-2000). The Plan budget from 1975-76 to 1999-2000 increased by 781 percent and Non-Plan budget increased by 1252 percent.

Table 1.7: Plan Investment in Agricultural Activities (in Percentage)

Heads	**Fifth Plan (1974-1978)**	**Sixth Plan (1978-1980, 1980-1985)**	**Seventh Plan (1985-1990)**
Research & Education	4.98	3.42	5.10
Crop Husbandry	92.14	91.55	81.77
Storage & Ware Housing	1.03	1.64	2.58
Agriculture Marketing & Quality Control	1.82	3.38	2.76
Soil & Water Conservation	7.30	3.90	7.76

Source: Lama, 2001.

Although planned agricultural development in Sikkim was started during 1954-55, it gained momentum only in 1976-77, that is during the fifth five year plan. The Plan Investment (1974-1990) on Agriculture in different heads, Research & Education, Crop Husbandry, Storage & Ware Housing, Agriculture Marketing & Quality Control, Soil and Water Conservation is shown in table 3.4. It is noticed that the highest Plan Investment was done on Crop Husbandry, followed by Soil and Water Conservation, and Research and Education.

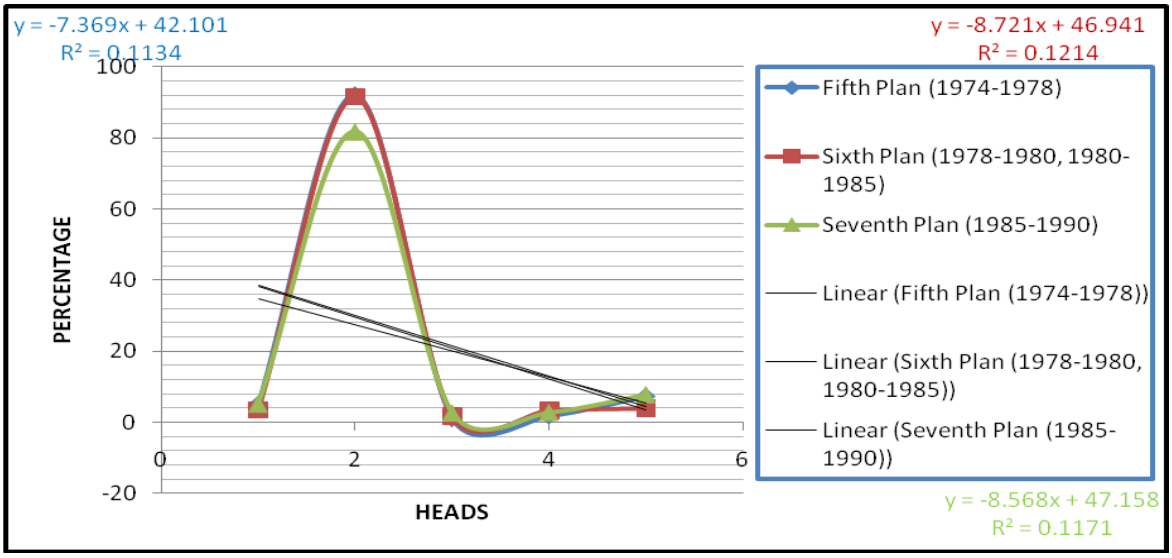

Figure 1.2: Plan Investment in Agricultural Activities (in Percent)

The figure 1.2 shows the percentagewise plan investment in agricultural activities in different heads. The linear 1, 2 and 3 show the regression lines corresponding to different heads such as Research & Education, Crop Husbandry, Storage & Ware Housing, Agriculture Marketing & Quality Control, Soil and Water Conservation. The first and second regression curves are highly significant in the case of Crop Husbandry. The Storage & Ware Housing curves show the negative decreasing order and corresponding straight line equations are:
Y = -7.369x + 42.101, R^2 = 0.1134, y = -8.721x + 46.941, R^2 = 0.1214 and y = -8.568x + 47.158, R^2 = 0.1171 respectively.

The Agrarian Structure

Sikkim has three-tier agrarian structure comprising landowners, sharecroppers and agricultural labourers. The different types of landowners, sharecroppers and the agricultural labourers in Sikkim may be classified as follows:

1. Landowner or *Bustiwalla*:
    i. Absentee landowner
    ii. Non-cultivating landowner
    iii. Cultivating landowner
    iv. Cultivating landowner-cum- sharecropper/agricultural labourer.
2. Tenants *(Pakhurey)*/ Sharecroppers (*Adhiadar*, *Kutdar* and *Chakhurey*):

   i. Sharecroppers
   ii. Sharecroppers-cum-landowner
   iii. Sharecroppers-cum-agricultural labourer
3. Agricultural labourer or *Khetala*:
   i. Labourer
   ii. Labourer -cum-landowner
   iii. Labourer -cum-sharecropper

The absentee landowners who do not live in the *busti* or village employ *pakhureys or* sharecroppers who cultivate the land either as *adhiadar* or as *kutdar*. The non-cultivating landowners live in the village but do not take part in the production system. Usually they give their land on lease to *pakhureys* who cultivate land on the basis of contract. The cultivating landowners are usually small farmers who cultivate their land themselves or employ agricultural labourers. The cultivating landowners-cum sharecroppers/labourers are marginal labourers, but only temporarily (Choudhury, 2004: 26).

There are different categories of tenant or *pakhurey* in Sikkim. Those who cultivate land in lieu of 50% of the total produce are called *adhiadars*. The *adhiadars* enjoy some amount of liberty in raising subsidiary crops that they may not have to share with the landowner. But the system of adhiadar is prevalent to a very limited extent. The *kutdars* are those tenants who pay money for rent. They also have to bear some other duties imposed by the landowners. Quite often the rent of land is fixed verbally and renewal or revision of contract depends upon the will of the landowner. In other words, there is no fixed agreement on the lease of land in case of the *kutdar*, and the landowner may drop a *kutdar* at his will. The tenants of the monastery estates are known as *chakhurey*. The *chakhureys*, in addition to cultivating the land taken on lease from the monasteries, have to contribute manual labour. Renewal of their contracts depends entirely upon the mercy of the lamas of the concerned monastery. The tenants or the sharecroppers mostly cultivate their land themselves. Exchange of labour is quite common among the sharecroppers. They exchange labour in lieu of labour at their convenience. Sometimes they engage the agricultural labourers or *khetala*, especially when the land taken on lease is large and the size of family is small. Since the sharecroppers are also found to be landowners, it is quite common for them to engage labourers (Choudhury, 2004:26).

The agricultural labourers or *khetalas* perform all sorts of work decided by their employers. They are employed on daily wage or contract basis. The labourers employed on contract basis are usually paid in kind. In most cases the contract labourers get a share of the produce, the amount of which is stipulated by his employer. The well-to-do landowners employ labourers who perform both household work and agricultural operations. They are paid both in cash and kind. Besides, there are labourers who are engaged to perform all sorts of work including ploughing, sowing, harvesting throughout the year in lieu of food and shelter but do not get any wage (Choudhury, 2004:26).

Like other hilly and mountainous areas, the question of land has been central to the political economy of Sikkim, both because it is scare and because of historical factors. For many centuries, feudalism had a stranglehold over land and society. Land rights were vested primarily in the nine Kazi (feudal lords) families, with each region rigidly separated from the others. Accordingly to the 1991 Census, Sikkim was predominantly rural with nearly 91 percent of the population living in villages (Lama, 2001). Sikkimese agriculture has to be seen in the context of larger Himalayan geography and environmental specificities therein. Physiography of the region has made agricultural conditions extremely diverse. Agriculture is greatly impacted by altitude and slope aspect. Agricultural fields are invariably terraced all over Sikkim Himalaya. The natures of terrain and varied micro climatic conditions influence agriculture in Sikkim to a great extent (Khawas, 2012).

In the present scenario, agricultural land use covers about 11.13% of the total geographical area of the state. Out of the total agricultural land, 82.1% land is under crops, 9.5% under fallow and 8.4% land is not very well recognized and considerable progress has been realized within past few years in this direction. This has apparently been the result of the planners and administrators, who vividly envisaged the need for having rapid agriculture development in hilly areas. The agricultural universities, I.C.A.R. research complexes and the state Departments of Agriculture have been playing major role in transforming the economy of hill people. Only a beginning has been made and more needs to be done to have meaningful development in hilly region. The concerted efforts made is evolving suitable land-use patterns for developing hill economy have paid good dividend and the concept of agro-forestry, agri-horticulture, silvi-pastoral etc., systems of land use are gradually becoming popular amongst cultivators. Also, cropping system like intercropping, relay cropping and multiple cropping have replaced traditional farming in many areas. Further the cultivation of commercial crops like seed potato, off season vegetables, ginger, turmeric, etc have been gradually gaining ground. The stage has been set for the progress in the right direction and thereby requires further promotion and encouragement.
The agricultural lands are situated within the elevation of 300m to 3000m above mean sea level. However, most of the cultivated area is located within 1800m (Choudhury, 2004).

The Agriculture and Horticulture Department has prepared a month-wise calendar for the cultivation of different crops in Sikkim. According to the calendar, the concerned department and the farmers plan for cropping of different crops from time to time; departmental experts sometimes train the farmers according to the calendar.

Table 1.8: Month wise Calendar for Agricultural Operations in the State

Area	Climate	Altitude (M)	Ecological Adaptation	Crops	
				Agriculture	Horticulture
Lower Hills	Tropical	300-500	Wet & Dry Agriculture, Sedentary Farming, Livestock, Horticulture	Rice, Maize, Millet, Wheat And Mustard, Pulses, Soybean, Vegetables, Potato.	Guava, Lime, Lemon, Ginger, Oranges
	Sub-Tropical	500-1500			
Mid Hills	Temperate	1500-2000	Wet And Dry Agriculture, Slash And Burn Agriculture Or Rotational Dry Collection Of Minor Forest Produce, Horticulture	Paddy, Maize, Millet, Wheat, Soybean, Potatos, Vegetables, Ginger	Mandarin (Orange), Large Cardamom, Plum, Peach, Peas.
High Hills	Temperate	2000-2700	Dry Agriculture, Bhutias Transhumance	Maize, Barley, Vegetables, Sweet Potato	Apple, Plum, Peach, Peas.
High Hills	Sub-Alpine	2700-4000	Yak Herding, Horticulture, Pastoral Economy, Wool, Cheese, Butter, Hides, Apple	Potato	Apple
	Alpine	4000-5000	Potatoes Are Commercial Commodities		
Very High Hills	Alpine	Above 5000	Lachenpa and Lachungpa Transhumance Groups Visit the Area; Lachenpa Grows vegetable And Potato at higher elevation.	Mainly Used For Seed Potato, Vegetables	Pasturage

Source: Agriculture & Horticulture Department, Government of Sikkim.

The above table (1.8) shows the month wise calendar prepared by the Agriculture and Horticulture department, Govt. of Sikkim wherein the time frame is stipulated for the Preparation of the Soil, Sowing and Transplanting, Irrigation & Interculture and Harvesting & Threshing for different crops and vegetables in Rabi and Kharif seasons. The suitable months for cropping of different crops in the case of Sikkim are January, February, March, April, May, June and July only and rest five months i.e., August, September, October, November and December according to agriculture and horticulture calendar are not suitable due to lack of irrigational facilities.

Sikkim contains within its borders a variety of non-tropical and geographic environments from the low snow tree outer hills to the high peaks with permanent snow and glaciers. Within its habitable portions, different social, religious, linguistic and ethnic groups co-exist practising different types of agriculture and pastoral activities. As one moves northwards, valley floors and mountain peaks increase in altitude, the terrain becomes more rugged and the climate drier and more temperate, the vegetation changes from Sal forest to rhododendrons and conifers and finally to grass above timber line. Such a transition can sometimes be seen even on a single mountain side in any of the ecological zones (http://www.envis.nic.in).

It is observed that the agricultural as well as horticultural crops had important stand from lower hills i.e. from 500m up to very high hills of above 3000m. The tropical, subtropical to temperate region has occupied important place for the cultivation of different crops in Sikkim. But in the sub-alpine to above alpine region, few crops can be sown due to cold climate.

Table 1.9: Horticulture Schedule of Cropping

Zone	Sowing	Transplanting	Harvesting
1. Low hill up to 650 m. Tomato, Capsicum, Brinjal, Cucumber, etc Mid season cauliflower	Dec- Feb August	Jan-March September	June-Aug December
2. Mid hills 651-1800 m. Tomato, Capsicum, Brinjal, Chilly, Cucumber etc.	Jan-Feb	Feb-March	July-Aug
3. High hill 1801-2700 m. Cabbage, cauliflower, Broccoli, Tomato, Capsicum, Cucumber	Feb-March April March – April	March- April May April – May	July-Aug Aug Aug-Sept
4. Very high hill 2701-3500 m. Cabbage, Cauliflower, Broccoli Tomato, Capsicum, Cucumber	March – April March	April – May April	July – Aug Aug- Sept

Source: Training Manual of Horticulture crops.

Table 1.9 shows the Horticulture Schedule of Cropping in four different zones in Sikkim such as Low hill up to 650 m, Mid hills 651 m to 1800 m, High hill 1801 m to 2700 m and Very high hill 2701m to 3500 m. According to different zones, crops are sown, transplanted and harvested in different feasible months. From the depiction in the diagram below, it is clear what types of altitude is needed for the vegetables grown.

Figure 1.3: Altitudinal Agro-Climatic Zones of Horticulture in Sikkim

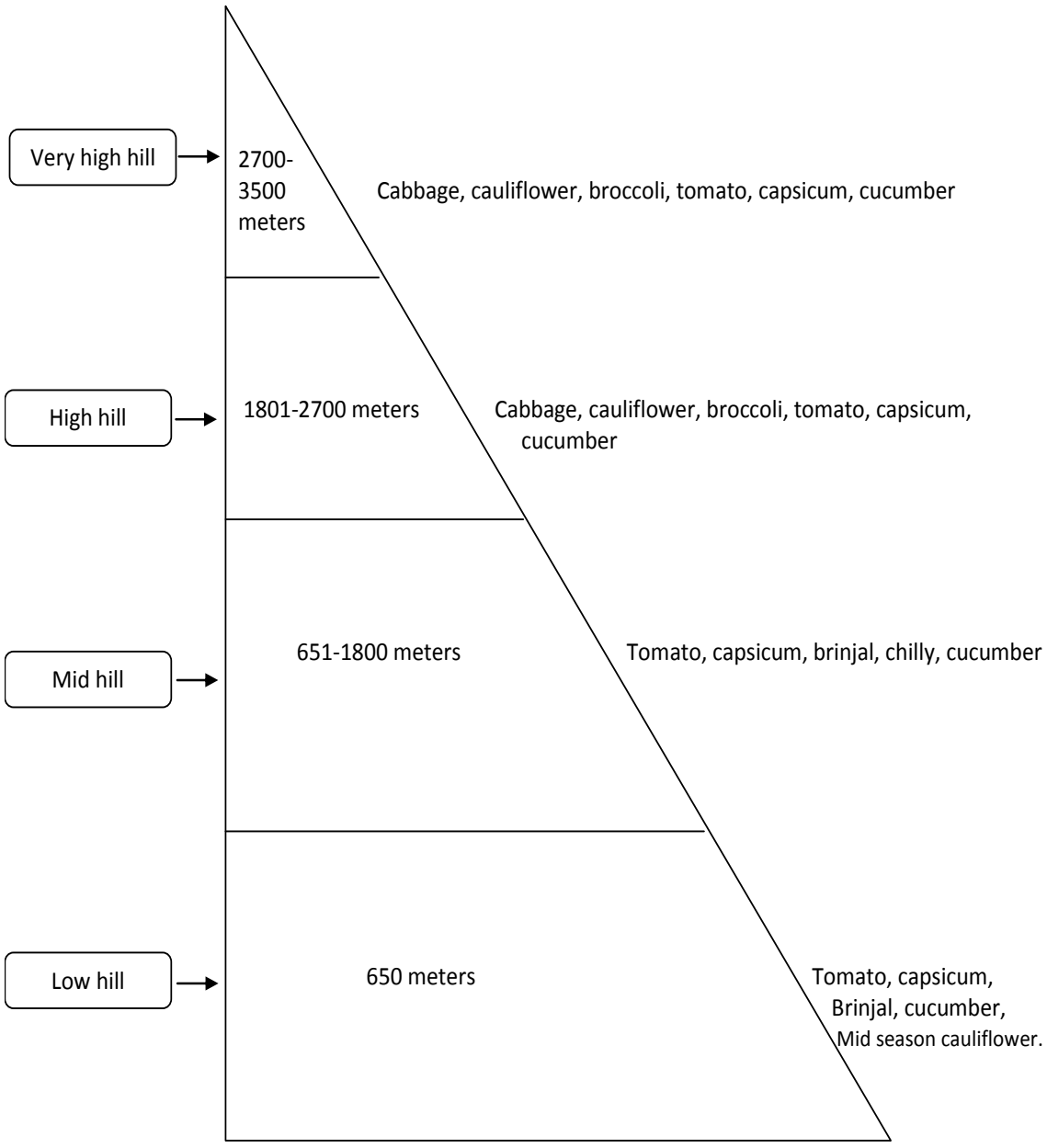

Table 1.10: Ecological Zones and Ecological Adaptation in Sikkim

Area	**Climate**	**Altitude (M)**	**Ecological Adaptation**	**Crops**	
				Agriculture	**Horticulture**
Lower Hills	Tropical	300-500	Wet & Dry Agriculture, Sedentary Farming, Livestock, Horticulture	Rice, Maize, Millet, Wheat And Mustard, Pulses, Soybean, Vegetables, Potato.	Guava, Lime, Lemon, Ginger, Oranges
	Sub-Tropical	500-1500			
Mid Hills	Temperate	1500-2000	Wet And Dry Agriculture, Slash And Burn Agriculture Or Rotational Dry Collection Of Minor Forest Produce, Horticulture	Paddy, Maize, Millet, Wheat, Soybean, Potatos, Vegetables, Ginger	Mandarin (Orange), Large Cardamom, Plum, Peach, Peas.
High Hills	Temperate	2000-2700	Dry Agriculture, Bhutias Transhumance	Maize, Barley, Vegetables, Sweet Potato	Apple, Plum, Peach, Peas.
High Hills	Sub-Alpine	2700-4000	Yak Herding, Horticulture, Pastoral Economy, Wool, Cheese, Butter, Hides, Apple	Potato	Apple
	Alpine	4000-5000	Potatoes Are Commercial Commodities		
Very High Hills	Alpine	Above 5000	Lachenpa and Lachungpa Transhumance Groups Visit the Area; Lachenpa Grows vegetable And Potato at higher elevation.	Mainly Used For Seed Potato, Vegetables	Pasturage

Source: www.envis.nic.in.

The above table depicts that Area, Climate, Altitude, Ecological Adaptation, Crops- Agriculture and Horticulture are correlated with each other. It also provides information on types of Agriculture and Horticulture crops that are grown and the nature of ecological adaptations that are followed by the people in different areas at different altitude and climatic conditions.

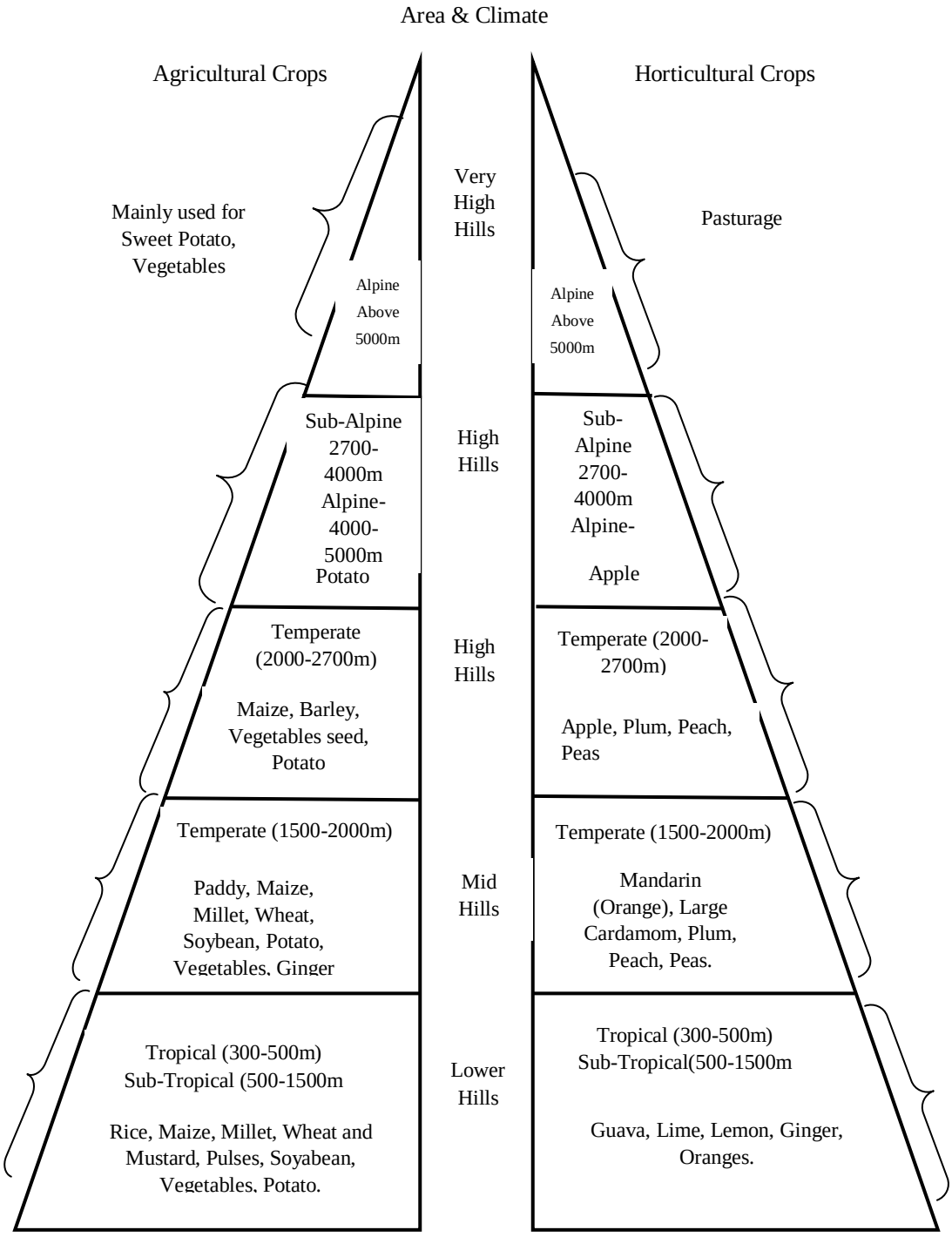

Figure 1.4: Ecological Zones (Agriculture & Horticulture)

The economic profile of Sikkim is presented under three broad heads, namely, (i) Agriculture and allied activities, (ii) Industries, and (iii) Services. The economic profile of the state shows an overwhelming dependence on agriculture and allied activities (Choudhury, 2006).

Conclusion

Sikkim's agriculture thus remained highly subsistence oriented (Economic Survey, 2006-07). The agricultural activities for livelihood in study areas are mainly categorized into three groups - mainly subsistence, mainly commercial and no agricultural activity. The highest livelihood of Sikkim's farmers depends on mainly subsistence which covers around 96 percent and some households are marching towards commercial basis i.e. 3.4 percent in order to earn money for their family. Some of the households i.e. 0.33 percent in villages are not involved in agricultural activity due to less population, water scarcity, old age, but are involved in other forms of activities.

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