CHAPTER 3

AGRICULTURE AND MARKETING INFRASTRUCTURE IN BARAK VALLEY

India is the 7th largest country in the world in terms of geographical area. It is the 2nd largest country in the world in terms of population. Much of the workforces still depend on agriculture. India is blessed with considerable amount of physical capital needed for the growth of agriculture. In fact, with about 53 percent of total geographical area under arable land, India stands 5th in the world, while only 11 percent of total geographical area of the world is arable (FAO:2010). Being a developing country, agriculture plays a pivotal role in the economy both in terms of income generation and employment creation. It may be noted that Indian agriculture is characterized by declining contribution to national income having a significant share of employment. The income share of the agriculture sector went down from 34 percent in 1991 to 26 percent in 2001 and then to 19 percent in 2010 (GOI, ES: 2004-05 and 2010-11). It has further come down to 13.7 percent during 2012-13 (The Economic Times: 2013). However, the decline in employment share did not keep pace with the income share. While 67 percent of the main workforce was engaged in agriculture in 1991, it went down to 58 percent in 2001 (GOI: 2004-05), then to 48 percent in 2010 (FAO: 2010) and to 47 percent in 2012 (WB: http://data.worldbank.org/indicator/SL.AGR.EMPL.ZS). It may be noted that while 38 percent of the world population depend on their living from agriculture in 2010, (FAO: 2010) the same for India is 48 percent (FAO: 2010). This shows the relative importance of agriculture in employment generation in India.

3.1 Status of Agriculture in Assam and Barak Valley

In order to understand the status of agriculture in the economy of Assam, we intend to look into the status of the parameters like land use pattern, availability of cultivable

land, area under irrigation, yield rate, major crops, cropping intensity, size of land holding, etc. These parameters have been analyzed in a three tier comparative framework, i.e., national, regional and local. The sole objective is to situate the local agricultural condition in comparison with the national and regional situations.

3.1.1 Land Use Pattern

Agricultural activities are land centric. An analysis of land use pattern exhibits the use of land for agricultural purposes as well as availability of cultivable land for the future expansion of agriculture in a given region. The land use pattern in Assam is shown in Table 3. 1.

Assam has 7.84 million hectares of land which is about 2.39 percent of the total reported geographical area of the country (328.73 million hectares). About 24 percent of the total geographical area of Assam is covered with forest which is slightly above the national average (23 percent). About 33 percent of the land in Assam is not available for cultivation. These lands are either used for non-agricultural purposes like roads, buildings, dams, urban centers, etc. or barren and uncultivable land which could not be put to agricultural uses at present. The size of the land under this category is quite large compared to national average (14 percent). Although the size of the culturable waste land constitutes 4.14 percent of the total land area of the country, the same for Assam is only about 1 percent which indicates that there is not

Table 3.1: Land Use Pattern 2010-11

(in per cent)

Sl No.	Particulars	India	Assam	Barak Valley
1	Total Geographical Area (Reported)	100	100	100
2	Forest Area	22.89	23.61	37.16
3	Not Available for Cultivation	14.24	33.45	20.56
4	Other Uncultivated Land excluding Fallow Land	4.41	4.53	4.71
5	Cultivable Waste Land	4.14	0.98	0.64
6	Fallow Land	8.04	1.63	1.96
7	Net Area Sown	46.28	35.80	34.98

Source: Directorate of Economics and Statistics, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India, http://eands.dacnet.nic.in

much scope left in Assam for the expansion of extensive cultivation. Similarly the availability of fallow land is also very less in Assam (1.63 percent) compared to the national average (8.04 percent). Nonetheless, Assam lags behind the national average in terms of net area shown which indicate that more areas might be brought under cultivation.

It may, thus, be inferred from table 3.1 that there is not much cultivable land left in Assam. Even the cultivable waste land is also very small. Hence agricultural development in Assam calls for a strategy of intensive cultivation rather than extensive cultivation.

Barak Valley region constitutes 8.80 percent of the total geographical area of Assam. Agriculture is the main occupation of the majority of the people of Barak Valley. It may be noted that the condition of Barak Valley is no different as far as the state average of the net sown area is concerned. As there is not much area under current fallow, there is hardly any scope for extensive cultivation in Barak Valley as well.

3.1.2 Availability of Cultivable Land

The total cultivable land in Assam is about 38 percent of the total geographical area (table 3.2). In terms of availability of cultivable land to total geographical area Assam ranks 21st among the Indian states.

Among the districts of Assam, the total cultivable land in Cachar, Hailakandi and Karimgangj is 34.52, 38.56 and 43.23 percent of total geographical area respectively (table 3.2**).** However, majority of the districts including Hailakandi and Karimgangj stand above the state average and some of the districts including Cachar stand below the state average (table 3.2). Of course, cultivable land is scarce in the hill districts of Karbi Anglong (12.23 percent) and North Cachar Hills (5.76 per cent) (table 3.2).

Table 3.2: District-wise Cultivable Area in Assam: 2010-11

(in Hectare)

Sl. No	District	Total Geographical Area (Reported)	Total Cultivable Area	4 as %of 3
1	2	3	4	5
1	Baksa	196108	66508	33.91
2	Barpeta	264510	161906	61.21
3	Bongaigaon	151999	80756	53.13
4	Cachar	377610	130345	34.52
5	Chirang	109985	48021	43.66
6	Darrang	180707	125475	69.44
7	Dhemaji	323700	93452	28.87
8	Dhubri	266601	154244	57.86
9	Dibrugarh	338782	149900	44.25
10	Goalpara	184262	81987	44.49
11	Golaghat	354070	129402	36.55
12	Hailakandi	132587	51127	38.56
13	Jorhat	285100	139199	48.82
14	Kamrup	308684	181611	58.83
15	Kamrup Metropolitan	115017	44435	38.63
16	Karbi Anglong	1033400	126399	12.23
17	Karimgangj	180900	78207	43.23
18	Kokrajhar	312900	90864	29.04
19	Lakhimpur	235024	105979	45.09
20	Morigaon	158765	101334	63.83
21	N.C.Hills	488800	28171	5.76
22	Nagaon	411030	243532	59.25
23	Nalbari	100483	72238	71.89
24	Sibsagar	260290	146283	56.20
25	Sonitpur	532298	171201	32.16
26	Tinsukia	379000	109176	28.81
27	Udalguri	167393	103640	61.91
	Barak Valley	691097	259679	37.57
	Assam	7850005	3015392	38.41
	India	328730000	178830000	54.40

Source: Directorate of Economics and Statistics, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India, http://eands.dacnet.nic.in

3.1.3 Area under Irrigation

Irrigation is the most important factor for agricultural growth and productivity. The significant poverty reduction in many parts of India is attributed to the availability of

irrigation, which not only boosted agricultural production but also made possible the adoption of modern farming technology – seeds, fertilizers and pesticides. Irrigation may lead to poverty reduction via increased yields, increased cropping areas and higher value of crops.

Irrigation may affect different types of poor people in different ways: perhaps impacting on small farmers first by boosting yields and income levels, then impacting on landless labourers through increased demand for agricultural labourers, and then on the urban poor via lower food prices and possibly reduced migration of the rural poor to urban areas. Irrigation thus can impact upon the rural sector of an economy in many ways. The first direct impact is on output levels. Irrigation boosts total farm output and hence, with unchanged prices, raises farm incomes. Increased output levels may arise for any of at least three reasons. Firstly irrigation improves yields through reduced crop loss due to erratic, unreliable or insufficient rainwater supply. Secondly, irrigation allows for the possibility of multiple-cropping, and so an increase in annual output. Thirdly, irrigation allows a greater area of land to be used for crops in areas where rainfed production is impossible or marginal. Hence irrigation is likely to boost output and income levels (Lipton, et al: 2003).

The second direct impact is on income level. It has been observed that rise in income is more pronounced in areas having irrigation facilities compared to areas without such facilities (Dhawan: 1998).

The third direct impact is on employment. There are two sources of additional demand for labour created by irrigation projects. Irrigation projects firstly require labour for construction and on-going maintenance of canals, wells and pumps etc. This is likely to be an important sector of employment for the poor, especially the landless rural poor or rural households with excess labour or seasonal excess labour. Secondly, increased farm output as a result of irrigation will stimulate demand for farm labour both within the main cropping season and across new cropping seasons, increasing both numbers of workers required and length of employment period. Rural poverty levels may therefore be reduced by increased employment opportunities. In addition there may be effects that extend to other areas if irrigation projects reduce migration to urban areas, and so reduce the pool of job-seekers and relieve the

downward pressure on urban wages and the upward pressure on prices of housing and other urban infrastructure (Lipton, et al: 2003).

The fourth direct impact is on the food prices. If irrigation leads to increase in staples or non-staple food output then this may result in lower prices for staples and food. Besides the rural population, this low food prices might also stabilize the urban wages and bring relief to urban population as well.

The fifth direct impact is on stability of agricultural production. Irrigation not only raises crop output levels but usually cuts variance over seasons – because of double cropping for example – and over years as reliance on rainfall is reduced, at least as a percentage of the mean. Rao, et al: (l988) argue that, in comparison to non irrigated conditions, the expansion of irrigation has contributed to a substantial extent in reducing instability in the output of food grains as well as of other crops.

The sixth direct impact is on farm-non-farm linkages. Several empirical studies have documented the power of farm-non farm linkages in Asia. Based on data from India, Rangarajan (1982), Mellor and Lele (1973) and Mellor and Johnston (1984) estimated economy wide agriculture-to-non-farm income multipliers in the range of 0.7. Haggblade *et al.* (2007) estimated rural agricultural growth multipliers to be of the order of 1.5. In other words a Rupee increase in agricultural income will generate an additional 50 paisa in rural non-farm goods and services (Lipton, et al: 2003).

In spite of the tremendous positive impacts of irrigation, it has not been developed equally in all the agriculturally potential states in India. As far as the irrigation capability is concerned, Appendix 3.1 presents land use and irrigation statistics among the major states in India. One may note that states having higher area under irrigation are more advanced in agriculture like Punjab, Haryana and Uttar Pradesh—the citadel of Green Revolution (Appendix 3.1). Of the 15 major states in India, only 6 states are having area under irrigation more than the national average while 9 states are having area under irrigation less than the national average. It may be pointed out that Assam is lagging far behind the national average. While the highly irrigated state like Punjab is having 98.21 per cent of net area shown under irrigation, Assam is having only 2.76 per cent of net shown area under irrigation. Perhaps, this is one of the paradoxes that explains the relative underdevelopment in Assam as it receives very high rainfall and also the storehouse of country's water resources.

As far as the spatial distribution of the irrigated area in Assam is concerned, it is observed that the agriculturally developed districts of Assam, like Baksa, Udalguri, Karbi Anglon, N.C.Hills, Chirang, Nagaon, Darrang, Kamrup Metropolitan, Kokrajhar, Hailakandi, Morigaon, Karimgangj and Sonitpur (table 3.3) are having higher percentage of net irrigated area under irrigation.

Table 3.3: District wise Irrigated Area in: 2010-11

(in Hectare)

Sl. No	Name of District	Net Area Sown	Net Irrigated Area	Col 4 as % of Col 3	Rank
1	2	3	4	5	6
1	Baksa	66085	13522	20.46	1
2	Barpeta	159311	1405	0.88	21
3	Bongaigaon	67635	448	0.66	24
4	Cachar	115386	3205	2.78	14
5	Chirang	46767	6367	13.61	5
6	Darrang	103833	11074	10.67	7
7	Dhemaji	67506	618	0.92	19
8	Dhubri	134349	843	0.63	25
9	Dibrugarh	139498	1068	0.77	23
10	Goalpara	80753	1940	2.40	15
11	Golaghat	119046	1376	1.16	17
12	Hailakandi	50294	4265	8.48	10
13	Jorhat	120240	520	0.43	27
14	Kamrup	177254	2090	1.18	16
15	Kamrup Metropolitan	43317	3997	9.23	8
16	Karbi Anglong	126399	24075	19.05	3
17	Karimgangj	76035	4806	6.32	12
18	Kokrajhar	86556	7398	8.55	9
19	Lakhimpur	100169	612	0.61	26
20	Morigaon	92011	6490	7.05	11
21	N.C.Hills	28171	4056	14.40	4
22	Nagaon	235626	30352	12.88	6
23	Nalbari	67730	671	0.99	18
24	Sibsagar	136822	1208	0.88	22
25	Sonitpur	165141	9144	5.54	13
26	Tinsukia	104714	953	0.91	20
27	Udalguri	99949	19261	19.27	2
	Barak Valley	241715	12276	5.08	
	Assam	2810597	161764	5.76	
	India	141580000	60600000	42.80	

Source: Directorate of Economics and Statistics, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India, http://eands.dacnet.nic.in

However, it is rather surprising that the predominantly hill districts of Dima Hasao (previously known as North Cachar Hills) and Karbi Anglon, inspite of not being agriculturally forward districts, are having a significant net irrigated areas under irrigation.

3.1.4 Yield Rate

Yield rate is one of the important parameter that exhibits the conditions of productivity of land in an area. The higher the yield rate, the higher is the productivity of land. As yield rate is measured in terms of output per hectare, it essentially represents the productivity of land. While the yield rate is generally higher in case of fertile land, it is lower in case of barren land. It may be observed from table 3.4 that Assam is lagging far behind in all lines of agricultural production. The yield rate of Assam is substantially lower than that of national average in case of foodgrains, non-foodgrains as well as oil seeds (table 3.4). The same for Barak Valley are slightly lower than the state average. While in case of foodgrains, the yield rate of Assam stands around 95 per cent of the national yield rate, the same for oil seeds amounts to only 56 per cent. In this case also, the Barak Valley exhibits lower yield than the state average. Like foodgrains, the similar trend is also visible in case of non-food grains. Yield rates for cotton, jute, mesta and sugarcane in Assam lag far behind than the national average. However, Barak Valley lags behind from state average yield rates of non-foodgrains crops. Thus, it may safely be conjectured that Assam suffers from disadvantages in all lines of agricultural production vis-à-vis the national average, and Barak Valley suffers from disadvantages in all lines of agricultural production except jute and mesta vis-a-vis state average.

3.1.5 Area, Production and Yield of Rice

Assam produces a number of crops like rice, wheat, jute, cotton, sugarcane, pulses and a number of horticultural products. However, rice is the major crop in Assam as it is the staple food of the local population.

Table 3.4: Area, Production and Average Yield of Foodgrains and Non-Foodgrains 2010-11

(Area in thousand Hect, Production in thousand Tonnes and Average yield in Kg / Hect)

Crop	Area			Production			Average Yield		
	India	Assam	Barak Valley	India	Assam	Barak Valley	India	Assam	Barak Valley
Foodgrains									
Total	126771	2766.49	236.62	229080	5105.50	484.63	1851	1763	1101
Oil Seeds									
Total	29048	297.64	5.39	27820	157.67	2.07	1039	581	496
Non-Foodgrains									
Cotton*	11235	1.40	0.18	25560	1.11	0.11	440	89.89	62
Jute and Mesta	910	67.24	0.16	11060	651.53	1.57	2176	1744	1770
Sugarcane	4740	29.74	0.63	324680	1076.33	21.19	68554	36196	35359

Source: For data relating to India, Directorate of Economics and Statistics, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India, http://eands.dacnet.nic.in. For data relating to Assam and Barak Valley, Ministry of Agriculture, Government of Assam, http://www.agriassam.in/Statistics/yearWise_2010-11-fieldCrops.pdf

For data relating to cotton in Assam and Barak Valley, http://apy.dacnet.nic.in/crop_fryr_toyr.aspx

* in '000 bales

Out of 3.02 million hectares of cultivable land in Assam (table 3.2) in 2011-12, 2.55 million hectares are under rice cultivation (table 3.5), i.e., about 84 percent of the cultivable land is under rice cultivation. This shows that rice is the predominant crop in Assam and the state lacks cropping diversity. In case of India, out of 182 million hectares of cultivable land, 43.97 million hectares, i.e., about 25 percent of the cultivable land is under rice cultivation. This shows that about one-fourth of cultivable land is used for the production of the main staple food of the people of the country. This also indicates that Indian agriculture does not suffer from lack of cropping diversity like agriculture in Assam. However, in case of Barak Valley, agriculture has remained far more traditional compared to national and regional trends. In 2011-12, out of 0.26 million hectare of cultivable land in the Barak Valley, 0.23 million hectare, i.e., 88 percent was under rice cultivation. This shows lack of crop diversification among the cultivators in the Valley. It may be noted that traditional agricultural practices is more pronounced at the local level particularly in areas far away from the national market centres like Barak Valley. One of the plausible reasons for such phenomenon might be the operation of the weak forces of market which stand on the way of commercialization of agriculture in the peripheral regions like the Barak Valley.

3.1.6 Cropping Intensity

It has already been pointed out in section 3.1.1 that Assam does not have much cultivable waste land and hence have to develop intensive cultivation in order to meet the growing demand of food for the growing population. Cropping intensity refers to raising a number of crops from the same field during one year. Thus, higher cropping intensity means that a higher portion of the net area is being cropped more than once during one year. This also implies higher productivity per unit of arable land during one agricultural year. For instance, suppose a farmer owns five hectares of land, and gets the crop from these five hectares during the kharif season and, again, during the rabi season he raises a crop from three hectares. He, thus, gets the effective produce from eight hectares, although he owns only five hectares physically. Had he raised crop from five hectares totally, his cropping intensity would have been 100 per cent, while now it is 160 per cent.

Table 3.5: Area, Production and Yield of Rice

(Area: Million Hectares, Production: Million Tonnes and Yield: Kg. /Hectare)

Year	Area			Production			Yield Rate		
	India	Assam	Barak Valley	India	Assam	Barak Valley	India	Assam	Barak Valley
2001-02	44.90	2.54	0.22	93.34	3.85	0.48	2079	1519	2182
2002-03	41.18	2.54	0.23	71.82	3.74	0.49	1744	1472	2130
2003-04	42.59	2.53	0.29	88.53	3.45	0.47	2077	1366	1620
2004-05	41.91	2.36	0.22	83.13	3.47	0.40	1984	1472	1818
2005-06	43.91	2.42	0.23	91.79	3.55	0.43	2102	1619	1869
2006-07	43.81	2.19	0.22	93.35	2.91	0.39	2131	1412	1772
2007-08	43.91	2.32	0.22	96.69	3.32	0.31	2202	1428	1409
2008-09	45.54	2.48	0.24	99.18	4.01	0.53	2178	1614	2208
2009-10	41.85	2.53	0.24	89.13	4.41	0.52	2129	1765	2292
2010-11	43.87	2.57	0.23	95.98	5.03	0.48	2239	1983	2152
2011-12	43.97	2.55	0.23	104.32	4.72	0.52	2372	1876	2311

Source: For data relating to India, 2001-09, Directorate of Economics and Statistics, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India. http://eands.dacnet.nic.in, and for 2010-12, http://agritech.tnau.ac.in/agriculture/agri_cropscenario_india.pdf.
For data relating to Assam, 2001-2012, Directorate of Economics and Statistic, Ministry of Agriculture, Assam, http://ecostatassam.nic.in/

It is evident from table 3.6 that Assam is not lagging behind the national average as far as the cropping intensity is concerned. Among the districts, Cachar, Dhubri,

Dibrugarh, Hailakandi, Jorhat, Kamrup, Karimgangj, Morigaon, Nagaon, Sibsagar, Tinsukia are below the state average and Barpeta, Bongaigaon, Dhemaji, Goalpara, Darrang, Karbi Anglon, Kokrajhar, Lakhimpur, N.C. Hills, Nalbari, Sonitpur are above the state average in terms of the cropping intensity in Assam. It may be noted that as far as the cropping intensity is concerned, the Barak Valley lags behind the state average (table 3.6).

Table 3.6: Cropping Intensity[1] in Assam 2010- 11

(in Hectares)

Sl. No	Name of District	Total Cropped Area	Net Area Sown	Cropping Intensity
1	2	3	4	5
1	Baksa	137955	66085	208.75
2	Barpeta	264732	159311	166.17
3	Bongaigaon	104698	67635	154.80
4	Cachar	160728	115386	139.30
5	Chirang	89679	46767	191.76
6	Darrang	154137	103833	148.45
7	Dhemaji	120243	67506	178.12
8	Dhubri	172980	134349	128.75
9	Dibrugarh	161031	139498	115.44
10	Goalpara	131800	80753	163.21
11	Golaghat	184885	119046	155.31
12	Hailakandi	73246	50294	145.64
13	Jorhat	177377	120240	147.52
14	Kamrup	181015	177254	102.12
15	Kamrup Metropolitan	48561	43317	112.11
16	Karbi Anglong	202564	126399	160.26
17	Karimgangj	103474	76035	136.09
18	Kokrajhar	179533	86556	207.42
19	Lakhimpur	206501	100169	206.15
20	Morigaon	126417	92011	137.39
21	N.C.Hills	56483	28171	200.50
22	Nagaon	289212	235626	122.74
23	Nalbari	113916	67730	168.19
24	Sibsagar	146734	136822	107.24
25	Sonitpur	265397	165141	160.71
26	Tinsukia	146916	104714	140.30
27	Udalguri	159311	99949	159.39
	Barak Valley	337448	241715	139.61
	Assam	4159525	2810597	147.99
	India	197323000	141559000	139.39

Source: Directorate of Economics and Statistics, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India, http://eands.dacnet.nic.in

It might be of some interest to note that similarity of cropping intensity at the national (140.54), regional (147.99) and local (139.61) levels may not be interpreted as the similarity of agricultural environment in all these three tiers. It appears only to be coincidental that the cropping intensity indices at the three levels do not exhibit any significant divergence inspite of the fact that the agricultural environments are diametrically opposite at the national and regional levels. While at the national level, planned development of irrigation facilities plays an important role behind the multiple cropping that prompts to higher index of cropping intensity, at the regional and local levels it is the availability of adequate surface water from the Brahmaputra-Barak river system and occurrence of high level of precipitation have made multiple cropping and higher cropping intensity possible. Thus, in no way similarity in cropping intensity indices among national, regional and local levels represents a situation of level playing fields for agriculture at these three levels.

3.1.7 Crop Diversification

Crop diversification is an important indicator of agricultural development. It is practiced as a strategy to maximize the use of land, water and other resources in a country/region. It provides the farmers with viable options to grow different crops on their land. The diversification in agriculture is also practiced with a view to avoid risk and uncertainty due to climatic and biological vagaries. It minimizes the adverse effects of the current system of crop specialization and monoculture for better resource use, nutrient recycling, reduction of risks and uncertainty and better soil conditions. It also provides better economic viability with value-added products and improvement of ecology (Acharya, et al: 2011).

Crop diversification in India is generally viewed as a shift from traditionally grown less remunerative crops to more remunerative crops. The crop shift (diversification) also takes place due to governmental policies and thrust on some crops over a given time, for example, creation of the Technology Mission on Oilseeds (TMO) to give thrust on oilseeds production as a national need for the country's requirement for less dependency on imports. Crop diversification is practiced in rain fed lands to reduce the risk factor of crop failures due to drought or less rains (Hazra: 2001). Crop diversification is usually measured in terms of percentage distribution of the gross

cropped are under different crops in a particular year. Table 3.7 represents this dimension of crop diversification on temporal and comparative scale. It might be noted that area under rice has been consistently declining at the national level. Although in case of Assam the area under rice cultivation has declined from 64.67 percent in 2000-01 to 61.29 percent in 2005-06, but it has registered a slight increase in 2010-11 to 61.79 percent. However, the Barak Valley region follows the national trend of consistent decline in the percentage of gross cropped area under rice cultivation. It might be noted that Assam has much higher percentage of area under rice cultivation compared to the national average. Similarly Barak Valley has higher percentage of area under rice compared to the state average.

It is evident from table 3.7 that rice predominates in cereals production in Barak Valley. This is also true in case of Assam. However, at the national level, non-rice cereals like wheat, bajra, millet, etc, predominates in the cereal category. This is mainly because of the fact that the soil and climatic conditions in eastern India are conducive for rice production which is also the staple food of the people in this part of the country. Although pulses are also grown in Assam and Barak Valley, but area under pulses both at the state and local levels are not significant.

It is important to note that at all the three levels--national, regional and local level, much of the gross cropped area are used for the production of food grains although the quantum of area under food grains exhibits a decreasing trend over time. The temporal variation shows a decline in area under food grains both at the national and state level (Assam) in 2000-01 and 2005-06. However, a slight increase in areas under food grains has been noticed in 2010-11. In case of Barak Valley, the temporal trend does not exhibit any hump and has consistently declined since 2000-01. At a comparative scale, area under food grains is highest at the local level (Barak Valley) and lowest at the national level which might be interpreted as less crop diversity at the local level compared to state and national levels.

Unlike foodgrains, the area under fruits at the national level has shown an increasing trend. However, the same for Assam and Barak Valley have declined from 2.61 and 3.37 percent in 2000-01 to 2.59 and 2.92 percent in 2005-06. However it has registered a slight increase in 2010-11. It might be noted that percentage area under fruits in Assam as well as Barak Valley are higher than the national average may be

due to the congenial climatic conditions for horticulture. The same is also true in case of area under vegetables which is far higher in Assam and Barak Valley compared to the national average (table 3.7).

Table 3.7: Percentage Share of Principal Crops in Total Cropped Area in Barak Valley, Assam and India

Year	State/ Region	Rice	Cereals	Pulses	Food grains	Fruits	Vegetables	Food Crops	Oil Seeds	Fiber	Plan-tation crops	Non-food crops	Total
2000-01	Barak Valley	72.26	72.31	1.40	73.71	3.37	4.06	85.96	1.71	0.13	5.56	14.04	100
	Assam	64.67	67.14	2.72	69.87	2.61	4.48	81.47	8.25	2.21	6.91	18.53	100
	India	24.15	54.69	11.51	66.19	1.89	2.54	74.72	13.29	5.24	1.16	25.28	100
2005-06	Barak Valley	68.39	68.45	2.21	70.66	2.92	8.18	86.31	1.91	0.11	11.45	13.69	100
	Assam	61.29	63.23	2.54	65.77	2.59	8.68	82.02	6.79	1.96	8.03	17.98	100
	India	22.78	51.84	11.62	63.08	2.10	3.05	73.24	15.83	5.02	1.24	26.76	100
2010-11	Barak Valley	67.99	68.09	2.03	70.12	3.41	7.96	86.01	1.60	0.12	11.76	13.99	100
	Assam	61.79	63.47	3.04	66.51	2.91	7.66	82.12	7.16	2.01	7.43	17.88	100
	India	22.05	51.24	13.27	63.71	2.17	2.71	73.51	14.60	5.96	1.32	26.49	100

Source: For data relating to Barak Valley and Assam , Directorate of Economics and Statistic, Department of Agriculture and Cooperation, Ministry of Agriculture, India, http://eands.dacnet.nic.in/, and for data relating to India, www.Indiastat.com

In sum, it might be noted that the ratio of area under food crops to area under non-food crops is found to be highest at the local level (Barak Valley), and lowest at the national level and in between at the regional level (Assam). This ratio for Barak Valley was about 86:14 for all the reference years as shown in table 3.7. For Assam, it was 81:19 in 2000-01 which has subsequently changed to 82:18 in 2005-06 and 2010-11. However, in case of national level, this ration was 75:25 in 2000-01, 73:27 in 2005-06 and 74:26 in 2010-11. This also indicates that farmer's practice more crop diversification at the national level compared to the state level. Similarly, farmers at the state level practice more crop diversification compared to the local level, i.e., at the level of Barak Valley. If crop diversification is considered to be an index of modernization of agriculture, then agriculture in Barak Valley is least modernized.

3.1.8 Average Holding

The average size of holding is an indicator that exhibits the nature of distribution of cultivable land. A skewed distribution in which larger operated area remains in the hands of few exhibits unequal asset distribution which may, in turn, be responsible for the income inequality in the society. In a market economy, there is a built-in tendency for the concentration of land in the hands of a smaller segment of holders. In order to prevent such concentration, governments in most countries undertake land reforms in order to ensure redistribution of land remove the intermediaries, protect the interest of the tenants, etc. Information relating to land holding pattern is, thus, important to understand the political economic dynamics of the development of agriculture in an area.

From table 3.8 it is seen that the fragmentation of holding is more in Assam compared to the national average. While in Assam, 67.31 percent of the holdings belong to the marginal category which covers only 25.83 percent of the area operated, at the national level marginal holdings constitute 67.10 percent of the total holding and they cover 22.50 per cent of the operated area.

Table 3.8: Holding and Area Operated 2010-11

(in per cent)

Types of Holding	India		Assam		Barak Valley	
	Number of Holding	Area Operated	Number of Holding	Area Operated	Number of Holding	Area Operated
Marginal (Below 1 hec)	67.10	22.5	67.31	25.83	63.73	21.45
Small (1-2 hec)	17.91	22.08	18.26	22.93	20.22	22.83
Semi-Medium (2-4 hec)	10.04	23.63	11.16	27.27	12.61	26.86
Medium (4-10 hec)	4.25	21.2	3.12	14.58	3.07	11.78
Large (10 hec & above)	0.70	10.59	0.15	9.39	0.33	17.07
Total	100.00	100.00	100.00	100.00	100.00	100.00

Source: For data relating to India and Assam, Agriculture Census 2010-11, All India Report on Number and Area of Operational Holdings, Agriculture Census Division Department of Agriculture & Co-Operation, Ministry of Agriculture, Government of India, 2014 http://agcensus.nic.in/document/agcensus2010/CompleteReport.pdf. For data relating to Barak Valley, Government of Assam, Agricultural census, data base 2010-11, Assam Report on Number and Area of Operational Holdings, Directorate of Economics and Statistics, Government of Assam . http://agcensus.dacnet.nic.in/districtsummarytype.aspx

In case of small holding, Assam also has higher percentage of holding compared to the national average. While 3.12 percent of the total holdings in Assam covering 14.58 percent of the operated area constitute the medium holdings, the same for the national average constitutes 4.25 percent of the total holdings covering 21.2 percent of the total area operated. Similarly, Assam has 0.15 percent large holding covering 9.39 percent of the total area operated while the same for the national average stands at 0.70 percent covering only 10.59 percent of the total operated area. As far as the average size of holding in Barak Valley is concerned, it is evident from table 3.8 that fragmentation of land is comparatively less in the Bark Valley compared to the state average. However, it is quite surprising to note that while only 9.39 percent of the operated area in Assam is under large holding (10 hectare and more), the same for Barak Valley stands at 17.07 percent. The probable reason for such a vast area under large holding in the Barak Valley might be due to the fact that the total operated area in the Valley forms only 8.30 percent of the total operated area of the state (GOA, 2005-06). Being studded with tea plantation and large areas covered under marshy land and bills (water bodies), the area under large holding has remained comparatively higher in Barak Valley compared to the state average.

3.2 Agricultural Marketing

Agricultural marketing can best be defined as series of services involved in moving a product from the point of production to the point of consumption Thus agricultural marketing is a series of inter-connected activities involving: planning production, growing and harvesting, grading, packing, transport, storage, agro and food processing, distribution and sale (Acharya and Agarwal: 2011).

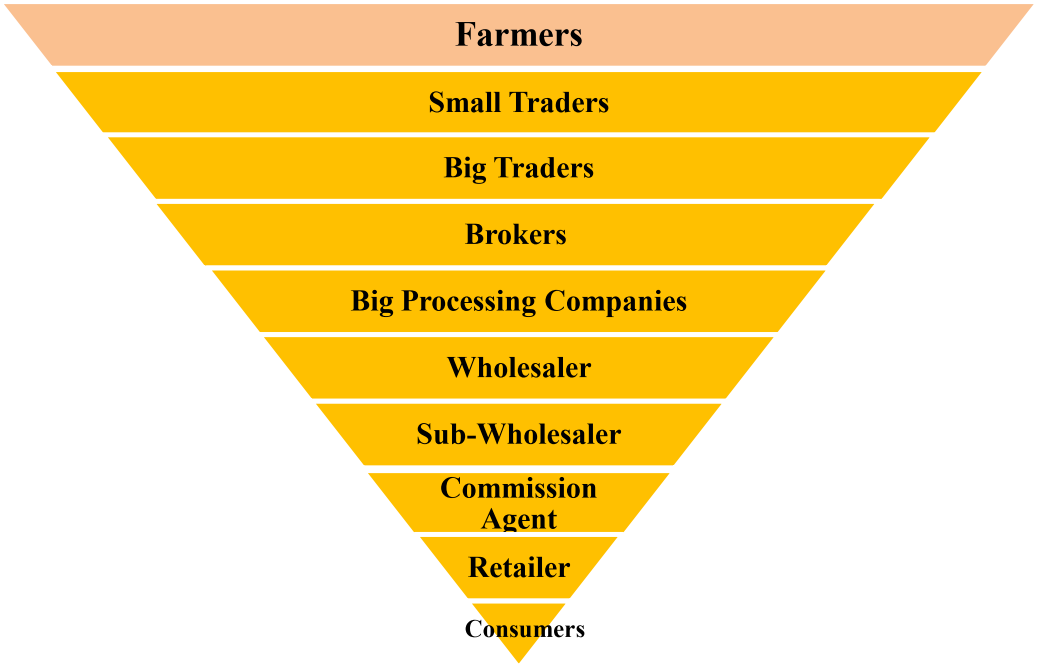
Agricultural marketing plays the role of catalyst in the growth of agricultural sector. If the product market is not well developed, agriculture will remain at the subsistence level. If there is no mechanism to dispose of agricultural goods, farmers will not produce any marketable surplus. If agricultural input markets are not developed, farmers will not have equal access to those inputs and hence this will negatively impact the land as well as labour productivity in agriculture. Thus, it is the agricultural marketing that smoothens out inter-sectoral flow of resources and

energizes economic growth. There are several channels in India through which agricultural commodities move from the farm to consumers. Marketing channels for agricultural commodities can be broadly divided into four groups viz., (a) direct from farmers to consumers; (b) through public agencies or cooperative organizations; (c) through private wholesalers and retailers; and (d) through processors. Acharyya (2004) observed the following characteristics of agricultural marketing in India: (i) the proportion of total marketed surplus going directly from farmers to consumers continue to be small. (ii) the share of private trade in handling marketed surplus has continued to be large. Taking all agricultural commodities together, the marketed surplus handled by cooperatives have been estimated as 10 percent, and by public agencies 10 percent. The private trade handles around 80 percent of the total marketed quantities of agricultural commodities. Even in the case of cereals, where government intervention is perceived to be quite high, the share of private trade in total marketed surplus was 72.5 percent during triennium ending was 71.1 percent during 2000-01. The private trade during 2000-01 handled more than 100 million tonnes of cereals. With larger quantities required to be handled by the private trade, the size and structure of the market have considerably expanded.

Supply Chain

An efficient marketing system provides an incentive to farmers to produce more. The agricultural market in India today is dominated by rural primary markets that meet local demand. Secondary markets that serve distant demands and wholesale markets that gather large amounts of produce from different sources for the retailers in the country have not developed uniformly across the geographical space. As a result, the location of market near the village acts as a major determinant of the decision on selling location. It has been noted at times that the markets are generally placed quite far from most of the villages and therefore, the small and medium farmers found it economic to sell their produce to the intermediaries. The supply chain of the agricultural produce generally prevalent in the country could be shown with the help of the following diagram.

Flow Chart 1: The Agrarian Supply Chain of Rice in India



Intermediaries at various stages

The direct impact of the emergence of intermediaries is the realization of lower prices by the farmers. The intermediaries appropriate a sizable proportion of the final sales as their service charges. Since each intermediary works out a margin for himself keeping the cost escalation in the next phase in mind, it is the farmer (being the first seller) who bears the ultimate cost[2].

3.2.1 Types of Agricultural Markets

Agricultural markets may broadly be divided into two types: (i) Wholesale markets and (ii) Rural Primary Markets. However, on the basis of government control, the markets can again be typified as (i) Regulated Markets and (ii) Unregulated Markets.

While the wholesale markets deal with the buying and selling of agricultural produces in bulk quantities, the rural primary markets include mainly the periodical markets known as haats, shandies, painths and fairs which are located in rural and interior areas and serve as focal points to a great majority of the farmers – mostly small and

marginal for marketing their farm produce and for purchase of their consumption needs. The rural primary markets also function as collection centres for adjoining secondary markets. Wholesale markets can again be subdivided into three categories: (I) Primary Wholesale Markets, (II) Secondary Wholesale Markets, and (II) Terminal Markets.

(I) Primary Wholesale Markets: These markets are periodically held, either ones or twice a week. Agricultural produce comes from neighboring villages. These markets deal in the sale of fruits, vegetables, foodgrains, all household requisites etc., e.g., village markets

(II) Secondary Wholesale Markets: These are also known as mandis. These are situated generally at district or taluka headquaters. Small merchants purchase from primary wholesale market and sale in these markets. Some cultivators directly sell their produce in these markets. Each market covers an area with a 10-20 miles radius, e.g., District and Taluka Markets.

(III) Terminal Markets: These are the markets in which the produce is either finally disposes off direct to consumer or processors or assemble for shipment to foreign countries. These markets are the parts where warehouses and storages are available. These markets cover a wide area, may be, a state.

It may be noted that Assam has 405 whole sale markets which comprises of 6.24 percent of all such markets in the country in 2012. Among the major states of India, Maharashtra has the highest number of whole sale markets which constitutes 13.58 percent of the country's total number of such markets (Appendix 3.2). As far as the whole sale markets are concerned, Assam is better placed compared to West Bengal, Tamil Nadu, Orissa, Madhya Pradesh, Kerala, Haryana, Bihar and Andhra Pradesh. However, this lead for Assam peters out in case of rural primary markets. Assam has only 735 rural primary markets while the same in Bihar is 1469, in Kerala 1014, in Madhya Pradesh 1321, in Maharashtra 3500, in Orissa 1150, in Uttar Pradesh 3464 and in West Bengal 2925. Given the territorial size of Assam, it requires to develop more number of such rural primary markets.

However, Assam lags far behind as far as the number of regulated markets is concerned. The state has only 20 principal regulated markets while Andhra Pradesh

has 331, Maharashtra 300, Tamil Nadu 277 and Uttar Pradesh 249 (Appendix 3.2) such markets. As far as the number of regulated sub-markets is concerned, Assam ranks far below from most of the major states. Thus, Assam has to establish more number of regulated markets in order to improve agricultural marketing network in the state.

Table 3.9: Number of Whole Sale, Rural Primary and Regulated Markets

(as on 31.03.2012)

District	Number of Markets			Regulated Markets		
	Wholesale Markets	Local Markets/ Rural Primary	Total	Principal Market Yards (PMY)	Submarket Yards (SMY)	Total
Barak Valley	15	149	165	0	20	20
Assam	405	735	1140	20	206	226
All India	6489	22,505	28,994	2456	4734	7190

Source: For data relating to India and Assam, http://agmarknet.nic.in/stminprreform.pdf and for data relating to Barak Valley, District Regulated Market Committee, Cachar, Karimganj and Hailakandi, http://asamb.in/index.php

As far as the marketing infrastructure in Barak Valley is concerned, it has 15 wholesale markets which form 3.70 percent of the total wholesale markets in the state of Assam. Similarly, there are 149 local markets in the Barak Valley which constitutes about 20.27 percent of the total such markets in the state. It is important to point out that there is not a single Regulated Principal Market Yard in the Barak Valley. As a result, agricultural marketing has remained extremely weak as the Sub-Market Yards work only as revenue collectors rather than providing marketing services to the buyers and sellers. However, the condition of agricultural marketing does not solely depend on the number of regulated markets in a state or region. Besides the number of markets, the facilities created in market yards play an important role in catering the services and widening the access to the farmers as well. The cleaning, grading and packaging of agricultural produce before sale by the farmers play a vital role in fetching a better price for the produce.

The benefits available to the farmers from regulated markets depend on the facilities/amenities available rather than the number of regulated markets in the area. Availability of both covered and open auction platforms, common drying yards, shops, godowns, cold storage, grading facilities, internal roads, boundary walls,

electric light, loading and unloading facilities and weighing equipments largely determine the efficacy of the regulated markets. Thus, besides the number of regulated markets, the quality of marketing services based on such parameters need to be evaluated in order to assess the condition of agricultural market in Assam. We shall focus on some of these parameters in the succeeding paragraphs.

3.2.2 Agricultural Marketing Infrastructure

While agricultural marketing infrastructure includes both the number of regulated and non-regulated markets, connectivity among the rural primary markets, district level/taluk level secondary markets and state level terminal markets, provision of facilities like storage, grading, etc, we shall focus here only those infrastructural facilities which are internal to a market instead of physical infrastructure required for inter-market connectivity.

(i) **Storage Infrastructures**

Storage facility is important on the following counts:

(i) It is necessary for carrying the agricultural produce from production seasons to consuming periods.

(ii) In the absence of adequate scientific storage facilities, farmers incur heavy losses in terms of huge wastage of quantity and quality of crops in general and of fruits and vegetables in particular.

(iii) Seasonal price fluctuations are caused in the absence of storage facility.

In terms of infrastructural facilities, the condition of agricultural marketing in Assam is far from satisfactory. Assam suffers from acute shortage of storage. As far as the storage capacity of the State Warehousing Corporation is concerned, Assam has 44 godowns with a storage capacity of 2.48 lakh metric tons (table 3.10). The state is having little less than 1 percent of total storage capacity in the country while the share of Punjab, Madhya Pradesh, Uttar Pradesh and Andhra Pradesh stands at 24.89, 17.55, 13.02 and 10 per cent respectively (Appendix 3.3). As far as Barak Valley is concerned, storage facilities are extremely limited. There is one godown in Cachar

having a storage capacity of 0.10 lakh MT and another godown in Karimganj having a storage capacity of 0.05 lakh MT (table 3.10). Except this, there are hardly any storage facilities in Barak Valley. Moreover, whatever storage capacity is available in the Valley, this is being used for storing foodgrains and food staffs by the FCI and other commercial agencies. There is hardly any scope for the local producer to use this storage facility.

Table 3.10: Storage Facilities under Assam State Warehousing Corporation

(as on June, 2013)

District	No of Godowns	Capacity (in lakh MT)
Barpeta	1	0.06
Bongaigaon	1	0.23
Cachar	1	0.10
Darrang	4	0.14
Dhemaji	5	0.12
Dibrugarh	1	0.06
Goalpara	1	0.08
Goalpara	1	0.04
Goalpara	1	0.02
Golaghat	2	0.05
Jorhat	1	0.01
Kamrup	10	0.64
Karbi-Anglong	2	0.06
Karimganj	1	0.05
Kokrajhar	1	0.02
Lakhimpur	1	0.05
Nagaon	6	0.38
Sivasagar	1	0.10
Sonitpur	1	0.06
Tinsukia	2	0.12
Barak Valley	2	0.14
Assam	44	2.48
All India	1659	250.93

Source:For data relating to India, Central Warehousing Corporation, 56 Annual Report 2012-13

http://www.cewacor.nic.in/Docs/an_report_dummy_2012-13.pdf, and for data relating to Assam , Assam State Warehouse Corporation , http://warehouseassam.com/occupancy.html

As has already been mentioned, organizations like Oil and Natural Gas Corporation (ONGC), Lafarge India Ltd, Indian Farmers Fertilizer Co-operative Ltd (IFFCO), Brahamaputra Valley Fertilizers Corporation Ltd. (BVFCL), Mc Leod Russel, Tata Tea Ltd, Assam Tea Corporation Ltd, District Rural Development Agency, (DRDA), Assam Bharat Sanchar Nigam Ltd. (BSNL), Technotive Eastern Pvt. Ltd, Jute Corporation of India Ltd. (JCI) and Food Corporation of India Ltd. (FCI) are the main users of these warehouse facilities. Local farmers hardly have any access to these warehouses. Besides public sector warehouses, there are a number of private godowns in both Cachar and Karimganj which are mainly used by the traders. As most of the farmers are either marginal or small holders, they hardly require large storage space and even if they wish to use the space in private godowns they cannot do that because of prohibitive transport cost. What is needed, i.e., the extension of warehousing facilities at the block level for the benefit of the small and marginal farmers, has not taken place in Assam.

(ii) Cold Storage

Availability of adequate cold storage capacity not only mediate the fluctuations in the prices of agro-produces but also save the farmers from price crash due to sudden rise in the supply of agro-products in the market immediately after the harvest. Due to inadequate cold storage facilities, farmers are compelled to bring their agro-produces in the market even if the price crash due to oversupply. Thus, cold storage is an important infrastructural facility that hedges the farmer from market risks. There are a total of 5381 cold storages (table 3.11) in the country with a total capacity of 244.51 lakh tonnes. Most of the cold storage units are in the private sector. Public and cooperative sector accounts for a very small capacity. There are only four states i.e. Punjab, Uttar Pradesh and West Bengal have more storage capacity compared to other Indian states (Appendix 3.4). Looking to the available quantities of perishable products, the cold storage capacity available in the country is inadequate and requires their promotion both in the production as well as consuming areas of the State.

However, Assam lags far behind from the major agriculture producing states in terms of cold storage facilities. In fact, it has the least number of cold storage among all the major Indian states. Next to Kerala, Assam has the second least cold storage capacity

(Appendix 3.4). So, more cold storage capacities need to be created in Assam and farmers' access in them needs to be ensured. This might be possible if cold storages are built under cooperative sectors where farmers would be the members of those cooperatives.

Table 3.11:District-wise Cold Storage in Assam (2013)

District	No. of Cold Storage	Capacity (Lakh MT)	Sector		
			Private	Co-op	Public
Barpeta	1	0.03	0	1	0
Cachar	2	0.10	2	0	0
Dhubri	3	0.02	1	0	2
Golaghat	1	0.04	1	0	0
Hailakandi	2	0.10	2	0	0
Kamrup	12	0.22	9	0	3
Karimgangj	2	0.07	1	1	0
N.C. Hills	2	0.10	2	0	0
Nagaon	3	0.12	2	1	0
Nalbari	1	0.04	0	1	0
Sonitpur	1	0.04	1	0	0
Tinsukia	2	0.09	2	0	0
Barak Valley	6	0.17	3	1	0
Assam	30	0.87	26	4	5
All India*	5381	244.51	4885	356	140

Note : * Data relating to 2009-10

Source: For data relating to India, http://iasri.res.in/agridata/13data/chapter6/db2013tb6_16.pdf, and for data relating to Assam, http://agmarknet.nic.in/asnew.htm

There are 6 cold storages in Barak Valley, 2 each in Cachar, Karimganj and Hailakandi. Out of six, 5 are under private ownership and 1 is under cooperative society. Both Kay Dee Cold Storage, Ltd, and Sri Lalit Cold Storage (P) Ltd, located at Silchar, are having a storage capacity 0.05 lakh MT each. Thus, a total storage capacity at Silchar is 0.10 lakh MT which is being used for multipurpose storage. Similarly, Hailakandi Vegetable Cooperative Society Ltd, and Dey's Cold storage (P) Ltd located at Hailakandi each having a storage capacity is 0.05 lakh MT. The total storage capacity of the district thus amounts to 0.10 lakh MT. Similarly, Barak Cold

storage at Badarpur and Cooperative Cold Storage at Golak Ganj are located at Karimganj and each of them is having a storage capacity 0.05 lakh MT and 0.02 lakh MT respectively. The total storage capacity in the district amounts to 0.07 lakh MT (agmarknet.nic.in/asnew.htm).

All of them are used by the traders for keeping their merchandize brought from outside of the Valley. Farmers hardly have any access to them. As a result, marketing of perishable agro produce keeps on suffering. At peak harvesting season of horticultural crops, markets are flooded with supply leading to crash in their prices and thereby yielding very low return to the cultivators. Thus the available cold storage capacity that has been created in the Barak Valley only serve the interests of the wholesale businesses by way of providing support to goods produced outside the region and brought here for selling into the local markets.

(iii) Grading

Grading and standardization of agricultural commodities is a *sine qua non* for efficient marketing. Grading and standardization of commodities also helps in collection and dissemination of accurate market information. Realizing the importance of the grading and standardization, a pioneer attempt has been made by the government of India through an enactment of legislation, viz., The Agricultural Produce (Grading and Marketing) Act, 1937. Under this act, the grade standard has been notified for 184 agricultural commodities so far. The commodities graded under this act bear AGMARK label on the products, which is an indication of purity and of quality goods. The AGMARK grading is done both for internal consumption and or for export.

Grading is being undertaken at the traders and producers level both for internal consumption and for export. To facilitate grading, grading centers have been established only in 1321 markets so far. The trend of the quantity of agricultural produce graded over time is a rising one. But the quantity graded at producer's level is still almost negligible. 956 laboratories (table 3.12) have been established for undertaking analysis of sample research and training of sponsored chemists. The spread of these laboratories as well as their availability per thousand Sq. Km is quite low.

On an average not even one laboratory is available for serving an area of one thousand square kilometer. As against this, there are 2 laboratories available to serve one thousand tone of produce at all India level. Such facilities are completely absent in all the North Eastern states, Sikkim and Goa. On examination of information of laboratory in relation to produce it has been observed that their availability is much below the all India average in the states of West Bengal, Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Jharkhand, Karnataka, Madhya Pradesh, Orissa, Punjab, Tamil Nadu and Uttaranchal.

Table 3.12: State-wise Grading Facilities in India (2009-10)

Sr No	Name of the State	No. of Grading Labs	No. of Grading Labs Per '000	
			Sq. Km	MT
1	Andhra Pradesh	44	0.17	1.12
2	Assam	0	0.00	0.00
3	Bihar	12	0.13	0.39
4	Gujarat	43	0.22	1.75
5	Haryana	82	1.85	3.93
6	Karnataka	44	0.23	1.62
7	Kerala	52	1.34	7.80
8	Madhya Pradesh	46	0.15	1.62
9	Maharashtra	68	0.22	2.17
10	Orissa	6	0.04	0.33
11	Punjab	62	1.23	1.92
12	Rajasthan	209	0.61	8.67
13	Tamil Nadu	47	0.36	1.86
14	Uttar Pradesh	153	0.64	2.09
15	West Bengal	24	0.27	0.58
All India		956	0.29	2.03

Source: Jairath (2013)

It is also important to note that there is not a single grading laboratory in Assam. While there are 956 grading labs in the country as a whole, 82 in Haryana, 209 in Rajasthan, 153 in Uttar Pradesh, and 62 in Punjab, it is extremely startling that the farmers of Assam are still deprived of this facility which plays an important role in pricing the agricultural goods.

(iv) Agmark

Agmark is an acronym for agricultural marketing. Agmark is a quality certification mark provided by the Government of India. It confirms the quality control and the best hygienic condition of the food. This certification also marks the food standard keeping in mind the requirements of WTO. This certification benefits all including the producer and the consumer. The sellers can sell their products easily and obviously it is a satisfaction mark for the buyers.

This certification is issued by the Directorate of Marketing and Inspection (DMI), Ministry of Agriculture, Department of Agriculture and Cooperation, Government of India. The Directorate is headed by the Agricultural Marketing Adviser to the Govt. of India (AMA). The Directorate has its Head Office at Faridabad (Haryana), Branch Head Office at Nagpur (Maharashtra) and 11 Regional Offices at Delhi, Mumbai, Chennai, Kolkata, Hyderabad, Chandigarh, Jaipur, Lucknow, Bhopal, Kochi and Guwahati and the Central Agmark Laboratory at Nagpur. Besides, there are 26 Sub-Offices, 16 Regional Agmark Laboratories (RALs) spread all over the country. Under the Guwahati Regional office, one Sub-office is located in Shillong and one laboratory is located in Guwahati. Both the Guwahati Regional Office and Shillong Sub-office can issue Agmark certificate for export consignment of an article graded and marked provision of the Agmark Act.

(v) Market Information System

AGMARKNET is an information and communication technology (ICT) based "Agricultural Marketing Information Network' which was introduced in India in March, 2000, to link important agricultural produce markets spread all over the country and the State Agriculture Marketing Boards and Directorates. The project is being executed with the technical support of National Informatics Centre (NIC). The scheme has made rapid strides during 2001-02 and 2002-03. A total number of 810 nodes have been covered under the scheme comprising 735 agricultural produce markets and State Agricultural Marketing Boards/ Directorates etc. Necessary Computer hardware and system software tools have been supplied to all the nodes and as many as 500 market nodes have become functional by April, 2003. A user friendly software package 'AGMARK', developed to facilitate organization and transmission

of market data, has been implemented in the markets. In order to strengthen interface with farmers and other beneficiaries, AGMARKNET portal (http:// agmarknet.nic.in) has been evolved. 300 plus markets are regularly reporting price related data which is being disseminated through the portal. The AGMARKNET portal also serves as a single window for accessing websites of various organizations concerned with agricultural marketing. It provides weekly trend analysis for important markets in respect of major commodities. It is also linked with Online Commodity Exchange of India Limited, providing prices in respect of oilseeds, fibre crops etc. International price trends of various agricultural commodities available on FAO website are also accessible through the portal. The portal is constantly being enriched. During the X Plan, the scheme is planned to be extended to cover 2000 more agricultural markets in the country. Out of the existing 7300 wholesale markets in the country, 2735 i.e. 37 percent would have on-line facility under the scheme by the end of X Plan. In order to facilitate market access of farm produce to larger markets, the proposed scheme will additionally provide information on market requirements in terms of quality, packing, standards, sanitary and phytosanitary conditions, etc. The scope of data collection and dissemination will be enlarged to provide information regarding pack-size, packaging material and marketing charges in a market where goods are to be delivered, facilities available to farmers in a buying market, re-handling of the produce, etc. At the the end of X Five Year Plan, a total number of 2965 nodes have been covered under the scheme. The Scheme is planned to be continued during the XI Plan period by enhancing its scope to cover 500 additional markets including remaining principal regulated markets, if any, farmer/ consumer markets, private markets, panchayat markets, urban markets and special commodity markets.

It may be pointed out that Assam also far behind from other major states in India in terms of number of Agmark Nodes which provide all types of market information to the farmers. While states like Andhra Pradesh has 334, Gujarat 319, Maharashtra 346, Haryana 150 and Punjab 199, Assam has only 23 (Appendix 3.5). In fact, Assam has the least number of Agmark Nodes per 1000 sq. km. among all the major states in India. Concerted efforts are required to expand the agmarknet nodes in the state of Assam.

It might be noted that except two hill districts of Karbi Anglong and Dima Hasao and Morigoan, all the districts are having at least one Agmarknet Node. Agriculturally

advanced districts like Nagaon, Barpeta and Kamrup are having two Agmarknet Nodes each. As far as the use of these Agmark Nodes in the Barak Valley is concerned, it has been gathered from the farmers in sample villages that they are not at all aware of them and have never visited any such Nodes. It has been gathered from the agricultural extension workers that these nodes are located within the District Agriculture Office and work only within the office hours. Hardly the farmers visit these Nodes for any information.

Table-3.13: Distribution of Agmark Nodes in Assam[3] (2013)

District	No of Agmark Nodes
Barpeta	2
Bongaigaon	1
Cachar	1
Darrang	1
Dhemaji	1
Dhubri	1
Dibrugarh	1
Goalpara	1
Golaghat	1
Hailakandi	1
Jorhat	1
Kamrup	2
Karbi Anglong	0
Karimgangj	1
Kokrajhar	1
Lakhimpur	1
Morigaon	0
N.C. Hills	0
Nagaon	2
Nalbari	1
Sibsagar	1
Sonitpur	1
Tinsukia	1
Barak Valley	3
Assam	23
All India	3011

Source:For data relating to India, Jairath (2013), and for data relating to and Assam district level, http://agmarknet.nic.in/mktcodes.asp

(vi) Transport and Communication Infrastructure

A well-developed and efficient system of transportation is the key for the effective functioning of markets. It reduces the transport time and costs of transportation of the commodities. Roads in an economy are just like the arteries in human body for blood circulation. Transportation bottlenecks are a major stumbling block for the development of the north eastern region. As the 72 percent of the region is hilly, internal communication system is very weak that discourages farmers to produce marketable surplus.

Appendix 3.6 shows total and surfaced length of roads among the major states in India. It is evident that developed states like Gujarat, Haryana, Punjab, Maharashtra and Tamil Nadu are having more than 80 percent of total roads surfaced. Similarly states like Uttar Pradesh, Andhra Pradesh, Madhya Pradesh and Karnataka have about 60 percent of their total road surfaced. However, the condition of Assam is very precarious. Only 18.83 percent of Assam's total road is surfaced, compared to the national average of 55 percent. This shows underdeveloped infrastructural condition in Assam which stands on the way of the development of agricultural marketing.

Table 3.14 shows PWD road length per 100 sq. km, of geographical area in the districts of Assam. Udalguri, Sibsagar, Nalbari, Kamrup and Goalpara are the more developed districts where road length per 100 sq. km. of geographical area is above 80. Similarly districts like Barpeta , Dhubri , Golaghat, Jorhat, Kamrup(M), Morigaonn, and Nagaon have about 60 km road per 100 sq. km, of geographical area in Assam. However, the position of Barak Valley is very poor. It is only 30.72 in Cachar, 35.64 in Hailakandi and 51.74 in Karimganj district. In all the three districts of Barak Valley, the road length per 100 sq km is less than the state average. It indicates that infrastructural condition in Barak Valley is not well developed which stands on the way of the development of agricultural marketing.

(vii) **Processing Infrastructure**

Food-processing sector plays a significant role in diversification and commercialization of agriculture. Processing not only adds value to the products but also generates income and employment in the economy. Processing industries use

agro-products as raw materials and thereby generate industrial demand for agricultural produces. This encourages the farmers to produce more as they get remunerative prices for their products. In the absence of processing industries, farmers incur a huge post-harvest loss of fruits and vegetables.

Table 3.14: District-Wise Length of PWD Roads in Assam (in km)

(as on 31.03.2012)

District	Surfaced / Black Topped	Total	% of Surfaced to Total Length	Road Length Per 100 Sq. Km. of Geographical Area
Baksa	480	1101	43.60	54.84
Barpeta	920	1824	50.44	68.13
Bongaigaon	501	805	62.24	46.66
Cachar	714	1163	61.39	30.72
Chirang	398	660	60.30	33.42
Darrang	660	1066	61.91	57.6
Dhemaji	532	1340	39.70	41.4
Dhubri	704	1154	61.01	69.35
Dibrugarh	962	1738	55.35	51.4
Goalpara	633	1550	40.84	84.98
Golaghat	1164	2480	46.94	70.82
Hailakandi	299	473	63.21	35.64
Jorhat	848	2051	41.35	71.94
Kamrup	1926	3235	59.54	92.86
Kamrup(M)	405	457	88.62	72.87
Karbi Anglang	1320	4309	30.63	41.29
Karimganj	481	936	51.39	51.74
Kokrajhar	688	1841	37.37	58.16
Lakhimpur	590	1091	54.08	47.91
Morigaonn	510	1150	44.35	74.15
N.C. Hills	816	1876	43.50	38.38
Nagaon	1708	3120	54.74	78.53
Nalbari	610	965	63.21	95.59
Sibsagar	1053	2874	36.64	107.72
Sonitpur	984	2648	37.16	50.15
Tinsukia	809	1765	45.84	46.57
Udalguri	485	1828	26.53	109.2
Barak Valley	1494	2572	58.02	39.37
Assam	21200	45500	46.59	69.56

Source: Economic Survey , Assam, 2012 - 13, http://www.planassam.info/economic_survery_assam_2012-13/CHAPTER%20-%20XIII.PDF

Although the country offers vast potential for establishing agro-processing units like for oilseeds, food grains and sugarcane, etc, yet only 2.3 percent of total production of fruits and vegetables is being processed in the country. There are several thousands of bakeries, traditional food units and fruit/ vegetable/ spices processing units in unorganized sector in the country. In the organized sector there are over 516 flour mills, 568 fish processing units, 5293 fruits and vegetable processing units, 429 sugar mills, 725 solvent extraction plants and 1.50 lakh rice mills along with 35088 modern rice mills. There are more than 15 thousand pulse mills having 16 MT capacity spread over the country (Jairath, 2013).

Table 3.15: District-Wise Distribution of Registered Factories in Assam, 2011

Dristict	Registered Manufacturing Factories dealing with food products and beverages
Barpeta	17
Bongaigaon	5
Baksa	5
Cachar	75
Chirang	2
Darrang	32
Dhemaji	3
Dhubri	12
Dibrugarh	199
Goalpara	7
Golaghat	154
Hailakandi	23
Jorhat	155
Kamrup	169
Karbi Anglong	17
Karimgange	15
Kokrajhar	13
Lakhimpur	28
Morigaonn	8
N.C. Hills	3
Nagaon	105
Nalbari	7
Sibsagar	126
Sonitpur	107
Tinsukia	226
Udalguri	46
Barak Valley	113
Assam	1559

Source: http://databank.nedfi.com/content/registered-factories

However, as far as the north eastern region is concerned, the processing sector has remained very week. In Assam registered manufacturing factories dealing with food products and beverages stands at 1559 in 2011. While districts of Dibrugarh, Tinsukia, Sibsagar, Jorhat, Kamrup, Sonitpur, and Nagaon have more number of food processing units, districts like Nalbari, Baksa, N C Hills, Chirang, Dhemaji, Bongaigaon, Morigaonn, and Goalpara have very less number of food processing units. As far as the Barak Valley is concerned, there are only 113 registered food processing units (Table 3.15).

Based on the information and analysis pointed above, it is evident that poor agricultural conditions in Assam go hand in hand with the lack of development of agricultural marketing infrastructure. Although no attempt has been made here to establish any sorts of causality between these two, however, one can infer that there exit a two-way linkages between them. The availability of better agricultural marketing infrastructure encourages the cultivators to produce more and similarly better agricultural conditions and higher productivity will attract market forces to penetrate in an otherwise underdeveloped region. Thus, the strategy for the promotion of agriculture-led rural growth must factor into this dynamics between agricultural growth and agricultural marketing. As far as Barak Valley is concerned, condition of agricultural marketing is extremely poor mainly due to the absence of marketing infrastructure which substantiates the validity of our first hypothesis.

3.3. Conclusion

It has been observed that agricultural practices in Barak Valley follow traditional cropping pattern characterized by over emphasis on the cultivation of winter paddy. It has already been pointed out that in 2010-11, about 68 percent of the total cropped area in Barak Valley was dedicated for rice cultivation, while the same for Assam were 62 percent and the national average was 22 percent. This shows the lack of crop diversification in Barak Valley compared to both the regional and national level. Area under food crops in Barak Valley in 2010-11 is estimated at 86 percent of the total gross cropped area. The same for Assam is 82 percent and the national average is 74 percent. It is important to note that out of the 14 percent of the total gross cropped

area under non-food crops, 12 percent is under plantation crops in Barak Valley. Thus, food crops and plantation crops together cover about 98 percent of the total gross cropped area of the Valley indicating no pronounced shift towards cash crops. The cropping pattern in Barak Valley has largely remained traditional. Extremely weak marketing network appears to be acting as one of the drivers for the continuation of this traditionality in agricultural practices in the Valley. Thus, strengthening of agricultural marketing infrastructure is called for the modernization of agriculture in the Valley.

Notes

1. Cropping Intensity is calculated by dividing Total Cropped area by Net area sown and then multiplying the ratio by 100.

2. However, there is no denying of the fact that agricultural marketing intermediaries also play an important role by way of facilitating marketing of agricultural produces.

3. There are 27 districts in Assam at present. However, 4 districts have recently been created. These are Baksa, Chirang, Kamrup Metropolitan, and Udalguri. Baksa is carved out of a part of Nalbari, Barpeta, Kamrup and small portion of Darrang district in 2004. Similarly , Chirang is carved out of the districts of Kokrajhar, Bongaigaon and Barpeta in 2004. Kamrup Metropolitan was carved out of Kamrup district in 2003 and Udalguri is created from Darrang district in 2004. In some cases, district level data presented in this study refer to 23 districts as separate data for the new districts are not available.

References

Acharya, Saraswati Poudel, H. Basavaraja, L.B. Kunnal, S.B. Mahajanashetti and A.R.S Bhat, (2011), " Crop Diversification in Karnataka: An Economic Analysis", Agricultural Economics Research Review, Vol. 24 July-December 2011

Acharya, S.S, (2004), "Agricultural Marketing and Rural Credit: Status, Issues and Reform Agenda", presented during the first technical workshop of Policy Research Networking Project held on September 16-17, at NCAP, New Delhi.

Acharya, S.S and N.L. Agarwal, (2011), *Agricultural Marketing in India*, Fifth Edition, Oxford & IBH Publishing Co.Pvt.Ltd., New Delhi

Agriculture Census , (2010-11), *All India Report on Number and Area of Operational Holdings*, Agriculture Census Division Department of Agriculture & Co-Operation, Ministry of Agriculture, Government of India, 2014 http://agcensus.nic.in/ document/agcensus2010/CompleteReport.pdf (accessed on 01.02.2014)

Assam State Warehouse Corporation, http://warehouseassam.com/occupancy.html, (Accessed on 10 . 2.2014)

Central Warehousing Corporation, 56 Annual Report, (2012-13) , Government of India,http://www.cewacor.nic.in/Docs/an_report_dummy_2012-13.pdf, (Accessed on 9 . 2.2014)

Dhawan, B.D, (1998), "Irrigation in India's agricultural development: productivity, stability, equity", Occasional Paper, Institute of Economic Growth, New Delhi

Directorate of Economics and Statistic, Ministry of Agriculture, Assam, http://apy.dacnet.nic.in/crop_fryr_toyr.aspxhttp://ecostatassam.nic.in/, (Accessed on 03.02.2013)

Directorate of Economics and Statistics, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India, http://eands.dacnet.nic.in, (Accessed on 23.11.2013)

District Regulated Market Committee, Cachar, Karimganj and Hailakandi, http://asamb.in/index.php, (Accessed on 6 . 12.2013)

Economic Survey, Assam, (2012-13), Directorate of Economics and Statistics, Assam, Planning and Development Department, Government of Assam, http://www.planassam.info/economic_survery_assam_2012-13/CHAPTER%20-%20XIII.PDF, (Accessed on 15 April, 2014)

Food and Agriculture Organization, (2010), *FAO Statistical Yearbook 2010*.

Government of Assam, (2010), *Statistical Handbook*, Assam, Directorate of Economic & Statistics, Guwahati.

Government of Assam, Agricultural Census, data base, (2010-11), *Assam Report on Number and Area of Operational Holdings,* Directorate of Economics and Statistics, Government of Assam. http://agcensus.dacnet.nic.in/districtsummarytype.aspx, (Accessed on 01.02.2014)

Government of Assam, *Report on Agricultural Census 2005-06 on Number and Area of Operational Holdings,* Directorate of Economics and Statistics, Guwahati

Government of India (GOI), *Economic Survey* (ES), 2004-05, 2010-11, Ministry of Finance, New Delhi

Government Of India, (2013), *Basic Road Statistics of India 2011-12*, Ministry of Road Transport and Highways, Transport Research Wing, New Delhi, http://morth.nic.in/showfile.asp?lid=1163 and Data relating to Assam district level, (Accessed on 14 April, 2014)

Haggblade, Steven, Peter B. R. Hazell, and Thomas Reardon, (2007), *Transforming the Rural Nonfarm Economy: Opportunities and Threats in the Developing World*, Jon Hopkins University Press, Baltimore

Hazra, C R, (2001), "Crop Diversification In India", in Papademetriou, Minas K. and Frank J. Dent, (eds), *Crop Diversification in the Asia-Pacific Region*, Food and Agriculture Organization of the United Nations Regional office for Asia and the Pacific, Bangkok

http://agmarknet.nic.in, (Accessed on 1.4.2013)

http://agmarknet.nic.in/asnew.htm , (Accessed on18 .2. 2014)

http://agmarknet.nic.in/mktcodes.asp, (Accessed on 5.6.2014)

http://agmarknet.nic.in/stminprreform.pdf, (Accessed on 6 . 12.2013)

http://agritech.tnau.ac.in/agriculture/agri_cropscenario_india.pdf, (Accessed on 03-02-2013)

http://apy.dacnet.nic.in/crop_fryr_toyr.aspx, (Accessed on 09.02.13)

http://databank.nedfi.com/content/registered-factories, (Accessed on 4.6.2014

http://iasri.res.in/agridata/13data/chapter6/db2013tb6_16.pdf, (Accessed on 19.2.2014)

Jairath, M.S, (2013), "Agricultural Marketing Infrastructural Facilities In India – State Wise Analysis", http://www.cosamb.org/wp-content/uploads/2013/07/ MISINDIA-Cosamb(F).doc, (Accessed on 3.3.2014)

Lipton, Michael, Julie Litchfield and Jean-Marc Faurès, (2003), "The effects of irrigation on poverty: a framework for analysis", Water Policy, Vol 5

Mellor, John W, and Bruce F. Johnston, (1984), "The World Food Equation: Interrelations Among Development, Employment, and Food Consumption", Journal of Economic Literature, American Economic Association, Vol. 22, No. 2

Mellor, John W. and U.J. Lele, (1973), "Growth Linkages of the New food grains Technologies", Indian Journal of Agriculture Economics, Vol 18, No 1

Ministry of Agriculture, Government of Assam, http://www.agriassam.in/Statistics/yearWise_2010-11-fieldCrops.pdf, (Accessed on 23.11.2013)

Rangarajan, C,(1982), *Agricultural Growth and Industrial Performance in India*, Research Report 33, International Food Policy Research Institute, Washington, DC

Rao, C. H. H. Ray, S. K. Subbarao, K, (1988), *Unstable Agriculture and Droughts: Implications for Policy*, Institute of Economic Growth, New Delhi

The Economic Times (ET), (2013), "Agriculture's share in GDP declines to 13.7% in 2012-13", August 30, http://articles.economictimes.indiatimes.com/2013-08-30/news/41618996_1_gdp-foodgrains-allied-sectors, (Accessed on October 8, 2013)

World Bank (WB): http://data.worldbank.org/indicator/SL.AGR.EMPL.ZS. , (Accessed on May 29, 014).

www.Indiastat.com, (Accessed on 25.04.2014)

www.Indiastat.com, (Accessed on 25.04.2014)