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Agricultural production and productivity in Darrang district, Assam, India

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Abstract

Agricultural productivity means the ratio of index of total geographical outputs to the index of total inputs used in farm production. It is a measure of the efficiency with which inputs are used to derive maximum possible outputs. The agricultural production and productivity varies spatially and temporally with the variation of physical, socio-economic and technological factors. Thus, this study has been designed to know the pattern of agricultural production and its spatial variations within the different community development blocks of Darrang district in Assam. The study area includes the whole of new Darrang district where almost all the varieties of crops are cultivated. The region has been divided into high, moderate and low agricultural productivity regions. The study indicates that agricultural productivity varies among different social groups of farmers inhabiting in the district.

Keywords : Productivity, spatial variation, social groups

1. Introduction

The agricultural production and productivity varies spatially and temporally with the variation of physical, socio-economic and technological factors. Productivity means the ratio of the index of total geographical outputs to the index of total inputs used in farm production. It is therefore, a measure of the efficiency with which inputs are used to derive maximum possible outputs. The level of agricultural productivity means the degree to which the economic, cultural, technical and organizational variables (i. e . the man-made frame) are able to exploit the biotic resources of the area for agricultural production (Jasbir Singh 1979). The regional variations in physical output from the soils are the result partly of natural circumstances and partly of human manipulations of the land resources.

In the district Darrang, the population has been increasing at a faster rate and so there has been need of more and more amount of food crops to feed them. To solve the problem of the farm families of the district, the production of both food and commercial crops should be increased. To know the pattern of agricultural production and its spatial variations within the different community development blocks of the district, a study has been made in the 31 representative villages of the different community development blocks of the district to find out the per hectares production of major crops of these villages which are situated in different ecological and socio-cultural setup.

2. Study area

The study area includes the whole district of new Darrang in Assam, India. It is extending from 26°9/ North to 26°45/North latitude and 91°45/East to 92°22/ East longitude. It is surrounded by Udalguri district in the North; Morigaon district and a part of Kamrup district in the South; Zia Dhansiri River and a part of Udalguri district in the East and Kamrup and Baksa

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district and Barnadi in the West. The district has a geographical area of 185058 hectares and a population of 908090 persons according to 2011 census. The seven community development blocks are the spatial units for the meaningful study of such a topic of agricultural production and productivity in Darrang district, Assam. These seven community development blocks are Sipajhar, Pub-Mangaldai, Pachim-Mangaldai, Dalgaon-Sialmari, Bechimari, Kalaigaon (part) and Khairabari (part).

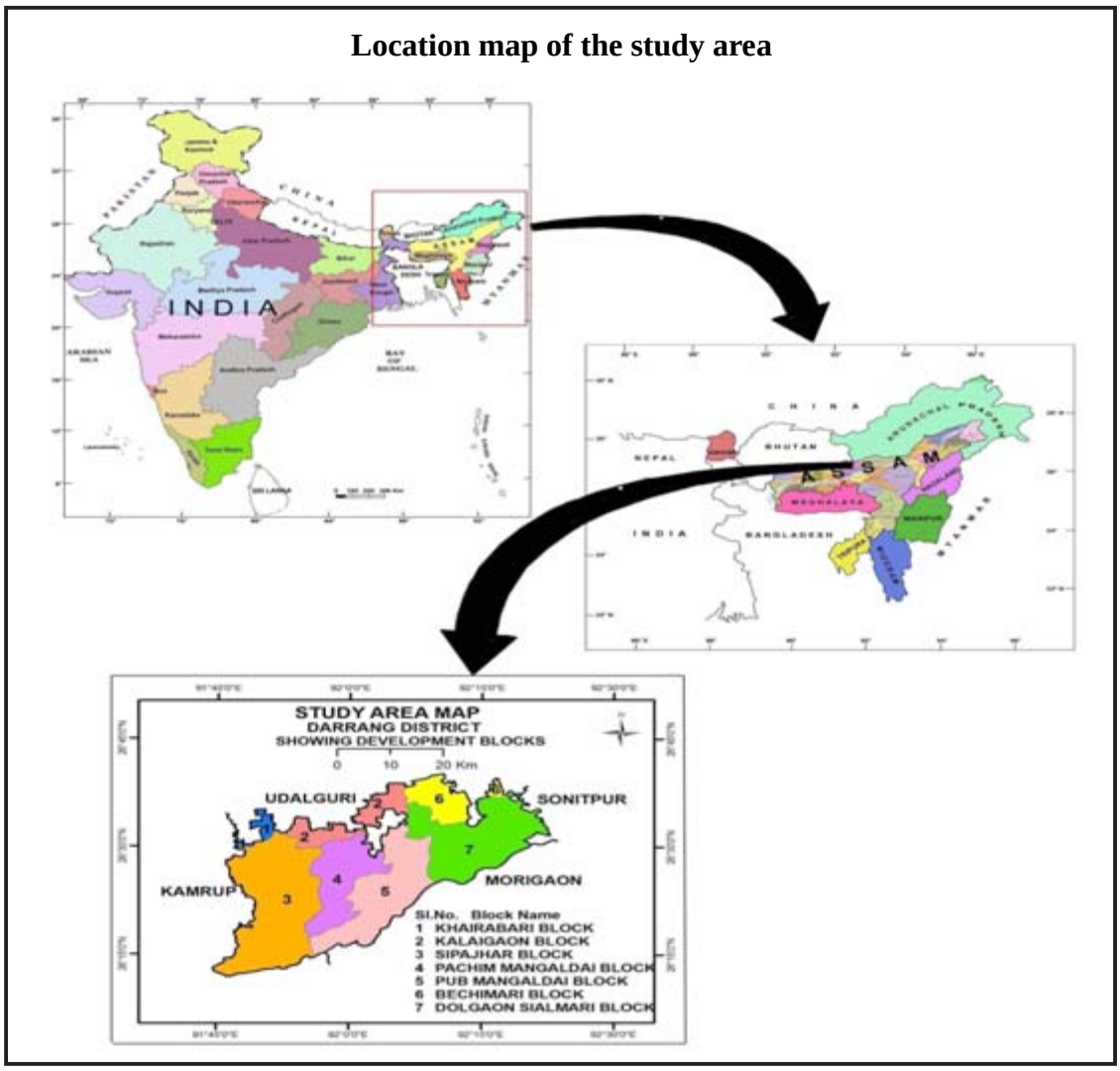

Fig. 1

3. Objectives

The main objectives of the study are

1. To examine the pattern of agricultural production and productivity in agriculture in the study seven community development blocks of the district.
2. To analyse the agricultural productivity in different social groups inhabiting in the different community development blocks of the district.

4. Methodology

The study has been done on the basis of both the primary and secondary data. The required primary data and information are collected through sample survey in 31 sample villages. From each sample villages, 30 percent of the sample households are selected. The samples are selected at random with certain qualitative stratification. The samples are distributed all over the seven community development blocks of the district. The primary data are collected by using a set of household survey questionnaire from these 31 sample villages.

The secondary data and information are collected from different state government offices like the Directorate of Census Office, District Agriculture

Office and block development offices of the district. The base map wherein the community development blocks are considered as spatial units of investigation is prepared by the Assam Remote Sensing Application Centre, Guwahati (ARSAC).

All the primary and secondary data have been processed and analysed by both traditional and sophisticated quantitative techniques.

5. Production of major crops

Almost all the varieties of crops are cultivated in the district. The major agricultural products of the district are winter rice (sali), summer rice (boro), autumn rice (ahu), maize, wheat, jute, rape & mustard, pulses, sesamum, linseed, sugarcane and different types of vegetables. To this variation, a study of production per hectares in different crops of the representative villages of different community development blocks are mentioned in the table 1.

Table-1 : Production of major crops in selected villages of different community development blocks of Darrang district, 2011(in quintal)

Name of the blocks	Total no. of selected villages	Total Cropped area	Production of Major Crops(in quintal)									
			Winter rice	Summer rice	Autumn rice	Maize	Wheat	Pulses	Rape & Mustard	Vegetables	Jute	Potato
Sipajhar	5	421.75	10565,55	2631.42	768.24	704.1	6.48	244.95	524.96	1356	1152	525.15
Pub-Mangaldai	5	277.99	4865.4	4333.56	768	255.9	22.32	134.1	298.88	1583.4	89.52	225.45
Pachim-Mangaldai	5	210.68	4890. 15	2684.22	233.52	226.2	—	149.1	369.12	384	76.8	65.7
Dalgaon-Sialmari	5	527.3	5837.98	4752.66	1384.08	—	57.6	144	369.12	9120.6	982.56	1686.3
Bechimari	5	529.64	8807.4	2287.56	1246.56	4.2	51.36	187.2	412.96	9900.6	316.8	965.7
kalaigaon	5	425.39	11718	4258.98	403.2	—	—	12	419.2	2083.8	242.88	531.45
Khairabari	1	45.47	1296	34.98	150.48	—	—	—	93.92	—	—	84.15

Source: Calculated on the basis of the primary data collected from the field, 2010-11

Almost all the varieties of crops are cultivated in Sipajhar community development block. In this block, the production of winter rice is the highest with 10565.55 quintal among the other crops. The production of summer rice and autumn rice is 2631.42 quintal and 768.24 quintal respectively. This block is situated in the built-up and char areas whereas the nature and quality of soils differ to certain extent of the char areas. With the variation of soil and physiography, the pattern of crops and their seasonal rhythem also vary. Most of the people of this block are indigenous Hindus. So the production of winter rice is the highest among all the crops in this development block. In Pub-Mangaldai community development block, all the social groups are engaged in producing a variety of crops. Summer rice, winter rice, autumn rice, maize, wheat, pulses, rape & mustard, sesamum, jute, sugarcane and potato are grown. Flood prone area in the southern part restricted the growth of winter rice and some kharif crops. The production of winter rice, summer rice, autumn rice is 4865.4 quintal, 4333.56quintal and 768 quintal respectively in this development block. In the villages of this development block where the indigenous Hindu and Muslim people are living, the production of winter rice is the highest. On the other hand, in the char areas of this development block, the production of summer rice and vegetables are the highest. The production of winter rice, summer rice and autumn rice is 4890.15 quintal, 2684.22 quintal and 233.52 quintal

respectively in Pachim-Mangaldai community development block. The production of winter rice is highest in the indigenous Hindu villages and the production of summer rice, maize, pulses and different types of vegetables are the highest in char areas where most of the people are Muslims of immigrant origin. The production of rape & mustard is highest in the scheduled Tribes villages. In Dalgaon-Sialmari community development block, the production of winter rice, summer rice, autumn rice and different types of vegetables is 5837.98 quintal, 4752.66 quintal, 1384.08 quintal and 9120.6 quintal respectively. As dominated by the Muslims of immigrant origin in this development block, the production of vegetables, summer rice, autumn rice, wheat, jute and potato is the highest among the another development blocks of the district. Almost all types of vegetables are grown in this development block. The vegetables are supplied to all the parts of Assam. Thus, in indigenous Hindu villages the production of winter rice is the highest and in Muslims of immigrant origin villages, the production of different types of vegetables is the highest. In Kalaigaon community development block, the production of winter rice is the highest with 11718 quintal among all the blocks of the district. In Khairabari community development block, the production of winter rice is the highest (1296 quintal).This development block is dominated by indigenous Hindus and the farmers are not interested to cultivate other crops.

6. Agricultural productivity

Agricultural productivity is a multi-dimensional concept which takes into account a number of complex factors like environmental, technological and institutional which affects the agricultural development of a region. The level of crop productivity means the degree to which the man-made framework is able to exploit the physical resources of an area for the purpose of agricultural production. The level of agricultural productivity has not been raised much in all the development blocks of the district and there have been existing spatial disparity in productivity pattern. Almost all the crops are of subsistence pattern where agricultural modernization has yet to gain sufficient pace. Only in the recent years, i.e. after mid-eighties, some of the farmers have started using modern inputs and to a certain extent technical implements in agriculture which has been slowly contributing to the growing spatial variation in the productivity pattern.

There are a number of methods evolved by geographers and agricultural economists for the study of agricultural productivity. Among these methods, the method introduced by M. G. Kendall in 1939 is one of the important. Kendall taking the acre yield of ten leading crops in each of the forty eight administrative countries in England for four selected years, tried on four coefficient: productivity, ranking, money value and starch equivalent or energy. Of the four co-efficient, the ranking coefficient is probably the easiest to calculate and gives a reasonable ranking in order of productivity. The procedure followed by Kendall is shown in the table 2.

Table-2 : Ranking of Major Crops by Kendall Method

Crops / Blocks	Winter Rice	Summer Rice	Autumn Rice	Maize	Wheat	Pulses	Rape & Mustard	Vegetables	Jute	Potato	Total	Coefficient Rank
Sipajhar	2	5	3	1	4	1	1	5	4	4	30	3
Pub Mangaldai	6	2	4	2	3	5	5	4	5	5	41	4.1
Pachim Mangaldai	5	4	6	3	-	3	4	6	6	7	44	4.89
Dalgaon Sialmari	4	1	1	-	1	4	4	2	1	1	19	2.11
Bechimari	3	6	2	4	1	2	3	1	1	2	27	2.7
Kalaigaon	1	3	5	-	-	6	2	3	3	3	26	3.25
Khairabari	7	7	7	-	-	-	6	-	-	6	33	6.6

Source: Prepared on the basis of the table 1

Table-3 : Level of Agricultural Productivity,2010-11 (Kendall's Method)

Productivity level	Ranking Co-efficient	Name of the Blocks
High	Below 3	Dalgaon – Sialmari and Bechmari
Moderate	3 – 5	Sipajhar, Pub-Mangaldai, Pachim-Mangaldai and Kalaigaon
Low	Above 5	Khairabari

Source: Prepared on the basis of the table 2

Table 2 presents the ranking of major crops of different community development blocks of the district. On the basis of the ranking co-efficient, three different agricultural productivity regions are delineated (table 3) such as high, moderate and low. These co-efficient are mapped (fig. 2) for visualization of the pattern of agricultural productivity in the district.

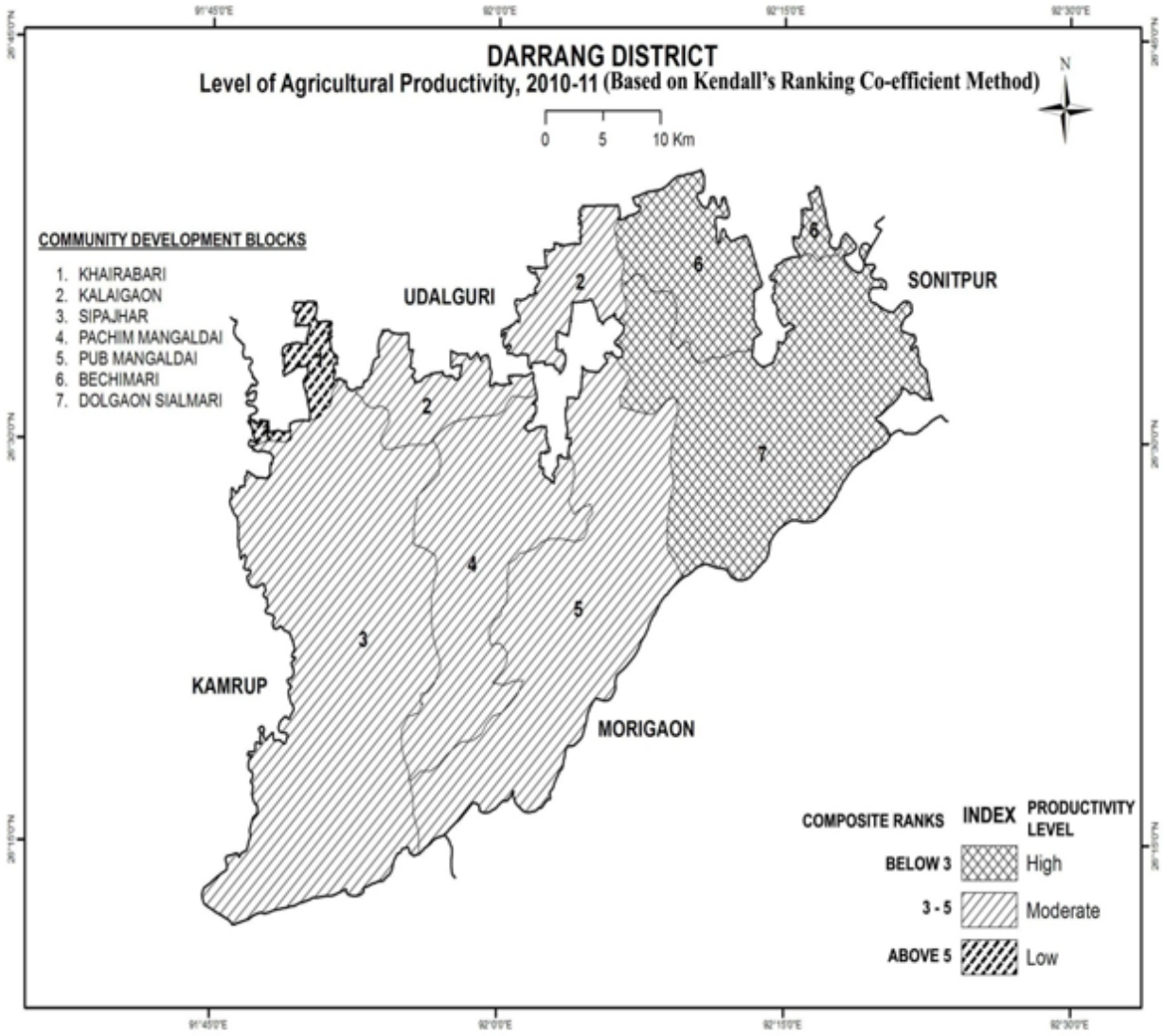

Fig. 2

7. High agricultural productivity regions

From the table 3 it is seen that Dalgaon-Sialmari and Bechimari community development blocks are the high agricultural productivity regions. These two community development blocks comprise 27.24 percent of the district's total area. Most of the people of these two development blocks are Muslims of immigrant origin. The farmers of this Muslims of immigrant origin are traditionally very efficient, derive maximum output from the cultivation. They stick consistently in agriculture and apply fertilizer, pesticides and insecticides, HYV seeds and modern farm appliances. They also use irrigation by shallow tube well and power pump. Both rabi and kharif crops are extensively cultivated in these development blocks. Dalgaon-Sialmari development block has ranked first in terms of per hectare yield for five crops, out of ten crops. This development block ranks first in the productivity of boro rice, ahu rice, wheat, jute and potato. Bechimari development block ranks first in the productivity of vegetables and this development block ranks second in the productivity of ahu rice, wheat, pulses, jute and potato. Intensive labour needed for weeding, thinning and harvesting of several crops is provided by the Muslims of immigrant origin of the area. On the other hand, the intensity of cropping, the area under fertilizer and irrigation are also high in these two development blocks. The quality of soil, the skilful labour input and the modern technologies employed have made these development blocks the most productive in the district.

8. Moderate agricultural productivity regions

Moderate agricultural regions are Sipajhar, Pub-Mangaldai, Pachim-Mangaldai and Kalaigaon community development blocks. The built-up regions of these development blocks are inhabited by the indigenous Hindu Muslims and scheduled Tribes caste social groups. The char areas of the Sipajhar, Pub-Mangaldai and Pachim-Mangaldai development blocks are inhabited by the Muslims of immigrant origin. All the social groups are engaged in the production of variety of crops. Winter rice, summer rice, pulses, rape& mustard, jute, potato and different types of vegetables are grown in these development blocks. Soil, being new alluvial is very fertile for cultivation of rabi crops. Rape& mustard and maize are extensively cultivated in the char areas. The intensity of cropping, the area under fertilizer and irrigation are moderate in these development blocks. On the other hand, without many efforts and without the use of much modern technologies, the yield per hectare becomes moderate. The aggregate value of the productivity of all the crops is moderate. The nature and quality of soil differ to certain extent between the built-up and the char areas. With the variation of soil and physiography, the pattern of seasonal crops also varies. The inputs such as intensity of cropping, fertilizer and irrigation do not help much in all the times and all the places to increase the productivity of crops, because of erratic and unreliable rainfall which appears to be the determining factor for productivity of crops in these regions. Due to the scanty rainfall in winter and early part of pre-monsoon period, crops dry up and the frequent floods occurred due to the heavy rainfall in summer damage the standing crops of the sub region. All these factors combined together have made the productivity in these development blocks as a whole medium.

9. Low agricultural productivity regions

Khairabari community development block is the low agricultural region. This development block is inhabited by indigenous Hindu social group. As the irrigation is very low, cultivation depends on rainfall. The use of fertilizer and the HYV rice is also meagre. However, winter rice, summer rice, autumn rice, rape& mustard and potato are cultivated in this development block. The overall productivity of the region is low. The total number of modern agricultural implements is also the lowest than the other development blocks of the district. Moreover, the soil character, physiographic difference and the attitudes of social groups, etc. are also responsible for low agricultural productivity in these development blocks.

10. Agricultural productivity in different social groups

In the district, there are mainly five social groups inhabit viz. Indigenous Hindu, indigenous Muslim, scheduled Tribes, scheduled Castes and Muslims of immigrant origin. In view of the availability of relevant data at the social group wise, Kendall method has been also adopted here to find out the agricultural productivity pattern at social group wise in the district.

Table-4 : Production of Major Crops in different Social Groups of Darrang District, 2010-11

Crops / Social Groups	Winter Rice	Summer Rice	Autumn Rice	Maize	Wheat	Pulses	Rape & Mustard	Vege-tables	Jute	Potato
Indigenous Hindu	17465.4	1790.58	950.4	-	38.4	132.15	841.76	4068	192	1143
Indigenous Muslim	9761.4	2552.88	660.96	8.1	70.56	40.05	484.32	2496.6	254.4	477.9
Scheduled Tribes	10409.85	3255.78	681.84	—-	—-	99.9	428.96	1495.8	236.88	390.6
Scheduled Caste	3317.85	1645.38	283.2	4.2	12.96	53.1	256	803.4	-	77.85
Muslims of Immigrant Origin	7025.98	11738.76	2377.68	1178.1	54.24	546.15	477.12	15564.6	1140.48	1994.4

Source: Calculated on the basis of the primary data collected from the field, 2010-11

Table-5 : Ranking of Major Crops of different Social Groups

Ranking Crops / Social Groups	Winter Rice	Summer Rice	Autumn Rice	Maize	Wheat	Pulses	Rape & Mustard	Vegetables	Jute	Potato	Total	Coefficient Rank
Indigenous Hindu	1	4	2	-	3	2	1	2	4	2	21	2.33
Indigenous Muslim	3	3	4	2	1	5	2	3	2	3	28	2.8
Scheduled Tribes	2	2	3	-	-	3	4	4	3	4	25	3.1
Scheduled Caste	5	5	5	3	4	4	5	5	-	5	41	4.55
Muslims of Immigrant Origin	4	1	1	1	2	1	3	1	1	1	16	1.6

Source: Prepared on the basis of the table 4

Table-6 : Level of Agricultural Productivity , 2010-11 (Kendall's Method)

Productivity level	Ranking Co-efficient	Name of the Social Groups
High	Below 2	Muslims of immigrant origin
Moderate	2 – 4	Indigenous Hindu, Indigenous Muslim and Scheduled Tribes
Low	Above 4	Scheduled Caste

Source: Prepared on the basis of the table 5

From the table 6, it is seen that agricultural productivity is the highest in the Muslims of immigrant origin social groups. From the survey it is seen that, the intensity of cropping, the area under irrigation to total cropped area, the area under fertilizer to the total cropped area, the percentage of commercial crops and the total number of modern agricultural implements are the highest in this social group. They have also been practising multiple and double cropping. As a result of the combination of all these factors together with the socio-economic attitude of the Muslim farmers of immigrant origin, the agricultural

productivity of this social group is found to be the highest among all the social groups of the district. On the other hand, agricultural productivity is medium in the social groups of indigenous Hindu, indigenous Muslims and scheduled Tribes. These social groups cultivate different crops only for self consumption. From the survey it is seen that the intensity of cropping, the area under irrigation, fertilizer and other inputs of modern agriculture are medium in these social groups. So the production of different crops is less than that of he social group of Muslims of immigrant origin. The agricultural productivity is low in the social group of scheduled Castes. It is seen that the intensity of cropping is only 135.09 which is lower than the district's intensity of cropping (181.48 percent). Thus, the area under irrigation and fertilizer are also lower than the district's total. Moreover, the farmers of the scheduled Castes do not have more agricultural land. They are mostly engaged in fishing and business. So, all these factors have combined together to make the social group a low productivity region.

11. Conclusion

To conclude, the agricultural production and productivity varies among the various social groups of farmers living in the district of Darrang. It is seen that almost all the varieties of crops are cultivated in the different community development blocks of the district. The production of winter rice is high with 10565.55 quintal in Sipajhar community development block which is situated in the built-up and char areas. Most of the people of this block are indigenous Hindus. In Pub-Mangaldai community development block, different social groups are engaged in the production of various types of crops. The southern parts of this block which are prone to floods, are restricted only to growing of winter rice and some kharif crops. This development block is inhabited by both the indigenous Hindus and Muslims of immigrant origin. In Pachim-Mangaldai community development block, which is dominated by the Indigenous Hindus, the major crop grown is winter rice. But the agricultural scenario is different in the Muslims of immigrant origin dominated development blocks of Dalgaon-Sialmari and Bechimari. Both these development blocks are located in the eastern part of the district where the soil is favourable for growing vegetables. The cultivation of vegetables is the highest with 9120.6 quintals in the Dalgaon-Sialmari development block. The vegetables from these two development blocks are supplied to different parts of the state. In Kalaigaon development block, the production of winter rice is the highest with 11718 quintals among all the development blocks of the district.

Thus, it is seen that Dalgaon-Sialmari and Bechimari development blocks fall under high agricultural productivity regions. Sipajhar, Pub-Mangaldai, Pachim-Mangaldai and Kalaigaon development blocks fall under moderate agricultural productivity region whereas the Khairabari development block falls under low agricultural productivity region in the district.

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