

Introduction

1.1 Background

In the modern age, the latest technology and scientific knowledge have become imperative for maximizing social welfare of the people. India offers an example where a lot of progress has been made during the last past decades or so in the realm of innovations and their applications. However, much is left to be done in our rural areas and it would not be correct to say that India has been progressing in social welfare unless developmental activities touch the rural population. Agriculture has become a pride of national economy providing livelihood to about 70 per cent of the rural population. It accounts for a sizeable share of total value of country's exports besides supplying raw materials to large section of industries. There has been a remarkable agricultural development and increase in agricultural production during the last few decades which has to be seen now as means of employment led economic goals, poverty alleviation and self reliance through its linkages and multiplier effect. Vision of development of a region is a convincing and inspiring picture of a desired and possible future for development. The vision for development of agriculture should flow from the collective aspiration of all the stakeholders of the area.

Krishi Vigyan Kendra, Bongaigaon is only a four years old organization established under the umbrella of Assam Agricultural University, Jorhat-13, coordinated by the Zonal Coordinating Unit, Zone-III, Umiam under Indian Council of Agricultural Research and started functioning since September 23, 2004. Since its inception, Krishi Vigyan Kendra, Bongaigaon has been trying sincerely for overall agricultural development and is on a mission mode approach to initiate reforms in agriculture and allied sectors. It is well felt that unless strategies for agricultural development are prepared and executed in a planned manner, therefore, an effort has been made to prepare a vision document for different agricultural activities considering agro-ecological situations, available resources, critical issues, problems, opportunities, existing farming practices, gaps in technology adoption, projected food requirement etc.



1. Identification and description of the agro-ecological situations of the district.
2. Documentation and analysis of existing farming systems under each agro-ecological situations.
3. Identification of critical issues, strength and opportunities.
4. Identification of production constraints and technology gap therein.
5. Formulation of strategies and action plans for different agricultural production systems.
- 6 Identification of policy issues to be addressed in the district.

1.3 Approach and Methodology:

Following approach and methodology was undertaken to conduct the present analysis to prepare the document

1. Consultation with the key stakeholders from public and private sector.
2. Comprehensive review of the secondary data.
3. Analysis of the existing farming practices.
4. Identification of critical gaps.
5. Formulation of strategies.

Past and Present of Bongaigaon

2.1 Creation

The decision of the Government of Assam in 1989, to create a new District of Bongaigaon curving out some areas of the Goalpara and Kokrajhar District with its headquarter located at Bongaigaon was quite challenging. It was the political and administrative exigencies which had necessitated to create this new district suddenly although the people of Bongaigaon and the adjoining areas were demanding a new Sub-Division with its headquarter to be located at Bongaigaon from the very beginning.

This decision to create a new District, Bongaigaon was quite challenging because the very idea to create such a district was neither a long standing one nor a tested one. Moreover, the decision to set up a district headquarter at Bongaigaon was more challenging as there was no Sub-divisional infrastructure in this town, whereas the other newly created district head quarters of Assam had Sub-divisional infrastructures of their own. In the absence of such basic infrastructural facilities, the initiation of the activity of the district headquarter was almost started on the street, which was not only challenging task but also novel one.

On 29th September, 1989, the creation of Bongaigaon District was declared by the Government of Assam with its headquarter at Bongaigaon. The major portion of the areas of erstwhile Bijni and Sidli estates along with tracts of Eastern Duars was curved out of Goalpara and Kokrajhar District in October, 1989 in order to create a newest district of Assam, i.e. Bongaigaon. Although the logistic behind the creation of this new district was no doubt an administrative one but the political as well as economic exigencies were also responsible behind its creation.

2.2 Background

(a) The original Goalpara district was first created in 1822 A.D. by David Scott- an employee of East India Company, who was the first Commissioner of newly created North East Rangpur district Hd. Qr. at Rangpur town(now in Bangla Desh) and newly created Goalpara district was also tagged with North-East Rangpur district for administration. The

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which included the undivided Garo Hills district area also constituted the original Goalpara district area in 1822. In 1866 Garo Hills was separated from Goalpara district area and in the same year a new district named "Greater Koch Behar" was created and the residual portion of Goalpara district was withdrawn from Rangpur and tagged with Koch Behar. In 1874 a new province named Assam Valley Province was created by British Govt.(Successor of East India Company) and Goalpara district area was withdrawn from Koch Behar and tagged with Assam Province which continues till today unless petty political gambling disturbs. Now the original Goalpara district has given birth of four districts namely (i) Goalpara (ii) Dhubri (iii) Kokrajhar and (iv) Bongaigaon.

MAP OF BONGAIGAON DISTRICT



It was first establishment by Bijit Narayan alias Chandra Narayan in 1671 comprising the area of undivided Goalpara district. Chandra Narayan was the son of Parikshit Narayan who was the grandson of Yuvaraj Sukladhwaj alias Chilarai, the world hero (1510-1571 AD). He was the younger brother of Moharaj Naranarayan, the great emperor of Kamrup Rajya alias Kamata Empire alias Koch Empire of 16th century. The first capital of Bijni Kingdom was at modern Bijni town from 1671 to 1864 and thereafter shifted to Dumuria(now known as Dalan Bhanga) due to attack by Jhawlia Mech - a local chief under Bhutan Kingdom. The big and dreaded earthquake occurred at 5 PM, on 12th June/1897 badly damaged the royal palaces of Dumuriya caused the shifting of the Capital temporarily to Jogighopa and thereafter permanently shifted to Deohati forest area now known as Abhayapuri named after Rani Abhayeswari in 1901, which continued upto 1956 when Govt. of India took over this Kingdom. At present Bongaigaon district is having three Civil Sub-Divisions, namely (1) Bongaigaon with Hd. Qr. at Bongaigaon (2) North Salmara with Hd. Qr. at Abhayapuri town and (3) Bijni with Hd. Qr. at Bijni town. 90 % area of Bongaigaon district belonged to erstwhile Bijni Kingdom and 10% area from Sidli Kingdom, Raja Bhairabendra Narayan Bhup Bahadur and Raja Ajit Narayan Dev were the last kings of Bijni and Sidli Kingdoms respectively. Joy Narayan, Shiv Narayan, Bijoy Narayan, Mukunda Narayan, Haridev Narayan, Indra Narayan, Amrit Narayan, Kumud Narayan and Rani Abhayeswari were the Kings and queen in between the founder king Chandra Narayan and the last king Bhairabendra Narayan of Bijni Kingdom.

2.3 On naming the district

The name of Bongaigaon town and district is the elongation of a fig and old village named Bongaigaon alias Bong-ai-gaon situated on the southern border of the town. According to hearsay (1) in the long past there were plenty of wild(Bon) Cows (Gai) in the surrounding hilly and forest areas. So, the villagers assembled time to time to drive away the wild cows for protecting their crops. Thus this area was popularly known as Bon-Gai-Gaon. (2) In that big village areas there dwelt one nature-poet named 'Bong' (Bong Roy) who could induce laughters to all his bye-standers with his cryptic but harmless oral composition describing the situation on the spot and in return he could collect grains or coins voluntarily offered by the audience. This was his only source of income and profession. Thus his areas was roughly identified as the village of Bong(Ray) i.e. Bong-er-Gaon=Bongaigaon that is in course of time. This Bongaigaon village area was famous for orange fruits which were sold

in the nearest market named Birjhora Bazar located at the heart of present Bongaigaon town. The word Birjhora was derived from Bir+Jirowa (Jirowa means resting place) of Bir(hero). It is held that the noble hero Chilarai took here rest for about two months during rainy season at the time of his invading the neighbouring Kingdoms of entire north-east India.

2.4 The People

From the chequered historical background of this district, it can easily be surmised that the entire area was ruled by Kings/Zaminders/Feudal Lords hailing from the Koch-Rajbonshies belonging to Indo-Mongoloid ethnic group of peoples right from 15th century to the end of princely states in 1956 A.D. The kings of this area had their hoary past and can be traced back to the "Kiratees" of epic age (Mahabharata fame) that is pre-vedic age. These Kiratees of dimpast are also mentioned in Kalika Puran and Joringi Tantra and also in histories written both by native and foreign schoolers.

Naturally Koches alias Koch-Rajbongchies and Kocharies are the original sons of the soil of this new district. Ravas, Garos, Yogis, Kalitas, Kayasthas and older Muslims are also indigenous who settled in this part of land prior to the advent of Britishers in North East Region. After advent of British Govt. in this part of land, a new term named Bodo/Boro was coined deliberately by European historian. According to them the word Bodo/Boro is a generic term and its species are (i) Kocharies, (ii) Koches, (iii) Rabhas, (iv) Garos, (v) Lalungs, (vi) Hajongs and (vii) Chutiyas

2.5 Socio-Cultural Spectrum

(a) Everyman and place do possess some peculiarities and particularities that constitute the inherent identity inspite of heterogeneous elements. Apart from prevalent common environment in the erstwhile Bijni Kingdom and undivided Goalpara district of 1822, the most striking factors of Bongaigaon district are the Hilly Caves (Gumphas) and stone carvings of Jogighopa hill-rocks demonstrating the existence of Buddhist culture. The hills and the hilly rocks, the rivers, natural and man made ponds, the deep forest, the trees, plants and the bushes ó all are animated and these are either friendly gods and goddesses or evil spirits causing sufferings to men especially amongst rural areas. "Ram Rajar Garh" near Deohati village is a man-made historical pond which was excavated by Ram Singh of Ambar Kingdom of Rajasthan. Ram Singh was grand son of Man Singh of Ambar

are with army of Delhi Sultan at the time of invading Ahom Kingdom in the second half of 17th century.

(b) Worshipping of benevolent gods and goddess or driving away evil spirits by incantation of "Mantras" or black-arts are the common mental make up and 99% of indigenous rural people even today are followers of pantheism and strong believer in inevitable destiny and are guided more by heart than head, more by emotion than by reason. The prime God named Mahadev is whorshiped almost universally at least in this district area. Bhairab Hills range, Mohadev Hills range and Bhumiswar Hill are famous for ruins of sculptures, idols, Siva etc. are pictorial sites awaiting archeological research works and when renovated these spots will be interesting and charming tourist centres of this district.

These potential tourist spots having rare and varied species of trees, birds, insects and even "Golden Langure" at Kakoijana Hill range, are eagerly awaiting for protection and promotion.



In addition to Tam Ranga" and "Konora Beels"(natural ponds) area can supply fresh and tasty fishes almost to entire Assam if commercially managed which can also be used ideal angling spots. In spite of pantheistic view of life and worshipping of Gods and Goddesses, Shreemanta Sankardeva (1449-1569) the propagator of one Supreme God known as "Vishnu" enjoyed ample scope for spreading his Ism and received warm patronage from Koch Kings and peoples. Kotasbari, Sankarghola, Bishnupur etc are the indelible foot-prints of Shreemanta Sankardev and his associates in this district.

2.6 District Profile of Bongaigaon District

Bongaigaon district is situated in North West side of Assam, surrounded by Kokrajhar and Dhubri district in North West, Barpeta in the East and river Brahmaputra in the south. The geographical area of the district is 2510 sq km. The district is located between 26.28 N and 26.54 N longitudes 89.42 E and 90.06 E and as a whole falls under Lower Brahmaputra Valley Agro-climatic Zone. The mighty river Brahmaputra flows along the southern part of the district and its tributary Aie river flows through the district besides many small rivulets and streams.

nt role in the economy of the district and about 70 per cent of the rural population directly involve in agriculture as their livelihood. Rice is the main crop of the district and mono-cropping of rice is a common practice in most of the rice growing areas. There is considerable scope of crop intensification by way of increased cropping intensity. Planned productivity, diversification and modernization of various subjects of agriculture help to increase the cropping intensity. Productivity enhancement in various crops is also an important issue as there is considerable yield gap due to various regions which need to be addressed. Crop diversification and productivity enhancement will also look after food and nutritional security of the people of the district. Animal husbandry is a wide spread activity in the upland farming system; however, there is need to improve the productivity level in this sector. The agro-climatic condition of the district is ideally suited to livestock farming systems and there is assured local market for various produces. Inland fish production in the region is not satisfactory and a considerable portion of the fish is to be imported from outside the district. In some areas, integrated fish farming is being practiced which have potential for further development.

2.7 Topography and Agro-climatic characteristics

The district has almost plain topography, although hills and hillocks are found in some parts of the district. The climate of the district is sub-tropical in nature with warm and humid summer followed by dry and cool winter. The average annual rainfall is about 3000 mm per annum of which 75 per cent is received during monsoon month (June to September). The monsoon months are wet and winter is dry. Both pre and post



unpredicted and erratic rainfall. The mean maximum and minimum temperature varies from 33 to 38⁰C and 9 to 10⁰C, respectively. The average radiation is the highest during March 6 April, while overcast sky reduces the solar radiation to the least during July.

The four orders of soils are found in the district namely (i) Entisols (recent alluvium), (ii) Inceptisols (old alluvium), (iii) Alfisols (Mountain valley) and (iv) Ultisols (Laterised red). The soil of zone is mostly acidic nature and P^H increases near the river Brahmaputra.

Nitrogen of the soil mostly varies from medium to high,
low in available P_2O_5 and medium in K_2O status.

On the basis of information on physiography, soils, farming systems, crop and cropping systems and hydrological information, the district Bongaigaon has been classified in to 6(six) agro-ecological situations, which are as follows ó

2.7.1 Foot hill old mountain valley alluvial plain

The northern part of the district comprising this situation contains old mountain valley alluvial soils (Alfisol & Ultisol). It is build up of alluvial materials washed down from the hill slops. The surface soil is light yellow to pale brown, compact, sticky and plastic. Generally, medium to heavy in soil texture. The elevation is higher towards foot hills which gradually slop towards south.

2.7.2 Flood prone recent riverine alluvial plain

Recent riverine alluvial (Entisol), sandy to sandy loam in soil texture. This situation is represented by an almost flat topography which often experiences flood hazard. Apart from some natural depressions, some riverine islands are also in existence.

2.7.3 Flood free riverine alluvial middle plain

Old riverine alluvial type (Inceptisol). The texture of the surface soils ranges from sandy loam to loam, silty clay loam, silty clay and clay. The topography is almost plain.

2.7.4 Char land

New alluvial plains, neutral in reaction, sandy-silty-clayee, sandy-silty and sandy in soil texture (Entisol). Chronically flood affected areas except the stable chars.

2.7.5 Hill and Hillock

Old alluvial type (Alfisol), sandy to sandy loam in texture and acidic in nature. The topography is undulating.

2.7.6 Beels

Entisols, usually peaty in nature and texturally these are silty and clay. Low lying waste land areas

The total population of the district is 6, 04,660 as per 2001 Census, out of which 5, 13,000 live in rural areas. The population density per sq km is 316 with sex ratio 1000: 945 (Male: Female). The demographic information of the district is given in Table 2.1.

Table 2. 1 Demographic Profile of Bongaigaon District

Total population (:000)	604.66
Male population (:000)	311.46
Female population (:000)	293.20
Rural population (:000)	513.00
Urban population (:000)	91.00
Total household (nos)	168556
Rural Household (nos)	145300
Total Literacy (%)	59.33
Literate male (%)	67.67
Literate female (%)	50.44
SC population (:000)	0.66
ST population (:000)	0.13
BPL Household (nos)	54045

Source: Basic Agricultural Statistics 2004-05, Directorate of Agriculture, Govt. of Assam

2.9 Land use pattern and land holdings

Land use pattern in Bongaigaon district and in different soil types are given in Table 2.2 & 2.3

Table 2. 2 Information on land use pattern in the Bongaigaon District. (Area in Ha)

Sl No	Name of the block	Geographical area	Cultivable Area	Cultivated Area	Cultivable Waste	Cultivated Fallow
1	2	3	4	5	6	7
1	Manikpur	28038	18905	17273	713	919
2	Dangtol	24121	12433	11364	580	489
3	Boitamari	24080	15974	15497	627	350
4	Srijangram	20317	11386	12234	741	418

			7995	7312	629	397
	Total	199045	68693	62780	3340	2573

Contd. .

Forest	Pasture	Land put to Non agri. use	Land under misc. plantation	Barren & unculturable land (waste land)
8	9	10	11	12
313	2750	3046	531	2493
2967	3358	3230	990	1143
379	3218	1269	876	2364
315	3015	1127	973	1501
227	2672	1499	811	1125
4201	15013	10171	4181	8626

Table 2. 3 Information on land use pattern in different soil types in Bongaigaon District (Area in Ha).

Sl No.	Name of Block	Light Grey area	%	Red soil (Mixed) area	%	Sandy soil area	%	Sandy loam area	%	Clay loam area	%
1	Manikpur	19626.6	70	8411.4	30	4766.46	17	17383.56	62	5887.98	21
2	Dangtol	15678.65	65	8442.35	35	2894.52	12	15919.86	66	5306.66	22
3	Boitamari	14688.8	61	9391.20	39	3852.8	16	15411.2	64	4816	20
4	Srijangram	14831.41	73	5485.59	27	3047.55	15	13409.22	66	3860.23	19
5	Tapattari	10316.88	72	4012.12	28	3099.09	21	9600.43	67	1719.18	12

2.10 Operational land holdings

Total 63,198 operational land holdings with 69,473 Ha land area have been reported. Small & Marginal operational holders constitute 71.16 per cent of total land holding having 73.61 per cent of land under their possessions while, big farmers constitute 8.73 per cent of total holding having 22.58 per cent of land under their possessions. Information on operational land holding is indicated in Table 2. 5.

Annual land holdings

Sl No.	Nature of the farmer	No. of holdings	Area (Ha)
1	Large*	5516	15688
2	Small*	10746	20704
3	Marginal*	34227	30432
4	Land Less*	12709	2643
	Total	63198	69473

Source: Basic Agricultural Statistics 2004-05, Directorate of Agriculture, Govt. of Assam

Large* = Above 2 Ha.

Small* = 1-2 Ha

Marginal* = 0.4-1 Ha

Land Less* = Upto 0.4 Ha

2.11 Soil Type

The soils of the district are mostly red, alluvial and mixed red. The soil texture is sandy loam to clay loam. Information on soil types are given in Table 2.6.

Table 2.5 Information on soil type

No	Soil type	Characteristics
1.	Light gray	Sandy loam to silty loam in texture
2.	Red soil (Mixed)	High in -Fe ₂ O ₃ and -Al ₂ O ₃ oxides. Fairly well drained soil
3.	Sandy soil	Light textured soil
4.	Sandy loam	Medium textured
5.	Clay loam	Heavy textured. Poor external as well as internal drainage

2.12 Water Resources & Management

Bongaigaon district has a good number of rivers, flowing from the mountainous region of Bhutan to its south which offers a good source of flow and lift irrigation and the total irrigation potential created is estimated at 5,336 ha. Beels, tanks and ponds are also being utilized for lift irrigation covering an area of about 2,500 ha (Table 2.7). These resources are also utilized



the phased development of the potential, certain basic infrastructural facilities identified are as follows

- i. A nodal agency to coordinate the various minor irrigation development project and to provide technical support.
- ii. Provision for maintenance of existing MI structure.
- iii. Adequate budgetary allocation

Table 2.6 Information on water resources

Categories of Water resources	Area (Ha)
1. Tanks & Ponds	994.64
2. Beel	1859.15
3. Swamp/Derelict	623.30
4. River	5336.20

2.13 Economy and major enterprises

Economy

- The economy of Bongaigaon district is basically agrarian in nature with about 80 per cent of the population dependent on agriculture.
- Out of total farmers 48 per cent consists of small & marginal farmers.
- The district is industrially underdeveloped.
- Paddy is the major crop. Other important crops include oil seeds, pulses, cash crop like jute & vegetables etc.
- Agriculture in the district is characterized by over dependence on rainfall, predominance of seasonal crops and traditional methods of cultivation.

Major food, commercial & plantation/ horticultural Crops

- Food crops: Paddy [winter & summer], wheat & pulses.
- Commercial crops: Oil seeds [Rape seed, mustard, sesame & Linseed], spices, Jute & Tuber crops
- Horticulture crops: Pineapple, Banana, Coconut, Jackfruit, Betelvine & Arecanut etc.

- Sericulture (Weaving and spinning) is also important activity in the rural areas. Eri, Muga, mulberry for silk worms are the important products of the activity.

Animal Husbandry

- The cattle & buffalo population in the district predominantly consists of low yielding non-descript indigenous stock. Dairy and Piggery is the second most prominent economic activity in the district.

Poultry

- Poultry is a traditional backyard activity on a small scale and commercialization is yet to take place in the district.

Sheep, Goat and Piggery

- Piggery & goatery are popular activities under small animal development schemes in the district. There is a regular inflow of Pigs from Bihar, UP & other eastern States.

Fisheries development

- The district is endowed with fisheries resources in the form of ponds/ tanks, Beel, swamps, low-lying area, derelict water bodies & a diverse network of river & rivulets. Fisheries sector plays an important role in rural economy of the district. . For about 90% of the district's population, fish is an important source of dietary protein.

Handloom

- Despite having large concentration of handlooms, the productivity is low partly due to existence of large number of primitive/traditional tools and use of looms only for domestic needs.

Agriculture in Bongaigaon District

3.1. Introduction

Agriculture is the back bone of Indian Economy and therefore, occupies a prominent place in the economy of Assam. According to census 2001, the state possesses substantial number of rural population (87.10%) with 37,30,773 nos. of cultivators (14%) and 12,63,532 nos. of agricultural labours (4.7%). The diverse topography and agro climatic conditions of the region has made it very conducive for cultivation of wide varieties of agricultural and horticultural crops.

Bongaigaon is one of the major districts of Assam situated at the Northern part of Brahmaputra river under Lower Brahmaputra Valley Zone of Assam. Agriculture plays an important role in the economy of the district and about

70 per cent of the rural population directly involve in agriculture as their livelihood. Rice is the major crop of the district which occupies 57 per cent and 43 per cent of cropped area during Kharif and Rabi seasons, respectively. The other important crops of



the district are wheat, rape & mustard, jute, black gram, green gram, sesame, sugar cane, Rabi & kharif vegetables, ginger, turmeric, coconut, areca nut, pineapple, banana, citrus etc. The district has plentiful of natural resources, however, the process of harnessing and judicious utilization of these resources is not yet well defined. Therefore, there is need to design and formulate situation specific need based strategies by taking into account agronomic, climatic and socio-economic conditions as well as available resources worthiness of farmers.

3.2. Major crops & varieties in the District

Table 3.1: Major crops & varieties in the Bongaigaon District

Major Crops	Varieties
1. Rice (Sali)	Ranjit, Mahsuri, Swarna Mahsuri, IR-36, Baismuthi, local varieties

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	Local varieties, Luit, Lachit, IR-36, Mala, Komal
	BR-8, BR-9, Joymoti, MTU 1001, IR-36
4. Rapeseed & Mustard	M-27, TS-36, Local varieties
5. Sesamum	Local varieties, AST-1
6. Black gram	Local varieties, PU-19
7. Lentil	Local varieties, B-77
8. Wheat	Sonalika, Molla gom, local varieties
9. Jute	JRC 212, JRC 321, JRO524, JRO 632
10. Potato	Kufri Jyoti, Kufri Pokhraj, Desi alu,



3.3 Area, Production and Productivity of major crops cultivated in the district

Area, production and productivity of major crops cultivated in the Bongaigaon district are shown in Table 3.2. From Table 3.2 it has been observed that rice is the major crop of the District followed by rapeseed, mustard and wheat both in terms of area and production.

Table 3.2: Area, Production and Productivity of major crops cultivated in the District

No	Crop	Area (ha)	Production (qtl)	Productivity (qtl /ha)
1.	Rice (Sali)	60754	709610	11.60
2.	Rice (Ahu)	34112	322700	9.46
3.	Rice (Boro)	9983	190970	19.13
4.	Rapeseed & Mustard	13182	66040	5.01

			2590	4.52
			12030	4.51
7.	Lentil	2417	13340	5.52
8.	Wheat	5942	74280	12.50
9.	Jute	2994	273620	16.45
10.	Potato	3418	220600	64.54

3.4 Input management

Management and timely supply of agricultural inputs such as seed, fertilizers, pesticides, farm machineries, implements, livestock feed etc is very much essential for agricultural development in the district. Several private agencies like input dealers and retailers as well as public sector organizations such as Assam Seed Corporation, Assam Agro Industries Development Corporation and concerned govt. departments have been rendering their services in managing various inputs. Information on input and service providers in the Bongaigaon district and Information on Agricultural Input are given in Table 3.3 & Table 3.4 respectively.

Table 3.3 Information on input and service providers (No. of outlet) in the Agricultural sector

Nos. of fertilizer, seed and pesticide outlet	146
Nos. of plantation / horticultural nurseries	-
Nos of fish seed farms / hatcheries	6
Nos of artificial insemination centre	10

Table 3.4 Information on Agricultural Input

Total N/P/K consumption	56 kg/ha
Nos of agricultural tractors	174
Nos of agricultural pumpsets	10377
Nos of agri-engines/ thresher/ cutters	NA

*NA= Not Available

Farm equipments

food grains combined with management problems, farm mechanization appears to be the solution for increasing the production and productivity. consolidation and promotes co-operative farming. Majority of the farmers in the district generally follow traditional methods of cultivation, hence, use of modern machineries and implements in the agricultural production sector is limited to a small As the majority of the farmers have small land holding, therefore, large scale mechanization with big machineries is difficult unless State Government takes up land portion of farmers. Poor economic condition often debars them from procuring costly agricultural machineries, although, inadequate information in respect of various government schemes and credit facilities are also some other determining factors. Information on most commonly used agricultural implements and machineries are indicated in Table 3.5.



Infrastructure gaps

- i. Genuine machineries and accessories
- ii. Repairing and maintenance facilities
- iii. Training facilities for handling modern machineries
- iv. Adequate banking network for providing credit support

3.6 Irrigation and ground water



A large portion of the area in Bongaigaon district is mainly rainfed as the district has been blessed with heavy rainfall during Kharif season. However, there is need and scope to improve irrigation facility as the crop suffers from moisture stress condition during rabi season due to uneven distribution of rainfall. Irrigation status of the district is summarized in Table 3.6, 3.7 and 3.8.

Table 3.6 Irrigation coverage

Source	Area (ha)
Canals / Channels	11048
Wells / Tubewells	16988
Tanks	NA
Other sources	3518
Net Irrigated area	17164

* NA= Not Available



Table 3.5 Block wise information on the agricultural implements and farm machinery

Name of the block	Agricultural Implements and Farm Machinery													
	Tractors		Pump sets		Power tillers		Sprayers		Puddlers		Weeders		Thresher	
	No. of household	No.	No. of household	No.	No. of household	No.	No. of household	No.	No. of household	No.	No. of household	No.	No. of household	No.
Manikpur	20	2	2190	2190	40	8	250	250	60	10	105	105	15	3
Dangtol	30	3	1390	1390	30	6	318	318	60	9	101	101	10	2
Boitamari	10	1	1119	1119	20	4	297	297	30	5	121	121	15	3
Tapattari	40	4	1841	1841	25	5	304	304	65	9	111	111	10	2
Srijangram	30	3	3403	3403	100	20	286	286	130	23	117	117	10	2

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block	area (ha)	area (source wise)	Lift	Wells/Borewells	Tank	STW	Others FIS
		Minor	A	A	A	A	A
1. Manikpur	14844	766	766			3285	
2. Dangtol	9748	600		600		2085	
3. Boitamari	13996	300	300			1678	
4. Tapattari	5170	64		64		2761	
5. Srijangram	8004	278		278		5104	

Table 3.8 Information on Rainfed and Irrigated areas

Type of the Project	Name of the Project	Projected area irrigation (ha)
Minor	Kuklung F.I.S.	620
Minor	Gargaon F.I.S.	450
Minor	Gergera Boulder weir	200
Minor	Chakapara E.L.I.S.	270

3.7 Rice Production System in the district

Rice is the most important cereal crop of Bongaigaon district cultivated in medium land to low land either as rainfed crop or under irrigated condition. Rice crop is grown in three different seasons and based on the harvesting time, this crop is classified as summer rice (Boro), autumn rice (Ahu) or winter rice (Sali). Sali rice occupies major portion (60,754 ha) of the rice growing areas, followed by ahu (34,112 ha) and boro rice (9,983 ha) [Table 3.9].

Sali rice is the most important rice crop of the district cultivated during kharif season under medium land to low land condition mostly as rainfed crop. Seeds are sown in the nursery bed during May-June and transplanting operation is carried out during June-July. Traditional low yielding rice varieties such as -Phulpakhri, -Moinagiri etc., scented rice variety -Kolajoha, local glutinous rice variety are mostly cultivated by the farmers, however, high yielding varieties like -Ranjit, -Pankaj, -Mahsuri, -Baismuthi (local name), Ketekijoha, etc. are also prevalent in the farmer's field. Among the HYVs, -Ranjit is the most popular variety in the farmer's field owing to its higher yield potential.

production system

i. Seed replacement rate is very low and mostly traditional low yielding rice varieties are prevalent in the farmer's field.

ii. Productivity level of both high yielding and traditional varieties is gradually declining owing to poor knowledge on seed production technology.

iii. Sali rice is mostly grown as rainfed crop during kharif season owing to which sowing and/or transplanting operation is often delayed when there is no rain. Moreover, moisture stress condition at the later stages of crop growth is more common in Sali rice field resulting in chaffy grains and lower crop yield.

iv. Sali crop is often affected by flood water in some chronically flood affected areas where farmers resort to cultivation of some traditional photo-sensitive varieties after recession of flood water. In some low lying



areas, where flood water remains in the field till the transplanting time is over, farmers use to cultivate boro rice under irrigated condition.

v. Transplanted ahu rice and boro rice cultivation under medium land to low land condition are being practiced under assured supply of irrigation water, however, some typical low lying beel areas are also available for boro rice cultivation under rainfed



vi. Imbalance use of fertilizers is a common practice in rice production system. Application of potassic fertilizer is often neglected because of ignorance of the farmers. In some boro rice growing areas, application of over doses of fertilizers is also seen. Integrated Nutrient Management technology is not yet popularized in the farmer's field.

vii. Under irrigated condition, water is applied without considering time of water application, method and quantity of water needed. In some areas, application of excess amount of irrigation water than the recommended is also observed.



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transplanted rice, weed growth is not favoured due to puddle
 management, however, weed causes severe damage and yield
 reduction in direct seeded ahu rice grown under upland condition. Hand weeding and
 mechanical weed control methods are usually applied to control weeds and use of low land
 paddy weeder is most common in transplanted rice where line planting is practiced. In
 direct seeded ahu rice, hand weeding and use of an implement Bindha are practiced in
 the farmer's field. Use of herbicide is limited to certain boro rice growing areas, although,
 farmers do not have adequate knowledge on this aspect.

ix. Rice crop is often infested by various insect pests such as stem borer, case
 worm, leaf folder, gall midge, brown plant hopper, mealy bug, gandhi bug etc. as well as
 diseases like blast, brown spot, sheath blight, sheath rot, stem rot, bacterial leaf blight,
 tungro etc. Mostly chemical method of pest control is applied by the farmers and
 injudicious use of chemicals is often noticed owing to inadequate knowledge of the
 farmers.

Table 3.9 Area, Production and Productivity of Rice crop cultivated in Bongaigaon district

No	Crop	Area (ha)	Production (qtl)	Productivity (qtl/ha)
1.	Rice (Sali)	60,754	7,09,610	11.60
2.	Rice (Ahu)	34,112	3,22,700	9.46
3.	Rice Boro)	9,983	1,90,970	19.13

3.8 Pulse Production System

Pulse is the integral component of our diet which is a rich source of protein, vitamins, minerals etc. Apart from the human diet, pulses form an important fraction of cattle feed and fodder as hay, green fodder and concentrates. Being leguminous, pulse crops play an important role in maintaining and restoring soil fertility.

Important pulse crops cultivated in Bongaigaon district are black gram, green gram and arahar during kharif season and lentil and pea during rabi season. These are mainly grown under rainfed condition and very limited area is brought under irrigation. Although, soil and climatic conditions are favourable for pulse production and



to increase the production of pulses, productivity level and therefore, there has been no perceptible change in per capita availability and thus, the problem of imbalance diet due to short supply of pulses remains unsolved. Poor adoption of high yielding varieties and improved agronomic practices, lack of irrigation facility etc. are some important factors contributing towards lower yield.

Some Important features of pulse Production system in Bongaigaon district:

i. Pulses are mainly grown as rainfed crops and therefore crops often suffer from moisture stress condition, especially during rabi season and crops become poor resource based rainfed crops.

ii. Growing season of kharif pulses coincide with rainy season. Rain is often erratic, uncertain and unevenly distributed because of which there is water logging in the crop field during kharif season.

iii. Rabi pulses are mainly cultivated in the medium land situation after harvesting of Sali rice. Cultivation of long duration rice varieties often delays timely sowing of pulse crops and crops suffer from moisture stress condition as well as low temperature.

iv. Pulses are mostly grown in neglected conditions as provisions for efficient drainage, better tilth, nutrient management, water management, weed management etc. are not made properly.

v. Suitable high yielding varieties of pulse crops are not yet popularized in the farmer's field and cultivation of locally available varieties having lower yield potential is in practice. Seed replacement rate is very low.

Table 3.10 Area, Production and Productivity of major pulse crops cultivated in Bongaigaon district

No	Crop	Area (ha)	Production (qtl)	Productivity (qtl /ha)
1	Black gram	2,667	12,030	4.51
2	Lentil	2,417	13,340	5.52

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Important oilseed crops grown in the district are sesame during kharif season and rapeseed & mustard, niger and linseed during rabi season. Rapeseed and mustard is the most important oilseed crop of Bongaigaon district grown during rabi season which occupies an area of 13,182 ha with a total production of 66,040 qtl. (Table 3.11). Productivity level of all the oilseed crops grown in the district is far below the national average which is mainly attributed to non adoption of high yielding varieties and improved agronomic practices, lack of irrigation facility etc. Some of the important features of oilseed production system are described below.



Some Important features of oilseed Production system in Bongaigaon district:

i. About 90 per cent area under oilseed crops grown in the district remains rainfed and absence of rain at critical stages of crop growth causes significant reduction in production and oil content.

ii. Growing season of kharif oilseed crop such as sesame (July to 1st fortnight of August) coincides with the rainy weather. So water logging immediately after sowing or at the initial stages of crop growth often causes mortality of seedlings and resulted in lower plant population.



iii. Rapeseed & Mustard is mainly cultivated in rice-toria sequence in medium land situation in most part of the district. Growing of long duration Sali rice varieties delays sowing of toria. Late sown toria often suffers from moisture stress condition at the time of siliqua formation or siliqua development stage causing severe yield reduction and oil content. Aphid infestation is also seen to be higher in late sown crop due to favourable weather condition late in the season.

iv. Majority of oilseed growers are small and marginal, adopt low standard of management technology viz. sub standard seed, imbalance use of fertilizers, injudicious use of agro chemicals for pest control etc.

v. Suitable high yielding varieties are not available in the farmer's field due to inadequate arrangement for seed supply and cultivation of old varieties is in practice.

of appropriate post harvest technology to prevent loss ten face storage, grading and marketing problems.

Table 3.11 Area, Production and Productivity of major oilseed crops cultivated in Bongaigaon district

No	Crop	Area (ha)	Production (qtl)	Productivity (qtl /ha)
1.	Rapeseed & Mustard	13,182	66,040	5.01
2.	Sesamum	572	2,590	4.52

3.10 Reasons for yield gap in major field crops

Crop	Reasons for gaps
Rice	Yield gap due to lack of suitable varieties, poor seed replacement & imbalance use of nutrients.
Green gram	Yield gap due to poor adoption improved varieties and modern crop management practices
Black gram	Yield gap due to poor adoption improved varieties and modern crop management practices
Sesame	Low yield due to poor adoption of improved production technology and high yielding varieties.
Rapeseed	Low yield due to poor adoption of improved production technology and improved high yielding varieties.
Lentil	Yield gap due to poor adoption improved varieties and modern crop management practices.

3.11 Gap in adoption of technology

Sl no	Enterprise	Commodity	Technological gap	Reason
1	Agriculture	Rice	-Seed treatment -Integrated nutrient management -Use of micronutrient -Integrated pest management	-Lack of awareness -Lack of conviction -Lack of knowledge -Lack of resources - Lack of awareness -Lack of knowledge -Lack of resources

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			Weed management	-Lack of knowledge
			-Seed replacement	-Lack of knowledge
		Pulse	-Variety	-Lack of awareness -Lack of knowledge
			-Seed treatment	-Lack of awareness -Lack of conviction
			-Integrated nutrient management	-Lack of knowledge -Lack of resources
			-Integrated pest management	-Lack of knowledge -Lack of resources
		Oilseed	-Variety	-Lack of awareness -Lack of knowledge
			-Integrated nutrient management	-Lack of knowledge -Lack of resources
			-Integrated pest management	-Lack of knowledge -Lack of resources

3.12 Gap in infrastructure

- Adequate irrigation facilities.
- Extension support.
- Cooperative structure.
- Flood control and soil conservation measures.
- Storage facilities.
- Marketing arrangement.
- Credit support.

3.13 Reasons for research/extension/adoption gaps

During the participatory field data collection, studies have been made to identify specific reasons for gap in research, extension and adoption of technologies in different Agro Eco System.

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Reasons for Gap		
		<ul style="list-style-type: none"> i. Lack of Awareness ii. Lack of Knowledge iii. Lack of Skill iv. Lack of motivation v. Lack of Conviction
2.	Adoption	<ul style="list-style-type: none"> i. Fear of Risk ii. Lack of Resources iii. Lack of input availability iv. Lack of Market infrastructure
3.	Research	<ul style="list-style-type: none"> i. Lack of Specific Recommendation for the AES ii. Recommendation is not profitable and compatible with market & infrastructure iii. Recommendation is in appropriate

3.14 Strategies for achieving plan projections

Appropriate and relevant strategies have been proposed considering the critical issues, problems and opportunities for achieving plan projections

Sl. No.	Critical issues ,problems and opportunities	Proposed strategies	Proposed activities
MANAGEMENT OF AGRICULTURAL PRODUCTION SYSTEM			
1	Considerable yield gap in paddy, pulses & oil seeds due to technological gap.	-Popularization of improved method of cultivation of paddy, pulses & oil seeds.	<ul style="list-style-type: none"> -Organising training on technological gaps. - Conducting demonstration on various aspect of improved crop management practices. -Organising field day in the site of success demonstration. -Linkage of farmers with credit, inputs and marketing.
2	Low yield of the existing varieties & Low rate of seed	-Screening of suitable varieties	<ul style="list-style-type: none"> -Awareness campaign. -On farm testing.

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		<ul style="list-style-type: none"> - Seed production of high yielding varieties - Seed replacement with high yielding varieties 	<ul style="list-style-type: none"> -Conducting demonstration. - Decentralized production of seeds of preferred varieties under the concept of seed village. -Exposure visit to successful sites. -Identification of sites and farmers who are willing to produce and sell seed. -Training on seed production and seed certification. -Linkage of farmers with credit, inputs and marketing.
3	Imbalance use of fertilizers & fertility management.	-Popularization of Integrated plant nutrient management technology	<ul style="list-style-type: none"> -Awareness campaign. -Demonstration of INM technologies. -Training on INM technologies in various crops. - Production and use of bio-fertilizers, organic manures such as FYM, Compost, vermi-compost, green manuring etc.
4	Suitable varieties for adverse	-Screening of suitable	-Identification of suitable

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		<p>varieties of rice</p> <ul style="list-style-type: none"> -Adoption of situation specific high yielding varieties -Supply of quality seed materials 	<p>varieties of rice for flood prone areas and also for late & staggered planting conditions.</p> <ul style="list-style-type: none"> -On farm testing. -Conducting demonstration. - Production of seeds of preferred varieties under the concept of seed village. -Exposure visit to successful sites. -Identification of sites and farmers who are willing to produce and sell seed. -Training on seed production and seed certification. -Linkage of farmers with credit, inputs and marketing.
5	Injudicious use of pesticides and environmental hazards	<ul style="list-style-type: none"> -Popularization of IPM technology - Opening up of ITK options for farmer's choice 	<ul style="list-style-type: none"> -Organising awareness campaign/ training on IPM technology. -Identification of key crop pests and diagnosis of pest problem. -Analysis and evaluation of technological options by participating farmer.

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			<ul style="list-style-type: none"> -Organising demonstration on crop pest management. -Organizing farmer field school programme, -Facilitating supply of bio pesticides, pheromone trap etc. on payment of cost.
6	Farm mechanization	- Encouraging farm mechanization for timely and effective agricultural operations	<ul style="list-style-type: none"> -Organizing awareness campaign on farm mechanization. -Organizing training and demonstration on use of farm machineries. -Identification of agro service centre for dealing with the farm machinery. -Linkage with ongoing schemes. -Group formation for finance on farm machinery.
7	Expansion of area under pulse & oilseeds	-Substitution of direct seeded upland rice with pulses & oilseeds	<ul style="list-style-type: none"> -Conducting field demonstration on crop diversification. -Organising field day near successful demonstration sites -Facilitating supply of critical inputs.

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		-Improvement of productivity in rainfed areas through adoption of dry land technologies	-Awareness campaign for adoption of dry land technology. -Identification and analysis of success stories on dry land technologies and indigenous water harvesting measures. -Exposure visit to successful sites. -Training to farmers on dry land technology such as weather analysis, crop planning, moisture conservation etc. -Organising demonstration and field day at the successful sites.
9	Crop intensification	-Increasing cropping intensity in canal irrigated areas & in areas having personal source of irrigation	-Crop planning for intensive cropping. -Identification and analysis of success stories where proposed intensive cropping is followed. -Exposure visits. -Training to the farmers.
10	Crop diversification	-Adoption of scientific crop rotation - Inclusion of pulses and	-Awareness campaign on crop diversification. -Organising farmers

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		oilseeds in the existing cropping pattern	training on scientific crop planning & crop rotation. -Conducting demonstration on ideal crop rotation and studying the economics. -Exposure visit.
11	Resource management & sustainability	-Integrated farming system approach	- Awareness campaign on need of Integrated Farming System approach.
12	Export potentiality	-Promotion of cultivation of aromatic rice for export	-Identification and characterization of aromatic rice varieties. -Conducting demonstration in the farmers field. -Facilitating linkage with marketing by organizing farmers interest groups.

3.15 Plan for future development: Cereal crops

SI No	Critical areas/issues	Strategies
1	Enhancing productivity	<ul style="list-style-type: none"> - Replacing traditional varieties with HYVs. - Adoption of appropriate technologies in respect of sowing method, fertility management, water management and weed management. - Adoption of IPM technology for efficient plant protection. - Popularization of System of Rice Intensification Method.

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		<ul style="list-style-type: none"> - Expansion of area under HYVs. - Expansion of area under transplanted ahu rice as well as boro with assured irrigation facility.
3	Researchable issues	<ul style="list-style-type: none"> - Development of HYVs resistant to drought, submergence, insect pests and disease. - HYVs having high nutritional quality. - Management practices for organic agriculture.
4	Policy issues	<ul style="list-style-type: none"> -Ensuring availability of quality seed and timely supply of agricultural inputs. -Expanding irrigation facility. -Increasing credit flow to the farmers.

3.16 Plan for future development: Pulse crops

Sl No	Critical areas/issues	Strategies
1	Enhancing productivity	<ul style="list-style-type: none"> -Replacing traditional varieties with HYVs. -Adoption of appropriate technologies in respect of tillage management, sowing method, fertility management, water management and weed management. -Adoption of IPM technology for efficient plant protection.
2	Expansion of area	<ul style="list-style-type: none"> -Utilizing potential areas for rabi pulses in Sali rice fallow. -Substitution of upland direct seeded ahu rice area with pulse crops. -Cultivation of rabi/summer pulses in char areas. -Inclusion of pulse crops in the existing cropping system either as inter-crop or as sequential crops or as relay.
3	Researchable issues	<ul style="list-style-type: none"> -Development of HYV resistant to drought,

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		fairly resistant to water logging, resistant to pre-harvest sprouting, non spreading type, thermo & photo insensitive, having high nutritional quality resistant to pest & diseases etc. -Technology generation for storage of pulses.
4	Policy issues	-Ensuring availability of quality seed and timely supply of agricultural inputs. -Expanding irrigation facility. -Increasing credit flow to the farmers. -Establishment of Processing industry. -Ensuring market facility.

3.17 Plan for future development: Oilseed crops

Sl No	Critical areas/issues	Strategies
1	Enhancing productivity	-Replacing old, low yielding varieties with HYVs like TS 36, TS 38 etc recommended for Assam. -Adoption of appropriate technologies in respect of tillage management, sowing method, fertility management, water management and weed management. -Emphasizing on INM technology as well as micronutrient management, especially -Boron and Sulphur -Scheduling of irrigation at critical stages of crop growth during dry period. -Adoption of IPM technology for efficient plant protection. - Timely sowing.
2	Expansion of area	-Utilizing potential areas for rabi oilseeds in Sali rice fallow by growing suitable short duration high yielding varieties of rice.

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		<ul style="list-style-type: none"> -Cultivation of rabi oilseeds in char areas. -Inclusion of oilseed crops in the existing cropping system either as inter-crop or as sequential crops or as relay.
3	Researchable issues	<ul style="list-style-type: none"> -Development of HYVs, resistant to drought, fairly resistant to water logging having high oil content, resistant to pest & diseases etc. -Technology generation for storage of oilseeds.
4	Policy issues	<ul style="list-style-type: none"> -Ensuring availability of quality seed and timely supply of agricultural inputs. -Expanding irrigation facility. -Increasing credit flow to the farmers. -Establishment of Processing industry. -Ensuring market facility.

3.18 Crop wise interventions for the district with detailed action plan

A. Productivity enhancement

Sl No	Crop	Intervention	Action plan
1	Paddy (winter)	<ul style="list-style-type: none"> -Use of HYVs -Seed replacement -Adoption of improved agronomic package -Adoption of IPM & INM 	<ul style="list-style-type: none"> i. Training ii. Demonstration iii. On farm testing iv. Awareness campaign v. Seed village programme
2	Paddy (summer)	<ul style="list-style-type: none"> -Use of HYVs -Seed replacement -Adoption of improved agronomic package -Adoption of IPM & INM 	<ul style="list-style-type: none"> i. Training ii. Demonstration iii. On farm testing iv. Awareness campaign v. Seed village programme

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		<ul style="list-style-type: none"> -Adoption of improved agronomic package -Adoption of IPM & INM -Increasing irrigation potential 	<ul style="list-style-type: none"> i. Training ii. Demonstration iii. On farm testing iv. Awareness campaign v. Seed village programme
4	Rape seed and Mustard	<ul style="list-style-type: none"> -Use of HYVs -Adoption of improved agronomic package -Adoption of IPM & INM - Increasing area under irrigation -Expansion of area - Timely sowing in rice-toria sequence 	<ul style="list-style-type: none"> i. Training ii. Demonstration iii. On farm testing iv. Awareness campaign
5	Black gram	<ul style="list-style-type: none"> -Use of HYVs -Seed replacement -Adoption of improved agronomic package -Adoption of IPM & INM -Increasing more area under intercropping -Expansion of area 	<ul style="list-style-type: none"> i. Training ii. Demonstration iii. On farm testing iv. Awareness campaign
6	Sesamum	<ul style="list-style-type: none"> Use of HYVs -Seed replacement -Adoption of improved agronomic package -Adoption of IPM & INM -Expansion of area 	<ul style="list-style-type: none"> i. Training ii. Demonstration iii. On farm testing iv. Awareness campaign
7	Wheat	<ul style="list-style-type: none"> -Use of HYVs -Adoption of improved agronomic packages -Adoption of IPM & INM - Increasing area under irrigation -Expansion of area 	<ul style="list-style-type: none"> i. Training ii. Demonstration iii. On farm testing iv. Awareness campaign

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Intervention		
1	Paddy (Winter)	Organizing training, demonstration and awareness campaign for popularization of HYVs.
2	Paddy (Summer)	Organizing training, demonstration and awareness campaign for popularization of HYVs.
1	Paddy(Autumn)	Organizing training, demonstration and awareness campaign for popularization of HYVs.
2	Mustard	Popularization of HYVs through training and demonstration
3	Black Gram	Popularization of HYVs through training and demonstration
4	Sesamum	Organizing training, demonstration for popularizing HYVs.

3.19 Researchable Issues

Critical Research issues in Agriculture sector and their Proposed Strategies:

Sl. No.	Crops	Gap in Adoption	Research Strategies	Activities
1	Paddy	a. Suitable HYV for late planting in flood prone areas (Sept. planting).	a. Screening suitable varieties for late planting.	OFT by KVK
		b. Suitable HYV for drought like situation.	b. Screening of suitable varieties resistant to drought.	OFT by KVK
		c. Suitable HYV resistant to pest & disease.	c. Screening of suitable varieties resistant to pest & diseases.	Evolving Suitable varieties by Rice Research station
		d. Suitable HYV with aroma.	d. Suitable varieties with aroma.	Evolving suitable varieties having aroma.

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		adoption to local condition.	a. Screening suitable varieties locally adoptable.	Evolving suitable varieties by AAU research station OFT by KVK
3.	Oilseed	a. Suitable HYV adopted to local condition. b. Lack of suitable HYV resistant to pest & disease.	a. Screening of suitable varieties locally adoptable. b. Suitable varieties to be developed.	Evolving suitable varieties by AAU research station Evolving suitable varieties

bandry in Bongaigaon District

4.1 Information on livestock population

It is need less to mention that livestock plays a pivotal role in the livelihood of the rural population. Agriculture and livestock rearing are culturally and traditionally bonded and act as back bone of the rural economy. Important livestock of the district are cattle, goat, pig, sheep, poultry, ducks etc. Rearing of improved breed of livestock is not a common practice and majority of livestock species are indigenous and non descriptive type. Therefore, it is noticed that the productivity level of the livestock population often goes to sub optimum level which contributes to far below per capita availability of livestock produces as compared to the ICMR recommendation. This might be due to low genetic potential, improper utilization of available resources, non adoption of scientific rearing of livestock and lack of awareness about scientific advancement. A picture of the livestock status in the district has been given in Table 4.1



Table 4.1 Information on livestock population in Bongaigaon district during 2007-08

Category	Population
Cattle	
<i>Crossbred</i>	3,743
<i>Indigenous</i>	2,16,236
Buffalo	
<i>Crossbred</i>	1,238
<i>Indigenous</i>	1,901
Goats	84,023
Sheep	
<i>Exotic breed</i>	11
<i>Local breed</i>	30,337
Pigs	

	4,090
	8,177
Ponies	78
Ducks	1,37,916
Poultry	4,96,649

4.2 Farmer's group and organizations involving in livestock sectors

The information on farmer's group and organization involving in livestock sector in the Bongaigaon district are presented in Table 4.2.

Table 4.2 Farmer's groups and organizations working in livestock sectors in Bongaigaon district

Sl No	Farmer's group/organisations	Location	Area of operation	Commodity	Activities
1	Pig rearing society	Chalantapara	Bongaigaon, Shillong	Pig	Produce and sale
2	Bageswari Milk Producers Association	Bongaigaon	Bongaigaon	Milk	Produce and sale

4.3 Information on input and service providers (No. of outlet) in the Livestock sector

The information on input & service providers and infrastructure/ institutes in Bongaigaon district are presented in table 4.3 and 4.4 respectively.

Table 4.3 Information on input and service providers (No. of outlet) in the livestock sector

Name of the block	Animal feed & poultry feed	Veterinary medicines
Manikpur	1	2
Dangtol	5	4
Boitamary	2	1
Tapattary	2	1
Srijangram	1	2
Total	11	10

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Structure/ institutes in Bongaigaon District

No	Infrastructure	Quantity	No.
1	Office building	1. Office of the District Animal Husbandry & Vetty. Officer. 2. Office of the Sub Divisional Animal Husbandry & Vetty. Officer. 3. State Vetty. Dispensary & Block Vetty. Dispensary. 4. Block Vetty. Dispensary 5. Vetty. First Aid Centre. 6. Vetty. Stock Man Centre. 7. Regional A1 Centre. 8. ICDP centre	1 1 10 5 15 7 1 2

4.4 Animal Husbandry-dairy development

Dairy is an important allied activity in the district. This sector is characterized by a large population of non-descript animal. The Animal husbandry department is the nodal department in the district overseeing implementation of various programmes and extension services.



The Veterinary department provides services like vaccination, castration of scrub bulls, veterinary extension and education on fodder development, cattle feed and livestock management. The District Rural Development Agency also plays a vital role in identifying interested farmers and providing credit-linked

Government subsidy to procure dairy animals. In addition to availability of quality milch animals, other important factors for successful exploitation of the potential are

- i. Availability of adequate green fodder, concentrated feed, water etc.
- ii. Availability of facilities for animal breeding, medicines and veterinary aid centres.
- iii. Training facilities for dairy farmers and adequate marketing as well as transport facilities.
- iv. Chilling centers and milk processing plants.

to provide necessary credit support.

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Rearing of improved breed of cattle is not a common practice and majority of the cattle population of the area are indigenous and non-descript type, (Population: 21,623 Nos.) reared in traditional semi intensive system of management. The indigenous bullocks are short, sturdy, disease resistant and suitable for ploughing. The cows are also small in size, sturdy, and have very low milk production capacity (0.5-0.75 liter per day) in the existing rearing practices(No input, Low output system) which contributes to far below per capita availability of milk or milk product as compared to ICMR recommendation. The milk production in the district during 2007 - 08 was 24,536 tonnes as against the demand of 49453 tonnes. The per capita availability of milk in the district is very low as compared to that at the state level. The female animals are usually kept to produce offspring and getting milk is believed to be the bonus to them.



The state veterinary and animal husbandry department has initiated the Artificial Insemination programme with exotic germplasm but this effort is not showing the result up to the mark. Moreover no effort have been taken up for scientific production system (viz. under proper feeding, breeding, housing and health cover) of the indigenous cattle population to justify their low productivity, they are always left as such and are blamed for their poor productivity.

a. Free range or open grazing system (No input : Low output system): In this system, cattle are kept loose in the open fields, road side, reserve forests and river banks for grazing without any attendants during the non cropped season.. They are brought back in the evening and kept in 'Gohali' local name of cattle shed made with locally available material during the night hours.

b. Restricted grazing system (No input: Low output system): The indigenous non descript cattle are reared in this system. In this system, animals are tied with rope in the road side, open un-cultivated areas, forest areas etc. to avoid crop damage.

c. Intensive stall fed system: Very small number of progressive farmers and youth who is establishing commercial enterprise follows the intensive stall fed system of rearing. The increasing demand for milk and milk product in the district followed by State

Commercializing dairy farming amongst native people has stall fed commercial dairy operations in the rural areas also and are now concentrating on rearing high yielding crossbred animals for self sufficiency or surplus production.

4.5.1 Housing system

Majority of the cattle sheds is traditionally built with mud or concrete flooring, wooden or bamboo post and thatch or CGI sheets roofing. Mangers are not well constructed. In maximum farms the dung pits are situated very near to the cow shed creating unhygienic conditions around the shed and exposing the livestock to various diseases.

4.5.2 Feeding system

Majority of the farmers doesn't prefer compounded commercial feed; instead they prefer to feed their cattle by their own feed composition. The common feed ingredients that are fed to the cows are wheat bran, broken rice and mustard oil cake. These ingredients along with salt are mixed in different proportions in a bucket at an approximate ratio to make a semi solid composition with water and given to the individual cows three times a day. Some farmer mixes vegetable and kitchen waste in the boiled broken rice thus production and reproduction are virtually affected due to this system of feeding.

The major source of green fodder are unprotected forest area, reserve forest, fallow land etc which are not at all sufficient to provide the maintenance ration for the cattle.

Gap in adoption and Reason for Gap in adoption

Animal: Cow (improved)

Sl No	Package	Recommendation	Existing Practices	Reason for Gap in adoption **
1.	Breed up gradation Artificial insemination Breed	Jersey C.B. & Red Sindhi Nearest A.I. Centre	As recommended But not upto 100%	a,b,c
	Location Natural Insemination Breed Location	Jersey C.B. & Red Sindhi Nearest Bull Centre	As recommended but not upto 100%	a,b,c

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	(Kg/Day) Dry Fodder (Kg/Day) Concentrates (Gms/Day) Minerals (Kg/Day) Vitamins (ml/Day)	30 kg 6-8 kg 1 kg 20 gms 10 ml	7-12 Kg 6-8 Kg 300-500 gms Nil Nil	a,b,d,g a,b,g a,b,g a,b,g a,b,g
3.	Inter calving Period (months)	12-13 months		f
4	Health care (Per year) HSBQ (No. of Vaccination) FMD Rinder Pest Deworming Anthrax	Once Twice Once Quarterly	Once - - Twice	a,b,g a,b,g a,b,g a,b,g a,b,g
5	General Management Washing (Times/day) Cleaning (Times/day) Housing (Pucca/Kutchra) Drinking Water (lit/day)	Once Once Pucca 40-50 lit/day	Twice/Week Once Intermediate 30-40 lit/day	a,b a,b,g a,b
6	Average Milk yield (lit/day)	5-10 lit/day	5-7 lit/day	f

** Code for specific reason for gap

- a. Lack of awareness
- b. Lack of knowledge
- c. No AI center (but at remote urban areas)
- d. Lack of Pasture land
- e. No exotic bull centre for nature al.
- f. Lack of proper management
- g. Lack of finance.

4.5.3 Salient observations on dairy production and strategies needed

a. FEEDING

1. Present feed composition is not balanced (**Need awareness**)
2. High cost of the feed ingredient (**Policy initiation is needed**)
3. No extra amount of drinking water is provided to the dairy cattle. (**Need awareness and training**)

1. Housing needs scientific interventions (**techniques for better land resources utilization needed**)
2. Continuous water supply provisions for cattle in the sheds are lacking (**Need awareness and training**)
3. Knowledge on stocking density and stocking ratio is lacking (**Need awareness and training**)

c. GENERAL, HEALTH CARE AND BREEDING MANAGEMENT

1. AI is practiced but is not covering all the area and is a costlier affair for the farmer (**Mass infertility campaign is needed**)
2. Lack of breed up gradation knowledge (**Need motivation and awareness**)
3. Heifers are not well managed hence suffer from delayed puberty (**need awareness and training on scientific feeding and management**)
4. Vaccination (HS, BQ and FMD) and deworming are practiced but not regularly (**Need motivation and awareness**)
5. Record keeping which is believed to be the core requirement for planning veterinary and breeding services is not seen at farmer's level (**Need motivation, awareness and training at farmer's level**)
6. Regular culling is not practiced; cows are culled only when they are unproductive (**Need motivation, awareness and training at farmer's level**)
7. Lack of knowledge on heat and transportation stress management. (**Need awareness and training**)
8. Unavailability of superior animals locally for replacement (**Policy initiation is needed**)

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and fodder resources with their nutrient composition.

2. Study on cost of milk production to analyze import threat from neighboring areas.
3. Characterization and evaluation of productive and reproductive performances of Indigenous non descript cattle population.
4. Study on the stress management.

4.6 Small ruminant production system

Small ruminant production implies goat and sheep production. The animals reared by the local people are of indigenous, non-descript type (mainly reared for meat purpose) as well as some are also rearing Assam hill goat. The goats are reared in open grazing system, with least attention towards their feeding, housing, disease control, vaccination and manage mental aspect. The animals are let loose through out the day and are tied in a stall during night hours. No attention is paid towards their indiscriminate breeding in the field in poor production due to poor genetic potential of the locally available buck. The experience shows that the local goats are small in size, sturdy and gives at least two kidding per year where twins are very common. Although goats are least cared, they are believed to act as insurance for the family in the most needed time and also act as immediate source of feast for the guest.



Gap in adoption and Reason for Gap in adoption

Animal: Sheep

Sl No	Package	Recommendation	Existing Practices*	Reason for Gap in adoption**
1.	Breed up gradation Artificial insemination Breed	Bhakarool	P	c,e
	Location Natural Insemination Breed	Improved local	P	e
	Location			

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	Concentrates (gms/day) Minerals (kg/day) Vitamins (ml/day)	100-500 gms 10 gms 5 ml	N	a,b,g
3.	Inter calving Period (months)	185 days		
4	Health care (Per year) HSBQ (No. of Vaccination) FMD Rinder Pest Deworming Anthrax	Twice Once Once Quarterly	N	a,b,g
5	General Management Washing (times/day) Cleaning (times/day) Housing (pucca/kutchra) Drinking Water (lit/day)	Once Pucca 2-5 lit/day	- Kutchra 2-3 lit/day	a,b a,b,g a,b
6	Average Milk yield (Kid/sheep)	Lamb-2/y/sheep	1-2 lamb/yr	f

*F= Full

P=Partial

N=Nil

** Code for specific reason for gap

- a. Lack of awareness
- b. Lack of knowledge
- c. No AI center
- d. Lack of Pasture land
- e. No exotic buck centre for nature al.
- f. Lack of proper management
- g. Lack of finance.

4.6.1 Salient Observation on goat production and intervention needed

1. Local goats are well adopted to adverse climatic condition and present low input managerial system.
2. They are highly prolific breeder with a superior quality of hide and juicy meat.
3. Breed characterisation of indigenous goat is the immediate need.
4. Indiscriminate breeding in the field resulting in poor production (Artificial insemination with superior buck semen).

study to develop database regarding productive and local goat and their selective breeding for up-grading the existing genetic pool.

4.7 Pig Production System

Piggery farming is the core competent area of the tribal people and pork is one of the most preferred meat in the district as there is no taboo for pork eating amongst tribal population. Due to the importance of pig in their dietary habit, almost every tribal rural production. The animals are reared in traditional method where pigs are let loose to feed on roots, colocasia and tubers in open field, kitchen or hotel waste and are neither provided with proper housing and feeding nor proper vaccination and health coverage.



Gap in adoption and Reason for Gap in adoption

Animal: Pig

Sl No	Package	Recommendation*	Existing Practices*	Reason for Gap in adoption**
1.	Breed up gradation Artificial insemination Location Natural insemination Breed Location	N Large black York shire Hamshire boar	N Natural service With improved Variety of boar	e
2.	Feed Management (Per animal)			

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	Vitamins (ml/Day)	3000-4000 gm/day 30 gm/day 10 ml/day	1000-2000 gm 10 gm/day	a,b,c
3	Inter calving period	6 months	7 months	f
4	Health care (per year)			
	HSBQ (No. of vaccinations)	Once/yr	N	
	FMD	Once/yr		a,b
	Rinder pest			
	Mastitis			
	Thilaris			
	Deworming	Quarterly	Yearly	a,b
5	General Management			
	Washing (times/day)	Once	N	a,b
	Cleaning (times/day)	Once		
	Housing (pucca/kutchra)	Pucca	Kutchra	a,b,c
	Deworming Drinking water (lit/day)	4-5 lits	3-4 lits	a,b
6	Average yield Meat (kg/animal)	80-100 Kg	60-80 kg	f
	Piglet (Nos./year/animal)	12-16 Nos.	10-12 Nos.	

*F= Full

P=Partial

N=Nil

** Code for specific reason for gap

- a. Lack of awareness
- b. Lack of knowledge
- c. Lack of resources
- d. Lack of market infrastructure
- e. Lack of exotic breed
- f. Lack of improved management practices

production and intervention needed

ched with the traditional pig husbandry and shows reluctance to shift to scientific piggery practice (need to motivate and change the mindset with community participatory approach).

2. The knowledge of scientific feeding practice, breed up-gradation and disease prevention techniques were not known to majority of the farmers (need awareness, training and trained village level service provider).

3. Need to aware farmer and traders regarding scientific slaughtering method, importance of food safety standard, and hygienic marketing of pork (need awareness, training).

4. Educating farmers and village level service providers regarding zoonosis related issue and their preventive measure. (Need awareness, training).

5. Lack of inputs (feed, superior progeny piglet, medicine etc.) discourages neo-entrepreneurs to take up piggery as a commercial venture.

6. Advance study needed:-

- a. Study of the productive and reproductive traits of different existing non descript and crossbred pigs.

4.8 Poultry production System

Poultry is inseparable component of rural society as almost every household rears a small number of poultry in their backyard which provide immediate source of animal protein supplement for the household. Commercial poultry farming is the fastest growing sector of Indian Agriculture due to the low basic characteristic of the industry i.e. the chipper capital investment followed by early income to the farmers and simple management practice. Commercial poultry farming has percolated to the rural areas but due to the havoc created by the bird flu in the preceding years most of the farmers shows reluctance towards taking up commercial poultry farming as their main source of livelihood. In this status backyard farming gains more importance due to the fact that they are reared almost on zero input.



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Various nondescript chickens are housed at traditionally commonly attached with the residence of owner. Inside the shed different size of bamboo cages are kept for different age group of bird. Early in the morning birds are provided with broken rice or maize crush in the cage itself and then they are let loose for scavenging in nearby localities through out the day time. In the evening the birds came back to their shed and the owner used to assist the birds to enter their respective cage. Vaccination or deworming is not followed in rural condition. The common disease which are encountered in the region include Ranikhet, CRD, Coccidiosis, IBD and Colibacillosis.

Duck and other poultry are least cared and are reared under traditional system. They were fed broken rice and kitchen waste and then allowed to move at their own for foraging at the field, wet land, river, swamp etc. to feed on fingerling, snail, earth worm, insect and vegetation. Ducks are mostly reared in integration with fisheries and in some places with wet rice cultivation.

Gap in adoption and Reason for Gap in adoption

Bird: Poultry (Back yard)

Sl No	Package	Recommendation	Existing Practices*	Reason for Gap in adoption **
1.	Breed up gradation Breed	Amrit, Giriraj, Banaraj, WLH	P	a,b
2.	Feed Management (Per Bird) Concentrates (gms/day) Gree Leaves Minerals (gm/day) Vitamins (ml/day)	120 gm/bird/day Sufficient 1g/bird/day 0.1 ml/bird/day	50-100 g Sufficient	a,b,c a,b,c a,b,c a,b,c
3	Health care (yearly) Rd. (No. of Vaccination) Fowl pox Deworming	Twice Once Quarterly	N	a,b,c

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	(pucca/kutchu) Drinking Water (lit/day)	Once Pucca 1 lit/day	P P 0.5-0.6 lit	a,b a,b,c a,b
6	Average Yield (Egg)	200-250/year	180-230	d

*F= Full

P=Partial

N=Nil

**** Code for specific reason for gap**

- a. Lack of awareness
- b. Lack of knowledge
- c. Lack of finance.
- d. Lack of improved management

4.8.1 Salient Observation in poultry Production

1. Although the indigenous nondescript birds are hardy and disease resistant but the production capability is very low in the existing production system (introduction of superior germplasm fit for backyard rearing).

2. Nutrient obtained by the birds on scavenging system could not be ascertained hence intervention on existing feeding system with incorporation of locally available feed resources may be tried to improve productivity.

3. Government policies need to make easy accessibility of the different input (feed chick, instrument, vaccine and medicine for commercial poultry farming).

4. Integration of poultry farming with other agricultural sector for feed ingredient production (Maize, Mustard, tapioca etc) to reduce cost of feed production.

5. Training on Bio- security major, vaccination and other health care calendar is needed to be introduced.

f the district

		Thrust areas
1	Livestock production system	<ul style="list-style-type: none"> -Up gradation of breed - Improving feeding, housing, sanitation & health care for livestock -Fodder cultivation -Production of feed materials based on locally available resources -Preservation, processing and value addition

4.10 Critical issues and proposed strategies

Sl. No.	Critical issues	Proposed strategies
1	Low productivity of dairy animals	-Improving productivity of livestock through
i	Breed up gradation in dairy animals	- Provision of graded bull in rural areas
ii	Quality feed	-Construction of feed manufacturing units based on locally available feed resources - Popularization of fodder cultivation for improved nutrition of dairy animals.
iii	Maintenance of animals	-Improving feeding, housing, sanitation & health care for dairy animals
2	Processing & value addition	-Processing & preservation of milk products.
3	Goat Raring	-Expansion of goat raring units -Breed up gradation -Improving feeding, housing, sanitation & health care for goat
4	Piggery	-Introduction of improved germplasm -Up gradation of local pigs -Improving feeding, housing, sanitation & health care for pig
5	Poultry	-Encouraging back yard poultry with superior breeds -Improved feeding, housing & health care for poultry birds.

		Vaccination, de worming & treatment against parasites of poultry, pig, sheep & goat.

4.11 Recommended interventions for the district

Sl no.	Constraints	Intervention & Action Plan
1. Cattle production system		
i	Low productivity of indigenous cattle	<ul style="list-style-type: none"> -Breed upgradation by selecting superior indigenous cows and bulls to develop nucleus herd - Procurement of selected cows and bulls to develop nucleus herd at phase manner - -Infrastructural facilities for nucleus herd -Specialized training for vety. & para vety. On AI -Restoration of pasture and grazing land
ii	Cross breed ó High cost of production, semi scientific management system, high feed and AI cost	<ul style="list-style-type: none"> -Herd registration - Breed characterization -Streamlining management practices such as housing, breeding, feeding, health care through <ul style="list-style-type: none"> - Training - Awareness campaign - Strengthening of infrastructure facilities - Micro and macro credit linkage with financial institution
2. Pig production system		
i	Indigenous non descript--- scavenging management, lower body weight gain and little size	<ul style="list-style-type: none"> - Awareness campaign for scientific management - Training on scientific management - Development of trained village - Strengthening of infrastructure facilities - Micro and macro credit linkage with financial institution - Ready availability of inputs
ii	Cross breed pigsô Poor management practices	<ul style="list-style-type: none"> - Awareness campaign for scientific management - Training on scientific management - Development of trained village - Strengthening of infrastructure facilities <ul style="list-style-type: none"> - Micro and macro credit linkage with financial institution - Ready availability of inputs
3. Poultry production system		
i	Non descript chicken--- Poor productive performance	<ul style="list-style-type: none"> -Improving existing feeding system - Training of farmers to utilize the local feed

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		resources - Introduction of improved rural indigenous birds
ii	Commercial broiler birds--- high cost of chicks and feeds, periodicity of market	<ul style="list-style-type: none"> - State policies to make easy accessibility of different inputs - Integration of poultry farming with other agricultural sector for feed ingredient production - Training on bio-security measures, vaccination, health care etc. - Contact farming can be promoted taking utmost precautions to protect the farmer's right
4. Small ruminant production system		
i	Low productivity	<ul style="list-style-type: none"> -Expansion of goat rearing units -Breed up gradation -Improving feeding, housing, sanitation & health care for goat - Training on scientific rearing

Agriculture in Bongaigaon district

5.1 Introduction

Bongaigaon district is under the North East sub Tropical Horticultural Zone of India. The district has favourable agro-climate for development of various horticultural crops. Generally, horticultural crops are not cultivated by considering the commercial aspect except vegetable crops in some parts of the district. Among the various fruit crops, banana, pineapple and citrus fruits are becoming popular and many farmers have started cultivation of these crops in commercial scale. Technology Mission Programme under National Horticultural Mission has given impetus to the development. The district has got tremendous scope for plantation of medicinal and aromatic plants. Floriculture sector in Bongaigaon district is gradually gaining importance and presently, a market for selling fresh flower is established. Area, production and productivity under plantation and horticultural crops during the year 2007-08 are indicated in Table 5.1.



Table 5.1 Information on area, production and productivity of various horticultural crops

No	Crop	Area (ha)	Production (MT)	Productivity (kg /ha)
1.	Potato	2250	18727	8323
2.	Chilly	600	1084	1807

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		1650	19189	11630
		2407	39475	164.00
5	Ginger	61	373	6120
6	Turmeric	295	6342	21498
7	Coriander	221	136	615
8	Black pepper	145	261	1800
9	Garlic	195	787	4036
10	Onion	257	3084	12000
11	Pine apple	257	5334	18585
12	Jack fruit	147	1312	8925
13	Litchi	254	1895	7461
14	Mango	95	498	5242
15	Orange	98	8237	8399
16	Areca nut	1771	2904	152 nuts per tree
17	Coconut	549	3788	74 nuts per tree
18	Banana	682	16721	24517
19	Assam lemon	252	911	3615
20	Medicinal and aromatic plants	124	611	4927
21	Guava	52	1019	19596
	Total	10296	192715	116779



(Garden) of Bongaigaon district of Assam

The homestead garden which is commonly known as “Bari” is a very important source of agricultural produce, food and non-food materials. In the old days, when the pressure of population was less, every farmer had a largish homestead producing a variety of crops, though normally not rice, which is grown in comparatively low lying areas, requiring lots of water as it does. Due to the plentiful rains and accompanying floods, villagers prefer to have their homesteads on higher land, and the higher parts of a farmers holdings (subdivision and fragmentation of holdings is the common feature) was utilized for homestead. To that extent, just any land would not be a homestead, at least not of choice, and would be selected carefully.

A homestead typically used for growing Areca Nut trees, Betel vines climbing on the areca, Coconut trees, Vegetable patches, growing seasonal vegetables, Occasionally mustard would be sown in a part of the homestead, Patches with vegetables which were perennial in the sense they did not require cultivation every season, such as edible wild ferns called 'Dhekia', which sprout with the coming of the rains. If the homestead area were large enough, a fish pond, Fruit trees such as Jackfruit, Mango, Jamun, and local fruits such as Paniol. A bamboo grove, which yielded bamboos for house building, fencing material, for trellises for supporting climbing vegetable vines such as pumpkin, gourds e.g. water gourd, bitter gourd, ridge gourd ('Jika') etc, for making household implements and implements used in agriculture and fishing, Bamboo shoots from the grove, A patch of cane creepers, which gave cane for various household objects, fishing implements, as well as 'Cane shoots'-very bitter, Some trees which provided fencing and house posts, as well as lops and tops being used as firewood.

An area for keeping cattle, milk cows as well as plough bullocks, A patch for cow dung used in farming as fertilizer, A raised bamboo structure for keeping a goat or two, as well as ducks, to prevent foxes, which were plentiful around the villages, from carrying off the ducks and kids, Granaries for rice- usually two granaries for storing the produce of two years- any self respecting farmer would not normally eat the current years produce, preferring the previous years rice. A patch, after being carefully swept and plastered with a mixture of clay and cow dung mixed with water, for threshing the paddy- in Assam paddy was not normally threshed in the fields. Women used to have a very big role in the homestead activities, while the men were out in the fields.

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istrict of Assam:

	No.	(%)	Area (ha.)	(%)
Less than 1 ha.	44877	44	23758	25
Between 1 and 2 ha	48934	47	23369	25
Above 2 ha	10646	11	20903	22

Uses of Bari for production of Organic Manure and Bio-degradable organic wastes

Indiscriminate and unscientific pattern of use of chemical fertilizers had resulted in fast depletion of soil fertility thereby making them unfit for cultivation in the long run and fall in productivity of soils. In order to attain sustainability in production, there is a need to increase the usage of organic manure, FYM etc., to rejuvenate the soils and bring them back to their natural health. In view of this there is an urgent need to enhance the production and supply of organic manures and compost through NADEP method of composting and vermiculture etc. The Bio-degradable waste from agriculture activities and Municipalities can be used for producing manure. The Agro and Municipal waste from vegetable and fruit markets will be available for converting the same into organic manure. A people-driven programme aiming at encouraging segregation of organic and inorganic garbage at source is to be launched in the district. The segregated garbage is to be brought to NADEP and vermi compost units where organic garbage would be recycled and manure obtained thereof could be sold.

Uses of Bari for production of Vermi Culture

Production of vermi casting through scientific rearing of earth worm is to be encouraged in the district. The vermi casting is found to be a good source for sustainable agriculture. Due to its unique characteristics of supplementing humus, plant nutrients, vitamins, enzymes, antibiotic and plant growth hormones, vermi castings have the potential of becoming an effective and commercial bio-fertilizer. The important benefits of using vermi castings in the field is for better crop yield, effective environment protection, optimum utilisation of bio-degradable wastes, reduction in the cost of farm inputs such as water, fertilizers, pesticides etc. Compost making : The compost making units under NADEP system, which is cost effective, employment generating, pollution free and involving very simple technology, may also be encouraged in the district. It works on aerobic bio-degradation process which requires 100 to 120 days for compost making. The efficient use of dung and agro-wastes in this process makes it possible to produce 20 kgs of enriched compost from one kg of dung.

Plan in the *Bari* by NABARD

Supporting bamboo farming, processing and marketing as a mainstream activity by changing the 'forestry mindset' to 'farm mindset'. NABARD PLP 2006-07 - Bongaingaon, Assam has constituted a 'Bamboo Cell' at its HO and prepared a document highlighting policy & promotion, financial assistance, capacity building and networking. Banking plan to boost bamboo cultivation in different states have been prepared. It is envisaged to provide credit support for development of bamboo over an area of 1 lakh hectares with an estimated investment of Rs. 200 crore annually.

Medicinal and Aromatic Crops in the *Bari* by NABARD

NABARD has prepared state-wise directories of manufacturers and traders and formulated 45 bankable model schemes of high demand species. NABARD is promoting the cultivation of MACs in AEZs. The unit cost / scale of finance for MAC cultivation has been fixed. NABARD provides cent per cent refinance at the lowest slab. To ensure a stable market and remunerative prices for MACs grown by farmers, NABARD initiated dialogues with corporate houses like Reliance Life Sciences, GUFIC, Keva Biotech, Natural Remedies, Zandu Pharmaceuticals, Healthy Herbals, etc

Recommendation/Suggestion

The Agriculture Department has to take initiative for implementation of innovative schemes, educate the farmers offering by free training, supply of good variety seeds for Bamboo cultivation, Safed Musli, Vanilla, Ginger, Banana, Patchouli, Flowers, Spices etc.

For successful implementation of schemes, Government line departments should take initiative to create infrastructural facilities like, Market connectivity to enable farmers to get best prices, Construction of Rural godowns, Marketing infrastructure. The financial institutions should take proper initiative towards financing of crop loans, issue of KCC, formation of SHGs and financing other allied economic activities to farmers.

5.3 Critical gap analysis

Critical gaps needing attention are low productivity and poor quality of the product, inadequacy of infrastructural facilities for post harvest management and marketing, inadequate effort for product diversification and consumption, inadequacy of quality planting materials, inadequacy of human resource in horticulture, lack of

ive planning, inadequacy of trained manpower and em, credit support / price support and slow pace in adoption of modern technology. Since, horticultural development has to be seen as integrated approach, inadequate availability of quality planting materials, lack of availability of micro propagated plants, lack of disease surveillance, lack of quality standard, lack of technologies in value addition, poor market intelligence, poor credit support, ineffective transfer of technologies, weak linkage between research and development, poor marketing practices and infrastructure etc. are also gaps which need attention.

Horticultural sector has got tremendous scope and potentiality in Bongaigaon district in respect of expanding the areas as well as improving the productivity. Use of quality seeds/ planting materials and adoption of improved production technologies as well as INM & IPM technologies are some important aspects which need to be considered for productivity improvement.

5.3.1 Gap in infrastructure

Number of progeny orchards and nurseries are inadequate in the district to meet the requirement at present. Lack of cold storage, market yards and organized marketing system, processing units, training and demonstration plots to educate farmers, absence of ownership of the land, lack of awareness of scientific cultivation practices, lack of credit facilities and general apathy of Bankers to provide credit support, non existence of large scale processing facilities, non- availability of important and vital infrastructures facilities, lack of awareness of details of programmes for Government employees, bankers, extension workers, are the major infrastructure gaps in the district.

5.4 Agro processing

Agro processing along with related post harvest technology play a key role in value addition, income and employment generation in rural areas. The market potentiality for

processed fruits is growing with improvement in processing technology, leading to export of processed fruit. Fruit crops like pineapple, citrus banana etc. are mostly consumed in raw and only 1 per cent of the produce are processed at present. Since the demand for ready to serve beverages and fruit juice concentrates are constantly rising,



this sector has the potential to be one of the main industries of the district in the years to come. The information available on agro process facility in Bongaigaon district are shown in Table 5.2.

Table 5.2 Information on Agro processing facility

Sl No	Location	Name of the centre	Commodity processed
1	Bongaigaon	District Community Canning and Training Centre, Bongaigaon (Govt.)	Fruits and Vegetables
2	Abhayapuri	Community Canning and Training Centre, Abhayapuri (Pvt.)	Fruits and Vegetables



5.5 Constraint Analysis

Gap in adoption and Reason for Gap in adoption

CROP: Cauliflower

F.S: Rabi irrigated

Sl No	Package	Recommendation	Existing Practices*	Reason for Gap in adoption**
1.	Variety	Pusa snow ball, Hissar-1 Early Kunwari, Pusa Katki, Pusa Deepali	As recommended	
2.	Spacing (cm)	45x45 Cm.,60 x 60 Cm	-do-	
3.	Manure	10 T/ha	6-7 T/ha	a,b
4	Major Nutrients (N+P+K)	80:60:50 Kg/ha	60:40:40	a, b,d

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		Borax-8 Kg/ha Multiplex 4Kg/Ha	4-5 Kg/ha	a, b,d
6	Weed Management - around the plants - In between the rows	2 weeding	2 weeding	
7	Pest Management 1. Leaf eating caterpillars, 2. Cut worm & cricket	-Malathion 50 Ec-1.5 L/ha - Malathion 55 Dust 20 Kg/ha	As recommended	a,b
8	Disease management- Black rot	- Sreptomycin 2g/10 L. of water	N	a, b
9	Water management No. of irrigation Method of irrigation	- 3 Nos. - Light Surface flow	2-3 Nos. L.S.F.	a,b,d
10	Special Practices			
11.	Harvesting - Method - Time (Hours)	- Cutting by sickle - Evening	As recommended	
12.	Farm level processing	Dressing by cutting the leaves	As recommended	
13.	Marketing -Location of Market -Distance from farm -Mode of Transport -Marketing by individual/Group	-Regulated Market -Thella, Tractor, van group, FCIG	Local market Thella Individual	f
14	Average yield (t/ha)	15-20 t/ha	10-14 t/ha	g

*F= Full

P=Partial

N=Nil

** Code for specific reason for gap

- a. Lack of awareness
- b. Lack of knowledge
- c. Lack of suitable variety
- d. Lack of finance
- e. Lack of irrigation facility
- f. Lack of support price/organized marketing
- g. Lack of improved management practices.

on and Reason for Gap in adoption

CROP: Cabbage

F.S: Rabi irrigated

Sl No	Package	Recommendation	Existing Practices*	Reason for Gap in adoption**
1.	Variety	Golden Acre, Pusa Mokta, Pride of India, Drum Head Eclipse Drum Head	As recommended	
2.	Spacing (cm)	60 x 30 cm	-do-	
3.	Manure	10 T/ha	6-7 T/ha	a,b
4	Major Nutrients (N+P+K)	120:60:60 kg/ha	60:40:30	a, b,d
5	Micro Nutrient - Dose - Method of Application	Borax-8 kg/ha	4-5 kg/ha	a, b,d
6	Weed Management - around the plants - In between the rows	2 weeding	2 weeding	
7	Pest Management 1. Leaf eating caterpillars, 2. Cut worn & cricket	-Malathion 50 Ec-1.5 L/ha - Malathion 5% Dust 20 kg/ha	As recommended	a,b
8	Disease management	-	-	
9	Water management No. of irrigation Method of irrigation	- 2-3 Nos. - Light Surface flow	2 Nos. L.S.F.	a,b,d
10	Special Practices			
11.	Harvesting - Method - Time (Hours)	- Cutting by sickle - Evening	As recommended	
12.	Farm level processing	Dressing by cutting the leaves	As recommended	
13.	Marketing -Location of Market -Distance from farm -Mode of Transport -Marketing by individual/Group	-Regulated Market -Thella, Tractor, van -group, FCIG group, FCIG	Local market Thella Individual	f

	20-25 T/ha	15-20 T/ha	g
	P=Partial	N=Nil	

** Code for specific reason for gap

- a. Lack of awareness
- b. Lack of knowledge
- c. Lack of suitable variety
- d. Lack of finance
- e. Lack of irrigation facility
- f. Lack of support price/organized marketing
- g. Lack of improved management practices.

Gap in adoption and Reason for Gap in adoption

CROP: Potato

F.S: Rabi Upland rainfed

Sl No	Package	Recommendation	Existing Practices*	Reason for Gap in adoption **
1.	Variety	K.Jyoti, K. Sinduri K. Chandramukhi	HYV, Local	c
2.	Spacing (cm)	30 x 15 Cm	30 x 15 Cm	a,b
3.	Manure	10 T/ha	6-7 T/ha	a,b
4	Major Nutrients (N+P+K)	60:50:50 Furrow	40:20:20	a, b,d
5	Micro Nutrient (Mixed) - Dose - Method of Application	2.5 Kg/ha Foliar	N	a, b,d
6	Weed Management - Around the plants - In between the rows	Twice	Twice	
7	Pest Management 1. Red Arts 2. Aphil	-Thimet 10 G- 15 Kg/ha - Malathion 50Ec - 1.5 L/ha	As recommended	a,b
8	Disease management- Blight	Indofil M-45 2.5 Kg/ha	As recommended	A,b
9	Water management No. of irrigation Method of irrigation	-	Rainfed	
10	Special Practices	Earthing up Mulching	As recommended	
11.	Harvesting - Method - Time (Hours)	Uprooting	As recommended	
12.	Farm level processing	Regulated Market	Local Market	

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	-Location of Market -Distance from farm -Mode of Transport -Marketing by individual/Group	-Regulated Market -Thella, Tractor, van ógroup/ FCIG	Local market Thella Individual	f
14	Average yield (T/ha)	9-10 T/ha	6-8 T/ha	g

*F= Full

P=Partial

N=Nil

** Code for specific reason for gap

- Lack of awareness
- Lack of knowledge
- Lack of suitable variety
- Lack of finance
- Lack of irrigation facility
- Lack of support price/organized marketing
- Lack of improved management practices.

Gap in adoption and Reason for Gap in adoption

CROP: Tomato

F.S: Kharif up Land irrigated

Sl No	Package	Recommendation	Existing Practices	Reason for Gap in adoption **
1.	Variety	Punjab Chuhara, Pusa Rabi, Sioux, Arka Alok, Arka Abha	As recommended	
2.	Spacing (cm)	50x30 cm & 75 x 30 Cm	60 x 30 Cm	a,b
3.	Manure	10 t/ha	6-7 t/ha	a,b
4	Major Nutrients (N+P+K)	75:60:60 kg/ha Basal+ Top Dress	60:30:30	a, b,d
5	Micro Nutrient (Mixed) - Dose - Method of Application	2.5 kg/ha Foliar Spray	As Recommended	a, b,d
6	Weed Management - Around the plants - In between the rows	3 times	Twice	a,b
7	Pest Management Aphil	Malathion 50Ec - 1.5 L/ha	As recommended	a
8	Disease management - Late Blight - Fungal Wilt	Indofil M-45 2.5 Kg/ha Caption- 1.5 kg/ha	As recommended	

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	Water management			
	No. of irrigation	3-4 Nos.	2-3 Nos	a,b
	Method of irrigation	Surface flow(light)		
10	Special Practices	Mulching	Partially Followed	a,b
11.	Harvesting - Method - Time (Hours)	Hand Picking Evening	As recommended	
12.	Farm level processing	Grading	As recommended	
13.	Marketing -Location of Market -Distance from farm -Mode of Transport -Marketing by individual/Group	-Regulated Market -Thella, Tractor, van ógroup/ FCIG	Local market Thella Individual	f
14	Average yield (t/ha)	20-30 t/ha	16-23 t/ha	g

** Code for specific reason for gap

- a. Lack of awareness
- b. Lack of knowledge
- c. Lack of suitable variety
- d. Lack of finance
- e. Lack of irrigation facility
- f. Lack of support price/organized marketing
- g. Lack of improved management practices.

Gap in adoption and Reason for Gap in adoption

CROP: Brinjal

F.S: Rabi irrigated Medium Land

Sl No	Package	Recommendation	Existing Practices	Reason for Gap in adoption **
1.	Variety	Pusa Kranti, P. Purple, P.P. Long, P.P. Round, pant Samrat	As recommended	
2.	Spacing (cm)	75 x 60 cm	60 x 60 cm	a,b
3.	Manure (T/ha)	10 t/ha	6-7 t/ha	a,b
4	Major Nutrients (N+P+K)	50:50:50 kg/ha Basal+ Top Dress	50:30:30	a, b
5	Micro Nutrient (Mixed) - Dose - Method of Application			

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		3 times	Twice	a,b
7	Pest Management Fruit & Shoot borer	Furadan 3 G- 2.5 Gm/P	Partial	a,b
8	Disease Management - Bacterial Wilt - Fungal Wilt	Streptomycin 10 PPM Captaf 3%	Partial	a,b
9	Water Management - No. of irrigation - Method of irrigation	3-4 Nos. Surface flow(light)	2-3 Nos	a,b
10	Special Practices	-		
11.	Harvesting - Method - Time (Hours)	Hand Picking Evening	As recommended	
12.	Farm level processing	Grading	Nil	a,b
13.	Marketing -Location of Market -Distance from farm -Mode of Transport -Marketing by individual/Group	-Regulated Market -Thella, Tractor, van ógroup/ FCIG	Local market Thella Individual	a,b
14	Average yield (t/ha)	16-20 t/ha	10-15 t/ha	g

** Code for specific reason for gap

- a. Lack of awareness
- b. Lack of knowledge
- c. Lack of suitable variety
- d. Lack of finance
- e. Lack of irrigation facility
- f. Lack of support price/organized marketing
- g. Lack of improved management practices.

Gap in adoption and Reason for Gap in adoption

CROP: Ginger		F.S: High land rainfed		
SI No	Package	Recommendation	Existing Practices	Reason for Gap in adoption **
1.	Variety	Nadia, Karkai, Maron, Jorhat, Chaina	As recommended	
2.	Spacing (cm)	20 x20 cm	As recommended	
3.	Manure (T/ha)	10 t/ha	6-7 t/ha	a,b

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		20:40:20 Basal	Nil	a, b
	- Dose - Method of Application			
6	Weed Management - Around the plants - In between the rows	3 times	Twice	a,b
7	Pest Management Shoot borer	Rogor 1.5 Lit/ha	Nil	a,b
8	Disease Management - Rhime rot	Indofil M-45 2.5 Kg/ha	Nil	a,b
9	Water Management - No. of irrigation - Method of irrigation		Rainfed	
10	Special Practices	Mulching	Mulching	
11.	Harvesting - Method - Time (Hours)	Uprooting the rhizome	As recommended	
12.	Farm level processing			
13.	Marketing -Location of Market -Distance from farm -Mode of Transport -Marketing by individual/Group	-Regulated Market -Thella, Tractor, Van ógroup/ FCIG	Local market Thella Individual	f
14	Average yield (t/ha)	15 t/ha	10 t/ha	g

** Code for specific reason for gap

- a. Lack of awareness
- b. Lack of knowledge
- c. Lack of suitable variety
- d. Lack of finance
- e. Lack of irrigation facility
- f. Lack of support price/organized marketing
- g. Lack of improved management practices.

Gap in adoption and Reason for Gap in adoption

CROP: Areca nut		F.S: High land rainfed		
Sl No	Package	Recommendation	Existing Practices	Reason for Gap in adoption **
1.	Variety	Local Type	Local Type	

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		2.75 x 2.75 m	2.1 x 2.1 m	a,b
		7 t/ha	5-6 t/ha	a,b
4	Major Nutrients U+SSP+MOP	200+250+230 Gm/p/yr	Nil	a, b,d
5	Micro Nutrient (Mixed) - Dose - Method of Application			
6	Weed Management - Around the plants - In between the rows	Twice/year	Once/year	a,b
7	Pest Management No Significant pest	-	-	
8	Disease Management - Bud Rot - Ganoderma	Bordeaux mixture Caption, Clyxin	Nil	a,b
9	Water Management - No. of irrigation - Method of irrigation	Rainfed	Rainfed	
10	Special Practices			
11.	Harvesting - Method - Time (Hours)			
12.	Farm level processing	Supari	As recommende d	a,b
13.	Marketing -Location of Market -Distance from farm -Mode of Transport -Marketing by individual/Group	-Organized Market -Thella, Tractor, Van ógroup/ FCIG	Local market Thella Individual	f
14	Average yield Con/ha (1600 nut=/con)	450-650 con/ha	350-500 c/ha	g

** Code for specific reason for gap

- a. Lack of awareness
- b. Lack of knowledge
- c. Lack of suitable variety
- d. Lack of finance
- e. Lack of irrigation facility
- f. Lack of support price/organized marketing
- g. Lack of improved management practices.

on and Reason for Gap in adoption

F.S: High land rainfed

Sl No	Package	Recommendation	Existing Practices	Reason for Gap in adoption **
1.	Variety	Assam Tall Bengal Selected Bengal Hazari	As recommended	
2.	Spacing (m)	2.75 x 2.75 m	6 x 6 m	a,b
3.	Manure (T/ha)	3.6 t/ha	2-3 T/ha	a,b
4	Major Nutrients U+SSP+MOP - Dose - Method of Application	1.5+2.5+1.75 Kg/p/yr	Nil	a, b,d
5	Micro Nutrient (Mixed)- Borax - Dose - Method of Application	25 g/p/yr ring	Nil	a,b,d
6	Weed Management - Around the plants - In between the rows	Twice/year	Twice/year	a,b
7	Pest Management - Rhinoceros Beetle - Red Plam Weevil	Malathion 5% D- 25g/p/yr Endosulphun 35 Ec 1 m 1/1	As recommended (Partial)	
8	Disease Management - Crown Rot - Stem Bleeding - Ganoderma	Borax 25 g/pl Bordeaux mixture Caption, Calyxin	As recommended (Partial)	a,b
9	Water Management - No. of irrigation - Method of irrigation	Rainfed	Rainfed	
10	Special Practices	Removed of old leaves yearly	As recommended	
11.	Harvesting - Method - Time (Hours)	Hand plucking	As recommended	
12.	Farm level processing	-		
13.	Marketing -Location of Market -Distance from farm -Mode of Transport -Marketing by individual/Group	-Organized Market -Thella, Tractor, Van ógroup/ FCIG	Local market Thella Individual	f
14	Average yield Nuts/year/ha	11,000-18,000 muts/ha	9000-13000 muts/ha	g

- c. Lack of suitable variety
- d. Lack of finance
- e. Lack of irrigation facility
- f. Lack of support price/organized marketing
- g. Lack of improved management practices.

Gap in adoption and Reason for Gap in adoption

CROP: Orange

F.S: Upland rainfed

SI No	Package	Recommendation	Existing Practices	Reason for Gap in adoption **
1.	Variety	Khasi Mandarin	As recommended	
2.	Spacing (m)	5 x 5 m	4 x 4 m	a,b
3.	Manure (Kg/P)	25 Kg	20 Kg	a,b
4	Major Nutrients (N+P+K) - Dose - Method of Application	750+600+500 Basal	Nil	a, b,d
5	Micro Nutrient (Z,B,Mo) - Dose - Method of Application	20 gm/P1. Foliar	Nil	a,b,d
6	Weed Management - Around the plants - In between the rows	Twice/year	Once	a,b
7	Pest Management Trunk & Soot borer, Leaf Miner, bark Cater piller	Monocrotophos 1 L/ha	0.6-0.8 L/ha	a,b
8	Disease Management - Foot rot - Wither Tip - Scab -	Indofil M-45 @ 1.5 Kg/ha	1-1.5 Kg/ha	a,b
9	Water Management - No. of irrigation - Method of irrigation		Rainfed	e
10	Special Practices Pruning	Yearly	Yearly	
11.	Harvesting - Method - Time (Hours)	Hand plucking Evening	As recommended	
12.	Farm level processing	Grading	Grading	

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	-Mode of Transport -Marketing by individual/Group	-Organized Market -Thella, Tractor, Van ógroup/FCIG	Local market Thella Individual	f
14	Average yield No. of Fruits/plant	800-1000 Nos.	500-600 Nos.	g

** Code for specific reason for gap

- a. Lack of awareness
- b. Lack of knowledge
- c. Lack of suitable variety
- d. Lack of finance
- e. Lack of irrigation facility
- f. Lack of support price/organized marketing
- g. Lack of improved management practices.

Gap in adoption and Reason for Gap in adoption

CROP: Pineapple

F.S: Upland rainfed

SI No	Package	Recommendation	Existing Practices	Reason for Gap in adoption **
1.	Variety	Kew, Queen	Kew, Queen	
2.	Spacing (cm)	30 x 60 x 90 cm	Partial	a,b
3.	Manure (Per ha)	10-15 t/ha	5-7 t/ha	a,b
4	Major Nutrients (N+P+K) - Dose - Method of Application	12+2+12 gm/p Basal & Foliar	Nil	a, b,d
5	Micro Nutrient - Dose - Method of Application	Tracel-2 @3.5 Kg/ha	Nil	a,b,d
6	Weed Management - Around the plants - In between the rows	3 times/yr	Twice	a,b
7	Pest Management	Nil	Nil	
8	Disease Management - Leaf Spot	Indofil M-45 @ 1.5 kg/ha	Nil	a,b
9	Water Management		Rainfed	e

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		Regulation of flowering & Early fruiting	Nil	a,b
11.	Harvesting - Method - Time (Hours)	Cutting/plucking	As recommended	
12.	Farm level processing	Grading	Grading	
13.	Marketing -Location of Market -Distance from farm -Mode of Transport -Marketing by individual/Group	-Regulated Market -Thella, Tractor, Van ógroup/ FCIG	Local market Thella Individual	f
14	Average yield (t/ha)	60-70 t/ha	45-55 t/ha	g

** Code for specific reason for gap

- a. Lack of awareness
- b. Lack of knowledge
- c. Lack of suitable variety
- d. Lack of finance
- e. Lack of irrigation facility
- f. Lack of support price/organized marketing
- g. Lack of improved management practices.

Gap in adoption and Reason for Gap in adoption

CROP: Banana

F.S: Upland rainfed

Sl No	Package	Recommendation	Existing Practices	Reason for Gap in adoption **
1.	Variety	Malbhog, Jahaji, Chenichampa	As recommended	
2.	Spacing (m)	2.1x 2.1 1.8x 1.8	2 x 2 1.5 x 1.5	a,b
3.	Manure	12 Kg/pl	6-10 kg	a,b
4	Major Nutrients (N+P+K) - Dose - Method of Application	110+33+330 gm/p Ring Method	Nil	a, b,d
5	Micro Nutrient (B,Zn,Cu,Mo) - Dose - Method of Application	20 gm/pl Soil Application	Nil	a,b,d

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		Twice/yr	Once	a,b
7	Pest Management Corn & Pseudo stem Borer Fruit Scaring Beetle	Furadon 3 g-40 g/pl Malathion 50 Ec- 750 ml/ha	Nil	a,b
8	Disease Management Panama & Sigatoka Leaf Spot Bunchy top	Bavistin 500 gm/ha Dimercron 500 ml/ha	Nil	a,b
9	Water Management - No. of irrigation - Method of irrigation		Rainfed	a,b
10	Special Practices	Desuckering	Done but not as recommended	a,b
11.	Harvesting - Method - Time (Hours)	Hand picking Evening	As recommended	
12.	Farm level processing	Packing	Nil	a,b
13.	Marketing -Location of Market -Distance from farm -Mode of Transport -Marketing by individual/Group	-Regulated Market -Thella, Tractor, Van ógroup/ FCIG	Local market Thella Individual	f
14	Average yield (t/ha)	20-25 t/ha	15-18 t/ha	g

** Code for specific reason for gap

- a. Lack of awareness
- b. Lack of knowledge
- c. Lack of suitable variety
- d. Lack of finance
- e. Lack of irrigation facility
- f. Lack of support price/organized marketing
- g. Lack of improved management practices.

Reasons for yield gap in major horticultural crops

Crop	Reasons for gaps
Coconut	Non availability of quality planting material, poor adoption of improved crop management practices
Arecanut	Non availability of quality planting material, poor adoption of improved crop management practices
Orange	Non availability of quality planting material, poor adoption of improved crop management practices
Pineapple	Non availability of quality planting material, poor adoption of improved crop management practices

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	...y of quality planting material, poor adoption of management practices
	...of IPM and INM technologies,
Brinjal	Poor adoption of IPM and INM technologies,
Tomato	Poor adoption of IPM and INM technologies,
Potato	Poor adoption of IPM and INM technologies,

Processing/ storage/Marketing gaps

Sl No	Activities	Recommendation	Existing Practices	Reason for Gap in adoption **
1	Processing	Grading and standardisation	Partially followed	Lack of awareness
		Seed processing	Not followed	Non existence of seed processing unit
		Preservation of fruits and vegetables	Partially followed	Lack of agro-processing units
2	Storage	Perishable commodities such as potato, tomato etc.to be kept in cold storage	Traditional method of storage	Lack of cold storage facility
		Grain crops to be stored by applying scientific methods	Traditional method of storage	Lack of proper knowledge
3	Marketing	i. Market information system ii Marketing through regulated market in rural areas iii Establishment of cooperative marketing society iv) Grading and standardization facility	i Marketing of produce without any information on demand and supply ii.Direct selling to local vendors iii) Non existence of cooperative marketing society	i) Lack of market information system in relation to demand and supply position ii)Lack of regulated market in rural areas iii)Location of market iv) Mode of transport v)Involvement of middle man in the marketing channel. vi)Lack of awareness on

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					cooperative marketing society. vii)Lack of grading and standardization facilities. viii)Lack of public private partnership in market related initiatives.
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Identified thrust areas of the district

Sl. No	Enterprises	Thrust areas
1	Horticulture production system	<ul style="list-style-type: none"> -Reduction of yield gaps -Commercial production of major fruits, vegetables, spices etc -Commercial floriculture -Preservation of locally available fruits and vegetables -Adoption of appropriate IPM technology in vegetable production -Alternate land use and crop diversification -Commercial rearing of honey bee -Expansion of area under medicinal and aromatic plants

5.6 Critical issues and proposed strategies

Sl. No.	Critical issues ,problems and opportunities	Proposed strategies
1	Significant yield gap in vegetable & fruit crops due to technological gap in management practices	-Overcoming technological gaps in major vegetables & fruit crops through adoption of improved crop management practices.
2	Excessive use of pesticides in vegetable crops	-Popularizing IPM technology in vegetable crops.
3	Supply of quality seed and planting materials	-Decentralized production of vegetable seeds & planting materials for fruit crops.
4	Alternate land use & crop diversification	-Dry land horticulture as alternate land use & crop diversification.
5	Higher fruit production	<ul style="list-style-type: none"> -Expansion of area under fruit crops like banana, citrus, pineapple etc. -Adoption of scientific method of cultivation
6	Higher vegetable production	<ul style="list-style-type: none"> -Intensive cultivation of vegetables in irrigated areas -Expansion of area under off season vegetables by crop substitutions.

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		-Popularizing post harvest technology and value addition in fruits and vegetables.
	of organic spices & vegetables	-Encouraging production of organic spices & vegetables for export.
9	Opportunities for commercial floriculture	-Introduction of commercial floriculture.
10	Mono cropping of tomato, brinjal & cole crop	Popularizing crop rotation with non solanaceous crops like beans, capsicum etc.

5.7 Recommended interventions for the district

5.7.1 Crop wise intervention

Sl no	Crop	Intervention
1	Potato	Supply of certified seeds, cold storage facility
2	Tomato	Popularization of pest and disease resistant varieties, staggered planting, value addition
3	Coconut	Introduction of quality planting material, adoption of improved management practices and value addition
4	Arecanut	Introduction of quality planting material, adoption of improved management practices and value addition
5	Banana	Introduction of quality planting material, adoption of improved management practices, Popularization pf INM and IPM technology, value addition
6	Pineapple	Introduction of quality planting material, adoption of improved management practices, Popularization pf INM and IPM technology, value addition

5.7.2 Constraints and intervention

Sl no	Constraints	Strategies	Action Plan
1	Inadequate supply of quality planting material	Infrastructure development	- Establishment of nurseries, cold storage etc. - Training on nursery management

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		Establishment of processing/preservation unit	<ul style="list-style-type: none"> -Training on post harvest management - Method demonstration -Formation of SHGs -Financial linkage for farm credit -Development of agro-processing unit
3	Inadequate market facilities	<ul style="list-style-type: none"> -Promotion of Marketing through regulated market in rural areas - Establishment of cooperative marketing society - Grading and standardization facility 	<ul style="list-style-type: none"> -Training -Awareness - Formation of cooperative society
4	Poor adoption of improved management practices	<ul style="list-style-type: none"> - Adoption of improved management practice - Adoption of IPM technology 	<ul style="list-style-type: none"> - Training to practicing farmers, rural youth, farm women and extension functionaries - Front line demonstration on recently released technology - On farm research - Awareness campaign

Fisheries in Bongaigaon district

6.1 Introduction

The district of Bongaigaon is endowed with fisheries resources in the form of ponds/tanks, beel, swamps, low-lying area, derelict water bodies and a diverse network of river and rivulets. In addition to above an estimated network of 100 kms. of riverine stretches including a part of the mighty river Brahmaputra can be considered for the exploitation of fisheries. The present annual fish production from the above resources in the district is about 4,915.2 tonnes during 2007-2008 as against a demand of 5,986 tonnes for the entire district at the recommended rate of 11 kg. per capita per annum assuming 90 per cent of the human population consumes fish.

There is a wide gap between production and demand. The short fall is partially made good through import of fish nearly 81 tonnes imported during 2007 -2008 from other states like Andhra Pradesh, U. P, W. B., Bihar, etc. Out of the



production in the district nearly 70 per cent comes from capture fishery resources and 30 per cent from culture fisheries. As regards existing natural resources in the district of Bongaigaon, around 548 hectare of water spread area is under ponds / tanks with average

production of less than 1 tonne. per ha/year, and there is ample scope for improving this production to 3t/ha/year by adopting scientific culture techniques. Besides, there are low lying and swampy areas of about 623 ha. available for construction of new ponds/ tanks. By adopting

and management practices the farmers can raise the average production of fish from beels in the district. The fish seed production in private sectors was 9.00 million during 2007-2008 indicating good sign for development of activity. There is a declining trend in fish catch from rivers in the entire state in general and Bongaigaon district in particular due to indiscriminate fishing, large scale capture of under sized fishes and unscientific management.

infrastructure and support services

a. Infrastructure facilities are required for fish culture in ponds/ tank, beel fisheries, riverine fisheries, and Inland fisheries to cater to the development needs. There is a need for fish seed hatcheries.

b. The office of District Fisheries Development Officer was established on 2nd July 1993 and the FFDA (Fish Farmers Development Agency) was reregistered on 29th October 1993 which are extending necessary technical support and extension services to fishermen in the district. No major development has taken place during the last five years in the infrastructure availability. The Government fish farms (1 in Abhayapuri) is being looked after by DFO, Bongaigaon. There are two Eco-hatcheries, four fish farms, one fish grower under private sector located at Garaimari, Kisanbazar and Nadiapara. The market of Garaimari is popular for the sale of fish seed. Total fish seed production during the year under private sectors was 7.85 Million. There are 7,121 ponds, 195 community tanks with water area of 894.72 ha developed by private fish farmers, 94 beels with water area of 1,850 ha with adequate measures for conservation of fish stock.



c. The fishery dept. is responsible for the successful implementation of F.F.D.A. Programme as well as other developmental scheme in rural areas. The scheme on the development activities will be shared on 75:25 basis between the Government of India and State Government The subsidy will be provided at 25 per cent for SC/ST beneficiary and 20 per cent for general beneficiaries.

d. The fishery department in the district has inadequate staff. The Department is functioning without adequate infrastructure like Laboratory, Training Center, Audio-visual Equipments etc. Posting of fishery extension officer at Tapattari and Boitamari development Blocks and fishery demonstrator at Dangtol Development blocks are necessary.

Table 6.1 Water resources, production and requirement in Bongaigaon district

Ponds and Tanks	8421 nos.	803.1 ha
Community Tanks	201 nos	102.58 ha
Hatchery	3 nos	-

	1 no.	-
	84 nos.	1850.00 ha
Pvt. Water logged area	14 nos	33.20 ha
Fish production	4951.2 MT	-
Seed production	11.30 MT	-
Fish requirement	6318.66 MT	-
Fish seed requirement	72.45 lakhs	-
Nos of seed producer	4	-
Nos of fish seed grower	30	-

6.3 Farmer's Organization

Some farmer's organization are working in the district for development of fishery sectors. The information of such organization in the district are as follows.

1. Self Help Group - Organised by farmers and NGO.
2. Primary Fish Co-Operative Societies (PFCS), Organised by Deptt of Fishery.
3. Fisher Association, Tamranga beel, Ghilaguri, Bongaigaon.

6.4 Critical gap

- i. Improper utilization of natural resources.
- ii. Poor knowledge on scientific pisciculture.
- iii. Inadequate supply of quality seed.
- iv. Damage of breeding ground.
- v. Non implementation of fishery law.

6.4.1 Gap in infrastructure

- i. Fish seed hatcheries
- ii Infrastructures like laboratory, training centre etc.
- iii. Credit support
- iv. Trained manpower

6.4.2 Details of the on going schemes and scheme wise activities under Fishery department

Sl no	Sector	Name of the schemes	Activities	
Year: 2007-08				
			Extension	Development

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		AACP	-	Reclamation of pond
		AACP	Training	-
3	Central	F.F.D.A.	Training	Do-
4	State	F.F.D.A.		Do-
Year : 2008-09				
5	State	R.K.V.Y.	Training	Construction and reclamation of ponds & input supply
6	State	Dist administration		Construction of office building
7	State	Reclamation of derelict water bodies		Reclamation of derelict, Beel
8	State	Employment generation schemes through SHG		Nursery development, rearing ponds
9	State	Fish seed farming		Repairing pvt. Nursery
10	State	S.C.C.P.		Reclamation of derelict, beel, supply of nets, beel development

Gap in adoption and Reason for Gap in adoption

Enterprise: Fishery

FS: Low Land rainfed

Sl No	Package	Recommendation	Existing Practices	Reason for Gap in adoption **
1.	Culture components a. Indian Major carp (composite) b. Exotic carp c. Prawn d. Cat fish	IMC Exotic	Composite	c
2.	Pond preparation a. organic manure (kg/ha)	1200 kg/ha	800-900 kg/ha	

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	a)	600 kg/ha - 600 kg/ha 90 cm	300-400 kg/ha - 300-400 kg/ha	a,b,c
	e. Water depth			
3	Weed control a. Manual b. Mechanical c. Chemical	Mechanical	Mechanical	f
4.	Stocking size/No. a. Spawn b. fry c. Fingerlings	6000 Nos.	Composite	a,b
5.	Feeding schedule a. Rice bran b. Oil cake c. Green Leaf	2000 kg/ha 2000 kg/ha	1000-1500 kg/ha 1000-1500 kg/ha	a,b,c
6.	Sample netting Monthly Quarterly Half yearly	Monthly	Monthly	
7.	Aeration			
8	Disease UDS	Cifax		
9	Harvesting method	Netting	Netting	
10	Culture method	Composite	Composite	
	Average yield (ton/ha)	2.5 T/ha	1.5-2 T/ha	g

** Code for specific reason for gap

- a. Lack of awareness
- b. Lack of knowledge
- c. Lack of suitable species (fingerlings)
- d. Lack of resources
- e. Lack of conviction
- f. Lack of Organised marketing
- g. Lack of improved management practices

6.5 Critical issues and strategies

Sl. No.	Critical issues	Proposed strategies
1	Opportunity for composite pisciculture	- Introduction of composite pisciculture in water bodies with surface, bottom & column feeder of high yielding type. - Introduction of poly culture in village tank
2	Low productivity of fish per unit	-Popularization of technology for higher

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		fish production.
	seeds	-Decentralized production of finger lings. -Enhancing production of quality seed in both govt. and private sectors -Production of advance fingerling

6.6 Recommended intervention

Sl. No.	Constraints	Intervention & Action Plan
1	Poor knowledge on scientific pisciculture	-Farmers training programme on scientific pisciculture - Exposure visit to successful site
2	Non availability of quality seeds	- Training on quality seed production - Exposure visit to successful site
3	Poor development of beel fisheries	Technological intervention for beel fishery development through training and awareness campaign
4	Lack of knowledge on Assam Fish Seed Act	- Awareness programme at field level
5	Mortality of fish due to pesticide application in adjacent rice field	- Awareness/ motivation programme against use of toxic substance in the nearby areas - Training and awareness programme for popularization of IPM technologies in rice field
6	Irrational fishing	-Restriction of irrational fishing during breeding and spawning season

CHAPTER VII

Sericulture in Bongaigaon District

7.1 Introduction

Sericulture has an old traditional existence in Bongaigaon district since time immemorial. It plays a significant role in the socio- economic development of the weaker section. Most of the sericulturist of this district still prefers sericulture as their subsidiary income source of their off agricultural season. It is mentioned that the eri practice in the district is traditional among some cast and community, but the muga culture is becoming more popular from last few years. Climatic conditions are favourable for cultivation of crops like eri, muga and mulberry for silk worm rearing. Most of these activities, except growing of plantation and rearing are basically non farm activities. There is tremendous scope and prospect for expansion of sericulture in rural areas through increasing food plants especially for muga culture. There is also scope to spread the sericultural activities to the people of char areas especially in eri culture though proper organization. The existing activities related to sericulture and sericulture production details are given below in Table 7.1 and 7.2 respectively.



Table 7.1 Existing activities of sericulture

Sl no.	Activities	No of families involved (2007-08)	Nos. of seri. village	Area under silk worm food plants (2007-08)
1	Eri silk industry	1873	59	185.33 ha
2	Muga silk industry	1537		218.6 ha
3	Mulberry silk industry	159		2.5 ha

Table 7.2 Production of Sericultural sector

Sl no	Activities	Item	Production (2008-09 up to December,08)

		Eri DFS	1,20,000 DFS
		Eri cut cocoon	11500 kg
2	Muga silk industry	Raw silk	250 kg
		Reeling cocoon	12,50,000 nos.

7.2 Government Farm / Institution under department

- i. Nayagaon V. G. R., Nayagaon, Bongaigaon.
- ii Khagarpur collective mulberry garden, Khagarpur.
- iii. North Boitamari collective mulberry garden,
Dewangaon.



7.3 Details of the on going schemes and scheme wise activities under Sericulture department

- i) Som plantation at Nayagaon V.G.R. covering 18.0 ha under NREGA, 2007-08 with cost Rs. 26.60 lakhs.
- ii) Som plantation at North Boitamary C.M.G. covering 5.0 ha under NREGA, 2007-08 with cost Rs. 8.81 lakhs.
- iii) Som plantation at Khagarpur C.M.G. covering 5.0 ha under NREGA, 2007-08 with cost Rs. 8.81 lakhs.
- iv) Construction of Grainage house for muga seed production at Navagaon V.G.R. under SGSY,2008-09 with cost Rs. 30.76 lakhs.



7.4 Critical gap

Critical gaps identified in sericulture sector are

- Lack of awareness and skill up-gradation.
- Lack of sophisticated infrastructure.
- Non availability of fund / schemes like grants-in-aid etc. especially for minorities.

7.4.1 Infrastructure gap

- Sericulture office for identification of suitable area and beneficiaries.
- Nurseries for adequate supply of quality planting materials.
- Skill up gradation training.

Gap in adoption and Reason for Gap in adoption

Enterprise: Sericulture (Eri Cut Cotton)

Items of package	Recommended practice	Existing practice	Gap in adoption (F/P/N)*	Specific reason For the gap**
Sowing: Planting				
Time	April- Sept	April- Sept	N	
Method	Pit system	Pit- system		
Varieties	Kessero/Castor	Kessero/castor	N	
Seed rate (per/ha)	900	1125	P	1
Organic manure (ton/ha)	20 tons	10 tons	P	1,2
Fertilizer (kg/ha) per year				
Basal (N+P+K)	300:120:120	150:60:60	P	1,2
Top dress (N+)				
Method of fertilizer use Basal	Basal	Basal	N	
Top dress				
Disease management				
Powdery mildew	DM-45	DM-45	P	1,2
Leaf spot disease	Bavistin	Bavistin		
Weed management				
Mechanical	Deep ploughing	Deep ploughing	N	
Water management no of irrigation Method of irrigation	Weekly Drip	Rainfed	P	2
Method of harvesting	Plucking	Plucking	N	
Silk worm race	Eri (Multivoltine)	Eri (Multivoltine)	N	
Rearing methods	Shoot rearing	Scoot rearing	N	
Disease control	Disinfection of rearing house	Disinfection of rearing house	N	
Mounting method	Separate mounting hall,use of plastic mountages	Mounting in open place with bamboo mountage	P	2
Cocoon yield Average yield Kg/100 DFLS	7.8 kg	8 kg		

P=Partial

N=Nil

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Gap in adoption

- a. Lack of awareness
- b. Lack of finance
- c. Non availability of material
- d. Demand of seed material
- e. Lack of separate rearing house

Gap in adoption and Reason for Gap in adoption

Enterprise: Sericulture (Muga Raw Silk)

Items of package	Recommended practice	Existing practice	Gap in adoption (F/P/N)*	Specific reason For the gap**
Sowing: Planting				
Time	April- Sept	April- Sept	N	
Method	Pit system	Pit- system		
Varieties	Som/Soalu	Soalu	P	1
Seed rate (per/ha)	1125	1125	N	
Organic manure (ton/ha)	20 tons	10 tons	P	2
Fertilizer (kg/ha) per year				
Basal (N+P+K)	300:120:120	150:60:60	P	1,2
Top dress (N+)				
Method of fertilizer use Basal	Basal	Basal	N	
Top dress				
Pest management				
Leaf bladder	Nuvan	-	F	1,2
Disease management				
Powdery mildew	DM-45	DM-45	P	1,2
Leaf spot disease	Bavistin	Bavistin		
Weed management				
Mechanical Herbicides	Deep ploughing	Deep ploughing	N	
Water management (No of	Weekly	Rainfed	P	1,2

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irrigation				
Method of harvesting				
Silk worm race	Muga (Multivoltine)	Muga (Multivoltine)	N	
Rearing methods	Out door	Out door	N	
Disease control	Disinfection of rearing appliances & trees	Disinfection of rearing appliances	P	1,2
Mounting method	Zali	Zali	N	
Cocoon yield Average yield kg/100 DFSL	5000 Nos. reeling cocoons	4500	P	3,4

*F= Full

P=Partial

N=Nil

** Code for specific reasons for gap in adoption

- Lack of awareness
- Lack of finance
- Non availability of material
- Demand of seed material
- Lack of separate rearing house

7.5 Sericulture sector

Sl no	Constraints/ Issues	Intervention & Action Plan
1	Expansion of area under muga and eri food plants	- Utilization of waste land for muga and eri food plants
2	Infrastructure facilities	- Construction of training cum production center having sophisticated equipments - Nursery development
3	Skill up-gradation	- Awareness campaign & skill upgradation training on plantation, silk worm rearing, grainage technology, post cocoon technology etc

KVK: Perspective Plan

8.1 Introduction

Krishi Vigyan Kendra (KVK) is an innovative science based organization at the district level established by the Indian Council of Agricultural Research (ICAR) after recommendation of Mehta Committee (1973) with an objective of technology dissemination to the farmer's fields without any transmission loss. The KVKs have been charged to take up the responsibilities of technology evaluation and impact assessment, demonstration of field technology on the farmer's field, organizing training courses for the extension workers to update their knowledge level and skill training for the farmers including farm woman as well as rural youth.

8.2 Objectives of KVK

- a. To demonstrate the new improved technology to the farmers as well as to the extension agencies directly in the farmer's field with their active participation.
- b. To identify the area specific problems of the farmers and prioritization of the identified problems as per their importance.
- c. To collect feedback from the farmers and extension agencies and to provide linkages with the scientists for the modification or refinement of the technology.
- d. To impart training to farmers, rural youths and extension functionaries for capacity building.
- e. To provide new and important information on agriculture and allied sectors to the extension agencies or NGOs for wider circulation to improve their economic condition.
- f. To prepare different extension models and verify these models in the farmer's field with their participation to create confidence among them.

8.3 Mandates of KVK

- a. Conducting on-farm testing for identifying technologies in terms of location specific sustainable land use system.
- b. Organizing frontline demonstration to generate production data and feed

- from vocational training in agriculture and allied sector vocations for rural youths with emphasis on learning by doing for generating self-employment through institutional financing.
- d. Organizing training to update the extension personnel within the area of operation with emerging advances in agricultural research on regular basis.

8.4 Staff position

Sl. No.	Name	Designation of staff
1	Dr. S. K. Paul	Programme Co-ordinator
2	Dr. C. K. Sarma	Subject Matter Specialist (Agronomy)
3	Dr. G. Moral	Subject Matter Specialist (Soil Science)
4	Ms. Purnima Das	Subject Matter Specialist (Entomology)
5	Dr. Pallabi Devi	Subject Matter Specialist (Animal Science)
6	Dr. H. K. Baruah,	Subject Matter Specialist (Agril. Economics)
7	Miss Chayanika Nath	Programme Assistant (Computer Application)
8	Miss Ranjita Brahma	Farm Manager
9	Sri Kandarpa Kr. Das	Programme Assistant (Agril. Statistics)
10	Mr. D. D. Mahanta	Accountant
11	Mr. Madhusudhan Ghosh	Typist
12	Mr. Pulen Ch. Roy	Supporting Staff

8.5 Thrust areas identified

- i. Commercial production of fruits and vegetables crops, medicinal and aromatic plants in the irrigated area.
- ii. Preservation of fruits and vegetables.
- iii. Crop production technology specially for *Sali, Ahu, Boro-rice, Pulses, Oil seeds, Cash crops, Plantation crops and spices.*
- iv. Bamboo cultivation technology.
- v. Dairy, Piggery and poultry production for milk, meat and egg.
- vi. Promotion of self help group and acceleration of co-operative movement.
- vii. Composite fish farming.
- viii. Integrated pest and disease management (IPM) techniques.
- ix. Organic farming and integrated nutrient management (INM).
- x. Agro-forestry and waste land management.
- xi. Soil and water management.
- xii. Sericulture, weaving and textile.
- xiii. Mushroom production.
- xiv. Child care and women health.
- xv. Promotion of rural youth club.
- xvi. Women empowerment.

8.6 Role of KVK in changing perspective of global agricultural scenario

- a. Identification and analysis of existing farming situations.
- b. Assessment and refinement of different technologies under different farming situations.
- c. Demonstration of newly released or likely to be released technologies and its management practices in the farmer's field under different farming situations.
- d. Diversification and intensification in existing farming systems.
- e. Reduction in yield gap through improvement in Productivity and income of existing Enterprises / commodities in existing farming systems.
- f. Improper crop management practices, soil erosion, water logging, soil acidity,

- and bio-diversity etc. has posed serious threat to the cultural production systems. KVK will emphasize on efficient management of natural resources.
- g. Group approaches have been found highly effective in various developmental activities. KVK will take initiative in community organization for safeguarding common interest, empowerment of community and management of natural resources .
 - h. Enhancing credit flow and infrastructure development
 - i. Effective forward and backward linkage.

8.7 SWOT Analysis of the District

In order to prepare the plan, it is necessary to assemble a statistical profile of the district which will lead to understanding of the development perspective of the district and considering these, SWOT analysis need to be carried out. SWOT analysis was carried out under different components e.g. ecological, socio-economic, infrastructure and farming system. The details of SWOT analysis results are given below.

8.7.1 SWOT analysis of agricultural sector

Sl No	Particulars
	STRENGTH
A.	ECOLOGICAL
1	Rich bio diversity
2	Favourable climatic and soil conditions for various types of field crops, horticulture crops etc.
B.	SOCIO-ECONOMIC
1	Social relationship and cohesiveness
2	Cheap labour force
3	Research and developmental back up by Research stations of A.A.U.
4	Existence of KVK, Bongaigaon, Kajalgaon for HRD
5	Local weekly markets
6	Existence of supportive line departments
C.	FARMING SYSTEM
1	Perennial water source in low lying areas for multiple cropping.
2	Basic knowledge in cultivating crops
	WEAKNESS
A.	ECOLOGICAL
1	Soil erosion causing land degradation.
2	Reduced depth of top soil due to unabated soil erosion.
3	Micro nutrient deficiency (Bo,Mo,Zn)

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Forcing monoculture of rice.

1	Small and marginal land holding
2	Faith in traditional farming and reluctant to adopt scientific technology
3	Thinly populated and isolated village with poor communication.
4	Rigid customs
5	Alcoholism in male
6	Exploitation of rural money lenders
7	Immigration by outsiders for exploitive cultivation.
8	Poor economic condition
C	FARMING SYSTEM
1	Lack of technical knowledge on improved crop management practices
OPPORTUNITIES	
A.	ECOLOGICAL
1	Potential for multi-tier cropping.
2	Recycling of biomass for soil health management
3	Integrated watershed development
B.	FARMING SYSTEM
1	Low use of external inputs in crops which provides scope for promotion of organic farming.
2	Improving productivity of crops through adoption of scientific technology
3	New market opportunity for organic products
4	Cultivation of aromatic rice for export
5	Scope for expansion of area under pulses and oilseeds
THREATS	
1	Reduced stream flow during dry season
2	Loss of biodiversity
3	Change of flood habits
4	Immigration by outsiders for exploitations of natural resources
5	Degradation of land forest
6	Crop damage due to sudden out break of flood
7	Fluctuation in market prices of agricultural produce and inputs

8.7.2 SWOT analysis of Animal Husbandry and Veterinary sector

Sl No	Particulars
STRENGTH	
A.	ECOLOGICAL
1	Rich and diverse natural resources
2	Agro-ecological condition favours rearing of varied livestock
B.	SOCIO-ECONOMIC
1	Social relationship and cohesiveness
2	Cheap labour force
3	Research and developmental back up by Research stations of A.A.U.

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gaon, Kajalgaon for HRD
product
network

C.	FARMING SYSTEM
1	Breed up gradation facilities for dairy animals and goat.
2	Farmers in the district follow mixed farming system with livestock as one of the important and inseparable component
	WEAKNESS
A.	PRODUCTION SYSTEM
1	Large number of indigenous livestock with poor productivity
2	Non availability of superior germplasm for replacement
3	Lack of scientific know how
3	Higher production cost due to high feed cost
B.	SOCIO-ECONOMIC
1	Traditional mindset and livestock are always considered as subsidiary income source
2	Inadequate credit support
3	Poor involvement of corporate sector in the production process
4	Rigid customs
5	Lack of livestock feed production unit
6	In efficient marketing channel
	OPPORTUNITIES
A.	PRODUCTION SYSTEM
1	Gap in terms of demand and supply
2	Scope to improve productivity of indigenous livestock population
3	Restoration of barren land to pasture or grassland
4	
B.	FARMING SYSTEM
1	Potential development of cross breed cows
2	Scope for black pig farming and backyard poultry
3	Opportunity for formation of farmers group for value addition
4	Rabbit rearing in sub urban as well as rural areas.
5	Goat rearing in rural areas.
	THREATS
1	Rapid commercialization and shrinkage of agricultural land
2	Decline in natural resource base with disturbed ecosystem
3	Higher prices of feed ingredients and other inputs
4	Natural calamities
5	Ranikhet disease in poultry
6	HS, BQ, FMD of goat & cattle
7	Swine fever & FMD in pig

8.7.3 SWOT analysis of Horticultural sector

Sl No	Particulars
	STRENGTH
A.	ECOLOGICAL

	soil conditions for various types of horticultural crops
	oil for dry land horticulture, plantation and agro forestry
4	Well drain red soil (mixed red) with low rainfall favoures spices like ginger and turmeric
5	Vast areas available for cultivation of horticultural crops
B.	SOCIO-ECONOMIC
1	Social relationship and cohesiveness
2	Cheap labour force
3	Research and developmental back up by Research stations of A.A.U
4	Existence of KVK, Bongaigaon, Kajalgaon for HRD
5	Local weekly markets
C.	FARMING SYSTEM
1	Off season cultivation of vegetables like potato, bean, bhendi, cole crops & tomato.
	WEAKNESS
A.	ECOLOGICAL
1	Soil erosion causing land degradation.
2	Micro nutrient deficiency (Bo,Mo,Zn)
3	Indiscriminate deforestation
B.	SOCIO-ECONOMIC
1	Small and marginal land holding
2	Lack of knowledge of scientific production technology
3	Inadequate post harvest infrastructure and marketing channel of the produce
4	Rigid customs
5	Poor economic condition
6	Exploitation by rural money lenders
7	Immigration by outsiders for exploitive cultivation.
	OPPORTUNITIES
A.	ECOLOGICAL
1	Potential for multi-tier plantation/cropping.
2	Recycling of biomass for soil health management
3	Ecological access to new crops like spices and aromatic & medicinal plants
4	Scope for Integrated watershed development
B.	FARMING SYSTEM
1	Low use of external inputs in crops which provides scope for promotion of organic farming.
2	Extensive cultivation of off season vegetables
3	New market oppportunity for organic products
5	Potential for dry land horticulture
9	Scope for commercial floriculture
10	Mushroom cultivation in urban areas
13	Commercial cultivation of pineapple, citrus and banana.
14	Honey bee rearing in rural areas.
15	Wide scope for growing high value low volume crops
16	Large scale fruit processing
	THREATS
1	Reduced stream flow during dry season
2	Loss of biodiversity
3	Change of flood habits

s for exploitations of natural resources

st

8.7.4 SWOT analysis of fishery sector

Sl No	Particulars
STRENGTH	
1	Low lying areas favouring development of community fishery
2	Cheap labour force
3	Research and developmental back up by Research stations of A.A.U
4	Existence of KVK, Bongaigaon, Kajalgaon for HRD
5	Local weekly markets
6	Tradition of having pond in the existing farming system
7	High market demand due to gap in demand and supply
WEAKNESS	
1	Inadequate knowledge on technical and scientific approach in fish production system
2	Traditional mindset and fish production system is maintained as zero input system
3	Higher cost of feed material
4	Sudden outbreak of flood causing severe loss
OPPORTUNITIES	
1	Single species and composite pisciculture in ponds and irrigated areas.
2	Integrated pisciculture in poultry & duckery
THREATS	
1	Change of flood habits
2	Immigration by outsiders for exploitations of natural resources

8.7.5 SWOT analysis of Sericulture sector

Sl No	Particulars
STRENGTH	
1	Favourable climatic and soil conditions for various types of food crops required for eri and muga rearing
2	Vast area is available for plantation of food crops
3	Availability of skilled labour force
WEAKNESS	
1	Inadequate knowledge on technical and scientific approach in eri and muga production system
2	Traditional mindset
3	Poor economic condition
4	Poor market linkage
5	Inadequate infrastructure facility
OPPORTUNITIES	
1	High market demand
2	Restoration of barren land to food crops

Formation of farmers group/ SHGs

Improvement

THREATS

1	Rapid commercialization and shrinkage of agricultural land
2	Decline in natural resource base with disturbed ecosystem

VISION 2020 –AN APPROACH

8.8 Preamble

Bongaigaon district is situated in North West side of Assam, surrounded by Kokrajhar and Dhubri district in North West, Barpeta in the East and river Brahmaputra in the south. The geographical area of the district is 2510 sq km. The district is located between 26.28 N and 26.54 N longitudes 89.42 E and 90.06 E and as a whole falls under Lower Brahmaputra Valley Agro-climatic Zone. The mighty river Brahmaputra flows along the southern part of the district and its tributary Aie river flows through the district besides many small rivulets and streams.

The climate of the district is sub-tropical in nature with warm and humid summer followed by dry and cool winter. The average annual rainfall is about 3000 mm per annum of which 75 per cent is received during monsoon month (June to September). The monsoon months are wet and winter is dry. Both pre and post monsoon months have unpredicted and erratic rainfall. The mean maximum and minimum temperature varies from 33 to 38⁰C and 9 to 10⁰C, respectively. The average radiation is the highest during March to April, while overcast sky reduces the solar radiation to the least during July. The total population of the district is 6,04,660 as per 2001 census out of which 5,13,000 live in the rural area. The population density is 316 per sq. km with male female ratio of 1000:945 Literacy rate is 45.6 per cent.

Agriculture plays an important role in the economy of the district and about 70% of the rural population directly depends on agriculture for their livelihood. The district has a high cropping intensity and more intensive and diversified farming systems in comparison to the other zone. The major field crops are *rice* (Sali, boro and ahu) black gram, arahar, lentil, pea, *Jute*, mesta, *Rapeseed* and *Mustard*, *Sesamum*, *Buckwheat*, *niger*, *linseed* etc. Horticultural crops include vegetables like cole crops, brinjal, tomato, potato, chilli, cucurbits onion, garlic, turmeric, ginger etc. Important plantation crops are Areca nut, Coconut, Bamboo etc. Banana, pineapple, citrus etc. are major commercially cultivated fruit crops of the district. Rain fed farming is generally followed by the farmers

irrigated area is brought under irrigation through canal, lift and a few natural beels where fish grows naturally and generally fish cultivation is done in community tanks or ponds and low lying areas. Cattle, goat, pig and poultry are the major livestock of the district. However, there has been considerable yield gap in both agriculture and allied sectors due to gap in adoption of scientific technology. The infrastructure facilities like supply of input, marketing, institutional credit and extension services are still inadequate. Gradual degradation of natural resources such as soil and water is also noticed due to adoption of inappropriate agricultural practices. Therefore, conservation of these resources needs to be prioritized through adoption of sustainable land use system.

8.9 Vision Statement

In spite of the richness of resources, the production of most of the food grains, livestock and fish is not satisfactory and so, there is need to address three important aspects of development such as production, infrastructure and human in future which will lead to better productivity and employment. The vision for development of agriculture should flow from the collective aspiration of all the stakeholders of the area and thus, will emerge from collective imagination for wellbeing of local community through realizing the potential for agricultural growth. The vision of development aims at

- Ensuring comprehensive food and nutrition security at the family level, including an adequate supply of food to meet quantitative and nutritional requirements.
- Reducing food and nutritional requirements from outside by augmenting agricultural technologies that are environment friendly
- Arresting environmental degradation and adopting appropriate measures for conservation of natural resources for enhanced sustainability and productivity of agriculture
- Strengthening or establishing linkages among related sectors for the promotion of agricultural diversification and improvement of quality of life.
- Improving infrastructure facilities like supply of input, marketing, institutional credit and extension services

8.10 Developmental Issues

ues, problems strength and opportunities, some
ound appropriate and relevant have been identified which
are mentioned below.

A. Diversification and intensification in existing farming systems

Agriculture, horticulture, livestock, fishery and plantations are the major production systems of the district There is need to stress on diversification of low spread low yield crops while high spread low yield crops need intensification. Low spread and high yield crops need encouragement and high spread high yield crops need to be encouraged through value addition, agro-processing and marketing for more profit and sustainability.

B. Improvement in Productivity and income of existing enterprises / commodities in existing farming systems

There has been a considerable yield gap exists between yield potentiality and actual farm yield of most of the enterprises and commodities and there is need to reduce the gap through adoption of appropriate extension strategies

C. Improvement in sustainability in production/income

Degradation of natural resources due to improper crop management practices, soil erosion, water logging, soil acidity, loss of vegetative cover and bio-diversity etc. has posed serious threat to the sustainability of the agricultural production systems. Therefore, there is need to develop some strategies for management of the natural resources.

D. Community Organization

Group approaches has been found highly effective in various developmental activities. Various farmersø group such as SHGs, Common Interest Groups, Userø Group etc. need to be formed in village level for safeguarding common interest, empowerment of community and management of natural resources

E. Project sustainability

As most of the project do not sustain after the project period is over, it is considered essential to form a revolving fund by cost sharing with the farmers for sustainability of the project after the fund flow is stopped

For effective implementation and sustainability of the project, it is necessary to train up all the extension functionaries of concerned departments, NGOs, input agencies and private extension workers

G. Enhancing credit flow and infrastructure development

The constraints of infrastructural facilities coupled with other socio-economic factors prevailing in the district have affected the development of the district. The institutional credit flow to various sectors is also affected owing to poor recovery performance resulting in high level of NPAs.

8.11 Projected human population and food requirement of Bongaigaon district

Parameters	Projected requirements		
	2010	2015	2020
Human population	10,32,000	10,97,000	11,62,000
Cereals (MT)	1,88,340	2,00,202.5	2,12,065
Pulses (MT)	28,251	30,030.3	31,809.8
Oilseeds (MT)	15,067.2	16,016.2	16,965.2
Vegetables (MT)	94,170	1,00,101.3	1,07,218.8
Fruits (MT)	11,300.4	12,012.2	12,723.9
Milk (,000 lit)	75,336	80,081	84,826
Meat (MT)	11,300.4	12,012.2	12,723.9
Egg (lakh nos.)	1858	1975	2092

8.12 Perspective Plan

A. Diversification and intensification in existing farming systems

Sl. No.	Strategy	Proposed Activity
1.	i) Agril. Production system Expansion of area under Fruits & Vegetables substituting upland rice	Identification and analysis of success stories where farmers have successfully taken up fruits and vegetable cultivation.
		Exposure visit to above successful sites by other farmers.
		Facilitate supply of key inputs like seed, fertilizer & pesticides.
		Organizing training programme for improved Fruits & Vegetables cultivation
		Linkage with marketing of produce.
2.	Substitution of upland rice crop to pulses & oilseed	<p>Conducting field demonstration on crop diversification.</p> <p>Organizing field days near successful demonstration sites.</p> <p>Facilitate supply of critical inputs like seed of pulses and oil seeds for sole/inter cropping.</p>
3.	Improvement of rained farming adopting dry land technology	Awareness campaign for adoption of dry land technology.
		Identification and analysis of success stories on dry land technology and indigenous water harvesting measures.
		Exposure visits of farmers to success sites where dry land farming techniques have been adopted.
		Training to farmers dry land technology such as weather analysis and crop planning in-site moisture conservation, soil and water conservation, run-off harvesting & standard crop husbandry practices (field level).
		Organizing demonstration on standard crop husbandry practices.
		Facilitate supply of seeding/sapling for agro forestry & dry land horticulture.
		Organizing field days for conviction of farmers at the site of successful demonstrations.
4.	Increasing cropping intensity of canal irrigated areas and in areas having perennial source of	Identification & analysis of success stories where the proposed intensive cropping is followed.

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		Exposure visit to the successful example by other farmers
		Training of new farmers about management practices of proposed crop by using successful farmers as resource person (field)
		Facilitate supply of critical inputs for intensive cropping.
5.	Cultivation of aromatic rice for export	<p>Identification and characterization of indigenous aromatic rice varieties.</p> <p>Conducting demonstration of Basmati & non Basmati type of rice varieties with Local aromatic types and study their economics.</p> <p>Facilitate linkage with marketing by organizing farmers interest groups.</p>
6.	Adoption of Scientific Crop rotation	<p>Organizing farmerø training on scientific crop planning & crop rotation using resource farmer (institutional).</p> <p>Conducting demonstration on ideal crop rotations and study the economics.</p> <p>Exposure visit of other farmers to successful demonstration sites to have interaction with the demonstrating farms.</p>
1.	ii) Horticulture production System Expansion of area under off- season vegetable by crop substitution.	<p>Identification and analysis of success stories where innovative farmers have already started cultivating off- season vegetable.</p> <p>Exposure visit to above successful examples by other farmers.</p> <p>Facilitate supply of seeds & other inputs for off-season vegetables.</p>
2.	Dry land horticulture as alternate land use and crop diversification	<p>Organizing awareness campaigns for dry land horticulture.</p> <p>Exposure visits to sites where dry land horticulture has successfully been taken.</p> <p>Training of farmers on dry land horticulture.</p> <p>Facilitate supply of grafts for dry horticulture plantation (mango, guava, lime)</p> <p>Decentralized production of sapling & grafts by involving NGOø & private sector.</p> <p>Linkage with marketing.</p>
3.	Cultivation of organic spices like ginger, turmeric & tuber crops.	<p>Awareness campaign for motivating farmers to go for organic spice & tuber cultivation (Institute).</p> <p>Facilitate supply of high yielding types of ginger & turmeric.</p> <p>Conducting demonstration on organic spice cultivation.</p> <p>Arranging field days at successful demonstration sites.</p> <p>Agro processing & value addition of organic</p>

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		spices.
		Identification & analysis of success stories where innovative farmers have started commercial floriculture.
		Exposure visit to above successful site by other farmers.
		Organizing training programme on cultivation of rose, chrysanthemum tube rose & gladiola and marigold (Institutional).
		Facilitate supply of key inputs for floriculture.
		Linkage with marketing of cut flowers.
5.	Introduction of paddy mushroom in around town area.	Identification of villages and farmer groups where substrate is available.
		Organizing demonstration on mushroom production.
		Facilitate supply of critical inputs like spawn.
		Linkage with marketing of produced mushroom.
6.	Post harvest technology & value addition in fruits & vegetables.	Identification of area where marketable surplus of vegetable & fruits are available.
		Identify the SHG & FIGs for post harvest handling and processing of fruits & vegetables.
		Organizing training & demonstration on preservation & processing of fruits & vegetables (Institution).
		Facilitate supply of essence, preservatives, colour etc.
		Linkage with marketing.
7.	Commercial cultivation of honeybee.	Identification of area with nectar bearing trees and field crops like mustard, Niger, sesamum and neem.
		Identification of farmer interest groups and organizing training for them (village level)
		Facilitate supply of high yielding bees (Italian bee) box, smoker etc. for apiary.
		Demonstration on extraction of honey and preservation.
		Linkage with marketing.
8.	Intensive vegetable cultivation on irrigation areas.	Identification of areas where vegetables have been successfully cultivated intensively.
		Exposure visit to successful sites for motivation of farmer.
		Organising training for the farmers on vegetable cultivation using innovative farmers as resource personal (Institutional)
		Facilitate supply of critical inputs for vegetable production.
		Organic FIGs for vegetable seed production and

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		<p>on system</p> <p>airy animals</p>	<p>marketing.</p> <p>Restricting A.I. service to only those villages where cross breed animals are being currently raised.</p> <p>Training of Para vet for providing A.I. at door step (Institutional).</p> <p>Supply of inputs on cost basis.</p> <p>Training to FIGs on breed up gradation and presentation of animals (village level).</p>
2.	Expansion of goat rearing units and breed up gradation		<p>Supply of improved bucks for natural breeding.</p> <p>Training to farmers for care and maintenance of goat and plantation of fodder trees (Institutional).</p> <p>Vaccination, deworming & treatment against ectoparasites for goat.</p>
3.	Introduction of improved piggery.		<p>Identification of innovative farmers who have taken piggery successfully.</p> <p>Exposure visits of other farmers to the villages where piggery has been successfully taken.</p> <p>Training of farmer groups on improved piggery (Institutional)</p> <p>Facilitate supply of key inputs for piggery.</p>
4.	Encouraging backyard poultry		<p>Popularization of improved breeds of poultry birds for backyard rearing.</p> <p>Organization of training for disease management & feeding of poultry birds.</p> <p>Facilitate vaccination, deworming & treatment against ectoparasites in poultry birds.</p>
	iv) Fish production system		
1.	Introduction of composite pisciculture in water bodies		<p>Awareness campaign for Pond preparation and composite pisciculture.</p> <p>Organising farmers training for composite pisciculture.</p> <p>Demonstration of critical practices.</p> <p>Facilitate supply of critical inputs like fingerlings.</p>
2.	Introduction of poly culture in village tanks.		<p>Exposure visit to successful sites and CIFA Bhubaneswar.</p> <p>Training of motivated persons on technology aspects by using successful farmers as trainee (Institutional)</p> <p>Linkage of above farmers with credit & input organization.</p> <p>Demonstration of critical practices on polyculture.</p> <p>Facilitate linkage with critical inputs & marketing.</p>

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	agro-forestry, silvipasture and farm forestry.	<p>Awareness campaigns for alternate land use on arable and non arable lands.</p> <p>Organising user groups in watershed areas for alternate land use.</p> <p>Training on raising seedlings & planting techniques for social forestry agro-forestry & JFM.</p> <p>Facilitate supply of seed materials for raising saplings (Eucalyptus, Subadul, saris, babul, aracia, Shisam, Anole, Imli, Rosewood & Teak).</p>
2.	Planting mulberry & sericulture	<p>Identification of success stories on sericulture.</p> <p>Exposure visit of new groups to the successful villages.</p> <p>Training to the FIGs on Sericulture.</p> <p>Facilitate linkage with input supply & marketing of produce.</p>
3.	Cultivation of medicinal plants.	<p>Identifying sites & farmers for medicinal plant cultivation.</p> <p>Exposure visit to research stations & successful plantation sites.</p> <p>Training to needed farmers on cultivation technique & processing.</p> <p>Facilitate linkage with input supply & marketing.</p>
4.	Expansion of area under aromatic plantation.	<p>Identifying sites & farmers for aromatic plantation.</p> <p>Exposure visit to successful plantation.</p> <p>On-site training to new farmer on production technique & processing.</p> <p>Facilitate linkage with supply of inputs and marketing of products.</p>
5.	Expansion of area under cashew nut plantation in wasteland.	<p>Identification of wasteland feasible for plantation.</p> <p>Organising farmer for community plantation.</p> <p>Demonstration of technique for plantation & extraction of nut.</p> <p>Facilitate linkage with supply of planting material processing & marketing.</p>

B. Improvement in Productivity and income of existing enterprises / commodities in existing farming systems.

1.	i) <u>Agricultural production system</u> Overcoming technological gap in major crop, rice, maize, jute, wheat, pulses & mustard.	<p>Education of farmers through mass media on technological gaps.</p> <p>Organising training programmes on technological gaps.</p> <p>Organising demonstration on seed testing, seed treatment, fertilizer application & pest management.</p>
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		Organising farmer's field days on the site of successful demonstration.
		Linkage of farmers with credit, inputs & marketing.
		Demonstration on use of bio fertilizers & micronutrients.
		Identification and analysis of success stories where seed is produced and sold by farmers.
2.	Decentralized production of seeds of preferred varieties under the concept of seed village scheme.	Exposure visit of farmers to successful sites.
		Identification of sites (village) and farmers who are willing to produce and market seed at their own level.
		Training of seed production farmers about seed production & certification skills.
		Procurement of foundation seeds of preferred variety (to be decided by matrix ranking) from reliable source on cost payment.
		Organising field day at maturity of crops for farmers & local dealers who are willing in purchasing seeds.
		Facilitate linkage with credit, input supply & certification including processing.
3.	Value addition and agro- processing in maize, pulses & oilseeds.	Identification of farmer interest or commodity interest groups.
		Organising demonstration & training on agro processing and value addition.
		Facilitate linkage with supply of machinery credit & marketing.
4.	Farm mechanization for timely and effective agricultural operation.	Organising awareness campaigns on farm mechanization.
		Organising training and demonstration on farm mechanization.
		Identification of agro service centre for dealing with farm machinery.
		Linkage with on-going schemes for subsidizing sale of agriculture implements & farm machinery.
		Group formation for finance on farm machinery.
1.	ii) <u>Horticulture production system</u> Over coming technological gaps in major vegetable crops like brinjal, tomato, bean, potato (cabbage and cauliflower) onion and sweet potato and spices. (Ginger & turmeric)	Educations of farmer through mass media on technological gaps.
		Organising need based trainings on technological aspects.
		Demonstration on seed treatment planting technique, INM & IPM etc.
		Linkage of farmers or groups with credit, supply of inputs & marketing.
		Organizing special training on hybrid vegetable production technology.

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		materials	<p>Identification and analysis of success stories where seed & planting materials are produced & sold by the farmers.</p> <p>Exposure visit of willing farmers to the successful farms.</p> <p>Identification of sites & selection of willing farmers for seed & planting materials production.</p> <p>Training of seed producing farmers about seed production technology.</p> <p>Organising field days for farmers & dealers who are willing to purchase seeds.</p> <p>Linkage with supply of foundation seeds on cost basis credit & marketing.</p> <p>Dovetailing of on-going schemes on seed & planting material production.</p>
3.	Post harvest technology, value addition and agro-processing for fruits vegetable and spices.		<p>Carryout diagnostic study about issue relating to market.</p> <p>Assess marketed surplus of each commodity with different types of farmers family.</p> <p>Identify alternate market opportunities for each commodity.</p> <p>Assess specification regarding consumer's preference for each commodity at alternate market.</p> <p>Assess new technological options regarding post harvest handling at farm level.</p> <p>Organising training & demonstration for the farmer groups about post harvest handling, value addition and agro processing (preservation techniques) to meet, specific consumer's preference.</p> <p>Linkage with input supply & marketing.</p>
4.	Overcoming technological gaps in fruit crops like mango, banana, papaya, guava, jackfruit & pine apple.		<p>Awareness campaigns on fruit plantation & on technological gaps.</p> <p>Exposure visit to successful plantation sites.</p> <p>Organising need based training on serious technological gaps.</p> <p>Demonstration on raising of saplings, grafting, pruning and aftercare of fruit plants.</p> <p>Linkage of farmers or groups with credit in put supply & marketing.</p>
1.	<p>iii) <u>Live stock production system</u></p> <p>Improved feeding, housing & health care for dairy animals (cows & buffaloes)</p>		<p>Awareness campaign on breed up gradation care & management of dairy animals & schematic provisions.</p> <p>Identification of milk unions & FIGs for improvement of dairy.</p> <p>Organising training for the farmer's groups to</p>

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		avoid the technological gaps.
		Exposure visit to successful villages.
		Arrangement of required inputs on cost basis.
		Facilitate linkage with credit, & input to take up the work.
2.	Vaccination, de worming and treatment against ecto-parasites for poultry pigs, sheep & goat.	Identification of paravets & NGOs willing to take up the work.
		Organization of training for paravets, NGOs & farmers on vaccination, deworming & treatment techniques.
		Supply of critical inputs on cost basis.
		Organization of mobile treatment camps at village level.
3.	Fodder cultivation for improved nutrition of dairy animals.	Identification of success stories where fodder cultivation has been taken successfully.
		Exposure visit of identified farmers or farmer groups to successful sites.
		Identification of sites and species (grasses) for green fodder cultivation.
		Organization of trainings on improved fodder cultivation techniques.
		Facilitate supply of critical inputs.
4.	Processing and preservation of milk products.	Assessment of marked surplus of milk.
		Identification/formation of groups for milk processing.
		Organizing trainings for processing & preservation of milk products.
		Linkage with input credit & marketing.
1.	iv) Fish production system Pond preparation & adoption of technology for higher fish production.	Exposure visit of willing fish farmers to CIFA or successful pond sites.
		Training on improved production technology.
		Facilitate linkage with supply of critical inputs, credit & marketing.
2.	Decentralized production of fingerlings.	Identification of ponds, water bodies where fish production on composite technique or poly culture technique is feasible.
		Identification of farmerø for fish seed production.
		Exposure visit to CIFA & local units of fingerlings production.
		Organisation of trainings for fingerling production.
		Facilitate linkage with input supply, credit for setting hatchery unit & marketing.
1.	v) Plantation crops Overcoming technological gap for improving productivity of cashew plantation.	Identifying the plantation sites & farmers with serious technological gap.
		Organizing training to overcome the serious technological gap.
		Organising demonstration on managing, pruning &

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		pest management.
		Conducting field days on successful sites for other farmer.
2.	Preparation of quality planting materials for cashew, bamboo and medicinal plants.	<p>Identification of new plantation sites, farming & assessment of planting materials requirement.</p> <p>Identification of sites for raising planting materials on community basis or by NGOs.</p> <p>Organizing training for preparation of planting materials and grafting techniques.</p> <p>Supply of seed & stock material on cost basis.</p> <p>Linkage with other schemes for production of planting materials & arrangement for transportation.</p>

C. Improvement in sustainability in production/income

	Integrated watershed management for soil & water conservation & of natural resources.	<p>Organising training for watershed committees, watershed associated on technological gaps and watershed plus activities.</p> <p>Demonstration on improved cropping system in watershed areas.</p> <p>Assess the magnitude of soil erosion areas and prepare a detailed action plan to manage the erosion problem by involving the farmers.</p>
		<p>Identify technological option including ITK & ETK and assess farmer's preference to the above options.</p> <p>Assess willingness of farmers to pay at least 25-50 of cost required for mechanical measures.</p> <p>Organize training for the user groups regarding implementation of various soil conservation measures & maintenances of records.</p> <p>Release the fund for implementation of mechanical or biological measures in installments.</p> <p>Follow-up support for smooth functioning of the planning & implementation process.</p>
2.	Management of water logged low-lying areas in command areas.	<p>Assess the magnitude of the problem through transact walk with the affected families.</p> <p>Prepare a detailed action plan to manage the water logging problem with technological options.</p> <p>Assess the farmer's preference to the options and willingness to pay at least 25-50 per cent of cost.</p> <p>Organise the farmers into user groups & train the members on proposed measures.</p> <p>Release the funds for implementation of proposed work in suitable installments.</p>

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		Provide follow up support.
	soils.	Testing of soils to assess the P ^H
		Identify the upland area where the PH is 5 or less for amendment.
		Organise the farmers to obtain soil amendments lime requirement allowing transportation subsidy.
		Train the farmers to amend the acid soils by using local materials or use of MRP + S.SP at 3.1 ratio.
4.	Conservation bio-diversity (Agril.)	Identify the valuable indigenous crop varieties & forest species by involving farmers.
		Multiply these varieties and species among farmer co-operations.
		Characterize these varieties & species using farmer participatory research.
		Promote in situ conservation on small farms through encouragement of diversification.
		Combine the re-introduced and indigenous varieties & species with improved & ecologically sound soil, water and nutrient management to further improve the productivity of these local varieties/species.
5.	Integrated Plant Nutrient supply system.	Organise awareness campaigns for IPNS.
		Prepare a detailed action plan to manage the IPNS at farm level.
		Organize training for farmers on production and use of bio-fertilizers compost, vermin compost and use of balance fertilizer based on soil tests.
		Identify the feasible waste lands for production of green manure seeds & bio-fertilizers like Azolla & BGA by SHGs/ Mahila Mandal etc.
		Supply bio-fertilizer at subsidy & organize crop demonstration.
		Conduct field days at the site of successful demonstrations.
		Follow up support for use of non-traditional nutrients sources like bio-fertilizer, vermin compost etc.
		Organise plantation of leaf manure crops like Glyricidia on waste lands or on common lands.
		Refinement of technological package on INM for different AES recycling organic wastes & crop residues etc.
6.	Integrated Pest Management	Organise awareness campaigns on IPM technology.
		Identification of key crop pests and diagnosis of pest problem in an endemic village in each AES.
		Analysis of technological options source of innovation including bio-pesticides.
		Organising demonstration/action research on crop

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		pest management.
		Concurrent evaluation of technological options by participating farmers.
		Organising farmer field School (FFS) programme to make the farmer IPM experts.
		Facilitate supply of bio pesticides, pheromone traps etc. on payment of cost.

D. Community organization

1.	Organisation of farmers groups for new commodities to be produced through diversification of farming system.	Identify the new commodities and access the scope for formation of groups.
		Sub-contract to NGOs for organization of farmer groups.
		Organizing training for capacity building of the groups.
2.	Organisation of commodity oriented groups for better access to inputs, marketing & technological support.	Identify the success stories where CIGs have been successful.
		Exposure visit of feasible farmer groups to successful areas where CIGs have been formed.
		Organize groups with help of NGOs.
		Organise training for skill up gradation & group empowerment.
3.	Organisation of woman SHGs for NRM.	Identify the successful SHGs.
		Arrange exposure visit to successful villages.
4.	Organization of water User association (Pani Panchayat) for distribution of canal water & maintenance of system.	Organize SHG formation through regular interaction by involving local NGO.
		Motivate the group member for capacity to share, collectiveness to work on groups & capacity to make decision.
		Organise trainings for the SHGs on management of records and capacity building.
		Facilitate linkage with other institutions for development of economic base of member, supply of credit & inputs etc.
		Conduct regular meetings of the SHGs and decide further course of action.
		Organize the farmers to form WUA through the NGOs.
		Exposure visit of WUA members to successful canal areas under AIP.
		Training of WUAs on water management maintenance of canals, rational distribution of water crop planning & collection of water rates.
		Demonstration in canal areas on water management & multiple cropping.
		System improvement & farmer turn over in canal areas.
E.	Sustainability of the Project.	

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		farmers on & water	Awareness campaign for the farmers for NRM & farmers participation.
			Motivation the farmers to pay 25-505 for the community work and 50% contribution for individual works.
			Pursing the user group to contribute for community work & building a revolving fund.
2.	Building up revolving fund on service charge & supply of critical inputs.		Organizing awareness campaign over the farmers about the necessity of revolving fund.
			Motivating the CIGs or FIGs for payment of cost for AI, Soil testing, consultancy, grafts & bio-fertilizers etc.
			Utilizing the revolving fund for further multiplication by supply more inputs.
3.	Opening agro-clinics and providing consultancy on payment.		Organising awareness campaigns for the farmers about the concept of agro clinic at block level & panchayat level.
			Collection of service for charges additional field & advisory service.
F. Human Resource Development			
1	Training		Need based training programmes for extension functionaries, NGOs, input agencies etc. Training programme for skill upgradation
2	Exposure visit		Exposure visit of farmers and extension workers
3	Aware ness campaign		Organising awareness campaign on specific issues at grass root level
G. Enhancing credit flow and infrastructure development			
1	Enhancing credit flow and infrastructure support		- Increasing crop loan -Participation of banking institution in increasing credit flow for development of land and water resources, production of organic inputs, farm mechanization, plantation and horticultural crops, sericulture, animal husbandry, fishery, forestry and wasteland, utilization of renewable source of energy etc. -increasing credit flow to non farm sector like handloom and handicraft, forest based industries, agro and food processing.

8.13 Proposed strategies for marketing in Bongaigaon district

Sl. No.	Critical issues	Problems/Issues	Strategies	Activities
1	Agriculture Minimum support price for paddy	Farmers are not getting minimum support price	Govt. policy for minimum support prices & procurement through FCI	Formation of CIG, FO for organized marketing Creating awareness

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		availability information on internet intelligence Creation of export facility	Provision of market information system with relation to demand and supply position. Creating awareness on agricultural marketing act.	on facilities available for marketing information system -Do-
2	Horticulture Tomato & Cole crop production	Excessive production of Tomato & Cole crops leading less price to farmers. Non availability of information on marketing intelligence. Lack of awareness regarding Agro processing centre. Non existence of cold Storage units	Area under tomato & cole crops may restrict and replacement by other vegetables having demand. Creation of marketing information system with respect to demand and supply position. Linkage between commodity and Agro processing centres. Construction of cold storage structures.	Formation of CIGs, FOs for organized marketing. Creating awareness for market information system. Creating awareness on facilities available for export potentialities for value added products. Formation of CIGs, FOs to avail the Govt. subsidy for
3	Animal husbandry Breed up gradation in cattle. Quality feed	Non availability of AI- Units in rural areas. Non availability of graded bull for natural insemination. Non availability	Construction of AI units in rural areas Provision of graded bull in rural areas Construction of	Dove tailing of departmental ongoing scheme. SHG, CIG, FO may be involved in rearing the bull on cost service basis. SHG,CIG,FO may

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		Quality feed manufacturing	feed manufacturing centres.	be organized for construction of feed manufacturing centres.
4	Fisheries	Non availability of quality seeds	Enhancing production of quality seeds both in government & private farms. Production of advance finger lings.	Encourage farmers/farmers organized owing farm ponds/storage ponds to take up seed production through net working and institutional linkage. 1. Improvement of infrastructure facilities of seed production farm. 2. Creating awareness on natural resource management.

8.14 Scope for public-private partnership growth

Sl. No.	Type of enterprise	Type of partnership	Proposed activities
1	Seed production in agricultural crops	Pvt.-public Farmers with Assam Seed Corporation	Seed production
2	Nursery & seedling supply	Pvt.- Pvt. Farmers with private nursery owners	Supply of improved vegetable & fruit seedlings
3	Milk production & procurement	Pvt.- Pvt. Farmers with private agency	Milk production
4	Poultry	Pvt.- Pvt. Farmers with private suppliers	Supply & marketing of poultry birds & eggs
5	Pig	Pvt.- Pvt. Farmers with private supplies	Supply & marketing of pig

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		Pvt.- Pvt. Farmers with private feed manufacturing dealers.	Feed manufacturing
7	Weaving	Pvt.- Pvt. Weavers suppliers	Cloth weaving
8	Vermi composting	Pvt.- Pvt. Farmers suppliers	Production of vermin compost
9	Value addition (Fruits & vegetables)	Pvt.- Pvt. Public farmers SHG public section	Preparation of jam, jelly, squash, prickle
10	Value addition (cereals)	Pvt.- Pvt. Farmers millers	Preparation of sira/muri
11	Fishery	Pvt. Public Pvt.	Production of fish/ fish seed and marketing
12	OFT, FLD & farmers scientist interaction	Pvt. Public (KVK)	Conducting OFT, FLD & farmer scientist interaction
13	Market information system & consultancy centre	Pvt. Public NGO/SHG ATMA consultancy units	Price trend market forecast
14	Information & communication technology	Pvt. Public KVK	Information related to technology

8.15 Strengthening of Self Help Groups/Voluntary Institution's participation

Existing FIGs & FOs	Proposed FIGs & FOs	Strategies
<p>a. 15 FOs are existing in Bongaigaon District out of which 9 FOs are active.</p> <p>b. 9 37 FMCs (farm Management committee) are working for agriculture and allied sector development</p> <p>c. 16 CIGS under fishery Department</p> <p>d. 8 NGOs are involved in socio-economic and</p>	<p>1. The following FIGs and CIGs are proposed</p> <p>a. Fruits & vegetable growers and export group</p> <p>b. Cashew growers group</p> <p>c. Mango growers group</p>	<p>a. Various groups are formed by involving the consumers and producers.</p> <p>b. Creating awareness programmes and conducting trainings.</p> <p>c. marketing facilities by opening outlets or sale points.</p>

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<p>functioning</p> <p>f. Thrift and micro financing is the major activities.</p>	<p>d. Coconut growers group</p> <p>e. Areca nut growers group</p> <p>f. Banana growers group</p> <p>g. Pineapple growers group</p> <p>h. Vermicompost producers group through SHGs</p> <p>i. Organic farmers group</p> <p>j. Mulberry growers group</p> <p>k. Fish farmers group</p> <p>l. Nursery men groups</p> <p>m. Milk producer & marketing society</p> <p>o. Jackfruit growers group</p> <p>p. Fruits & vegetable based value added products processing group.</p>	<p>d. Exposure visit to successful sites by the FIGs & CIGs.</p>
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8.16 Regulatory issues / reforms

Sl No	Issues	Proposed policy intervention
1	Capital mobilization	-Micro credit system facility
2	Lack of organized SHG/NGO	-Formation of SHG/NGO
3	Technological gap	-Dissemination of improved method of technology
4	Institutional credit	-Credit linkage with financial institution -Simplification of norms and procedure for loan
5	Low literacy rate	-Female education -Awareness campaign
6	Irrigation	-Establishment of micro irrigation system -Credit linkage

		-Construction of village link road through on going schemes
8	Modern spinning and reeling technology in sericulture	-Facility for modern spinning and reeling
9	IPM/INM concept	-Focus on IPM/INM

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