DRAFT AGRICULTURE POLICY – 2011

Department of Agriculture & Cane Development

and

Department of Animal Husbandry & Fisheries

GOVERNMENT OF JHARKHAND, RANCHI

CONTENTS

Draft Agriculture Policy-2011, Jharkhand

(1) Introduction

The State of Jharkhand which became a separate administrative entity, was formed on November 15, 2000 out of the erstwhile state of Bihar. According to the 2001 Census, Jharkhand has a population of 269.09 lakh with the density of 338 persons per sq. km. Out of the total population nearly 77% is rural and about 67% of the total work force is dependent on agriculture. The tribal population in the State is 26.34 per cent. The major tribal dominating districts are West Singhbhum, Ranchi, Gumla, Simdega, Dumka, Pakur, Sahibganj and Khunti. Out of the total population, 51.51% are male and 48.49% are female. Rural labour engaged in agricultural works are 25.31 lakh comprising of 65.98% of male and 34.02% of female.

The State has a total geographical area of 79.71 lakh ha. As per revenue records, about 38 lakh hectares are available for cultivation but at present net area sown is 18.04 lakh hectares. The forest area of the State is about 29% of the land area and is among one of the few states with extensive forest and mineral resources. Agriculture and related activities are the primary sources of livelihood for the people in this State. Despite the fairly sufficient average rainfall of around 1400 mm, only 11.3% of the total net sown area is under irrigation.

The State has a fairly high potential for development of agriculture in general and in particular for cultivation of certain high value agricultural crops including fruits, flowers and vegetables in view of the favorable climatic conditions. Despite these advantages, development of agriculture and adoption of modern technologies has not really taken off in the State. Consequently, production and productivity is below the national averages in case of most annual crops.

The milk yield per cattle is very low and despite the large area under forests, the value of its forest is of the lowest in India. One of the redeeming pictures, however, is that in the case of vegetables, the state enjoys a pre-eminent position of not only high productivity but also high production and is the number one agricultural export commodity of the state. The potential for development is, however, very large provided appropriate resources are made available, modern production and development technologies are adopted and committed supportive policies are available.

Keeping the above facts under consideration there is need for immediate transition towards fostering more inclusive growth in agriculture of Jharkhand. This calls for significant new initiatives in different sectors.

For inclusive growth, the Govt. of India prepared a comprehensive agriculture policy in the year 2000 to attain the following objectives:

- A growth rate in excess of 4 per cent per annum in the agriculture sector;
- Growth that is based on efficient use of resources by conserving soil, water and biodiversity;
- Growth with equity i.e. growth which is widespread across regions and farmers;
- Growth that is demand-driven and caters to domestic markets and maximizes benefits from export of agricultural products in the face of the challenges arising from economic liberalization and globalization;
- Growth that is sustainable technologically, environmentally and economically.

In order to realize these objectives, the focused areas as envisaged in the policy document the Govt. of Jharkhand has formulated the State Agriculture Policy to suit the state requirements.

(2) Objectives

- Development of strategies for agriculture and allied sectors in the State to provide sustainable livelihood opportunities to the people for overall economic, social and human development.
- A growth rate commensurating with the national priorities and State priorities i.e. ensuring food, nutrition and economic security through development of agriculture in terms of foodgrain, oilseed, horticulture, cash crop, livestock, fishery and agro-forestry.
- Efficient and sustainable use of soil, water and biodiversity including forest natural resources.
- Provide sustainable income generation activities to the farm families through integrated farming system of crop, livestock, fisheries and allied sectors.
- Linking food production with agro-based industries like lac, silk and post-harvest technologies for employment generation and market linkages.

(3) Priorities

- Increasing productivity of cereal, pulse and oilseed crops with the concern of profitability
- Increasing area under irrigation
- Increasing cropping intensity
- Controlling indiscriminate diversion of agricultural lands for non-agricultural purposes
- Converting culturable wastelands into agricultural lands
- Utilizing unutilized wastelands for agro-forestry and afforestation
- Increasing seed self-sufficiency
- Improving soil health and increase in use of organic, inorganic and bio-fertilizers
- Development of fruits, vegetables, flowers and medicinal and aromatic plants
- Increasing farm mechanization
- Increasing farm credit to farmers
- Increasing lac production, processing and value addition
- Development of sericulture
- Development of livestock through breed improvement
- Development of milk production through dairy
- Development of piggery, goatery and sheep husbandry
- Increasing investment in agricultural research, extension and development
- Building a well organized agricultural research and education system
- Revitalizing extension services and training
- Improving input delivery system
- Strengthening Information Communication Technology
- Updating agricultural statistics
- Promotion of dryland farming
- Promotion of organic farming
- Development of forestry sectors including agroforestry
- Promotion of export-oriented agriculture
- Farmer-oriented agricultural policy
- Establishment of state agricultural prices commission
- Establishment of quality control laboratories
- Biodiversity conservation

- Protection of farmers rights
- Crop and livestock insurance
- NGO's involvement for agriculture and rural development
- Linkages with other development departments
- Convergence of developmental schemes at grassroot level
- Weather forecasting
- Provision of incentives for agriculture
- Bringing adequate management reforms

(4) Cropping Intensity

- The present cropping intensity of Jharkhand is 116%. The net sown area is 18.1 lakh ha and only 2.6 lakh ha area is sown more than once. It needs to increase up to 130% by 2020.
- Each year, around 50,000 ha area will be brought under double cropping by providing small water harvesting structures like *Dobha*.
- Each hectare land will have around 10 *Dobha* of 3mx3mx3m. Accordingly 5 lakhs *Dobhas* will be constructed each year.
- Crops like chickpea, lentil and field pea will be promoted in upland and medium land.
- Vegetable crops, sugarcane, maize, wheat and fodder crops will be promoted in lowlands.
- Intercropping has to be popularized on large scale.

(5) Crop Diversification

- There is need to bring more area under soybean, cotton, sorghum, *bajra*, castor, and barley in uplands. Each year target for each crop will be fixed to diversify the crops in upland.
- Soybean area is at present only 162 ha. It will be increased by 100 ha each year, and will be linked with marketing.
- Sorghum (*Jowar*) is a drought tolerant crop and its area should be increased in Palamu and Garhwa districts. Each year some 100 ha will be brought under it.
- Castor is a drought tolerant crop and its area is around 230 ha. Its area will be increased in drought-prone region by 100 ha each year.

- Cotton is also a crop of drought-prone regions. At present its area is negligible. Each year around 100 ha will be brought. Arrangement for procurement and marketing will also be made to encourage its cultivation.
- *Bajra* is a drought tolerant crop. Its area is at present 305 ha. Each year 100 ha area will be brought under cultivation.
- Barley area is around 12,000 ha and each year, 1,000 ha area will be brought under this crop.

(6) Yield Enhancement

- Strategies to increase productivity in each crop will be developed by appropriate interventions of new improved varieties, hybrids, IPM, ICM and INM technologies.
- **Rice:** More area will be brought under new varieties and hybrids in a planned manner. The fertilizer use would also be increased. Apart from this SRI technology will be popularized for yield enhancement.
- **Wheat:** New high yielding varieties with better use of nutrients will be encouraged to increase wheat productivity. Apart from this SWI technology will be promoted for yield enhancement.
- **Pluses:** New varieties and hybrids of pulses with better yield potential and resistant to diseases will be introduced.
- **Oilseeds:** New varieties and hybrids of oilseed crops will be promoted in a phased manner.
- **Maize:** Hybrid area will be increased each year.
- ***Ragi*:** Area expansion with improved varieties will be encouraged.

(7) Use of Organic Manures & Biofertilizers

- Use of *karanj*, *neem* and *mahua* cake will be encouraged in all crops.
- Number of vermicompost units will be increased to enhance its use and thereby increasing the nutrient status of the soil.
- Rhizobium use will be increased in all the pulse crops.
- Use of blue green algae, azolla, azotobactor, VAM ,PSB, azospirralum will be increased in rice and other upland crops.
- Improved method of composting will be encouraged to reduce the nutrient losses.

(8) Human Resource Development

- Training of extension personnel through SAMETI, KVK, BAU, ICAR institutes, and international institutes will be conducted regularly to all the staff of the departments of agriculture, horticulture, animal husbandry, and fisheries.
- Extension Training Centre will be strengthened to regularly start the training programmes for grassroot level extension functionaries like VLWs, Farmer Friends, etc.
- Farmers of each district will be regularly taken to visit universities, ICAR institutes, and reputed NGOs for exposure of the new technologies.

(9) Sugarcane

- There is vast scope to increase area under sugarcane and to start industry for *gur* making. The *gur* industry will be developed for income generation of the farmers.
- At present sugarcane is grown in an area of 400 ha. Each year area will be increased by 100 ha.
- Seed farmers in each district will be identified and linked with breeder and foundation seed production chain.
- Training on improved method of *gur* production will be organized.

(10) Dryland Farming

- Due to climate change and irregular monsoon, dryland area is increasing. A Dryland Research Institute will be established to focus technology generation for dryland agriculture. Water harvesting through small farm ponds, drought tolerant crops and on farm research will be the priorities.
- The proposed Dryland Research Institute will focus on varietal improvement, soil and water management and agricultural implements related to field crops and horticultural research.
- On- station and on-farm research on dryland crops will be focused.
- Research on *aonla*, *ber*, custard apple and arid horticulture will be undertaken.

(11) Seed Certification

- A separate seed certification unit will be established in the Department of Agriculture.
- Seed testing laboratories will be strengthened for quality seed production at district level.
- Seed Certification Officer at district level will be appointed to monitor the quality seed production through seed village programme.

(12) Agricultural Education

Birsa Agricultural University is the only University in the State catering to the need of education in the field of agriculture and allied sectors. The University's education system is guided by the ICAR guidelines according to the State and national priorities. Agricultural education will be regularly reviewed and updated. Courses on agribusiness, entrepreneurship development, integrated farming systems, rainfed agriculture, natural resource management, climate change, marketing, international trade & business, agro-biodiversity management, risk management, allels mining, biotechnology and post-harvest & value addition need emphasis in the emerging scenario of Jharkhand agriculture.

Agricultural education needs orientation to serve the major clienteles i.e. small and marginal farmers. State will have a network of agricultural institutions as detailed below:

- Ranchi Agricultural College, Ranchi Veterinary College and Forestry College will be the centres for post-graduate studies. UG courses in agriculture, veterinary sciences and forestry will be continued as at present.
- College of Biotechnology will be further strengthened.
- Colleges of Agriculture at Godda and Garhwa will be undergraduate colleges with 100 seats each.
- Three new colleges of Horticulture, Agril. Engineering and Home Science will be established for undergraduate, diploma and certificate courses.
- Zonal Research Station, Darisai (East Singhbhum) will be converted into an Agricultural College for education & location-specific research.
- A college of Agri-business Management for MBA (Agribusiness) degree programme will be started at BAU, Ranchi with emphasis on entrepreneurship development in emerging fields.

- A new college of Veterinary Sciences for B.V.Sc. course with annual intake of 50 students will be opened at Dumka.
- Forestry education need to be linked with horticulture and a new college of Horticulture & Agroforestry will be opened in Palamu region with intake of 50 students.
- Institutes for Dairy Technology and Livestock and Fisheries will be established at suitable locations.

Besides the degree programmes, BAU will cater to the needs of the State by starting diploma courses in areas such as agri-inputs management, watershed management, food processing, animal nutrition, forest products utilization, organic farming, natural resource management etc.

(13) Soil Health

In Jharkhand there is practice of imbalanced fertilization, and soil is deficient in organic carbon content. Fertilizer use efficiency is far below i.e. half from the national average. Less use of phosphatic and potassic fertilizers is very common. The soils of the state generally requires sulphur, but state lacks in availability of sulphur-based fertilizers. Micronutrient deficiency especially that of boron and molybdenum is common in the Jharkhand soils. The following measures will be taken to ensure care of the soil health:

- Large number of vermicompost units will be established under RKVY and NFSM to increase vermicompost production, which will benefit the soil health.
- Computerized soil health card system with necessary e-Governance standards will be started for giving soil health care due attention. Each household will be provided soil health card showing all the details of the soil of their land under cultivation.
- All the soil testing laboratories will be networked and a good database will be prepared so that information on soil fertility status of block/ panchayat / village can be prepared.
- Proper trained staff will be deployed at each STL and regular training will be provided to enhance their analytical skills.

(14) Soil Amendment

Jharkhand is one of State in the country having about 10 lakh ha of acidic soils. Soil acidity is a big problem which hampers food grain productivity. The following measures will be taken for amendment of soil acidity:

- Amendment of acid soil will be undertaken on large scale in the State. Soil amendment can be done with the use of lime; but availability of lime is inadequate. The state is bestowed with some dolomite mines located in Palamu region that will be used as liming material to treat soil acidity.
- On the basis of recommendation of BAU to use LD slag (basic slag of 80 +100 mesh size) as liming materials. Large scale demonstrations will be conducted to make aware the farmers to ensure their confidence for use of the LD slag as liming material.

(15) Agriculture Land Conversion

Land is a finite resource and with the increase in population, the land: man ratio is fast decreasing. Further, with the growth of the industrial sector, there is a growing demand for the diversion of prime farm land to non-agricultural uses. Conflicts have been witnessed in several states whenever changes in land use are attempted; a mini-revolt results when people feel that their sources of livelihood are taken away from them. Such demands will increase in geometric proportions in the future and there should be a definite policy to regulate such diversions. The State Land Use Board will be constituted to act as a means of regulating land use. In addition to "**State Land Use Board"**, Land Use Advisory Service will also be established a block level to facilitate the work of the State Land Use Board which will take a holistic view on decisions of land use.

The gross cultivated area at present is 21.07 lakh ha. This area is projected to increase to 28.17 ha by the year 2020. The additional land for cultivation will be available by gradually reclaiming arable land of the order of 7.10 lakh ha currently classified as 'cultivable wasteland'.

(16) Extension Services

The knowledge and skill gap between scientific know-how and field level do-how has been widening in the recent years. This knowledge deficit needs to be overcome speedily to enhance farm productivity and profitability. It is well recognized that farmers are changing over the years, both as individuals, as their contact with the outside world and their

information seeking behaviour. Today they require both extension education and extesnion service simultaneous unlike two decades ago.

Ensuring that the technological advancements reach the farmers is one of the prime objective of any extension system. **"Reaching the Unreached"** should get higher priority in agricultural extension.

The extension system has to undergo a change in its outlook leading to responsive and dedicated work commitment. **'Talking Type'** of extension work will be replaced by **'Doing Type'**. Reaching the contact farmers and delivering the messages by **'Doing Type'** of extension will be emphasized.

Since dissemination of agricultural information and transfer of technology are the weakest links in the State, the following points will be considered in the agricultural extension policy for the State:

- Efforts would be made that extension education and extension service reach the farmers together.
- A new decentralized market-driven and farmer-led extension model with bottom up planning for technology assessment and refinement and demonstration will be strengthened which is running through KVKs (extension education) and ATMA (extension service) in the state.
- The positive and desirable components of the erstwhile T&V system with the ATMA model under new extension reforms will be dovetailed wisely.
- ATMAs will be properly equipped, both in terms of training and manpower. Revised ATMA Scheme-2010 has given functionary support at State, district and block level.
- Agricultural graduates will be motivated to undertake agricultural consultancy services in the form of agri-clinics and agri-business centres. Such **Agricultural Consultants** will act as catalysts in bringing the desired changes. These consultants will be trained in the Agricultural University and will be provided a package of technology that is locally acceptable.
- At district level each ATMA will have one Project Director and two Deputy Project Directors each separately having defined responsibility and authority to give impetus to extension service and avoid role ambiguity.
- At block level one Block Technology Manager and two Subject Matter Specialists will be provided to facilitate BTT and FAC and have link with *Krishak Mitras*.
- State level and district level Farmers Advisory Committee will be formed and training will be imparted to the nominated members from each DFAC and BFAC respectively.

- Presently, the extension work is being done by the institutions in the public domain. In the changed scenario new institutional mechanism will be developed i.e. besides the public sector agencies, agri-clinics, farmers' organizations, farmer field schools, cooperatives, *Panchayati Raj* Institutions, NGOs and para-technicians will be encouraged and coordinated for extension activities.
- Emphasis will be laid on promoting farmer-to-farmer learning by setting up Farm Schools and Farmer Field Schools in the field of progressive farmers.
- One lead farmer for each two revenue villages will act as *Krishak Mitra*. The *Krishak Mitra* will be appropriately trained so that they serve as effective contact points for dissemination of agricultural technology to other farmers in the *Gram Panchayat*.
- Linkages between the State Departments and research institutions like BAU, CURRS, IINRG and HARP etc. will be strengthened so as to facilitate smooth transfer of technology to the farmers. The KVKs in the districts would be the link points on researchable issues in the farm sector.
- Each block will have one ATIC which will be a centre for agricultural technology dissemination. ATIC will provide a platform for knowledge sharing among BTT, FAC, BTM, SMS and *Krishak Mitra* (Farmers' Friend).
- Selected best farmers would be given awards at block, district and state level every year.
- The extension officers of the Department at each level will be professionally trained to upgrade their skills and technological knowledge in partnership with institutes of repute.
- Use of ICT in agriculture will be focused to transfer/disseminate technology quickly.
- Opening of 'Information Kiosks' by interested agri-entrepreneurs will be encouraged.
- *Kisan melas* will be organized at state, district, block level to disseminate the technology emanating from the research stations.
- The KVKs will be developed as a strong knowledge resource centre at district level to provide technological backstopping to various stakeholders of agricultural extension system.
- Arrangements will be made for strong functional linkages between research, extension, farmer and market (R – E – F – M).
- As the agricultural sector will be gradually segregating into two different segments – commercial and subsistence, the extension system will have to adopt a bimodal approach which is as follows:

- Specific commodities will be selected for market-led extension particularly for commercial growers and well organized FIGs.
- Farming situation-based extension and integrated farming system models will be promoted for relatively resource poor farmers.

- The nodal agency for extension education in the state i.e. the Directorate of Extension Education, BAU will be strengthened in terms of manpower and infrastructure.
- The existing lone Extension Training Centre (ETC) of the state and other training centres will be strengthened with new mandates of imparting training to the BTT members, farmer's friend, etc. apart from the village level workers.
- The nodal agency in the state to provide support to ATMAs in the field of extension and management i.e. SAMETI will be strengthened in terms of faculty members and ICT facilities.
- There would be need to establish **Agricultural Resource Centres** at panchayat level equipped with facilities of agricultural information and critical inputs.

(17) Publicity and Promotion

State-wide publicity and promotion of agricultural technologies, developmental schemes, availability of inputs, etc. will be done through intensive use of mass media and information communication tools and technology. Agencies like State line departments, SAMETI, SAU, KVKs, credit and marketing agencies as well as private sectors will be networked for launching campaigns supported by leaflets, pamphlets, etc.

(18) Awards and Incentives

At present the State Department of Agriculture and Cane Development has provision to give awards to outstanding farmers at block, district and state levels. In order to motivate farmers more awards will be provided and this incentive will be extended to the panchayat level. Provision will be made for capital investment subsidy and subsidy for procuring fertilizers including micro nutrients and biofertilizers, green manure seeds, plant protection chemicals and equipments and farm machineries and implements. Existing seed exchange programme will remain continued including mini-kit demonstrations under ISOPOM. Special assistance will be provided for production of certified seeds by the farmers under seed village scheme and drip irrigation equipments will be provided on highly subsidized rate. Rashtriya Krishi Bima Yojna (RKBY) will be implemented for annual horticultural and commercial crops along with foodgrains and oilseeds. Minimum support price and market support for

agricultural commodities will be provided and extended. Farm machineries will also be provided on hire purchase. For export promotion state nodal agency will be constituted. For acid soil management lime/gypsum will be distributed on subsidized rates.

Provisions will be made to give subsidy on export-oriented agro-industries and subsidy on etricity as well as petro-fuel will be provided to the farmers. However, emphasis will be laid on intrinsic motivation rather the extrinsic motivation through these steps.

(19) Drought Management

Dry spells of less than 10-day duration is very common in Jharkhand during the months of June-August, but such short dry spell is tolerable for most of the kharif crops. But, in the recent years due to the unprecedented successive drought, which largely hampers kharif prospects, drought management for agriculture has become the need of the state. The following strategies will be adopted for mitigation and adaptation of the drought situation in the state:

- Efforts will be taken to change cropping pattern and replace upland paddy by kharif pulses and oilseeds.
- Aerobic rice technology will be emphasized.
- Paddy will be taken in only those areas where water accumulates even in low rainfall conditions.
- Pulse and oilseed crops will be given priority.
- Water use efficiency will be improved through use of micro irrigation measures.
- Climate resilient crop technology will be undertaken.
- Short duration paddy crop will be taken to use available soil moisture after harvesting to sow the next rabi crop.
- Zero tillage technology will be promoted to use the residual soil moisture immediately after harvest of early kharif crop.
- Standing alternative crop plan will be prepared to face the drought like situation.
- Millet crops of high value like *ragi* will be given emphasis.
- Tuber crops like potato, colocacea and cassava will be promoted.
- Check dams and *Dobha* will be emphasized and special aid will be provided in such areas.
- If necessary, drought tolerant paddy varieties like BVD 109/110, Sahbhagi etc. will be used wherever paddy cultivation is required for subsistence.
- Delineation of drought-prone areas at district and block level will be done.

- Mulching measures will be taken to preserve soil moisture.
- Watershed development will be given top priority.
- Rain water conservation will be taken on large scale in a campaign mode by ensuring people's participation. Crops like sorghum, groundnut, castor, bajra and *ragi* will be promoted in such areas.
- Land leveling and bunding measures will be taken on large scale to check runoff losses.
- Large scale horticultural plantation will be taken up to cover those lands where crop cultivation is not possible.
- Remote sensing technology for drought monitoring, crop coverage and yield loss will be prepared.

(20) Plant Protection

Plant Protection is an important aspect of crop production which is looked after by a special wing of the Department of Agriculture of the State. It deals with mainly the problems of pests, diseases, weeds and micro nutrient deficiencies in the crops. In the State it is estimated that there is 10-20% loss in yield due to pest problems in major crops. The following measures will be undertaken to strengthen the plant protection services in the state:

- Revamping of PP centres with all required manpower and infrastructure.
- Each PP centre will be developed as training-cum-plant clinic centre.
- Each PP centre will be provided with essential pesticides and equipments to tackle the emergency.
- Posting of trained and qualified supervisors (Diploma/Agriculture Graduate) will be done against the vacant positions.
- IPM will be popularized through establishment of FFSs.
- INM will be given due attention in context of micro-nutrient deficiencies.

(21) Interdepartmental Convergence

Agriculture at the grass root level includes a number of activities such as production of agricultural crops and commodities, livestock and their management, fisheries, water management, primary processing of all kinds of produce, marketing etc. Farming activity at the farmer's level includes two or more of these activities. All these activities are interrelated complementing each other. These are presently handled by a number of line departments like

Agriculture, Horticulture, Soil Conservation, Fisheries, Animal Husbandry, Water Resources, Agricultural Marketing, etc.

Efforts will be made so that all these departments could function in unison with each other, and a considerable amount of coordination of their activities, especially for timely availability of inputs, goods and services is necessary. A Public Relation and Support Services Wing will be created within the 'Department of Agriculture and Cane Development' to facilitate continuous interaction with all these agencies in both structured and non-structured manner, in the interest of providing services to the farmers in an integrated and unified manner.

(22) Water Management

Water plays a significant role in increasing the yield from the land. Non-availability of timely and adequate water for irrigation is now becoming a serious constraint in achieving higher productivity and stability in farming. Therefore, assured irrigation is the need of the hour. Though the total rainfall in the state is satisfactory its distribution over time and space is highly uneven. Thus, rain water harvesting and improving the water use efficiency are important. It has been assessed that even 10% increase in the present level of water use efficiency in irrigation projects may help to provide life saving irrigation to crops in large areas. The concept of maximizing yield and income per unit of water would be used in all crop production programmes. Water Users Association (*Pani Panchayat*) will be encouraged to maximize the benefit from the available water. The followings are important policy initiatives for water management:

- There are number of irrigation projects at various stages of completion in the State. Adequate resources would be provided for speedy completion of the ongoing projects.
- Participatory community irrigation management (PCIM) would be encouraged through the *"Pani Panchayat"* system. *Pani Panchayat* system (Water Users Association) will be taken for capacity building of the groups which will bring about awareness of their rights, roles and responsibilities in effective utilization and monitoring of water allotted to them.
- Rotational water supply system will be adopted for effective use of water.
- Since spread of benefit of major and medium irrigation projects are confined only to a few districts of the State, it would be necessary to take greater interest for developing rain water harvesting structure, ground water recharge, traditional water bodies and farm ponds.

- Assured irrigation will be made to at least 30-35% of cultivable land in each block. This will be achieved by a suitable combination of flow irrigation and lift irrigation systems.
- Irrigation tanks will be dug out in every village having such potential. This will be very helping to raise the water table also.
- Individual tube wells and bore wells will be promoted only in such areas where condition of water conservation is good. In this case subsidy would be limited to 75% of the project cost.
- Community participatory lift irrigation projects will be promoted with subsidy up to 90% of the project cost in the non-SC/ST groups and up to 95% of the project cost for the SC/ST groups (group with a minimum of 50% SC/ST members).
- Micro irrigation will be promoted in a big way in the State by providing subsidies for drip and sprinkler irrigation up to 90% of the project cost.
- Supply of irrigation water through underground conduits in place of overground canals will be encouraged to minimize the transmission loss.
- Farm ponds, land leveling, field bunding and erosion control measures will be executed free of cost in the field of small and marginal farmers of the state.

(23) Wasteland Development

A large part of State's land (14.01 of TGA) is under wastelands. The major portion is contributed by underutilized/degraded notified forest land (9.85% of TGA), land with or without scrub (2.89% of TGA) and mining and industrial wasteland (0.19% of TGA). Different categories of wastelands require identification, distribution, location, estimation of extent and their proper scientific treatment.

The following are some of the challenges before the wastelands development:

- Low soil fertility.
- Little or no irrigation potential.
- Not suitable for cash crops that requires fertile soil and continuous water supply.
- Complex organization required for land development, cultivation, production and marketing.
- Improved technologies are required to make lands productive beyond the skill levels of poor families.
- High cost of investment in soil and irrigation development (cost per unit area) beyond the reach of most rural families.

The sustainable biomass production to improve the environment and to increase ground water potential shall continue to be the guiding factors for the wasteland management.

Following steps will be undertaken to develop wastelands:

- The exact area under wasteland of a particular district/block/village will be assessed/ demarcated through revenue records of the Govt. There is also a need to assess encroached area for proper wasteland management.
- The programme of development of wasteland in the State will be planned in a phased manner and emphasis will be laid on rehabilitation through industrial plantation so that revenue can be generated within short period of time.
- Development of systematic cropping patterns for annual crops, choice of tree species and their mix, and other land development activities, would be towards ensuring economic returns both on short and long term basis, so that sufficient incentives are there for undertaking developmental activities.
- The cattle proof trenching (CPT) under social forestry programme would deserve social/biological/political support for adequate strengthening.
- Timely distribution of quality grafts of horticultural plants preferably only for those target groups capable of providing protection from stray cattle menace and giving protective watering during summer will be undertaken.
- There would be recognition of the need and importance of people's participation in all the stages of developmental programmes.

(24) Farm Mechanization

Farm mechanization brings a significant improvement in agricultural productivity in a number of ways. The timeliness of various agricultural operations is crucial in obtaining optimal yield, which is possible only through mechanization. Secondly, the quality and precision of the operations are equally significant for realizing higher yield. The various operations such as land leveling, irrigation, sowing, planting, use of fertilizers, plant protection, harvesting and threshing need a high degree of precision to increase the efficiency of the inputs and reduce the losses. Farm mechanization also goes a long way in reducing the drudgery of agricultural operations. With mechanization, there is good scope to reduce the cost of production.

In Jharkhand, level of mechanization is low. Farm mechanization in the State would be promoted in a big way by ensuring easy availability of appropriate farm machineries at

substantially subsidized rates. Rate of subsidy on farm mechanization and equipments would be raised up to 50 to 75% depending on type of the implements/machineries.

- The farm machinery suitable for different size of landholdings, soil and farm operations for important crops will be developed.
- Technical know-how will be provided to the farmers with respect to appropriateness of the farm machineries for different types of farming situations.
- Training related to farm machineries and implements will be imparted to the farmers and artisans.
- Women-friendly farm implements will be promoted.
- Agro service centres will be promoted to provide door-step services for farm mechanization.
- There would be an independent Directorate of Agricultural Engineering and Farm Machinery with "District Agricultural Engineer" (as in Bihar state) in each district to setup and maintain implements bank on custom hiring basis for training to rural youth, demonstration of new improved implements and local assistance for minor repairs.

(25) Soil Conservation

Out of 79.6 lakh ha geographical area of the State, about 23 lakh ha are subject to severe erosion every year which affect about 30 lakh ha of land. This enormous soil loss needs to be checked by appropriate soil conservation measures.

A brief outline of soil conservation measures in the state will be as follows:

- Prevention of sheet or rill erosion on the arable lands and in transition zones.
- Promotion of horticulture, afforestation and grass land development strategy.
- Preventing damage from river back flow where present.
- Adoption of engineering measures wherever vegetative measures are not feasible.
- Motivation and financial assistance to dedicated institutions for managing watershed and different other programmes by soil conservation.
- Creating awareness among school children.

(26) Micro-irrigation

As the water is precious, the drip and sprinkler irrigation systems in horticultural crops on a large scale will be extremely beneficial to the state. The govt. will support to the farmers for having drip and sprinkler irrigation system.

(27) Horticulture

Horticulture provides excellent opportunity to raise the income of farmers even in dry tracts. A significant shift towards horticulture is evident in the State with the increase in area and, therefore, its production. Horticulture provides higher per unit productivity and greater scope for value addition and this enterprise is spreading throughout the length and breadth of the State. In Jharkhand, horticultural crops including MAP are grown in 1.82 lakh hectare area with estimated annual production of 19.55 lakh tons. The area is 8.13 per cent of the net sown area of the State (22.38) lakh ha. Jharkhand further has significant potential to increase area under horticultural crops in the six sub-zones. There is a significant scope to increase the productivity of the horticultural crops by adopting hi-tech horticulture.

- Area planning for horticulture crops will be done to provide a complete plan up to block level and for each crop. This will be put on the web site so that farmers are aware of the crops suitable for them and the optimum possible area under these crops in their block. This will be periodically updated.

- The above step will fulfill the need to generate proper cropping pattern in specific areas depending on the demand for the crop in the local, domestic and other target markets.

- Most of the horticultural crops being perishable in nature, facilities will be created for storage, processing and marketing for ensuring remunerative returns to the farmers. This will require that such crops are grown on a sufficient scale instead of scattered cultivation by individual farmers. A **cluster approach** will, therefore, be adopted. This will make it possible to have adequate processing and marketing arrangements made on a viable scale.

- Horticulture crops are also ideally suited for **contract farming**. The Government will actively encourage private entrepreneurs and food processing companies to enter into marketing contracts with farmers growing horticultural crops.

- In order to increase production of quality planting materials at least one model nursery will be set up in each district and one small nursery will be set up in each block.

- The horticulture farms of the State Government can be made available to private entrepreneurs on payment of suitable rent for setting up mega production centres

which can produce planting materials in large number by using modern technology and bio-technology. Such mega production centers can also be set up in PPP mode. These centres can also take up training of farmers in the cultivation and post-harvest management of horticulture crops.

- The State Government will promote cold storage facilities by providing subsidy and other incentives.

- Handling and collection centers and marketing intervention centers will be opened at vantage points in selected block headquarters. Cold storages will be made available in selected blocks through **public-private partnership**.

- For ensuring better occupancy of cold storages, good market information system with marketing credits will be provided.

- Electricity tariff for cold storages will be at special rates (agro-industrial consumers) instead of industrial/commercial rates.

- Thrust will be given to standardize post-harvest practices and popularize the same among the farmers by utilizing the services of the existing training centers of the Departments of Agriculture, Horticulture, State Agricultural University etc., to impart crop specific training to farmers, traders and other market intermediaries.

- Provision of cold-chain system for perishable commodities in the State by establishing pre-cooling centers, cold storages and linking markets with refrigerated transport in the private, co-operative and public sectors.

- Organic cultivation of horticultural crops will be promoted to reduce the cost of cultivation and replenish the soil fertility and attracting better price and market advantages in both domestic and international markets.

- Organic certification procedure will be put in place. In addition to this, awareness will be created among farmers about the advantages of organically grown fruits and vegetables. A special marketing and trade channel will be created for these products.

- A massive programme for rainfed horticulture coupled with drip irrigation system will be taken up at village/block level.

- A special dryland horticultural development programme will be taken up with State support, which will be included in the crop planning and placed on the website. This will also be popularized through media vehicles.

- Adverse climatic conditions and natural calamities have been inflicting heavy losses to horticultural producers. In order to help the farmers, **Input Insurance Scheme** for identified horticultural crops will be put in place. Similarly, crop insurance will also be extended to more number of horticultural crops.

- Horticultural crops need continuous extension support. This could be addressed through Hortinet, the interactive website that can be operated through the rural kiosks placed at the blocks/rural *mandis*.

- The services of the media network of regional TV channels will be fully exploited to provide the services and for the spread of knowledge about horticulture.

- Establishment of **Alternative Modernized Horticulture Markets** that ensures an effective domestic marketing system is the need of the day. Horticultural crops will thrive only with a proper and sustained market support. In addition to this a scheme of providing price support through minimum support price for horticultural crops will be worked out in consultation with the State Agricultural Price Commission.

- A separate **marketing department** will take care of the marketing of horticultural produce.

- At present, National Horticulture Mission **(NHM)** covers 17 districts of the State. The State will launch State Horticulture Mission (SHM) for the remaining 7 districts. All the benefits available under NHM will be extended to the farmers of the 7 districts under State Horticulture Mission.

- With the limited land available the production per unit area can be increased by increasing the number of plants especially fruits like mango, guava, papaya etc. The Govt. will encourage the farmers in adopting this technology which is called **high density planting**.

- **Protected cultivation** involves growing of vegetables and flowers which gives more yield than grown in open field. The initial cost is high. The Govt. will help in polyhouses making and in growing exotic vegetables particularly for export potential.

- There is a great demand of vegetable seeds both in quality and quantity. Hence one of the thrust areas would be to increase the production of quality seeds and seedlings. The State will help in establishing *"**Beej Gram**"* and seed processing units in each district. There should be a **state seed corporation** on the lines of NSC/other states.

- **Apiculture:** Scientific honey-bee keeping not only increases the production of honey and by-products like honey wax but also improves the crop productivity through assured pollination. Bee-keeping has good scope in Jharkhand with its abundant natural vegetation and crops under cultivation to provide adequate food for the bee colonies. The Govt. will provide assistance for the apiculture.

- There is a good potential for promotion of **button mushroom** and **oyster mushroom** in the State, as the climatic conditions are ideal for production of these mushrooms. The activity is ideal for generation of self employment especially for urban unemployed /landless people.

- Tax structures on horticultural products need to be rationalized so that cost of the end products can be kept within reasonable limits.

- The farmers involved in horticulture sector will have easy access to financial instruments like micro-credit and loans.

- **Cooperative farming** will be promoted among the farmers.

- Research and development is critical and it would be aggressively employed in the horticultural sector in areas like development of high-yielding variety of seeds and soil testing.

(28) Public-private Partnership (PPP)

- The wholesale markets in the state would be set up in the private sector with the State Government playing the role of a facilitator/promoter and regulator.
- There are many options for designing the PPP model, the most commonly used options are joint ventures, Build-Operate–Transfer (BOT), Build-Own- Operate-Transfer (BOOT). However, the most preferred model for marketing would perhaps be the financially free standing projects

(29) Floriculture

Jharkhand's soil and climatic conditions are suitable for successful cultivation of flowers like rose, tuberose, marigold, gerbera and gladiolus. Demand for flowers is also growing rapidly in the State. Though floriculture in the State is in infant stage, an increasing trend in cultivation of flowers is marked. Though there is a huge potential of floriculture in the State, farmers are reluctant to take up floriculture, mainly due to marketing problems. Information about prices and floriculture technology is also not readily available to the small producers. The following measures will be undertaken for promotion of floriculture:

- The State will help constitute groups of floriculturists with its intervention to overcome the bottlenecks of marketing, export and related infrastructural facilities for promotion of floriculture.
- Air freight subsidy will be provided to the floriculturists.
- Information about prices and the floriculture technology is not readily available to small producers. This will be provided through website in regional languages through media, pamphlets, bulletins and booklets.
- Sufficient primary markets are not there for floricultural products. More number of markets will be created in the State at vantage places.
- Growers Co-operatives will be encouraged and wholesale markets exclusively for flowers will be developed.
- Contract farming of flowers will be encouraged with suitable forward linkages.
- Suitable financial incentives will be provided not only for cultivation of flowers but also for post-harvest management.
- State Government would give 100 per cent outright **excise exemption** for the first ten years and 100 per cent **income tax exemption** for the first five years like Govt. of Uttarakhand to attract the corporate sector in floriculture.

(30) Post-harvest Management

The objective of agricultural development includes not only enhancing the productivity of agriculture but also maximizing the value of the produce generated. **Value addition** to agricultural produce involves proper post-harvest processing, grading, packaging, transportation and storage. The poor handling of farm produce results into a loss of up to 30% of the produce. This also considerably reduces the value realized by the farmers. Provision of post-harvesting, processing and storage facilities, therefore, assume great importance in increasing the income levels of the farmers of the State.

- In order to promote proper handling of vegetables and fruits individual farmers and farmers' groups would be given intensive training. Farmers would be provided with subsidy to purchase crates and other equipments.
- PHM facilities will also be created in PPP mode.

(31) Exports

The following measures are proposed to boost exports of various commodities from the State which include flowers, vegetables, etc.:

- With a view to give boost to exports, the Govt. has constituted a **State Level Exports Promotion Council (SLEPC)** headed by the Chief Secretary with wide representation from industry and commerce. The council would direct, promote and ensure monitoring of the export related activities in the State. The functioning of SLEPC will be further improved.
- The Govt. will set up an Air Cargo Complex at Ranchi, which would give the desired impetus to the exports of flowers, fruits, vegetables and other relevant commodities.
- **An Inland Container Depot (ICD)** at Jamshedpur with the assistance of Govt. of India will be setup shortly.
- **Exports Promotion Industrial Park (EPIP)** is proposed to be set up in Dhanbad with assistance of the Govt. of India, which will provide quality infrastructure facilities for exports-oriented units.
- **Special Economic Zone (SEZ)** is being proposed to be set up to give fillip to exports and earn valuable exchange for the country.
- Declaration of export-oriented units as essential services/public utilities services.
- The State Govt. would take supportive views in operation of relevant labour laws to facilitate export-oriented production.
- The following assistance will be available to exporters of the state horticultural produce:
    - Air freight subsidy @ 25% subsidy on air freight on cauliflower, *okra*, tomato, flowers and other products as specified by the State Govt. from time to time, subject to a ceiling of Rs. 10 lakhs per beneficiary/per year.
    - The State Govt. will provide subsidy for sending sample/ test marketing abroad. The State and Central Govt. assistance would not exceed 50% of the cost of sending samples and beneficiary could avail such grant only once for sending

samples for one time to one country and the product shall be of the state origin only.

(32) Agro-industry

- The State Government will offer back ended interest subsidy to tiny, small, medium and large agro-industrial units.
- Strong agricultural supply chain infrastructure is key to a vibrant and competitive agriculture and agro-industrial sector. The piecemeal attempts so far of setting up infrastructure for agri produce in the State will be replaced by a well-orchestrated system by the Government for coordinated and integrated infrastructure development across the State.
- The State Government will offer incentives for projects providing common infrastructure facilities in the value chain of agri produce from farm to market as decided by the Single Window Clearance Committee. The State Government will assist in preparing pre-feasibility studies through State Infrastructure Development Board. The State Government also intends to provide Government land including agriculture farms on long lease basis at reasonable rates.
- The State Government will reimburse 50% of the cost of preparation of the project report to set up new agro-industrial units subject to ceiling of Rs.5.00 lakh. Financial assistance will be released after the unit is set up and commences its operations.
- The State Government proposes to encourage private sector industries, apex co-operative institutions, APMCS, etc. to come forward and set up centres of excellence/specific crop development institutes. The State Government will support such projects by providing land at concessional rates and 50% initial seed capital matching the industry contribution within a ceiling of Rs.5.00 crores. In case the Centres of Excellence incorporated as a Company under the Companies Act, Government support will be treated as equity. The centre/ institute will be managed professionally by the industry and information will be made available to farmers, processors and planners.
- The Government will also consider suitable provisions to enable Agro Industries to hold private agriculture land on long term lease. The Government also intends to provide government land including agriculture farms on long lease basis at

concessional rates to Agro-Industries. The Government has already declared a scheme for development of government wasteland. In order to proactively invite investments in this sector, the Government will compile and make available information regarding such government wastelands in the State.

- Agro-processing industries will be encouraged to enter into contract farming arrangements either directly or through group of farmers, value added centres, and agro-service centres or cooperatives. To facilitate such arrangement, the State Government will accord priority in sanction of agriculture subsidy under its various schemes to the concerned farmers and will also permit the routing of such subsidy through such centres/groups/co-operatives, subject to the consent of member farmers.
- The Government will provide encouragement to the farmers to use drip and sprinkler irrigation technology with proper agronomic practices.
- The State Government will consider levying power tariff on tissue culture and R&D in biotechnology at the same rates as applicable for direct agriculture.
- Road development will be encouraged through co-operatives, private sectors and/or group of farmers. The State Government shall channelise assistance for such road projects under RIDF (Rural Infrastructure Development Fund) of NABARD.
- For the need-based human resource development, universities in the State will be encouraged to commence courses in food packaging, processing, bio-technology, information, technology in agriculture and allied fields.
- The State Pollution Control Board will, frame new guidelines keeping in view the nature of effluents, consistent within the frame work of Central Pollution Control Act to control pollution.
- Domestic markets will need to be developed simultaneously with export markets, for sustainable growth of the sector. In order to promote competitiveness and efficiency in the marketing chain, the State Government will encourage standardization, grading and setting up of world class testing facilities accredited by internationally acceptable agencies, national/regional commodity exchanges, auction houses, terminal markets, retail chains, etc. Most of these facilities would be created as part of agri infrastructure either by co-operative sector or through private initiative and government facilitation.

- The Co-op. Societies Act will be suitably amended to enable co-operative societies to participate in equity with limited companies/ private entrepreneurs to promote joint/ associate sector projects as per the recommendations of Dr. Y. K. Alagh Committee appointed by the Government of India. It is also under consideration to introduce the element of competition in agricultural marketing by permitting direct marketing, auction center by NDDB and private markets.
- The commodity exchange has been set up in the State in the name and style of National Multi Commodity Exchange of India Ltd. This exchange will help the farmers to plan their production, sales and realization of better prices by way of trading through warehouse receipts.
- Micro agro-units, tiny units and small scale units will be encouraged to produce internationally acceptable quality certification standards like HACCP or similar quality certification recognised by importing countries to encourage the practice of quality assurance for exports of products from the State. The Government will provide financial assistance upto 50% of the cost, subject to ceiling of Rs.5.00 lakh.
- The State Government will encourage individual organisation in government, private or co-operative sector in patent registration by providing financial assistance of 50% cost of Patent Registration within a ceiling of Rs.5.00 lakh.
- With economic liberalization and globalisation under WTO regime, it has become imperative to grade and standardize agri and horti products of the State on the basis of international standards. The State would formulate such standards and grading and develop regulatory mechanism for the same.
- The State Government will pro-actively promote global positioning of crops in which it has pre-eminent position in world market through generic promotion, participation in exhibition abroad and creating brand for agro products of the State. Special campaign shall be undertaken in targeted international market in association with APEDA, progressive farmers, farmer co-operatives, exporters and agri processors.
- State Government will encourage setting up chain of retail outlets in the State as a crucial link between consumers and producers. The support will be in the form of speedy approvals for land allocation, financial contributions to project costs, facilitation of infrastructure, for fresh produce segment, in particular.

- Food parks are the industrial estates specifically for setting up of food processing industries. Development of food park intends to enable particularly small and medium scale food enterprises to attain viability by defraying cost of major common facilities such as R&D, laboratory, cold storage, warehousing, pack house, food testing and analysis lab, effluent treatment plant, common processing facilities, power, water supply, road transport etc.
- The State Government would encourage private sector entities, apex co-operative institutions, etc. to set up the high technology projects. It would consider permitting private entrepreneurs to take up these activities in agricultural sector. It is also under consideration to provide power at concessional rates to such projects.
- In the age of liberalization and globalization of the economy, the importance of exports for economic development of the State cannot be ignored. Various measures are being proposed to boost export of various commodities from the State which include flowers, vegetables, medicinal plants, spices, fruits etc. The State would support AEZ through:
  - Setting up of Air Cargo Complex for perishable products at Ranchi Airport.
  - Setting up of world class laboratory for quality and inspection of agriculture and processed food products from the State.

The following assistance will be available to exporters of the State agricultural produce:

  - Air freight subsidy @ 25% subsidy on air freight on fruits, vegetables , flowers and such other products as specified by the State Government from time to time, subject to a ceiling of Rs.10.00 lakh per beneficiary/per annum.
  - The State Government will provide subsidy (within a ceiling of Rs. 50,000/- per beneficiary) for sending samples / test marketing abroad.

- The State Government will encourage research and development activities in the State. The Government will provide assistance to agro-industries for sponsored research work undertaken by reputed research institutions, upto 50% of the cost, within a ceiling of Rs.20.00 lakh.
- Government intends to prepare software for agri-business including availability and cost-benefit analysis of inputs, documentation of best agronomic practices for

various crops and varieties, weather forecast, market information, price projection, etc.

- In order to encourage production of organic products and make them acceptable in the international market, the State will facilitate setting up of internationally recognized quality testing and certification laboratories in the State.
- The State Government intends to create venture capital fund for agro-industries in association with financial institutions/ banks, etc.
- The State Government, intends to support projects on agri wastes, by treating them at par with agro industrial infrastructure projects for the purpose of incentives.
- Government support for other facilities like pollution control, water, etc. and other parameters not specifically provided herein above will be on lines of the industrial policy of the State.

(33) Medicinal and Aromatic Plants

Jharkhand has one of the richest ethno-medicinal tradition in India. The state has immense potential for cultivation of medicinal and aromatic plants (MAP). For promotion of cultivation of medicinal and aromatic plants the following planks of strategy will be adopted:

- A data base will be developed of MAP in the state for area planning for MAP crops which are not consumed directly.
- A cluster approach will be adopted for facilitating, processing and marketing of MAP on a viable scale.
- The Government will actively encourage private entrepreneurs and food processing companies to enter into marketing contracts with farmers growing MAP.
- In order to increase production of quality planting material at least one model nursery will be set up in each district and one small nursery will be set up in each block.
- Electricity tariff for cold storages will be at special rates (agro-industrial consumers) instead of industrial/commercial rates.
- Organic cultivation has much more relevance in MAP sector, which will be ensured strictly.
- Organic certification procedure will be put in place at village level and a special marketing and trade channel will be created for these products.

- Alternative modernized horticulture markets will be established. In addition to this a scheme for providing price support through minimum support price for MAP crops will be worked out in consultation with the State Agricultural Price Commission.
- A separate marketing department will take care of the marketing of MAP produce.
- Extension Education on appropriate technology will be provided by the State to the farmers/entrepreneurs through the state agricultural universities/research institutes etc.
- State will support the certification mechanism for quality standards, good agricultural practices and good storage practices.
- A high level research institute with the state of art facilities for work on MAP will be established, particularly for crop improvements and development of package of practices in the context of Jharkhand.

(33 'A') Spices and Condiments

Jharkhand grows a number of spices like ginger, turmeric, chilly, coriander and fenugreek. Many more spices like s*aunf*, bay leaf, *dalchini* and *jeera* can be successfully grown. As the prices of these crops have risen very high, the farmers can be benefited better with the government support.

- Unlike high perishability of fruit, vegetable and flower most of the spices need only good godowns for keeping them for long period except ginger. This advantage will be harnessed through promotion of spices cultivation.
- The production of quality planting materials especially of ginger with high gingerol and turmeric with high curcumin content is needed for the promotion of these spices. In order to increase production of quality planting materials at least one nursery in selected districts will be set up.
- Spices are grown both in *kharif* and *rabi* seasons. Thus they are suitable for proper cropping pattern in specific area. Spices like ginger and turmeric can be grown in orchard/shade places. Thus with proper planning these areas will be tapped.
- Most of spices are used as medicines for many diseases. These spices need to be processed for extracting oils etc. for better profit. Thus processing industry will be set up in PPP mode.

(34) Precision Farming

It is a concept of using the new technologies and collected field information for doing the right thing in the right place at the right time. The following steps will be taken to stress upon precision farming in the State.

- The Govt. will prepare soil maps based on satellite. This technology will help in identifying the exact nutrient status of soils of the particular area.
- Chisel ploughing will be done wherever needed. Drip irrigation system will be extrapolated for precision farming.
- Community nurseries for vegetable and other crops will be established to produce healthy vegetable seedlings.
- In order to combat the menace of pests and diseases in horticultural crops need-based application of pesticides and fungicides will be advocated which will help in reducing 1/3rd of cost of pesticides application.

(35) Land Development

Land is a finite resource and with increase in population, the land: man ratio is fast decreasing with growth of industry and increasing demand for diversion of good agricultural land into non-agricultural uses. This has resulted into conflicts because vast rural population depend on land for their livelihoods by growing a variety of crops. To check this, a 'Land use Advisory Board' at State level needs to be constituted, which will take a holistic view on decisions on land use. This advisory board will work in close collaboration with block level officials. Land records need to be computerized so that a database is available with the development agencies of the State.

Major emphasis would be on checking loss of top soil and organic matter by soil erosion due to high intensity rainfall in hilly terrain. This can be effectively managed by integrated development of watersheds with a farming system approach, bunding and terracing in uplands, land leveling, gully control, construction of silt detention dams and water harvesting pond. Work in a farmer participatory mode will yield positive results. The policy will stress upon the following aspects:

- The net cultivated land in the State is 18.04 lakh ha out of a total of 38 lakh ha available for cultivation. There is need to increase it to 25 lakhs ha by 2020.
- Each year around 0.75 lakh ha land will be developed.
- These lands need bunding, leveling and deep ploughing for rain water harvesting.
- Land would be developed, and distributed to landless agricultural labourers.

(36) Agricultural Land Expansion

Land which is capable or has the potential for agriculture but is not being used due to different constraints of varying degrees is termed as cultivable wastelands. As per estimates, 2.74 lakh hectares of cultivable wasteland can be brought under agriculture especially for fuel, fodder and timber for rural households. Further, there is about 5.73 lakh hectares of barren and uncultivated land.

Thus, about 8.45 lakh hectares of additional land can be brought under cultivation after adopting required conservation and management practices. The policy will stress upon:

- Involve local people in wasteland development
- Generate employment for rural poor by way of tree plantation, agro-forestry, fruit trees and pasture development activities
- Checking soil erosion and land degradation through vegetative cover
- Generating public opinion on their perceptions and expectations from the programme and its implementation process.

(37) Seed

Seed is one of the most crucial inputs that can enhance the production and productivity of the major foodgrains. The State faces acute shortage of quality seeds and ensuring timely availability of seeds to the farmers becomes a tough task. Hence, there is need for formation of Jharkhand State Seed Development Corporation (JSSDC) to cater to the domestic need of the farmers of the State, so as to achieve the target of 33% seed replacement rate (SRR) in near future.

For this the following steps will be taken:

- Constitution of JSSDC as an autonomous body with its own establishment and budgetary provision from the State Government.
- Establishing liaison between the seed villages and the JSSDC for ensuring timely availability of high quality seed locally.
- Creation of warehousing facilities for proper storage of seeds.
- Ensuring that the state is in the seed chain so as to get the appropriate variety of seeds in required quantity on proper time.

(38) Quality Control

Fertilizer and other inputs are the most critical commodities for sustaining agricultural production and ensuring food security. The Government ensures the quality of fertilizers

through Fertilizer Control Order (FCO), issued under Essential Commodities Act, 1955 to regulate, the trade, price, quality and distribution of fertilizers in the country. The State Governments are the enforcement agencies for implementation of the provisions of FCO.

- At present there is only one functional laboratory in Jharkhand for Fertilizer Quality Control which is located at Kirshi Bhawan, Kanke Road, Ranchi. This laboratory has an annual capacity of three thousand samples but presently due to lack of trained man power, lack of equipments, glassware and chemicals and above all, lack of space, the present capacity is not being utilized to its full potential. The lab needs strengthening. Therefore, it is proposed to strengthen this sole existing Fertilizer Quality Control laboratory. Also, an FQCL lab building has been constructed in Dumka but this is not made operational as yet.
- There is also a proposal of establishment of two laboratories one each at Hazaribagh and at East Singhbhum. This includes construction of new building to house the fertilizer quality control labs including provision of water facility, and procurement of equipments, glassware, and necessary items for establishment of the labs.
- At present there is an acute shortage of trained manpower to run the fertilizer quality control labs. This shortage can be met by training of BAOs who have done B.Sc (Agri.) and deploying them on these labs.
- Some fresh agriculture graduates having specialization in Soil Science and Agril. Chemistry/Agronomy can be recruited from the State Agril. University on contractual basis to enhance the capacity of the existing and the new Fertilizer Quality Control Labs.
- Three post of Asst. Dir. of Agriculture (Fertilizer Quality Control) would be created to head the newly established FQC labs at Dumka and for the proposed labs at Hazaribagh and East Singhbhum.
- Similar steps will be taken for quality control of other inputs like pesticides, etc.

(39) Fertilizer

Urea, DAP, MOP, SSP and complex fertilizers 12:32:16, 20:20:0,10:26:26 and organics like compost, vermi-compost, FYM and organic manure are widely used by the farmers of the State. Bio-fertilizer is produced only by Birsa Agricultural University, Ranchi in the State. Vermi-compost producers are only 12-13 in the State and during 2009-10 3862 MT production was reported. Per hectare fertilizer consumption is 60-62 kg/ha which is far below the national average of 118 kg/ha. Fertilizer consumption whatever is observed in the State is in vegetables>

fruits & flowers> maize> wheat> paddy> oilseeds & pulses and consumption of micro-nutrients is very low. Soil testing is urgently needed as per the area and suitability to different conditions. Soil testing labs are not well equipped and all nutrients including micro-nutrients are not tested regularly.

Keeping this in view efforts would be made to create awareness among farmers for use of balanced nutrients on the basis of soil test report and arrangements would be made to ensure adequate supply of quality fertilizers on right price, place and time. Integrated nutrient management (INM) would be popularized in the State for balanced fertilization.

(40) Farm Credit

Jharkhand's economy is heavily dependent on agriculture. Agriculture however, has not generated enough investable surplus to enable utilization of available resources. As such, there is little investment of agricultural credit in Jharkhand particularly in the field of capital formation for increasing farm production.

The following measures will be adopted for boosting up farm credit in the state:

- The institutional credit structure assigns lower priority to farm activities on account of the ills that pervade farming operations. This dilemma will be removed.
- A strong viable and professional system of credit disbursement will be ensured for adequately meeting the credit demands. This would include making a comprehensive assessment of the credit needs of the agriculture borrowers and extending a compensate cash-credit limit.
- Increased credit support will be provided for traditional sectors such as minor irrigation, farm mechanization and watershed management practice etc. Support should also be provided for diversification of activities such as (a) horticulture, floriculture, medicinal plants, sericulture, mushroom; (b) dairy, poultry, piggery and goatery, and; (c) agro-processing, storage and use of advanced technologies like tissue culture, drip irrigation and green houses.
- Legal and administrative systems will be changed in order to revitalize the co-operative credit structure and enable the system to respond adequately and effectively to the ever growing needs of the users and the markets.
- Delegating powers of sanctioning and releasing loans to the branch level;
- Kisan Credit Cards developed as a key product to expand the outreach of banks and simplify the farm credit system, will be issued to all eligible farmers; and

- Farmers will be protected against natural calamities such as, drought by extending insurance facility.
- Kisan, Smart Cards and Samadhan Cards will be made available to all categories of farmers including women so that credit availability does not become a bottleneck for productivity increase through technology adoption.
- Vulnerable farmers will be provided credit at concessional rate of 4% for which the Government will consider providing support to the banking system.
- Credit counseling will be established for severely indebted farmers.
- The banking system will be influenced to develop crop business potential for financing projects for improving storage, markets and transportation.
- Regional Rural Banks will be strengthened with the support of the RBI.

(41) Lac Culture

Jharkhand enjoys the unique distinction having about 50% of the total area under lac cultivation in the country. Out of approximately 200-250 million host trees available for lac cultivation, 110 million are located in Jharkhand. The production of lac is also about 60% of the country's total production of lac. In this State, it provides an employment of 35-40 million man-days a year.

The following are proposed specific policy initiatives for augmenting lac production and processing in Jharkhand.

- Enhance exploitation of unexploited lac hosts. Target 10% increase every year.
- Promote *ber* for *kusmi* lac as it is highly productive and better in quality
- Introduce *F. semialata* for propagating this bushy host at 10 ha/ yr. to reach 50 ha in state at selected locations.
- Motivate JHASCOLAMPF to increase procurement from present level of 10-15% to 50% in five years.
- JHASCOLAMPF could easily maintain a buffer stock of about 1000 t of seed lac. It would help minimizing price fluctuation in market price.
- Procurement and processing of seed lac to be handled by JHASCOLAMPF.
- Awareness, scientific methods of lac cultivation training, primary processing and project feasibility reports to be provided by IINRG, Ranchi. The activity could be undertaken through JFM, IINRG, JHASCOLLAMPF and industries.
- Creation of lac cell under Forest Department on lines of Chattisgarh
- Lac export zone in Jharkhand at Ranchi be created on the pattern of AEZ.

- The state would develop at least three brood lac farmers in high production catchments like Ranchi, Palamau, W. Singhbhum (one in each district). These could be managed by Forest Department itself.
- Focus would be on ecological approach for economic development.
- Minimum support price (MSP) will be given to lac farmers

(42) Sericulture

Jharkhand enjoys the unique distinction of production of 96 million tones of tasar silk out of the total 237 million tones and ranks highest among the 11 States producing this kind of silk. Despite the demand for tasar silk, both in the national and international market, no organized cultivation or scientific methods of production is practiced extensively. This is because most of the work is done by families belonging to disadvantaged sections of the society.

The Government of Jharkhand has initiated several measures for the development of tasar sericulture. These include plantation of tasar food plants in a large scale, supply of seed materials, establishment of reeling and weaving units, development of a cocoon market, and various kinds of product development to increase the demand for quality silk. Studies undertaken by the Department estimated that about 9 lakh hectares of various area is suitable for tasar cultivation. Currently, only 36 thousand hectares are utilized.

A phased programme of development will be planned for increasing this area to the full potential in a 10 year time frame. It is estimated that it will provide employment and sustainable livelihood opportunities to over one lakh people directly and indirectly.

(43) Livestock (Poultry, Goatry and Pigger)

Animal husbandry in the State will receive high priority for generating wealth and employment, increasing availability of animal protein in the food basket and for generating exportable surpluses. The overall focus will continue on four broad pillars viz. (i) removing policy distortions that is hindering the natural growth of livestock production; (ii) building participatory institutions of collective action for small-scale farmers that allow them to get vertically integrated with livestock processors and input suppliers; (iii) creating an environment in which farmers will increase investment in ways that will improve productivity in livestock sector, and (iv) promoting effective regulatory institutions to deal with the threat of environment and health crises stemming from livestock. The following strategies will be adopted to strengthen the livestock sector in the State:

Poultry development

- Organized poultry farms will be established and will be given support with functional hatcheries.
- In tribal areas backyard poultry farming will be promoted through indigenous birds. There is scope for exporting poultry products produced from birds fed on organically produced feed.
- There is good scope to increase the poultry and duck population of the State and minimize the gap between demand and supply. In order to encourage the farming of duck and poultry the State duck and poultry farms will be strengthened.
- High, medium and low poultry production zones in the State will be identified based on poultry population in the districts for strengthening of poultry production in potential zones.
- An institute for poultry research will be established to generate appropriate poultry production technologies and production and distribution of different vaccines for layers and broilers.
- One animal feed industry will be setup which will formulate suitable feed and ration for the birds.

The following other measures will be taken up:

- Breed improvement programme, especially to improve the production performance of *desi*/native birds
- Establishment of elite farms
- Establishment of one small farm of at least one thousand capacity for layers, broilers, quail, turckey at district level
- Establishment of poultry hatchery at regional level
- Establishment of small unit of feed processing at district level
- Establishment of centres for producing value added products at district level
- Modern poultry disease diagnostic laboratory (Biosecurity Laboratory, BSL-3 or BSL-4)
- Subsidy on feeds and equipments for poultry farmers

Goat development

Jharkhand is the repository of 5.7 million goats. The population of goat is almost evenly distributed across the districts. According to the census, it has been found that some districts of Jharkhand can be developed as Goat Zone as there is availability of forest area for

the semi-intensive system of goat rearing. The following strategies will be followed for development of goatery sector in the State:

- Genetic improvement programme for different economically important traits of goat will be aimed for selective breeding and crossbreeding. Genetic evaluation and conservation of Black Bengal type goats in their natural habitat will be strictly followed for maintaining pure line and developing suitable local strains according to farmer's need.
- It is necessary to protect goat resources from major disease like PPR. Therefore, disease monitoring and preventive measures and producing disease resistant stock will be given focus at education and research organization level.
- Extension and training programmes will be strengthened apart from credit, processing and marketing facilities.
- An institute for goat research with its primary objective of vaccine production against the two deadly diseases i.e. PPR and enterotozimia of goats.
- Existing breeds of goat will be improved through A.I. Therefore, one institute for goat semen production and preservation is highly needed in this area.
- The deficiency of feed and fodder for goats will be overcome by providing suitable mineral mixture containing macro and micro minerals deficient in soil, feed and fodder.

Piggery development

Pig husbandry is the most important activity in animal husbandry sector in Jharkhand especially in areas inhabited by tribal people. Pig enterprise is capable of playing an important role to improve the socio-economic status of poor farmers. The State has substantial pig population which constitutes around 10% of the country's pig population. Pig rearing has been a traditional occupation in Jharkhand and was limited only among ST & SC population, but now a days due to its conversion efficiency, shorter generation interval, faster growth rate, low maintenance cost and ability to utilize agricultural byproduct and waste materials to produce high human value diet, it is becoming popular among people belonging to other communities also. The following strategies will be adopted to boost up piggery sector in the State:

- Training programme on pig breeding and management for extension workers, farmers, unemployed youth, NGOs will be given importance and priority.
- Regular supply of "T & D" pigs to second line of breeders to fulfill its heavy demand.

- For the proper disposal of pigs produced by the farmers, bacon factory will be made functional.
- Govt. pig breeding farm will be strengthened with "T & D" and improved strain of pigs to generate quality seed stock for distribution among farmers.
- An institute of pig research for the production of vaccine, proper health coverage, regular training programme and providing suitable genetic material will be established.
- Integrated pig-cum-duck-cum-fish farming will be popularized.

Animal health management

- Enhanced and sustainable productivity through improved animal health will be one of the major strategies for development of the animal husbandry sector. A state immunization programme against the most prevalent animal diseases will be undertaken for animal disease diagnosis and accreditation as per the international standards and development of an effective surveillance and monitoring system for animal disease, animal quarantine, certification and enforcement will be the major functions of the department and necessary schemes on these will be evolved. Further, measures will be taken to ensure that firms producing veterinary inputs like vaccines, diagnostic kits, etc. are following Good Manufacturing Practices (GMP) and meeting Good Laboratory Practices (GLP) requirements.
- Use of technological and marketing interventions in production, processing and distribution of livestock products will be the central theme of any programme for livestock development. Generation and dissemination of appropriate technologies in the field of animal production as also health care to enhance production and productivity levels will be given greater attention.
- Effective integration of Animal Research Institutes with the Department of Animal Husbandry and Dairying will be ensured to facilitate transfer of technology as well as to undertake sanitary and phyto-sanitary measures.
- Efforts will be made to improve the skills and competence of all stakeholders by involving village schools, veterinary colleges and universities in collaboration with the ICAR and its institutions including Krishi Vigyan Kendras (KVKs), State Agricultural Universities and their field stations.
- Efforts will be made to consolidate and bring in convergence in the programmes of different ministries and departments.

Livestock services

- Efforts will be made to provide livestock services at the farmer's door, linked with cost recovery for economic viability. Availability of credit in time and technology support are the two important services needed for livestock development in the rural areas.
- Two carcass utilization plants will be set up in the State for the proper utilization of fallen carcasses.
- Development of a marketing network and remunerative price support to the produces are great incentives for higher animal productivity and these will be encouraged for all types of livestock products. External markets are an extremely important source of demand and these will be tapped much more aggressively. In order to encourage exports, licensing control for processing of livestock and its products will be removed.
- The intermediate focus will be on export of animal products and poultry products to Asian and African countries.
- The concept of organic farming will also be extended to animal products. Necessary infrastructure for certification procedures related to organic animal farming will be promoted.
- Quality and safety of livestock products depend upon a quality and safety assurance system for which legislation for setting up standards, corresponding to Codex standards is obligatory. These do not exist nor there is any method for reviewing and rationalizing the quality and safety guidelines. Efforts will also be made for harmonization of infrastructure facilities for testing food quality and safety with international standards.
- A State Animal Health and Production Information System will be established with the active involvement of research institutions, Government departments, Panchayati Raj Institutions (PRIs), urban local bodies (ULBs), private industries, cooperatives and NGOs. This will act as the state database.
- Efforts will also be made to strengthen the institutions working on livestock care system so that they can ensure and promote animal care and welfare. Research and technology development activities will be taken up for enhancing efficiency and reducing drudgery of animals by improving the design of carts, implements and tool used in agriculture.

The following programmes will be emphasized for growth of animal husbandry sector in the State:

- Adoption of national immunization programme to control prevalent diseases and efforts will be made for the creation of disease free zones.
- Development of fodder through cultivation of fodder crops and fodder tress, regeneration of grazing lands and proper management of common property resources.
- Improvement of small ruminants (sheep and goat) will be taken up in the regions where such animals are predominant.
- Building infrastructure for animal husbandry extension network.
- Panchayats, cooperatives and NGOs would play a leading role in generating a dedicated band of service providers at the farmer's doorstep in their respective areas.
- Strengthening infrastructure and programmes for quality and clean milk production and processing for value addition.
- Programmes to improve indigenous birds and promotion of backyard poultry in rural areas.
- An information network would be created based on animal production and health with active involvement of research institutions, Government Departments, private industries, cooperatives and NGOs.

(44) Dairy

The dairy sector in Jharkhand is presently lagging behind in meeting the domestic requirement of milk. Present milk production is 15.97 lakh ton against the requirement of 23.36 lakh ton (31.60% deficit). Per capita per day milk availability is only 152 gm. The total number of breedable female cattle is 2466174 (73148 crossbred and 2393026 indigenous), whereas number of breedable buffalo is only 455855. Poor productivity of milk is attributed to existence of indigenous cattle and lack of fodder. The State is 52.80 per cent deficit in fodder availability. Infrastructure related to dairy development in the State is also not well developed.

The following are the planks of the strategy for dairy development in Jharkhand:

- By implementing a properly structured animal breeding plan, it would be possible to enhance substantially the production of milk through better semen supply and AI services, proper health care and improved management and feeding practices.

- Induction of high-yielding cattle particularly amongst progressive farmers and unemployed youth would be the short term step to boost up the milk production as well as employment generation.
- The existing infrastructure will be consolidated and strengthened for a functional delivery system to cater to the needs of the sector in the State.
- Creation of additional veterinary hospitals, diagnostic labs and polyclinics would be helpful in the animal health care programme. Mobile veterinary units would be particularly valuable in the context of the State's topography.
- Extension activities will be intensified for greater awareness among milk producers. The paravet staff in the State will be increased and equipped with the necessary skills through appropriate training. Unemployed youth could potentially be harnessed and trained in scientific AH practices.
- Extension and input services at the village level will be geared up to meet the requirements for enhanced production.
- The level of organized collection and processing of surplus milk is very low. In order to encourage and sustain increased milk production, additional processing capacity in terms of dairy plants for liquid milk and value-added products will be built. Adequate cold-chain backing will ensure effective marketing of quality of milk and milk products.
- Convergence of different schemes/development programmes operating in the State viz., Jharkhand Dairy Project implemented by NDDB, Dairy Cattle Development Programme including BAIF operations, and other centrally sponsored schemes such as RKVY, National Project for Cattle & Buffalo Breeding (NPCBB), Fodder & Feed Development and Intensive Dairy Development Programme (IDDP) will be converged to boost up milk production.

Dairy livestock breeding policy: Livestock breeding policy will be location-specific and need-based for urban, semi-urban and rural areas separately.

Urban and semi-urban area

Cattle

Due to existence of huge gap in milk production/availability and demand in the urban and semi-urban including industrial areas, crossbreeding of available cattle with Holstein Friesian/Jersey through artificial insemination will be practiced with restriction that the level of exotic inheritance should not exceed more than 50%

Holstein-Friesian and Jersey crossbred heifers/cows will be inseminated with the semen of crossbred (half breds) of Holstein-Friesian and Jersey bulls by avoiding inbreeding to restrict their inheritance to 50 percent only.

Buffalo

In order to identify suitable breed type and size with desired production levels, local/improved buffalo will be upgraded with *Murrah*, *Surti* and *Mehsana* buffalo semen through artificial insemination or bulls for natural mating as per situation and infrastructural facilities available.

Rural area

Cattle

Less remote area: Cattle improvement by following upgradation of local cattle through semen of proven Sahiwal, Red Sindhi and Gir bulls will be practiced to improve milk production of females as well as draft power of males.

More remote area: Cattle improvement by following upgrading of local cattle through semen of Tharparkar and Haryana will be practiced for improvement in milk production and production of quality bullocks for agricultural purpose.

Buffalo

In order to identify suitable breed, type and size with desired production levels, local/improved buffaloes will be upgraded with *Murrah*, *Surti* and *Mehsana* buffalo semen through artificial insemination or bulls for natural mating as per situation and infrastructural facilities available.

In order to support the breeding policy calf and heifer rearing stations, bull mother farms for improved breeds and veterinary polyclinics with modern laboratories at regional levels will be established for disease diagnosis and surveillance to cater to the health needs of quality animals.

Fodder development

The followings are the strategic points for improving the fodder production in the State:

- Forage production will be adequately supported in the existing area by cultivating high yielding fodder varieties.
- Research will be focused on identifying dual purpose crop varieties for augmenting the production of forage in Jharkhand.

- Renovation of grass lands with improved varieties of grasses.
- Availability of vast stretches of pasture land in the State will be effectively managed for their better utilization for cattle feeding.
- Encouragement for year round green fodder production to the possible extent through field demonstrations on the fields of well to do farmers.
- Dairy farmers will be encouraged for stall feeding of the animals.
- The crop residues like paddy straw, maize, sorghum and bajra stovers will be preserved to maintain its quality.
- The sufficiently available forest grass during rainy season would be harvested at its flowering period and preserved as hay or silage or may be turned into feed blocks.
- Enrichment of roughages will be encouraged among the farmers with urea, molasses, common salt and mineral mixture etc.
- Encouragement for cultivation of lucerne (RL-88), hybrid napier (BNH-10, Co-3), maize (African Tall), *bajra* (BAIF Bajra-1), and stylosanthes will be given. Likewise other legumes like ricebean (Bidhan-1&2), cowpea (UPC 5286, EC-4216) and desmanthus will be encouraged for leguminous fodder wherever possible.
- Fodder tree species like Subabul, Sesbania species, Gliricidia, Mulberry, Ficus species, Shivan, Jackfruit etc. would be planted on field bunds and grasslands.
- Maximum rice field bunds will be planted with hybrid napier (NH-10) and guinea grass.
- Creation of water resources will be encouraged through farm ponds, small check dams, wells, bore wells, etc.

(45) Fisheries

The present demand of fishes in the State is 1.15 lakh metric tones against which the production is only 70 thousand metric tones. The number of ponds in the state is 1,15,780 with an area of 55534 ha. In addition there are 252 big and small tanks with an area of 1,15,000 ha and the number of check-dams is 1184 having an area of 4570 ha, apart from 1800 km river area. There is requirement of 9000 lakh fish seeds for fish culture in these water bodies. Presently 237 Fisheries Cooperative Societies have been organized in the state to rehabilitate the fisher community. This scenario requires strong policy interventions to

boost up fish production in the state. The following policy interventions will be employed for this purpose:

Pond fisheries

- Renovation of old and muddy ponds under MNREGA, Fishermen Development Agency, National Fisheries Development Board, etc.
- Creation of new ponds/water bodies.
- Training of fishermen at national and international institutes in the field of new scientific technologies.
- Fish seed production in seasonal ponds.
- Technological and financial empowerment of progressive fishermen.

Tank fisheries

- Settlement of tanks on priority to the local fishermen cooperative societies by the Department of Fisheries.
- Storage of fingerlings in all the tanks for which selection of tanks will be done every year.
- Payment of royality will be done by the members of the society.
- Training of society members on fish seed production and their financial empowerment.
- Efforts will be made to empower the societies to mange the tanks by themselves.

Seed production and distribution

- Renovation of fish hatcheries under the public sector and arrangement for water supply.
- Establishment of fish hatcheries at block level.
- Training to 10 fishermen/persons from each block on fish seed production and supply of fish feed, net, etc.
- Support in marketing and provision of license for transport of fish seed.
- Water supply in existing hatcheries, renovation of ponds and support in procuring tools, implements and machineries.
- Distribution of awards and prizes to encourage competition by organizing events at block/district and state levels.

Other fisheries-related components

- Promotion of fresh water prawn culture through establishment of prawn hatcheries, supply of prawn seed and feed and training as well as marketing support to such fishermen.
- Promotion of colour (ornamental) fish production through selection and training of entrepreneurs in the field of breeding, aquarium construction and maintenance and provision of financial support.
- Identification of natural habitats of breeding of air breathing fishes like *singhi, mangur*, etc. training of farmers of the neighbouring habitats and establishment of hatcheries for supply of seeds of such fishes.
- In order to reduce the cost of fish production integrated fish farming/culture will be promoted through integration of appropriate enterprises like poultry/ duckery/ goatry/ piggery/ dairy/ mushroom/ rice, etc.
- Promotion of net knitting enterprise particularly among womanfolk.
- Support to fishermen and other interested persons in construction and marketing of boats through training and credit facilities.
- Establishment of fish feed factory in public-private partnership mode. Conservation and protection of naturally-bred local fish species like *pothia, garai, tengra, getu,* etc. which are diminishing day-by-day and are on the verge of extinction.

Human resource development

- Training of persons engaged in fisheries at district and state levels.
- Advanced training to fishermen at CIFA, Bhubaneswar and CFRI, Barrackpore.
- Exposure visit of selected fishermen to centres of excellence.
- Advanced training of the personnels of Department of Fisheries.
- Establishment of Aqua Park and Aqua Library in each district.
- Regular publication of fisheries extension literature.
- Production of video films on fisheries.

Legislative and institutional reforms

- Reforms in provisions for settlement of water bodies.
- Determination of settlement of tanks with other related departments.
- Provisions for welfare of fishermen.
- Coordination with other departments engaged in pond excavation.

- Coordination with national institutes like CIFA, CFRI, CIFE, etc. and international institutes like FAO, IFAD, etc.
- Coordination with National Fisheries Development Board.
- Development of a website of the Department of Fisheries.
- Establishment of a call centre for the farmers and consumers.
- Constitution of a fishing team for fishing and transport of fishes to the big markets.
- Providing power of magistrate to the fisheries officers.

(46) Information Communication Technology (ICT)

- **Establishment of Agriportal on the pattern of MahaAgrisnet:** A portal will be established in the Department of Agriculture and Cane Development on the pattern of MahaAgrisnet which would provide platform for the interactions amongst all the stakeholders.
- **Strengthening IT facilities in Krishi Vigyan Kendras:** Krishi Vigyan Kendras are the knowledge warehouse of the district. IT facilities at the KVKs will pave the way for accurate and updated information delivery to the farmers through internet and cellular network.
- **e-Kisan Seva Kendra at village:** Connectivity has been provided up to panchayat level through JHARNET. Hence, connectivity would not be a problem. e-Kisan Seva Kendra will be established at panchayat either in PPP mode or as Government Centre to be operated by *Kisan Mitra* under the guidance and supervision of VLW/BAO. This centre may also work as training-cum-input delivery centre.
- **Computer training for extension functionaries:** Extension functionaries are scared of computers while learning the use of computers is not difficult. A compulsory training programme for 15-day duration will be organized for all the extension staff.
- Computer literacy programme for progressive farmers will also be organized.
- Distribution of audio and video CDs will be done in addition to distribution of extension literature, because, audio-visuals have more impact on learning.
- Initiation of transactional service on pilot basis in addition to information service.
- Promotion of SMS (both demand and supply mode) and IVRS services as almost every household has mobile.
- Establishment of Community Radio Station (CRS) in Krishi Vigyan Kendra.

(47) Agriculture Laborers

Agricultural labourers in Jharkhand form a major share of the total agricultural workers. In addition, many of the marginal and small farmers also work as agricultural labourers. There are 39.08 lakh cultivators in the State and the number of agricultural labourers is 28.62 lakh. Accordingly the cultivators constitute 38.59% and the agricultural labourers constitute 28.27% of the total work force. Therefore, the welfare of the farmers is very much associated with those of the agricultural labourers. These are largely unorganized and, therefore, the wages in rural area are decided through a mutual contract. As a result the agricultural labourers do not get even the minimum wages, due to which they prefer to migrate as construction workers or other workers in cities and other states. They live in miserable conditions without any of the basic facilities. Thus, this policy document envisages the following steps:

- Institutional support will be organized and provided to the agricultural labourers.
- Arrangements will be made for human resource development of agricultural labourers through skill development centres/training institutes in the field of new technologies including agro-processing, packaging and transportation of agricultural produce.

(48) Agriculture Economic Zone

Jharkhand has special advantages in production of vegetables, pulses and flowers. In order to economically promote these products five agriculture economic zones are proposed to be set up one in each five divisions, namely, North and South Chotanagpur, Palamu, Kolhan and Santhal Parganas to give fillip to exports and earn valuable exchange for the State as well as for the country. For this air cargo complex will be set-up and air freight subsidy will be provided. A world class laboratory for quality assurance and inspection of agricultural and processed food products will be set-up. In the proposed agriculture economic zones contract farming of selected enterprises will be done involving the private sector. An inland container depot would be established along with setting up of export promotion industrial park and food park in the economic zones. The State Marketing Board will be made implementing agency for setting up of the agriculture economic zones.

(49) State Farmers Commission

Jharkhand State Farmers Commission will be established as per recommendation of the National Farmers Commission. It will focus on the needs and grievances of the farmers and link it with the district and State administration. It will have farmers as members from each district.

(50) State Agricultural Price Commission

In order to decide the minimum support price at Govt. of India level, the State Agricultural Price Commission will be established in Jharkhand. The Commission will workout the cost of cultivation of various crops at district level and regional level in farmers' field. It will decide cost and price for both non-perishable crops and perishable crops like fruits and vegetables.

(51) Birsa Agricultural University

The Birsa Agricultural University (BAU), Ranchi has completed about 30 years of its existence since 1981. The mandates of the University include teaching, research and extension education. The University has to re-orient its programmes for the future course of action in its endeavour to achieve excellence in agricultural education, research and extension education for upliftment of farming standards and socio-economic condition of the farming community of the state with specific reference and concern to tribal welfare.

The following points will be the main planks of the policy related to agricultural education, research and extension education activities of the University:

Education

- The course curricula will be revised to include relevance and utility of agricultural education through reengineering of traditional syllabus and introduction of new subjects, to attract youth in farming.
- The focus of change will devise agricultural education to produce graduates who can create their own employment by skill development through hands on training in all aspects of enterprises and do not depend on Govt. and public sectors jobs.
- Priority emphasis will be on self employment schemes on agri-business and agri-clinics thus taking extension services to the door of the farmers. Entrepreneurship courses will be developed to meet the demands of diversified and emerging global market.

- The curricula will be designed keeping in view the relative role of women in farming so as to enable them to equally empower technologically in the State where women are dominantly engaged in handling of food to ensure quality control.
- The system of recognition to farm graduates to provide extension and other services as registered farm practitioners would be developed.
- Focus will be given to the development of skill of designing farm machines and farming systems.
- It would be ensured that farm graduates get well versed not only in the areas of agricultural production but also imbibe knowledge of emerging area in the entire production value addition, marketing, export chain, etc.
- Introduction of vocational courses in animal husbandry, dairy technology, fisheries, forestry, horticulture, vegetable, floriculture, primary processing, loss free storage and food preservation, sericulture, maintenance and hiring of farm machinery, seed and nursery propagation will require priority attention.
- Programmes will be organized to expose the teachers of comprehensive development process and equip them to coordinate entrepreneurship development related activities.

Research

- The need now is for developing a holistic system to attain sustainable development of agriculture. Low cost high benefit yield technology has become more crucial in view of growing number of small and marginal farmers and shrinking size of land holdings.
- A major issue that needs to be addressed to with regard to the post-harvest management of farm produce. Current research requires re-orientation to develop innovative products, processes and machinery of global standard.
- In the context of a holistic agricultural development ensuring household food security, role of biotechnology has become essentially much more important and vital than ever before.
- The conventional breeding methods will have to be complemented by an array of biotechnology tools in a variety of ways such as tissue culture, DNA finger printing, molecular breeding, genomic, diagnostics or development of transgenic etc. Needed support will be required for exploiting the gene revolution (biotechnology) benefiting from information and communication technology and promoting knowledge-based precision farming system, intensification and diversification.

- The accent of horticulture, livestock, fisheries, forestry speciality enterprises, value added products, organic farming, biomass recycling and energy farming and market driven diversification would further be intensified.
- There is need to establish Genius Awards for young scientists to attract talented youth to agricultural research, technology development and education.
- There is need to promote investment in agricultural research by private sector by strengthening regulatory and other enabling mechanisms and encouraging joint public private research.

Extension education

- KVKs will be given concurrent attention to develop link among researchers and farmers with reference to on farm and off farm livelihoods and promote end to end approach and link production with marketing consumption.
- Entrepreneurship development programme will be carried out by the KVKs and other vocational training institutes.
- The activities of KVKs, ATMAs, Lab to Land and Land to Lab programmes, Self Help Groups, agricultural cooperatives and other grassroot institutions will be integrated properly.
- There is need to develop the extension strategies to go beyond district boundaries and penetrate into the villages.

(52) Research and Development

- Basic, strategic, applied and on-farm adaptive research will be strengthened in the State. Need-based research will be given priority.
- BAU at its headquarters will focus on basic and strategic research.
- Applied and adaptive research will be carried out at Zonal Research Stations.
- On-farm adaptive research and trials will be conducted by the Krishi Vigyan Kendras.
- Adaptive research on various technologies will also be done by the Department of Agriculture through ATMAs. Feedback will also be provided to the formal research system to modify and develop need-based technologies.

(53) Natural Resource Management

- Proper land use policy based on available land resources will be developed. Cultivable waste land, permanent pasture and grazing land, barren and waste land, and water logged areas will be properly characterized at district, block, panchayat and village level for proper planning for their sustainable use.
- Water resources in different river basins, reservoirs, availability of surface and ground water for non-irrigation and industrial purposes will be clearly delineated.
- Utilization of water for irrigation purposes covering canal irrigation and tube well and well irrigation will be developed.
- The agro-ecological situations in different districts will be delineated on the basis of weather data.
- Soil map characterizing different soil type, pH, organic carbon, major and micronutrients will be prepared at village, panchayat, block, district and State levels.
- At district, block and village levels maps of forest resources will be prepared for development of forestry and agro-forestry.
- Sustainable utilization systems for forest and non-forest timber species, medicinal plants, ITK about medicinal plants will also be developed.

(54) Biotechnology

- Education and research in plant and animal biotechnology will be strengthened in the State. Teaching at under graduate, post-graduate and doctoral level will also be strengthened.
- Priority areas of research in the field of plant and animal biotechnology will be decided and adequate fund will be provided to carryout research.
- State policy on cultivation of genetically modified crops will be developed. Specific GM crops like Bt cotton, Bt brinjal, Bt maize, Bt rice, and Bt tomato cultivation will be prioritized after broad deliberations, considerations and consultations.
- Research on development and testing of genetically modified crops in Jharkhand will be properly formulated.

(55) Intellectual Property Rights (IPRs)

- IPR for use of traditional crop varieties, medicinal plants and related knowledge systems will be formulated.
- Education, training programmes and awareness campaigns will be organized.
- Farmers variety registration will be carried out through PPVFR Authority, Govt. of India.
- Policy on IPR related to public and private plant breeding will be developed.
- IPR Cell will be created in the State Agricultural University.

(56) Biodiversity Conservation

- Biodiversity of plants and animals needs to be documented with National Biodiversity Authority (NBA), Govt. of India. Regional Office of NBA has already been established with Birsa Agricultural University, and it needs to closely work with the State Govt.
- Characterization of biodiversity at village and panchayat levels will be carried out in NBA register. It will include, crops, fruits, forest plants and animal resources at village/panchayat level.
- Training and awareness campaigns will be organized at state, district and block levels.
- Collection and conservation of bio-diversity in situ and ex-situ will be undertaken.
- Support from NBPGR and NBA will be taken for biodiversity conservation in the State.

(57) Involvement of Youth

The situation of agricultural backwardness in the State is leading to alienation of rural youth from agriculture. Recent survey from the Times Group has shown that more than 50% of the farmers of the State do not want their posterities to continue being in the farming occupation. The youth population feel that farming is a loss-making business proposition. They try to get jobs in urban or semi-urban townships and add to the increasing population of these towns and live in a deplorable condition. This attitude of the rural youth has to be changed for which the following steps will be taken:

- Need-based training programmes will be organized to involve rural youth to help them select the right enterprise mix, that would enhance the return on investment to the farming community.

- Rural youth will be targeted for financial inclusion and will be given farm loan at low rates of interest.
- Rural youth will be involved in seed production activity, agri-clinics, agribusiness and production of biofertilizers and biocontrol agents.
- Rural youth will be given preference in the selection of farmer friends/contact farmers to act as para extension workers to disseminate the agricultural technologies.

(58) Role of NGO/Voluntary Agencies/SHGs

The NGOs use to establish a very important interface between the Government and the local people. Activities of the NGOs essentially cover the areas of common property resource management, creating environmental awareness, family planning and welfare, sanitation, gender equity, child welfare, self-sufficiency programmes, alternate livelihood programmes and studies on evaluation and impact of agricultural and rural development projects.

The NGOs/voluntary agencies/SHGs can be used as extended hands of the State Agriculture & Animal Husbandry Deptts.

- The NGOs/voluntary agencies will be assigned to act as master trainers in specific agrarian activities to train the farmers in order to enhance their farm income.
- NGOs/voluntary agencies/SHGs will be involved in mobilizing and motivating the farmers to take up new farm technologies like SRI method of rice production and SWI method of wheat production in order to boost production and productivity of rice and wheat, which are the staple food of the rural masses.
- These organizations will also be involved in providing bank-linkage to the eligible farmers.
- These organizations will be involved in creation of commodity interest groups (CIGs), farmers interest groups (FIGs) and women interest groups (WIGs) for availing the benefits of various govt. programme. They will also be involved in implementation of Central and State sponsored schemes at the grassroots level.

(59) Strengthening of Directorates and Departments

The Departments of agriculture and cane development and animal husbandry and fisheries and the directorates of agriculture, horticulture, soil conservation, animal husbandry and fishery as well as the nodal cell of Mukhyamantri Kisan Khushali Yojna and SAMETI will be strengthened in terms of regular manpower and adequate infrastructural facilities.

(60) Special Incentives to SC/ST Farmers

The farmers of Jharkhand mainly the Scheduled Tribes and Scheduled Castes are resource-poor and disadvantaged in respect of technology, credit, input, market and other agricultural infrastructure. The following policy initiatives will be undertaken:

- Strengthening the institutional structure to enable participatory process in decision-making.
- Easy access to institutional credit to all ST and SC farmers through Kisan Credit Card (KCC).
- Preservation of traditional seeds and documentation of traditional farming practices and indigenous technical knowledge of farmers.
- Both extrinsic and intrinsic motivational incentives will be made available to the ST and SC farmers.
- Provision of appropriate technology and extension services and easy availability of agri inputs like, improved and high yielding seeds, fertilizers and plant protection services on subsidized rates.
- Special awards/prizes will be instituted for rewarding ST and SC farmers for their outstanding achievements in the field of agriculture, horticulture, animal husbandry and agro-forestry.
- Arrangements would be made to protect the farmers' rights including intellectual property rights.

(61) Gender Equality

- Women who play important role in farm activities will be given proper recognition.
- Women self help groups will be established and strengthened to provide more microcredit through Banks for their income generation.
- Women's names would be included in agricultural lands.
- Gram Panchayat Mahila Fund will be created for entrepreneurship development among farm women. The State would provide the initial corpus for establishment of such a fund, which will be managed at the local level with minimum of bureaucratic controls.

(62) Crop Insurance

'Crop Insurance" scheme for all crops will be introduced to cover risks. The insurance premium will be subsidized with the Central Government paying 50% of the premium and the State Government 35% initially for a period of 5 years to create awareness among the farmers on the need for insurance against crop losses by natural calamities or other causes. Early and timely settlement of the claims will be ensured to mitigate the problems of the farmers.

The State would develop **'Agricultural Risk Fund'** to help farmers in their moments of distress either due to natural or unnatural calamities. The contributions to this fund will come from (a) The Central Government (Departments of Agriculture/Animal Husbandry/Rural Development); (b) The State Government; (c) Banks and Credit Institutions. These agencies would make an initial contribution to the corpus to establish the fund and add to it through annual contributions. The principle of the operation of the fund is only permitted to 'grow' and not 'deplete'. This is also in consonance with the recommendations of the National Commission on Farmers.

The crop cutting experiments (CCE) will be extended upto the village level to increase the sample size so that reliability of CCE data will be enhanced. The Rashtriya Krishi Bima Yojna (RKBY) will be implemented in the state in its true spirit.

(63) Marketing

Agricultural marketing in Jharkhand have large imperfections operating all along. These imperfections have been causing concerns to the farmers as the cost of production/cultivation has been increasing. Keeping this in view the policy initiative will include regulating properly the input and output markets. State level expert committee will be constituted for monitoring the performance of the markets. Farmers will be encouraged to form market societies. A group of 10-30 farmers will be encouraged to organize themselves as a group on the lines of SHGs for bulk production of agricultural commodities in order to facilitate fair selling of the produce and purchasing of the inputs.

(64) Marketing Board

New challenges in terms of finding markets for marketable surplus are being faced by the farmers of Jharkhand. After liberalization there is also a need to **respond to the opportunities offered by the global markets.** Thus a comprehensive agriculture produce market policy is demand of the time. Jharkhand being a new State has a great challenge to

boost up agricultural sector and for that **Agriculture Marketing Policy** needs to be formulated.

Agricultural marketing policy shall be aimed on the post-harvest management and emphasis will be laid to create a healthy environment for marketing of agriculture produce enabling the farmers to get the maximum price of their produce by way of eliminating middlemen, creating infrastructure, increased storage facility, setting up terminal markets, and passing on all the information related to markets i.e. grading, packaging and standardization of the produce etc.

To achieve this the State shall emphasize on:

- Training of farmers to adopt best post-harvest management practices to minimise crop loss and degradation before reaching market.
- Creating regulated terminal markets to prevent malpractices in trading of agricultural produce and reduce multiple charges.
- Development of better marketing infrastructure in existing market yards and big *haats*/ *bazars*.
- In order to increase storage facility, cold chain management to reduce post-harvest loss and ensure better return to growers.
- In order to provide market information to farmers, arrangements will be made to provide information regarding prevailing market price and arrival of produce in inter-state markets so that farmers can choose best markets, to get better price.
- Price of major agricultural produce in major cities will be displayed also in small towns/ market area. This will help producers as well as consumers to bargain for real price.
- Due to compelling need, farmers are forced to sell there produce, even if they are not getting desired price. To check this, pledging facility for short term may be provided to the farmers.
- In liaison with F.C.I., procurement centers shall be opened to facilitate farmers to get minimum support price.
- Agro-processing units on PPP model will be set up in producing areas to reduce wastage of horticultural produce, increased value addition and creation of off-farm employment in rural areas.
- Contract farming will be promoted for better and ensured return to farmers.

(65) Weather Forecasting and Agro-advisory Services

- Govt. of Jharkhand will establish weather data stations at block and district levels for long term weather forecasting and agro-advisory services.
- Agro-advisory services based on district and block level weather data will be published regularly to help the farmers and extension workers for better crop planning.
- Long term data on weather and climate will be collected from IMD for modeling and weather forecasting.

(66) Agriculture Statistics

Jharkhand is a nascent state. Since its formation after division of the erstwhile Bihar State the agricultural statistics has not been revised/updated. Statistics related to all the natural resources, particularly land/soil, and water and all the parameters associated with field and horticultural crops, livestock production, fisheries and forest-based enterprises will be updated through taking primary data at micro level and using GIS/ remote sensing data as well as other information sources. The statistics division of the Directorate of Agriculture will be revamped and the statistics units working at district/block/panchayat levels will be strengthened for this purpose.

(67) Risk Management

In order to minimizing the risk due to moisture stress, drought, flood and other natural calamities, both causing stress and perturbation the following policy initiatives will be undertaken:

- Keeping in view the frequent droughts, a Drought Monitoring Cell will be established which will provide technical input to the State and give prior warning of the impending situation.
- The Government farms will take up programmes for growing fodder and encourage farmers to grow fodder and persuade them by offering remunerative prices.
- The State will have a ready on the shelf schemes of alternative employment to provide employment during the drought year.
- The existing stream and tank beds will be reclaimed and repaired to divert water to these bodies.

- Disaster preparedness programems and contingent planning will be done for the disaster-prone areas with emphasis on the vulnerability index of the farming community.
- In partnership with IMD, location-specific weather forecast and Agro-meteorological Advisory Service (AAS) will be provided to the farmers as per the different climatic conditions and cropping patterns.
- The emerging issue of impact of climate change on agriculture would be addressed by taking proactive measures and developing effective strategies for each agro-climatic zone to reduce the vulnerability to climate change.
- The technology generation system will be oriented to conduct location-specific and need-based research to develop risk-minimizing technologies.

(68) Agricultural Administration and Governance

The State Departments of Agriculture & Cane Development and Animal Husbandry & Fisheries along with their associated units and support service organizations have a major role to play in bringing about an agricultural transformation in the State. This activity includes not only providing support services for improving productivity and production of all agricultural commodities in the State but also providing quality inputs, technological services, marketing support besides, capacity building, human resource development and extension of technologies. The demand for the range of services to be provided by the Departments is always on the increase and with the imminent globalization and its implications thereof, this will further increase. Thus, the Departments have to be restructured, strengthened and equipped to function as professional organizations with a service-oriented approach.

The following policy initiatives will be taken for better agricultural administration and governance:

- As suggested by the Commission on Agricultural Reforms, Research and Development, Jharkhand (2008), the Department of Agriculture and Cane Development would be named as “Department of Agriculture and Farm Development”.
- Presently under the Department of Agriculture the directorates of agriculture, horticulture, soil conservation, plant protection and SAMETI, quality control laboratories, soil testing laboratories and extension training centre are functioning. The units are well conceived structurally but operationally the existing manpower

resources available and organizational autonomy of these units need strengthening to enable them to function more effectively in view of their increasing demands of services. Apart from this the following measures are required to be implemented.

- Keeping in view the prospects of horticulture in the State a separate Department of Horticulture would be developed.
- The following new directorates would be created in phased manner:
  - Land resources management
  - Water resources management
  - Organic cultivation
  - Farm inputs management
  - Agricultural statistics
  - Agricultural information and communication

- Presently the integration of various departments is taken care of at the state level. A coordinating group will be formed at the district level that will function as the hub for coordinating/converging various activities of the related departments.
- The vacant posts in the existing departments will be filled up keeping in view the State Policy on personnel Management.
- The State Agricultural Prices Commission will be established.
- The local government bodies and village panchayats will be given power to take decisions by decentralizing the system. The government bodies will have to be more proactive and reactive to the farmers as their customers.
- Farmer participation in planning and implementation of agricultural development programmes/projects will be enhanced through developing participatory mechanisms.
- The e-governance modules will be implemented at panchayat level through common service centres (CSCs).
- There needs to consistent efforts to weed out corruption from the system to ensure more accountability and transparency and execution of development agenda to be kept away from party politics.

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