

1. What is Rainbow Revolution? What are its primary objectives? Discuss.

Introduction

Rainbow revolution is an integral development programme of agriculture, horticulture, forestry, sugarcane, fishery, poultry and animal husbandry. It includes the integration of all the other agricultural revolutions like Green revolution, Blue revolution, Yellow revolution etc.

Body

History:

The agricultural policy of 2000 envisaged holistic development of Indian agriculture and aimed to achieve through Rainbow revolution. Economic survey 2015-16 observed, "Indian agriculture is in a way, a victim of its own past success, especially the Green revolution". It suggested an Integral development programme to make the agricultural sustainability and Rainbow revolution as a concept was developed eventually.

Objectives of Rainbow revolution:

- Sustainability: Agricultural practices has to be reoriented to maintain environmental sustainability as well as resource sustainability. E.g,
- promotion of zero budget natural farming/organic farming to reduce use of chemicals in agriculture.
- Crop diversification in water stress areas like Punjab and Haryana.
- Promoting soil health through schemes like soil health cards, practices like rain water harvesting made compulsory etc.
- Promoting lab to land exhibition, investing in research and development of agricultural technologies.
- Farm income: To increase the annual growth rate in agriculture over 4%.
- Scale of agriculture production: Objective is to increase the collective cropped area which would help in increased capital investment and use of latest agricultural technologies and machines to increase agricultural productivity. E.g. greater private sector participation through contract farming, promote cooperative farming, leasing of farm machines, subsidizing the purchase of new machines (sub mission on agricultural mechanization) etc.,
- Price protection to farmers: Agricultural contracts, promotion of practices like warehouse receipts, promotion of agricultural exports through improved quality of agricultural produce (latest Agriculture export policy) etc.,
- Market availability to farmers: To dismantle the restrictions on movement of agricultural commodities throughout the country. Ensuring sufficient number of godowns, warehousing and cold storage facilities etc.,

- Insurance protection to farmers: inclusion of all farmers in agricultural insurance scheme (PM Fasal Bhima yojana) and eventually to cover all crops (horticulture produce is introduced lately on a pilot basis).
- Elimination of Regional disparity in agriculture: Rainfed areas are mostly reeled with low farmer income and productivity. Rainbow revolution through climate specific and farmer specific selection of crops and inclusion of allied sectors to increase farmer income is an objective.
- Harness the potential of Indian agriculture which hitherto unexplored. E.g. Blue revolution is a part of Indian foreign policy with cooperation with other countries. Incentivise the crops like pulses etc through inclusion to MSP to attain agricultural as well as nutritional security.

Conclusion

MS Swaminathan gave the call for evergreen revolution and this is possible only through the integrated and holistic approach to agricultural development. It involves leading innovation in agriculture, enabling farmers big and small, driving a sustainable intensification of agriculture, enhancing human health etc., With uncertainty of climate, low farm income and growth, nutritional issues – rainbow revolution is a way addressing these issues in the most comprehensive way making agriculture not only profitable but also sustainable.

2. India's demography and the changing lifestyle patterns make India a high potential destination for investments in the food processing sector. Elucidate. What incentives has the Government provided to attract foreign investment to this sector? Discuss.

Introduction

India ranks second in terms of availability of arable land with 127 diverse agro-climatic zones, having a share of 11.2% of the total arable land in the world. In addition, the resource-rich country has the sixth largest food and grocery market and fifth largest retail market globally. Thus, India can provide a perfect blend of traditional and hygienic food, processed and packaged according to modern technology.

Body

India as one of the biggest food producers of the world is in an advantageous position to become the hub for food processing industry. In any agricultural commodity, India is in 1,2 or 3 position. Now the Indian agriculture is being modernised and it has to be ensured that the farmers' produce gets a good market at fair price to keep up the agriculture productivity. It means not only consumption of main cereals but also that the surplus food output has to be converted into food processing snacks for domestic consumption as well as exports.

Reasons to invest

- The Food processing industry in India is indigenous because simple home-based techniques such as fermentation have resulted in the creation of worldwide acknowledgment of Indian pickles, papads, chutneys and murabba.
- The Gross Cropped Area accounting for around 60.3% of the total geographical area stands at 198.4 mn ha, as per the land use statistics (2014-15). In a similar period, the net sown period is 140.1 mn ha, with a cropping intensity of 141.6%.
- The total area sown under Rabi crops in 2017-18 stands at 63.23 mn ha. The total area sown under Kharif crops in 2017-18 stands at 21.08 mn ha, whereas, the area under wheat and rice stands at 30.59 and 43.20 mn ha.
- Benefiting from such a geographical advantage, India is the largest producer of milk, bananas, mangoes, guavas, papaya, ginger, okra, second largest producer of wheat, rice, fruits, vegetables, tea, sugarcane and cashew nut and the third largest producer of cereals, coconut, lettuce, chicory, nutmeg, mace, cardamom and pepper globally.
- India is also globally acknowledged as the leading producer of agriculturally allied products. As of 2018, India is the leading milk producing country in the world, accounting for ~19% of the global market share.
- India is the second largest fish producer in the world with a total production of 13.7 million metric tonnes in 2018-19 of which 65 per cent was from inland sector. More than 50 different types of fish and shellfish products are being exported to 75 countries around the world. Fish and fish products have presently emerged as the largest group in agricultural exports from India.
- The Horticulture sector has recorded a production of 313.85 mn tonnes in 2018-19, which is 0.69% higher than the horticulture production of 311.71 million tonnes in 2017-18.
- India has a geographical advantage from the viewpoint of trade, as it has close connectivity with Europe, Middle East & Africa from the western coast, and Japan, Singapore, Thailand, Malaysia, Korea, Australia and New Zealand.

As per the National Agricultural Research Project (NARP), India has been divided into 127 agro-climatic zones. Out of the total 42 Mega Food Parks sanctioned, 17 Food Parks have been operationalized as on May 2019.

Government incentives provided to attract foreign investment to the food processing sector:

- 100% FDI in trading including through e-commerce, in respect of food products manufactured and / or produced in India.
- World Food India, a mega food event, The purpose of which is to transform food economy and realize vision of doubling of farmers' income by establishing India as a preferred investment destination and sourcing hub for the global food processing industry. The first event took place in November 2017, brought together 75,000 business visitors, from 61 countries, 75

International & National policymakers and Heads of State, 60 Global CEOs and 100 Indian CEOs; resulting in 5,000 B2B meetings over a span of three days. It helped India showcase itself as a preferred investment destination, with MoU's worth \$13.56 Bn signed by domestic & foreign investors. At present, Global industry players such as GEA Group, Tetra Laval, Buhlar, Alfa Laval, Heat and Control and HRS process are reaping the benefits.

- Nivesh Bandhu, an investor-friendly portal launched by Gol brings together Central and State Government policies and incentives provided for the food processing sector. It is a one-stop platform for all stakeholders of the industry, including farmers, processors, traders, and logistics operators. To further help an investor make strategic decision, the portal also includes a Food Map that can help investors take decision relating to the project location.
- An Investor tracking and facilitation desk has also been set up with a dual objective to identify new potential investors and help the Ministry to organize trade shows both on domestic as well as the international front. Such an initiative will help India to meet its investment needs.
- Private Sector participation has been on a continuous rise in many segments of the value chain. There exist huge opportunities for investments in the fields of contract farming, raw material sourcing and creation of agri linkages. Many international companies have gained a major foothold in contract farming initiatives.
- Under the scheme of Mega Food Parks, Government has sanctioned 42 parks, and out of these 17 have been made operational so far. Additionally, under the scheme of Integrated Cold Chain and Value Addition Infrastructure, the Ministry is presently assisting 228 such projects, and in 2017, 16 projects got operationalized, creating an additional capacity of 0.24 MMT of cold storage, 210.75 metric tonnes per hour of individual Quick Freezing (IQF), 3.45 mn litres per day of milk of processing/ storage and 472 reefer vans during 2014 - 2017.
- Food Safety & Standards Authority of India (FSSAI), the apex regulatory body has taken wide steps aiming to simplify product approval along with the creation of a single-interface portal, "The Food Regulatory Portal" for effective and transparent implementation of the food safety laws in the country.
- Product-specific developments are also being undertaken, for example, setting up of a Common Food Processing Incubation Centre for Shallots in Perambalur.
- Sector-specific Skill Development Initiatives are also being taken up, with National Institute of Food Technology, Entrepreneurship and Management (NIFTEM) and Indian Institute of Food Processing Technology (IIFPT) being recognized as Centres of Excellence.
- Special Fund of Rs. 2000 crore in NABARD to make available affordable credit at concessional rate of interest to designated food parks and agro processing units.

- Food and agro-based processing units and cold chain infrastructure have been brought under the ambit of Priority Sector Lending (PSL) to provide additional credit for food processing activities and infrastructure.

Conclusion

India has about 40 billion worth food processing market. There is a need for diversification of crop pattern because most of farmers are concentrating on few farm products like rice and wheat only. India is importing about 22 billion dollar food processing products. So if there is diversification and substituting the imports, there is huge scope for second green revolution.

3. What are natural fibres? Discuss. What potential do natural fibres provide to act as a source of sustainable income to the farmers? What measures can be taken to fully capitalize the potential of natural fibres? Suggest.

Introduction

Natural fibres are fibers that are produced by plants, animals, and geological processes. Example of Natural Fibres is cotton, Jute, coconut fibre, wool and silk. Natural fibres are recyclable and biodegradable. They can be used as a component of composite materials, where the orientation of fibers impacts the properties. Natural fibers can also be matted into sheets to make paper or felt.

Body

Potential of natural fibres to act as a source of sustainable income to the farmers

Agriculture has become non-remunerative in recent times. Only 23% of rural income comes from agriculture (NABARD survey). 76% of the farmers would like to quit farming if given a chance ('State of Indian Farmers' report). Recently farmers in Shahganj, MP were forced to throw their tomatoes.

In this context natural fibres can potentially act as source of sustainable income to the farmers

- Biomass waste can be used to produce valuable fibres
 - Green Banana Paper based in Micronesia, rather than letting banana trees go to waste, purchases banana stems from banana farmers, giving them an extra source of income.
- New employment generation
 - For instance extracting the banana fibre from the banana stems is a labour intensive process
- New, expensive and exotic fabrics can be developed by natural fibres, promising high return to the farmers
 - Thailand or Myanmar for example, villagers have been using lotus fibres for rare fabrics for centuries. The process is quite time-consuming but produces a luxurious fabric that feels like a combination of silk and raw linen.

- Jaipur- based Hero's Fashion Pvt Ltd has started to make stain resistant shirts from lotus fibre.
- Taiwanese textile company Singtex has developed a yarn made from coffee grounds which offers excellent natural anti-door qualities, in addition to UV ray protection and quick drying time and recycled polyester.
- Demand for natural fibres has increased due to environmental harm caused by non-biodegradable synthetic fibres.

Measures to be taken to fully capitalize the potential of natural fibres

- Skill development – eg: extracting the banana fibre from the banana stems
- Development of supply chain – from procurement from farmers to processing to distribution in market.
- R&D – eg: for stain resistant shirts from lotus fibre.
- Collaboration – with Fashion houses and schools for popularizing new fabrics and products made from natural fibres.
- Mixing of natural fibres with synthetic fibres – to increase durability and minimise the environmental damage caused by them.

Conclusion

Increased use of natural fibres can become a powerful pathway to achieve the target of doubling farmers income by 2022.

4. What is integrated farming system? Discuss its advantages in the context of India's agro-ecological diversity and farmers' economic profile.

Introduction

Integrated Farming System is the integrated crop production with livestock management which in a way complements each other with a nice symbiotic relationship which at the time is economically viable and profitable, environmentally suitable, and benefit giver of diversification of production.

Body

Integrated farming system



Integrated farming is another approach or farming practice which originally devised in China and now being supported worldwide as an all-round development of agriculture along with animal husbandry and other such occupation which is related to core agricultural practices. Integrated farming has the capability to make the agriculture sector profitable which otherwise has been proved largely as a subsistence sector and a major reason behind leaving this age old occupation and migration to cities.

An Indian example of Integrated farming can best be understood by the fact that once a degraded land in Jodhpur, Rajasthan having very less crop production (and income) with the use of integrated farming practices such as plantation of improved qualities of Ber along with intercropping, honeybee keeping and a goat unit turned into a major revenue generator along with improving the quality of soil and decreased expenditure on fertilizer and pesticides, produced good quality fruits using organic farming which has high demand overseas.

Advantages of Integrated Farming system in the context of India's agro-ecological diversity and farmers' economic profile

- Income through arable cropping alone is insufficient for bulk of the marginal farmers. Activities such as dairy, poultry, fish culture, sericulture, bio-gas production, edible mushroom cultivation, agro-forestry and agri-horticulture, etc., assumes critical importance in supplementing farm income. It should fit well with farm level infrastructure and ensures full utilization of by-products. Integrated farming system is only the answer to the problem of increasing food production for increasing income and for improving the nutrition of small scale farmers with limited resources.

- Utilizing the by-products of one component of the farming system as an input in other for ensuring supplementary and complementary enterprise relationship. Thus reducing the effective input cost. For example, cattle dung mixed with crop residues and farm waste can be converted in to nutrient-rich vermicomposting.
- Maximization of yield of all component enterprises to provide steady and stable income at higher levels.
- Rejuvenation/amelioration of systems productivity and achieve agro ecological equilibrium.
- Control the built-up of insects-pest, diseases and weeds population through natural cropping system management and keep them at low level of intensity.
- Reducing the use of chemical fertilizer and other harmful agrochemicals and pesticides to provide pollution free, healthy produce and environment to the society at large.
- Increase in natural resource use efficiency by early recycling of nutrients.
- Some Integrated farming system features like Organic farming, and developing a judicious mix of income-generating activities such as dairy, poultry, fishery, goat-rearing, vermicomposting and others, and community-led local systems for water conservation etc help in reducing farmers' distress.
- Mitigation of negative impact of agriculture or livestock on environment.
- Integrated Farming Systems suitable particularly for hilly regions of the North Eastern Region can be adopted. Some are as - Integrated Fish cum Pig farming, Integrated Fish cum Duck Farming, Integrated Fish Farming-Chicken, Integrated Fish farming-cum-Cattle farming, Integrated Fish farming-cum-Rabbit farming, Integrated Fish farming-cum-Agriculture. Sikkim being an organic state is a good example.

Conclusion

Integrated farming systems seem to be the possible solution to the continuous increase of demand for food and nutrition, income stability and livelihood upliftment particularly for small and marginal farmers with little resources. Based on the research works conducted all over the country, it is clear that crop cultivation alone can't fulfill the demand of food and nutritional requirement and we have to focus on multi-component farming as it is the only way of efficient resource recycling within the system with increased economic profitability, economic stability, enhanced soil sustainability, and preserving environmental quality and maintaining biological diversity and ecological stability.

5. Examine the current status, prospects and challenges associated with the export of livestock products from India.

Introduction

Animal Products plays an important role in the socio- economic life of India. It ensures food security, provides employment, which leads to reduction in poverty and one the major source of protein intake. Livestock product export gains significance for doubling farmer's income by 2022.

Body

India has emerged as the largest producer of milk with 20.17 percent share in total milk production in the world. India accounts for about 5.65 percent of the global egg production and also the largest population of milch animals in the world.

Current status of livestock product exports:

- India's export of Livestock Products was Rs. 30,632.81 Crores which include the major livestock products like Buffalo Meat (Rs. 25168.31 Crores), Sheep and Goat Meat (Rs. 790.65 Crores), Poultry Products (Rs. 687.31 Crores) according to data on APEDA.
- Even though, India's buffalo meat exports fell 8.7 percent in 2018-19 from a year ago to the lowest level in six years still India is the world's biggest exporter of buffalo meat.
- India's Export of Dairy products was 1.13 lac MT to the world, major export locations were Turkey, UAE, Egypt, Bangladesh.
- Leather sector is known for its consistency in high export earnings and it is among the top ten foreign exchange earners for the Country.
- The export of footwear, leather and leather products from India reached a value of US\$ 5.69 billion during 2018-19.
- India's seafood export earned Rs 45,106.89 crore in 2017-18 with frozen shrimp and fish continuing to dominate the export basket.
- Wool exports (woollen yarn, fabrics, and made ups) stood at US\$ 185.96 million during 2017-18 and US\$ 120.36 million between Apr-Oct 2018.

Prospects livestock product exports:

- The demand for Indian buffalo meat in international market has sparked a sudden increase in the meat exports. Buffalo meat dominated the exports with a contribution of over 89.08% in total Animal Products export from India.
- In the 2018 Budget, the Department of Animal Husbandry made a provision to allocate \$383 million for establishment of an 'Animal Husbandry Infrastructure Development Fund'. The fund supports small and marginal farmers, including entrepreneurs, by helping to get better remuneration for their produce by meeting their working capital requirement to modernize or set-up a new infrastructure.
- Creation of 'Dairy Processing and Infrastructure Development Fund' with a net outlay of \$1.5 billion to benefit 9.5 million farmers in about 50,000 villages.

- National Dairy Plan (NDP) phase-1 through the National Dairy Development Board for breed improvement, artificial insemination, and fodder development.
- Creation of a special Fisheries and Aquaculture Infrastructure Development Fund is in pipeline; the fish production target is 15 MMT by 2020 and 20 MMT by March 2023.

Challenges associated with livestock product exports:

- Though, Supreme Court suspended the nationwide ban on sale of cattle for slaughter, revival of the idea might hurt the livestock sector.
- Government decided to ban the export of livestock from all sea ports in the country for an indefinite period at a time when the export of livestock from India has boomed from Rs 69.30 crore in 2013-14 to Rs 527.40 crore in 2016-17.
- China, which accounts for more than half of Indian shipments of buffalo meat, has been buying less in the last few months.
- There are concerns raised by China over foot and mouth disease infection among Indian buffalos.
- Indiscriminate and extensive use of antibiotics in poultry rearing needs to be strictly monitored to reduce the incidence of drug resistance in the food web. There are allegations on poultry sector of for spreading superbugs in the world.
- India decided to stay out of RCEP but free trade agreement with countries like New Zealand could have threatened India's dairy sector.

Conclusion

There is need to develop dedicated institutional mechanism for pursuing market access, tackling barriers and dealing with sanitary and phytosanitary issues and strive to double India's share in world livestock product export by integrating with global value chains. Farmers should get benefit of export opportunities in overseas market.