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Sustainable agriculture: A move towards a healthier and environment friendly farming and a hope to reduce food poverty in India

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Abstract

Sustainable agriculture can help us to become above a change in the pattern we consume food and also eradicate the problem of food shortage across the world, in particular in India, less than 4 % of the country had adopted to sustainable agriculture in which crop rotation, organic farming, agroforestry and natural farming is common, It can work to reduce poverty and hunger from the country, male nutrition is a very big issue where 15 % of the world male nutrition population is found in India. Sustainable agriculture can help

to combat the problem of pests, weed pressure, reduce the emission of greenhouse gases, soil erosion. Sustainable agriculture works with the nature takes into account environment health, economic and social equity of its people. Agriculture is the largest industry in India which provides jobs to maximum people, sustainable farming will double the income of farmers, generate employment, will led to the growth of healthier plants, soil and wildlife with water harvesting and agroforestry.

Keywords: Production, sustainable agriculture, crop rotation, organic farming, agroforestry, nutrition, environment health, weed pressure

Introduction

Today the world is adopting sustainable ways of development and living to combat the climate change which has affected all the sectors. Sustainable development goals the most significant object for the world to achieve to make the environment better for the future generation, today the world is suffering from food and water crisis, there is not a single country which is not experiencing the effects of climate change in some or the other form. Excess emission of greenhouse cases into the atmosphere has resulted in climate change which has directly or indirectly effected water and food sector. Its not just the Industrial revolution that has contributed to the rise in climate change but also the agriculture sector, which is also responsible for the emission of greenhouses gases especially methane and nitrous oxide, the agriculture sector is highly dependent on water for its crop growth, for soil purpose, in fact majority of the countries are dependent on rainy seasons which indicates their food productivity annually, farmers use renewable energy for the production of agriculture. There is a lack of groundwater available today, it is estimated that 50 % of the population will have no access to water by 2030. In order to tackle these issues especially climate change and reduce the emission of greenhouses gases into the atmosphere, the world has adopted sustainable agriculture / sustainable farming which takes into consideration environment health, soil equity and economic of a nation, it also reduces the use of renewable energy, ensures soil fertility and generate more employment and amplify the income of farmers and also introduce recycle methods, which will also minimize wastage and increase food security, collection of rainwater and using it for irrigation purpose, Sustainable farming is an eco-friendly way of farming which takes into consideration each and every aspects of environment and try to minimize use of artificial components from agriculture. Agriculture is the world's largest sector in the world, on which each and every person on this earth is depend, it employs more than one billion people and generates ample amount of food which is equal to 1.3 trillion dollar and 50 % of the land is used for agriculture, if you talk about developing countries, they are highly dependent on agriculture for their country's development and economy. India is the second largest agriculture country

After China, which is also adopting to sustainable agriculture, where more than 50 % of the workforce is employed, only 4 % of the country has adopted sustainable farming in India and we have adopted minimum sustainable farming methods. Countries like France, Netherlands, Canada, Finland, Japan, Denmark, Czech Republic, Sweden, Austria and Hungary have adopted sustainable Farming completely, there are 16 sustainable agriculture forms which can change the total agriculture sector of the world and minimize food crisis.

Research Methodology

For the purpose of this exploration, I have used a amalgamation of two of the archetypical social sciences research tools application –as they are authentic and brilliant method to assemble statistics from multiple appellant in an methodical and convenient way. Question were asked to the common youth, public policy Analyst, rural people, farmers, survey, interviews –consisting of several interrogation which were dispersed among representative of each contender group.

Objective of the Research Paper

The main areas of exploration in this paper incorporates

1. What is sustainable farming and why should we adopt it
2. How can sustainable agriculture help to tackle environmental problems?
3. What are the different sustainable agriculture methods?
4. In what ways India has adopted sustainable agriculture.
5. What is the future of sustainable agriculture in India?

Literature Review

In order to tackle the issue of drought and famine we need to shift from Industrial food system to sustainable farming and also to grow nutritious food, which many countries lack especially India and maintain the health of plants and soil overcome the problem of soil erosion and deforestation and making the livelihood of the local people sustainable. Sustainable agriculture is very important for the future as it can restore and nourish the soil, healthy soil will result in healthy plants and animals which will produce nutritious food for humans and healthy soil can hold moisture for long and we don't use to utilise artificial components to maintain the soil nutrient, sustainable farming takes into consideration nature and doesn't cost much harm, it can save energy by reducing the energy use at all levels, by designing smart farming methods which involves less human labours and more productive and efficient, in this way we can eradicate the use of fossil fuels from the agriculture sector, the main advantage of sustainable farming is it can save water which

incorporates methods like mulching, drip irrigation, creating swales on contour, garden beds that can hold water for long period and recharge groundwater resources, it can also help to prevent the water bodies from pollutions by the application of strainer clearer near water courses and adopting contour agriculture, Sustainable farming gives importance to diverse farming system which encompasses a variety of crops, and not just monoculture crops, such diversity leads to greater resilient during drought season, in cases of diseases and pests, as Sustainable agriculture opens the door for variety of crops, and a sustainable farms also the growth of both plants and animals together is a healthy location for pollinators and wildlife in a collaborative system. Sustainable agriculture provides resilience against climate change, the main feature of sustainable farming is, it requires less inputs, with a diverse system the requirement of water is also less, healthier plants and soil, crops are grown in a sustainable matter which has greater resilience than conventional systems of farming, local sustainable farms play a great role in production of local food, which also helps to increase the income of local communities and provide job opportunities and above all it is profitable to the people, planet and nature. There are 16 sustainable agricultures forms, India has not adopted all the forms. The government is taking measures to promote sustainable farming in India, crop natural farming and organic farming is prevalent in India, we have also seen the use of renewable source of energy in the agriculture industry of Indian sub -continent. Very less hectares of the land in India is being used for sustainable agriculture, Sikkim has competed moved towards organic farming followed by other North-East states. Andhra Pradesh has adopted Organic Farming, Every part of India has adopted a different sustainable farming method depending upon the weather patterns, environment and needs.

Findings

There are 16 practices sustainable agriculture which incorporates Organic farming, Agroforestry, Natural Farming, System of Rice intensification, Precision Farming, Conservation Agriculture, Crop Rotation and Intercropping, Cover crops and Mulching, Integrated Pest Management, Vermicomposting, Biodynamic Farming, Contour Farming, Integrated Farming systems, Rainwater Harvesting Artificial Recharge of Groundwater, Floating Farming and Permaculture. Prominent one in India are:

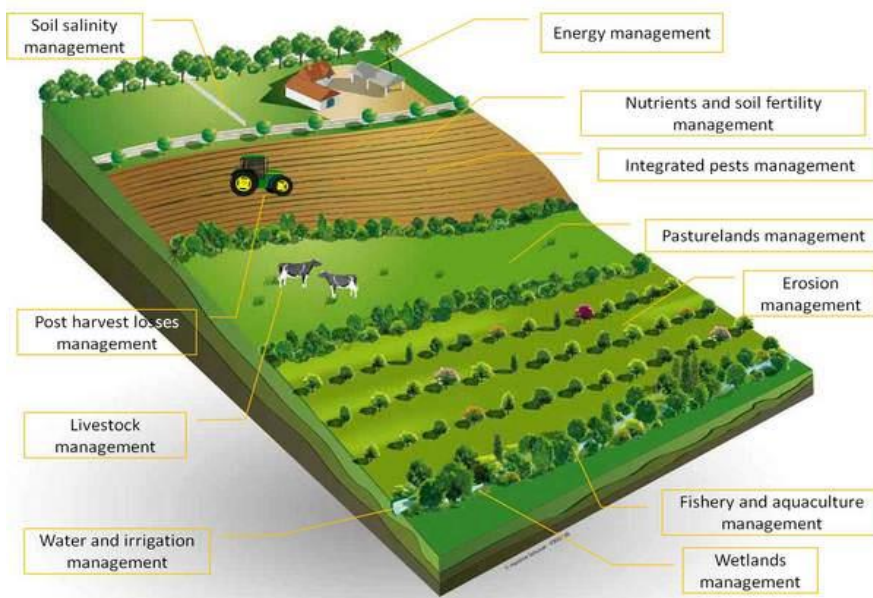


Fig 1

Organic farming restrict the use of chemical fertilizers and pesticides, it does allow the use of synthetic products, it depend on organic material like crops residue, legumes, bio-pesticides and animal residues for maintaining soil fertility and enhance productivity, it focus on individual components like soil, organic material, mineral, plants, animals, insects and human to develop a sustainable and self-sufficient ecosystem. Farmers adopt organic farming for a number of reasons, due to low rainfall, use of less inputs. The government of India has introduced two schemes at the National level for the use of organic farming that is Paramparagat Krishi Vikas Yojana (PKVY) and Mission

Organic Value Chain Development for North –East region, 2,780,000 hectares of India land is under organic farming as per March 2020, oilseeds, cotton, millets, cereals, tea, coffee, medicinal plants are grown. Sikkim, Maharashtra, Madhya Pradesh and Rajasthan are major states which practice organic farming followed by North-East states of Meghalaya, Mizoram, we also have Andhra Pradesh. Agroforestry is a old practice in India, it basically involves an interaction between the forestry and agriculture and includes farming, trees, wood, livestock, it escalates the ecosystem services contributing to environment security and energy,

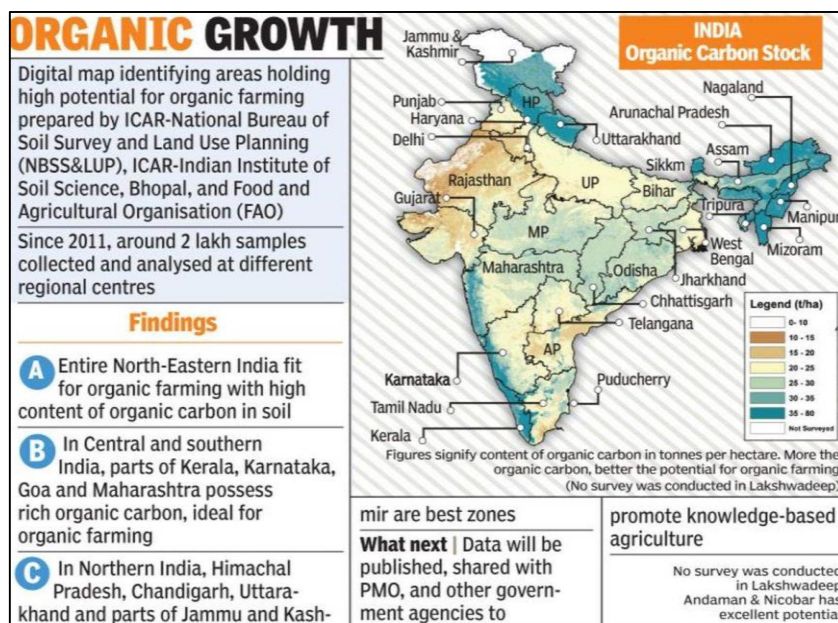


Fig 2

nutrition food, the use of solar energy, it can recover, recycle and use nutrition efficiently when nitrogen fixed trees are used, it also results in diversity increase of crops and livestock, contributes to wood industry by supplying many forest raw products, there are variety of agroforestry systems in India. The main tress used in agroforestry are Neem,

Poplars, Dalbergia, Melia, Tectona, Gmelina, Acacia, Alianthus and many other. The states which practice includes Uttar Pradesh (1.9 million Hectares) Maharashtra (1.6 million hectares), Rajasthan 1.6 million hectares. Natural Farming is practised by 800, 000 farmers in India, it basically eradicates the use of synthetic fertilisers are made

use of natural components like cow dungs, cow urine, use of locally sourced inputs, jiggery, pulse, flour, crop covers, much, symbiotic intercropping, mulch, use of bio-stimulants for microbial is an important part of natural farming, small farmers and tribal people practice natural farming, Andhra Pradesh is the leading state which practices natural farming followed by Maharashtra, Himachal Pradesh, Karnataka, Gujarat and Kerala. System of rice intensification is a climate smart way of farming, where it aims to reduce plant density, enhance the soil conditions through increase the use of soil organic matter and minimise and control water applications and growth of early and healthy plants 3- 4 million hectares of land is used for this, SRI is practised in the states of Tamil Nadu, Andhra Pradesh, Karnataka, West Bengal, Tripura, Punjabi, Odisha, Bihar, Chattisgarh, Gujarat and Jharkhand. Conservative farming is very prevalent in the Indo Gagentic Plain, commonly practised after harvest by the farmers, it is practised in the states of Punjab, Haryana, Delhi, Uttar Pradesh, Bihar and West Bengal, it is an ecosystem approach to agriculture land management.

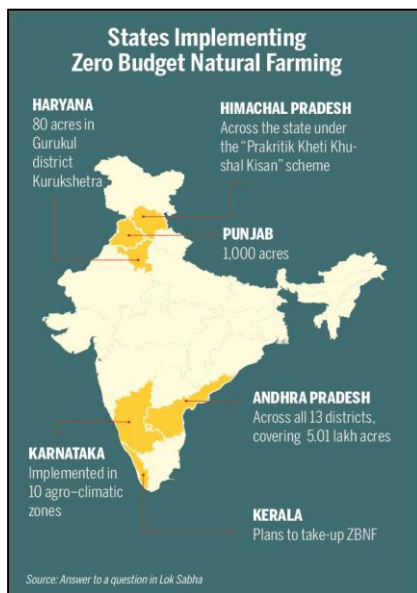


Fig 3

Crop rotation is very common in India is involves planting two or more crops sequentially on the same land to enhance soil health and nutrition and counter pest and weed pressure, it is done to increase profit without putting in more investment, it can break the cycle of pests and diseases and on the other hand Intercropping is growing of more than one crop simultaneous at the same location and period, it involves diversity, crop interaction and other natural regulations, Intercropping are of many types like Mixed, row, strip and relay intercropping Crop rotation is highly dependent on the socio-economic, economic utility and agroecological conditions of a state, it is location –specific, and Intercropping is flexible solution against crop failure, in particular in rain fed regions, it reduces the risks for farmers and ensures equitable returns.

Crop rotation is done in both small and large farms, apart from canal irrigated region, intercropping is also practised in small famers because of its flexible nature crop rotation is practised in the semi-arid region tropics and in most parts of the country. Intercropping is done in the semi-arid and tropical areas common in the southern parts of India, like

Telangana, Tamil Nadu and Karnataka and in the west also in Maharashtra. Intercropping includes crops like Pulses, horticulture, cereals. Crop rotation crops include Rice – pulses, groundnut-wheat, soyabean-mustard, rice-wheat rice-green gram etc.

Rainwater harvesting is storing rainfall on the surface for future use and through recharge of groundwater, it is stored in an area for beneficial purpose also referred to as artificial recharge when rainwater is directed into the grounds, it is practised in the arid and semi-arid areas of the country, 33 states have mandatory laws for rainwater harvesting. Precision farming is way to farm governance that uses infotech to certify that pasture and soil receives the right amount of what they require for health and productivity, it is an combination of different technologies and cover crops and mulching, basically protection crops are those crops which are grown to cover the soil rather than to be harvested and mulching it the process of protecting the soil surface with non-chemical materials or synthetic substance with the aim to protect soil moisture, enhance productivity and avoid runoff.

These are some of the practised of sustainable agriculture adopted in India and only a small percent has adopted it.

Way Forward

Sustainable agriculture is a need of the hour in India with extreme water crisis, India is experiencing the worst water crisis in the world which has an directly effect on the food security. The country is facing severe water and food crisis, every second child is dying because due to hunger and poverty, already 21 cities have no groundwater left, the country is left with no option but to adopt sustainable agriculture which will help to tackle climate change issue in the country and to a large extent end the issue of food security, and growing of more nutrition based food which will help to overcome the problem of male nutrition and under nourishment among the children, reduce the emission of green-house gases. Sustainable agriculture if all the 16 types are adopted, India will have no shortage of food crisis and the use of food will also reduce, conservation rainwater will further hep to recharge the groundwater and reduce the issue of water scarcity in India, as the population is amplifying the demand for food also increases, in order to make India self-sufficient it is important to adopt Sustainable Agriculture. Organic and natural farming will make the soil healthier and more moisture and we will not require to use any kind of artificial chemical, fertilizers which can have an indirect effect on all living creatures

Conclusion

Sustainable farming is emerging at a rapid pace across the world, where in India we have adopted only a few once. Sustainable farming is a very to eliminate the agriculture issues which has resulted in food shortage, salinization, soil erosion, deforestation, natural disasters and drought and famine which are a product of climate change. Sustainable farming is a weapon to solve the problem of rural people to a great extent and also eliminate or reduce the use of greenhouse cases, promoting renewable energy and make that, Some of the practices requires investment where the government needs to take initiative, We need to move towards sustainable development taking into account nature and environment resources, social equity. The central and state government should together work for towards the

adoption of sustainable agriculture in every state and district enhance productivity and conserve soil moisture.

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