

Ensuring Food Security by Promoting Sustainable Agriculture: An Analysis

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Abstract

The staggering number of undernourished people in the world hovering around 820 million is an alarming situation for the global leaders. This concern has found the place in the Sustainable development goals that United Nations has targeted to achieve by 2030. The Second Sustainable development goal mentions about ending hunger and achieving sustainability in the agricultural practices. Sustainability in agriculture seeks to intertwine the objectives of equity, profitability and ensuring healthy environment. Sustainable agriculture envisages farmers to promote practices which ensure healthy soil, reduction in pollution level at the farms, minimization of water use. Food security can be ensured by adopting sustainable farming practices. The visions of the world leaders while drafting the Sustainable development goals is not only to reduce hunger but also to ensure nutritious food for all. India is also striving to attain the Sustainable development goals by adopting precise policies and better implementation. The Government of India has come up with the scheme of Soil Health Cards in order to promote sustainable agriculture which assists the farmers in gauging the optimum amount of fertilizers to be used. India is providing basic cereals to its poor under the Public Distribution System. The Mid-Day Meal Scheme of the Indian government has also been recognized as a potential tool to meet the urgent needs to tackle the issue of Nourishment among the School going Children. The world should realize that farmer being the main stakeholder in the whole process should be strengthened by providing better access to good practices and easy finance.

Keywords: Sustainability, Sustainable Agriculture, Food Security

1. Introduction

The Definition of sustainable agricultural development is "the management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such development... conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and

socially acceptable”¹. Sustainable agriculture does not represent a return to pre-industrial revolution methods; rather it combines traditional conservation minded farming techniques with modern technologies².

Sustainable agriculture ensures that the practices adopted should be such as not to bring adverse impact on the soil and environment as to threaten the food security of future generations. Food security is part of one of the sustainable development goals adopted by the world leaders at the United Nations. The Second Sustainable Development goal aims for zero hunger and achieving food security and improving the nutrition quality and promoting the sustainable agriculture. The number of undernourished people have increased to 821 million as per 2017 estimates, which poses a big question mark as to the efforts done in this direction. No doubt good progress has been made in this direction especially in East Asian, Carribean and Latin American Countries as far as eradicating extreme hunger is concerned. However a lot need to be done if the journey to be covered is to be looked at. There are still 63% of the people in Asia who are suffering from hunger. As far as the ill effect of malnourishment is concerned 22% of the Children under 5 are still stunted. One third of the women in the reproductive age group are anemic. India is home to one-sixth of the humanity has greater role to play in achieving the sustainable development goals. India has a greater responsibility to deliver on this front of achieving the Sustainable development goals. If it fails it is difficult for the world as a whole deliver on this front. Indian government has been working and continuing its welfare schemes for the betterment of the masses. In order to track the progress at the state levels India has come up with the indices to measure the progress of each goal. The National Institution of Transforming India is working for the better teamwork between Centre and states in the federal setup of India. Measuring the incremental progress of each states will surely enable India to keep a watch on its progress towards achieving the Sustainable Development Goals. The fact that public investment all around the world is very low has to be confronted. In order to promote sustainable agriculture among the farmers the most important thing is to empower the farmers economically. Government spending on agriculture compared to agriculture’s contribution to the total economy has declined by 37 per cent³.

2. Sustainable Development Goal As Zero Hunger

Extreme hunger and Malnutrition remain one of the foremost hurdle in the economic development of most nations. There are 821 million people estimated to

¹ Tony Loftas, Dimensions of Need, An Atlas of Food and Agriculture, Food and Agriculture organization of the United Nations (Dec 12, 2019, 10:04 A.M.),

<http://www.fao.org/3/u8480e/U8480E00.htm#Dimensions%20of%20need>

² Sustainable Agriculture, John P. Reganold, Robert I. Papendick and James F. Parr, Scientific American , Vol. 262, No. 6 (JUNE 1990), pp. 112-121

³ United Nations Economic and Social Council, 'Progress towards the Sustainable Development Goals' (Ministerial meeting of the high-level political forum on sustainable development 2019).

be chronically undernourished as of 2017⁴. Despite concerted efforts to combat food insecurity, the number of chronically undernourished people in the world is estimated to have increased from 777 million in 2015 to 815 million in 2016⁵. According to Food and Agricultural Organization of the United Nations, there are different dimensions of the food security which include availability of food, both physical and economic access to the food, utilization of food and stability over time. There is a direct adverse impact of climate change on the productivity of crops and animals. It is an established fact that decline in the supply of food is directly linked with the Climate Change. The variability related to climate brings uncertainty for the poor. The shock linked to climate change can potentially drag the vulnerable into the poverty. The sudden floods often leaves the farmers unprepared and they incur farm related losses which can impose financial implications on the poor farmers. Similarly a drought like situation have an adverse impact on the livestock herd of the farmer. The World Bank study has assessed the impact of climate change impacts on the socio economic conditions of the people. The study found that under a high climate change impact scenario, the number of people in extreme poverty increases significantly in 2030 by 122 million people⁶. The future impact will also be ascertained by the policy choices of the governments in the developing nations.

The Climate Change has the potential to change the predictability of weather patterns. Such uncertainty can wreak havoc to the poor. The fifth Assessment report of Intergovernmental Panel on Climate Change has also found out higher levels of carbon dioxide concentrations have to potential to enhance the competitiveness of the invasive weeds. Climate Change can create a huge gap between developed and developing nations. Also the developing nations are more vulnerable to the negative impact of climate change as they lack capacity to fight against the adverse impact of the climate change.

The Irony lies in the fact that agricultural sector itself is the contributor to the greenhouse gas emissions. The challenging task is to tackle or confront this problem and to mitigate the contribution without adversely impacting the food security. The answer lies in the adoption of sustainable measures. The crops and livestock management should involve more sustainable measures so that they can help in thwarting the adverse impact of greenhouse gas emissions. The attempt in reducing the emissions from one stage could backfire in the way that emissions at other stage could increase. The best way is to look beyond production stage and

⁴ Goal 2: Zero hunger, UNDP, <https://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-2-zero-hunger.html> (last visited Jan 1, 2020)

⁵ FAO.org, A1 - 1 Sustainability, food security and climate change: three intertwined challenges | Climate Smart Agriculture Sourcebook | Food and Agriculture Organization of the United Nations, <http://www.fao.org/climate-smart-agriculture-sourcebook/concept/module-a1-introducing-csa/chapter-a1-1/en/> (last visited Dec 29, 2019).

⁶ FAO.org, SUSTAINABILITY, FOOD SECURITY AND CLIMATE CHANGE: THREE INTERTWINED CHALLENGES | CLIMATE SMART AGRICULTURE SOURCEBOOK | FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, <http://www.fao.org/climate-smart-agriculture-sourcebook/concept/module-a1-introducing-csa/chapter-a1-1/en/> (last visited Dec 12, 2019).

also look into the relationship with other uses of the land.

3. Sustainable Agriculture

The responsibility to ensure the sustainable agriculture is not simply of the farmers but also laborers, governments at the local, state and central level. The policy measures should be such that it should expect from the farmers the slow transition. The sustainable agriculture encompasses within it the reasonable use of the component utilized in the agriculture. The governments around the world has the sacrosanct duty to provide help to its farmer by promoting different methodologies to perform sustainable agriculture. Some of the Traditional methods are always good and cost effective. One of the ways in which farmers can conduct sustainable agriculture is Crop Rotation. The benefit of this exercise is it enhance the soil productivity. Otherwise the monoculture farming requires fertilizers and pesticides for the enhanced productivity. Rotation of crops takes care of all these aspects, wherein it enables proper nutrient cycling and better pest and weed control.

Farmers are making use of mulch films in the soil for conservation of moisture and fertility. However these films are made of Polyethylene. Disposal of such films is another overhead for the farmer apart from being labour intensive and time consuming exercise. In order to make this practice more sustainable better way is use of biodegradable mulch films. Such films gets absorbed by the microorganisms within the soil itself, thus saving both labor and time.

Water is one such component which is the soul of the agricultural process. The contamination of the water by using pesticides and fertilizers has its own ramifications. One of the problem is salinity. The sustainable measures are thus required which leads to reduced salinization of the water. Another aspect with the same subject is the overdependence of the crops on water in India. A Country where the agriculture is mostly rain fed this is very crucial. Promotion of optimum use of water for irrigation purpose is also important for sustainable agriculture.

Another important component on which the agriculture is dependent is energy. Today's agriculture practices are heavily dependent upon the non-renewable energy sources. However solution does not lie in expecting the farmer to change his dependence on equipment running on petrol and diesels, as it could lead to more cost for the farmer and agriculturist. In order to promote the sustainable agriculture change in approaches and strategy is required. Agriculturist should be promoted to use practices keeping in mind that local topography, climate conditions of the place and characteristics of the soil. The overdependence of alien things to the local situations do have ramifications. The sustainability can sometimes come in loggerheads with the advances made in genetic engineering and biotechnology. However the improvement in these technologies has to also take into account that excessive tinkering with the natural phenomenon can backfire and potentially be harmful to the food security of the country. Sustainable

agriculture is helpful in promoting inter-generational equity. Though the critics may point out the difficulty with sustainable agriculture in terms of food production. As sustainable agriculture demands getting one with the ecological balance, the production may be hampered and also the land use in terms of area has to be increased. The Brundtland Commission report states, "the 'environment' is where we live; and 'development' is what we all do in attempting to improve our lot within that abode. The two are inseparable"⁷.

3.1. Sustainable Agriculture in India

India has a geographic region spreading across various climatic conditions. The diversity in weather patterns across the Nation demand region specific policies relating to agricultural development. However the nation derives its unity among other things from monsoon, which has significant impact on the agriculture of the country. Risk to the Indian agriculture can be segmented at three levels i.e. crop, farm and at the food system level. The agriculture in India due to its dependence on the external factors is vulnerable to the climate change. The situation gets further aggravated by the existing vulnerabilities such as debt and inaccessibility to proper financial security among the farmers in India.

India aims at promoting sustainable agriculture through a series of adaptation measures focusing on ten key dimensions encompassing Indian agriculture namely; 'Improved crop seeds, livestock and fish cultures', 'Water Use Efficiency', 'Pest Management', 'Improved Farm Practices', 'Nutrient Management', 'Agricultural insurance', 'Credit support', 'Markets', 'Access to Information' and 'Livelihood diversification'⁸. The thrust areas to be addressed under this Mission are dryland agriculture, access to information, bio-technology and risk management.

The different components of National Mission on Sustainable development in agriculture consists of Rain fed Area development, Sub-mission on Agroforestry, National Bamboo Mission, Soil Health Management and other is Monitoring, Modelling and Networking between Climate Change and Sustainable Agriculture. Soil Health Management is an important part of National Mission on Sustainable Agriculture. It aims at promoting Integrated Nutrient Management (INM) through judicious use of chemical fertilizers including secondary and micro nutrients in conjunction with organic manures and bio-fertilizers for improving soil health and its productivity⁹. The Soil Health Card are being issued to the farmers after the testing of the soil. This ensures that farmers are using correct set of fertilizers and catering to the needs of the soil in terms of its requirements. This scheme has saved the farmers from inappropriate usage of fertilizers, which in turn has saved the

⁷ Jeff Surtees, IMPORTANT CONCEPTS IN ENVIRONMENTAL LAW – THE IDEA OF "SUSTAINABLE DEVELOPMENT" LAW NOW MAGAZINE (2018), <https://www.lawnow.org/important-concepts-in-environmental-law-the-idea-of-sustainable-development/> (last visited Dec 6, 2019).

⁸ National Mission for Sustainable Agriculture (NMSA), NATIONAL MISSION FOR SUSTAINABLE AGRICULTURE, <https://nmsa.dac.gov.in/Default.aspx> (last visited Jan 11, 2020).

⁹ SOIL HEALTH CARD, <https://soilhealth.dac.gov.in/Content/blue/soil/about.html> (last visited Jan 6, 2020).

cost for the farmers.

In order to ensure productivity which can ensure food security the farmer has to be appropriately compensated. The Indian government ensures this by its programme of Minimum Support price to the farmers. However this is complex for the farmers as not all the farmers enjoy the benefits of support of minimum price as the policy is not applicable for all the commodities. Looking at the correlation between the consumer price and support price, there is also a significant difference which is discouraging for the farmer in terms of investing his labor for such pursuit.

4. Food Security

With a nearly six-fold increase in food grain production from 50 million tonnes in 1950-51 to more than 283.37 million tonnes in 2018-19, India has done well to expand food production and build up stocks of food grains¹⁰. Under the Integrated Child Development Services, 70.37 million children in the age range 6 months to 6 years, and 17.18 million pregnant women and lactating mothers are provided access to nutritious food on 31st March 2019.

The approach of Indian Government in facilitating Public Distribution System of food grains in India has changed significantly. It has become moreover a rights based system after the passage of National Food Security Act, 2013. The Act has provisions safeguarding the food security of 50% of Urban Population and 75% of Rural Population by providing the common and necessary food grains like Rice, wheat and Coarse Cereals at the affordable cost of Rs. 3, Rs. 2 and Rs. 1 respectively.

Generally food security is ensured by the amount of production in the country and capacity to import food and capability of the nation to arrange for the distribution of food. The estimated cost for ensuring the food security in India from 2015 to 2024 comes around US\$729 billion which takes into account the cost of distribution of safe and nutritious food. The estimated gap which India is expecting to face in promotion of the sustainable measures to ensure food security comes around US\$293 billion. Evidence for India's food challenge can be found in the fact that the yield per hectare of rice, one of India's principal crops, is 2177 kgs per hectare, lagging behind countries such as China and Brazil that have yield rates of 4263 kgs/hectare and 3265 kgs/hectare respectively¹¹. The cereal yield per hectare in the country is also 2,981 kgs per hectare, lagging far behind countries such as China, Japan and the US¹². The factor that may lead to rise in the cost of agriculture is also the scarcity in the availability of land as the land gets occupied for other purposes including industry. The other contributing factor in raising the cost can be the

¹⁰ AGRICULTURAL STATISTICS AT A GLANCE 2016, MINISTRY OF AGRICULTURE & FARMERS WELFARE DEPARTMENT OF AGRICULTURE, [HTTPS://EANDS.DACNET.NIC.IN/PDF/GLANCE-2016.PDF](https://eands.dacnet.nic.in/PDF/GLANCE-2016.PDF)

¹¹ HOW SUSTAINABLE FARMING IN INDIA CAN SECURE ITS FOOD FOR THE FUTURE, <https://www.basf.com/in/en/who-we-are/sustainability/future-perfect/stories/How-sustainable-farming-in-India-can-secure-its-food-for-the-future.html> (last visited Jan 14, 2020).

¹² *ibid*

Climate change factor. For the country as a whole rural poverty declined from 45.61 per cent in 1983 to 28.30 percent and urban poverty declined from 42.15 per cent to 25.70 per cent between 1983 and 2004-05¹³. During the intervening period, average calorie intake per capita declined from 2221 to 2047 and from 2089 to 2020 kcal in the rural and urban sectors, respectively¹⁴. As regards calorie deprivation, its extent increased from 69 to 85 per cent in rural India and from 60 to 65 per cent in urban India¹⁵.

The art of balancing the need of increasing the productivity and managing the ecological balance in a sustainable manner is a challenging task. The link of Sustainable development goal 2 has to be matched with first goal. The Poverty no doubt is a hindrance in the access to food. Despite production and sustainable measures in agriculture the access to food can only be increased if the poverty is being tackled.

The issue under sustainable development goal 2 is intertwined with lot of issues. The solution of the problem do not simply ends by providing access to the food. The policy of the government should be inclined towards providing better nutritious food. The problems of undernourishment is linked with the issue of low height and underweight children. The development pace of the nation should ensure that it is inclusive and takes along with the poorest. That is possible if the nation takes care of the hunger of its masses.

5. Conclusion

The Sustainability of agricultural practice is a complex task as of now. The World population is about to touch 8 billion and it is a challenge when by all the technological advances the poor is not being fed nutritiously, then how to provide healthy food for all without compromising on the environmental commitments. However it cannot be denied that the present mechanism deployed for farming has been deteriorating the various components of the environment. The Indian government has shown deep interest in achieving the second sustainable development goal. The government has started the Soil Health Management under National Mission for Sustainable Agriculture for judicious use of fertilizers. The scheme has been accomplishing good results under the aegis of Ministry of Agriculture. There is a need for state governments and central government to work in close coordination to bring in better results. The State governments should receive the financial and technical assistance as and when required. The developed nations should assist the developing nations in bringing more measures which add to sustainable measures to be incorporated in the field of agriculture and farming. The World should remember that there is a responsibility of keeping our soils healthy by resorting to sustainable measures in order to increase the productivity

¹³ Research and Information System for developing Countries, 'India and Sustainable Development Goals: The Way Forward' (RIS 2016).

¹⁴ *ibid*

¹⁵ *ibid*

of the land and to feed the poor and hungry. The existence of hunger is a disgrace to the world and the malaise should be tackled in a synchronized manner by bringing members of the United Nations and Food and Agriculture Organization on board.