

# Vision 2030

## Sustainable Development Goal (SDG) 2

“End hunger, achieve food security

and

improved nutrition and promote sustainable agriculture”

Department of Agriculture Cooperation & Farmers Welfare



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## Sustainability Framework for Ending Hunger -An Approach Paper to realise the Sustainable Development Goal (SDG) No.2 along with SDG No.1 and some element of SDG No. 12

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### 1.0 Back ground and Introduction

United Nation's Millennium Development Goals - MDGs (2000-2015) for a better world free from hunger were succeeded by "The Agenda 2030" for Sustainable Development which was adopted by its 193 Member States on 25th September 2015. This Agenda has 17 Sustainable Development Goals (SDGs) to realize them. It also has a declaration, details on means of implementation, renewed global partnership and a framework for review and follow-up. UN Statistical Commission has given a global indicator framework comprising 169 targets and 231 indicators for measuring the progress in achieving the SDG targets. The SDGs present a major paradigm shift in the development vision, approach and ambition of UN Members across the world. This Agenda is informed and complemented by Paris Climate Agreement and the Addis Ababa Action Agenda in order to achieve global economic, social and environmental transformation. The former is a global treaty to limit climate change whereas the latter one provides a framework for financial and non-financial means of implementation (MoI). For example concerns on climate change and measures to curtail them have been interwoven in SDG13 and cutting across almost all goals. MoI targets are included in SDG17 of the 2030 Agenda (Source: Various UN/FAO documents). Taking note of the universal realities and recognizing the interdependencies among issues and problems, Agenda 2030 places a new emphasis on addressing inequalities among and within nations as a collective responsibility for all the countries.

As a signatory, to the Agenda 2030; India needs to develop its vision, strategies and targets for achieving SDGs by **effectively making them as part of its policy**. This paper aims at presenting a vision and framework for realising the SDG2 which focuses upon ending hunger, achieving food security and improved nutrition; and promoting the sustainable

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agriculture. This SDG focuses upon the development of rural infrastructure, promote agricultural research and extension services, encourage technology development and create plant and livestock gene banks in order to enhance agricultural productive capacity among developing countries. An FAO discussion paper (2016) on SDGs says, "these objectives are materially connected, inter alia, to SDGs 1 (ending poverty), SDG3 (target 3.2—child and maternal care, and target 3.4—diet and food system-related non-communicable diseases), SDG5 (women's empowerment, especially target 5.a—ensure women's right to own land), SDG6 (water and sanitation for all), SDG7 (access to modern energy—a prerequisite of inclusive rural poverty reduction), SDG12 (sustainable consumption and production, especially target 12.3 on food losses and waste), SDG 16 (peaceful and inclusive societies and effective, accountable and inclusive institutions, especially targets 16.1— reduce all forms of violence, and 16.6 develop effective, accountable and transparent institutions)". It would be useful to take cognizance of this interrelatedness while devising a response for realizing the targets under SDG2.

### **1.1 Centrality of Agriculture and rural development in Indian economy: Challenges and implications for Food Security in India**

Agriculture has played a significant role in India's economic development, growing about three percent each year over the last forty years. Besides providing food to a growing population, agriculture has provided income to rural areas, released labour for downstream industry, provided savings for investment and has increased demand for industrial goods. It also is the source of raw material for a large number of domestic industries and has provided an important source of foreign exchange.

Subsidised measures to encourage greater use of fertilisers, pesticides, seeds, water, electricity, and credit, as well as market support prices, have contributed to strong annual agricultural output growth in the last decade. These programmes continue to promote production growth enabling Indian agriculture to expand per capita supplies considerably, although rising resource pressures may reduce absolute growth rates over the next decade.



However, despite its growth, the role of agriculture in India's economy has been declining sharply. Primary agriculture accounted for about 14 per cent of national gross domestic product (GDP) in 2012, down from close to 30 per cent in 2000. But, while there has been a reduction in the share of agriculture in GDP, a commensurate reduction in its employment share has not taken place. Primary agriculture still employs around half of the Indian population, and it is the main driver of employment in rural areas, where 56 per cent of the population (not necessarily in the farming).

### **Policies and Achievements**

During Green Revolution and after, India has the strong case of agriculture as central element in the developmental strategy of the government in place. Much of the credit for this success should go to policy initiatives of central and state governments and of course to the small and marginal farmers who constitute 83 per cent of total that form the backbone of Indian agriculture and economy. Policy support, production strategies, public investment in infrastructure, research and extension for crop, livestock and fisheries have significantly helped to increase food production and its availability. During the last 30 years, India's food grain production jumped from 150 million tons in the triennium ending 1983 to nearly 270 million tons (mt) in 2014. Virtually all of the increase in the production resulted from yield gains rather than expansion of cultivated area. Increased agricultural productivity and rapid industrial growth in the recent years have contributed to a significant reduction in poverty level, from 45 percent in 1983 to less than 21 percent in 2014. Despite the impressive growth and development, India is still home to the largest number of poor people of the world.

There is a looming risk to the Indian agriculture sector due to climatic variabilities and extreme events which would happen at multiple levels including at the levels of crop or livestock, farm or cropping system and the food system. Adverse impacts on agricultural production would be severe in the absence of appropriate adaptation and mitigation measures with far reaching consequences in terms of shortages of food articles and rising prices which could endanger the food and livelihood security of our country. The sustainable agriculture can be answer to this climate change threat.

India already has several initiatives, policies and programmes those can effectively help in realizing the goal of ending hunger (SDG2) if completed

with necessary elements of sustainable Agriculture development model given in the framework as discussed in following sections. If implemented well with dynamic monitoring mechanism and scope for course correction as and when required India can successfully achieve SDGs including SDG2 on ending hunger, food security, increased nutrition and sustainable agriculture. Some such examples of such initiatives/programmes/schemes are as follows:

- **Pradhan Mantri Krishi Sinchayee Yojana (PMKSY):** "To achieve convergence of investments in irrigation at the field level, expand cultivable area under assured irrigation, improve on-farm water use efficiency to reduce wastage of water, enhance the adoption of precision-irrigation and other water saving technologies (More crop per drop), enhance recharge of aquifers and introduce sustainable water conservation practices by exploring the feasibility of reusing treated municipal waste water for peri-urban agriculture and attract greater private investment in precision irrigation system."
  - Ensure water security to farm sector through Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) and provide water to Har Khet Ko Paani.
  - To provide end-to-end solutions in irrigation supply chain.
  - Use micro irrigation technologies extensively to save water, increase production and productivity of crops in a sustainable manner and help in achieving food security.
  - Assured irrigation, increased use of micro irrigation technologies will provide increased income to farmers, ushering in much needed prosperity in rural areas.

### **Broad Strategy**

- As water scarcity is being felt, micro irrigation technologies will be promoted extensively in all crops.
- As far as possible these technologies will be made only method of irrigating plants over time.

- As a short time measure this strategy will be used in water stressed blocks only.
- Special focus will be on use of micro irrigation technologies in water guzzling crops like sugarcane, banana, cotton etc. in arid and semi-arid parts of the country. To achieve this end, suitable measures such as publicity campaigns, policy provisions and sharing of responsibilities with companies etc. will be initiated.
- The target of field crops, which is presently 25 percent will be increased to 50 per cent for bringing them under micro irrigation technologies.
- **Rashtriya Krishi Vikas Yojana (RKVY)** aims at: “1) holistic development of agriculture and allied sectors by incentivizing the states to increase public investment in this sector, (ii) providing optimum flexibility and autonomy to states in planning and executing projects, (iii) building robust infrastructure and creating assets for filling identified gaps, (iv) enabling Central Government to launch strategic initiatives from time to time reflecting national priorities and (v) maximizing returns to the farmers in agriculture and allied sectors.”
- **National Food Security Mission (NFSM)**: It is an initiative directed at achieving the targets under SDG-2. This is supposed to be a Centrally Sponsored Scheme with an objective to ‘End hunger, achieve food security and improved nutrition and promote sustainable agriculture’.
- **The National Mission for Sustainable Agriculture (NMSA)**, which is one of the eight (now nine) Missions under the National Action Plan on Climate Change (NAPCC) seeks to address issues regarding ‘Sustainable Agriculture’ in the context of risks associated with climate change by devising appropriate adaptation and mitigation strategies for ensuring food security, equitable access to food resources, enhancing livelihood opportunities and contributing to economic stability at the national level.

- **Rainfed Area Development (RAD) under National Mission on Sustainable Agriculture (NMSA)**:- To make rain-fed agriculture more productive, sustainable, remunerative and climate resilient by promoting location specific Integrated/Composite Farming Systems along with conservation of natural resources through appropriate soil and moisture conservation measures.
- **Sub-Mission on Agro-forestry (SMAF)** aims at: Promoting agro forestry through trees and crops that respond to local priorities and agro-climatic/ biophysical conditions, adoption of suitable management practices and integration of those practices into rural livelihood systems. The recent concept of landscapes approach comes across as a practical way to achieve mitigation, adaptation and agricultural production objectives while ensuring environmental sustainability.
- **National Horticulture Mission**:"It was launched in 2005-06 as a Centrally Sponsored Scheme to promote holistic growth of the horticulture sector through an area based regionally differentiated strategies. The scheme has been subsumed as a part of Mission for Integration Development of Horticulture (MIDH) during 2014-15. Presently, India is the 2nd largest producer of fruits and vegetables in the world."
- **National Horticulture Board**: Aims at improving integrated development of Horticulture industry and to help in coordinating, sustaining the production and processing of fruits and vegetables.
- **Soil Health Management (SHM)** :Aims at promoting location as well as crop specific sustainable soil health management including residue management, organic farming practices by way of creating and linking soil fertility maps with macro-micro nutrient management, appropriate land use based on land type, judicious application of fertilizers and minimizing soil erosion through following initiatives:

- A. **Paramparagat Krishi Vikas Yojana (PKVY):** Under the scheme organic farming is promoted through farmers group centric certification system known as 'PGS certification' in cluster approach. The area envisaged to be covered under PKVY will be about 2 lakh ha by the end of the 12<sup>th</sup> Plan.
- B. **Organic Value Chain Development for North Eastern Region:** The scheme is for implementation in the all the states of NE Region .The scheme aims at development of certified organic production in a value chain mode to link growers with consumers and to support the development of entire value chain starting from inputs, seeds, certification, to the creation of facilities for collection, aggregation, processing marketing and brand building initiative.
- C. **Soil Health Card Scheme:** A Centrally Sponsored Scheme "Soil Health Card" has been made operational from the year 2014-15 to ensure balanced /efficient use of fertilizer, based on soil tests and targeted to provide soil health cards to all farmers in the country once in every 2 years.
- **National Mission on Agricultural Extension and Technology (NMAET):** It encompasses extension, ICT, Seeds, Agricultural Mechanization and Plant Protection aims to restructure & strengthen agricultural extension to enable delivery of appropriate technology and improved agronomic practices to the farmers through interactive methods of information dissemination, use of ICT including Short Messaging Service (SMSs), Farmers' Portal & other web based applications, capacity building & institution strengthening. Public-Private-Partnership is encouraged in the Extension and Training components of the Mission. Recognized NGOs, para-extension workers, Farmers Organizations, dealers and-agripreneurs etc. are encouraged to participate and provide extension and training services and guidance to farmers to improve agricultural production and productivity.



- **Rashtriya Gokul Mission:** Implemented by DADF to promote indigenous breeds having unique characteristics of heat tolerance, tick and pest resistance, resistance to diseases and the ability to thrive under extreme climatic conditions.
- Government of India adopted a mega project called the **National Initiative on Climate Resilient Agriculture (NICRA)**. Its four main modules include Natural Resource Management, improving crop production, livestock and fisheries and institutional interventions.
- **Other Schemes of DAC&FW /Dept/Ministries relates to SDG 2 and mapped by NITI AYOOG**

SDG Target	Centrally Sponsored Scheme
2.1 to 2.4	<b>DAC&amp;FW</b> NFSM (Core), MIDH, NMOOP, NMAET (SAME, SMSP, SMAM, SMPP), RKVY (core)
2.4	NMSA (RAD, SHM, PKVY, SMAF) PMKSY
2.1 to 2.5	<b>DADF</b> National Livestock Mission (NLM) (Core) Livestock Health and Disease Control (Core) National Programme for Bovine Breeding and Dairy Development
2.1 and 2.2	<b>Other</b> Public Distribution System National Nutrition Mission (Core) National Food Security Act Mid Day Meal Scheme
2c	eNAM and other market interventions
2.4 and 2.5	ICAR

### Challenges faced by Indian Agriculture

Key uncertainties lie in India's macro performance, the sustainability of yield growth and the viability of government programmes. There is diversity in agriculture production, in some States i.e. Northern & North Western States production is substantially higher compared to Eastern & NE States but these Regions have plenty of opportunity to enhance productivity. The main challenges that contribute to declining production growth rates are the rising costs of production, including higher prices of energy inputs, feed and labour. Further resource constraints, like land degradation, water scarcity and increasing environmental pressures, present additional limitations, particularly in regions where land availability for agricultural expansion is severely constrained. Potential yield gaps remain, and concerns about the sustainability of growth in production are mounting. Rural labour costs are rising, water supplies are being depleted and smaller farm sizes due to fragmented land holdings potentially impede the capture of economies of scale. Every crop requires certain climatic conditions to give the best yields. Though rice and wheat are produced in a large area in India, certain areas can readily switch to other crops to get better productivity. India is importing many agricultural commodities including cooking oil though we have the necessary conditions to grow more here. Another challenge for Indian agriculture is the heavy dependence on traditional high yielding rice and wheat crops to the lack of a proper national plan on agriculture. Excess production and stocks of a few crops lead to problems in the selling of the produce at low price, storage leading to shortage of other essential farm output. The farm output which is biased towards crops like wheat and rice, irrigation and ground water facilities have been overexploited and misused, leading to a host of other problems as discussed sustainable agriculture in this paper. In addition supply channel bottlenecks and lack of a proper marketing channels are serious problems. These are issues which need to be tackled at the regional, state and national levels.

There is a challenge of balanced use of nutrients. Phosphorus deficiency is now the most widespread soil fertility problem in both irrigated and unirrigated areas. Continued investment in research and development, and extension services, remains critical to achieve much needed productivity gains.

Though the need to revamp the Agriculture Produce Marketing Committee Act is recognized the work is in progress but at snail speed. In



spite of the fact that the central government has passed a model APMC act 2003, many of the states haven't acted on it. There are many gaps in it. Some of them are like, the Act makes selling of agriculture products via local Mandis (located in the APMC Yards) compulsory. Farmers can't sell their produce directly if they are getting more price from some other customer. The act doesn't cover perishable items like vegetables, fruits. So here farmer is at the mercy of local Mandi and hence ends up incurring severe losses. This necessitates developing market linkage for the small and marginal farmers.

### **Reducing attractiveness of Agriculture as a Profession**

With continued large-scale rural-urban migration, the number of farmers especially young one are moving out of farming, boosting the labour productivity and raising incomes, but remaining in farming are the farmers who are ageing with negative implications for future productivity. Agriculture is no more a preference for most of the Indian youth (even the Farmers Commission headed by Dr MS Swaminathan reported this) as it seems to be economically unviable activity hence less attractive as a career to them. This will need measures for establishing agriculture as an attractive and viable profession, if India has to sustain its agricultural growth for food security and economic development.

## **1.2 Role of Sustainable Agriculture as a fulcrum in the overall strategy to end hunger, improved nutrition and ultimately achieving Food Security**

Given the importance of rural India and linkages of agriculture with multiple facets of SDG2, sustainability of agriculture becomes central concern within the overall strategy to end hunger, improve nutrition and achieving the food security.

### **Agriculture and Food Security in India**

In the last few decades, India has experienced rapid economic growth. Agricultural growth has also risen in this period, supported by solid increases in crop yields, and with both increased cropping intensity and greater area devoted to food crops. With its predominantly vegetarian diet, large arable land base and urbanizing society, India presents unique opportunities and challenges. India's agricultural sector has witnessed a

considerable transformation in recent years, with significant gains in productivity and total production volume. Despite this, the hunger scenario in the country and its quest for rapid economic growth will require agricultural policies focused on food security and finding the ways to invigorate agriculture to promote growth and employment in populous rural communities. The new National Food Security Act of India is the largest right to food programme of its kind ever attempted, allocating rations of subsidised cereals (about 90 per cent below retail price) to more than 800 million people. Major concern is its actual implementation given the challenges faced by Indian agriculture.

### **Food security efforts in India**

Indian agriculture productivity is less compared to the world average owing to reliance on green revolution technology, which has become obsolete/unsustainable. The lack of understanding of sustainability among the farming community, technocrats and policy makers has made things worse. India's policy effort to support farmers, promote rural development, and at the same time address food insecurity has been, and is now, very significant. A range of supply side programmes such as input subsidies for fertilisers, irrigation, electricity and farm credit, coupled with investments in irrigation, are designed to encourage higher yields and production. A range of market support prices are set to cover costs and improve farmer returns. High food subsidies definitely help poor consumers but a major question arising due to these measures and emerging trends is how will it impact Indian and potentially international food markets, and how they will contribute to meet India's objectives of increasing production and reducing food insecurity. On the demand side, India still remains largely vegetarian, and both calorie and protein consumption have remained low compared to levels in developed countries.

### **Addressing food and nutritional security**

At least 12 of the 17 Sustainable Development Goals are directly related to nutrition and contain nutrition-related indicators. This reflects nutrition's central role in achieving sustainable development, as well as its interrelationship with the majority of development sectors. The report highlights that improvements in nutrition are necessary for achieving progress on global health, education, poverty, female empowerment, and inequality. Simultaneously, poverty and inequality, water, sanitation and

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hygiene, education, food systems, climate change, social protection, and agriculture all have an important impact on nutrition outcomes.

According to Global Nutrition Report 2016 prepared by an independent expert group (commissioned by IFPRI) released recently in June 2016, India ranks 114th out of 132 countries in stunting among children aged less than five years. The report emphasizes the importance of underlying determinants of nutrition and the role of food security, health systems, education, water and sanitation and other delivery platforms. With 38.7 per cent prevalence of stunting among children under five years of age and 22 per cent adult overweight and obesity prevalence; India's double burden of malnutrition calls for an emergency repair to a broken food system. FAO estimates on undernourished people in India show that in spite of rising population, India might have been able to reduce the population of undernourished people from a high of 262 million in 1993-95 to a low to an estimated 196 million by 2014-15, indicating more rapid progress in reducing food insecurity.

With about one-quarter of the world's food insecure people within India, improving its nutritional status remains a significant challenge. Undernourishment has a significant impact on child development, which in turn influences adult productivity and economic growth. According to UNICEF-2014 reports that population of Indian children under-five years with moderately and severely underweight and stunted due to chronic undernourishment have fallen from 58per cent in 1992-93 to 43per cent in 2005-06. Still, India is yet to realize the Millennium Development Goal target of reducing by half the percentage of undernourished people by 2015. The number of food insecure has remained high despite India's rising trade surplus in cereals.

The role of cereal consumption in food security is highlighted by dietary evidence. The 12th Five-Year Plan Document (2012-17), which expresses concern that falling cereal consumption per capita since the mid-1990s "is the main reason why per capita calorie intake has not increased despite rising income. Even poor people are reducing the share of income spent on all foods in order to meet other non-food needs. In such a situation, where there is a disjunction between such a basic requirement of human development as nutrition and other consumer demands, there is a need to ensure that minimum nutrition requirements are met" (Government of India, 2013c, Chapter 12, p. 17). This is an important aspect which

underlies the rationale of India's new Food Security Act of 2013, which strives to increase the consumption of cereals through targeted subsidies while maintaining market support prices to farmers.

### **'More from Less for More' - An approach to meet the challenge of Indian agriculture and food security in India**

As discussed in the earlier sections, there is no doubt that India has made great strides in its efforts towards achieving the self reliance in food production during last few decades. But despite this food security to its billion plus population is a big challenge that needs to be addressed through policy instruments supported by well executed programmes on ground. The new challenges require much more dynamic solutions.

Improving agricultural productivity, while conserving natural resources, is an essential requirement to increase India's food supplies on a sustainable basis. Sustainability in agriculture is very important as many problems faced by farmers are related unplanned water use especially in arid area cultivating water intensive crops. Excess fertiliser usage not only makes the plants dependent on artificial fertilisers but also erodes the land quality, polluted ground water and in case of a surface runoff, pollutes the nearby water bodies. Currently, India's agriculture is still dominated by small scale farming that is intensive in terms of input use - fertilisers and pesticides - leading to degradation of land productivity in the long term and environmental degradation. Greater mechanisation will be needed to ensure increases in production from a falling and ageing labour force. Overall, the old model of intensification with ever increasing inputs is no longer sustainable, and India's food system will need to "produce more from less" and to benefit from stronger integration with markets.

As stated above, there is diversity in Agriculture Production, the Government is trying to reduce pressure and exploitation of Natural Resources in Northern/NW States through various initiatives in Eastern & NE States where plenty of opportunity to enhance food grain production sustainably. As indicated earlier in this write up, to address the issue of imbalanced nutrient application, correcting the distortion in relative prices of primary fertilizers (urea for example) could help correct the imbalances in the use of primary plant nutrients nitrogen, phosphorus, and potash and use of bio-fertilizers. To improve efficiency of fertilizer use thereby soil fertility and productivity, what is really needed is promotion of location specific use of fertilizers, integrated nutrient management,



including, use of micronutrient and soil amendments, improvement in soil testing services, development of improved fertilizer supply and distribution systems, and development of physical and institutional infrastructure.

## Doing more and better with Less- SDG-12 and its implications for SDG-2

Achieving the desired production levels in itself doesn't guarantee efficient use of produced material. United Nations (2016) estimates that 'one third of all food produced (equivalent to 1.3 billion tonnes worth around \$1 trillion) ends up rotting in the bins of consumers and retailers, or spoiling due to poor transportation and harvesting practices. This is another challenge that needs to be addressed even in India. Every year we have the situation where in precious farm produced gets rotten due to lack of necessary infrastructure for its proper storage. SDG-12 is about ensuring sustainable consumption and production patterns which can play an important role in ensuring the successful realisation of SDG2. It basically aims at "doing more and better with less". It warrants reducing wastage of farm produce and food items by developing better food harvest, storage, processing, transport and retailing processes. This broadly boils down to taking care of entire supply chain of a given crop.

### **Capacity building of farmers as change agents and messengers for sustainable development:**

Capacity building of farmers as a community is need of the hour to draw upon their skills and resources they need to take control and not only improve their lives but fuel the growth necessary for meeting the economic development aspirations of India which is necessary for ending hunger and removing poverty. While, sustainable agriculture provides the foundation of the framework for achieving the SDG 2, it is the empowered farmers across the country who will make it possible attain the goal of sustainable agriculture. Hence their capacity building and empowerment is must for the success of India in realising the goal of ending hunger, eradicating poverty, increasing nutrition through sustainable agriculture.

Ending hunger through poverty alleviation cannot be achieved without ensuring sustainability as a key element of programmatic strategies devised for realising SDG2 particularly with respect to agriculture. Sustainable development is understood in the broader context of a

developmental process that ensures availability of resources and opportunities to the future generation and resultant responsibility on those responsible for shaping today's developmental processes. This warrants a well thought out development project interventions conceived with the notions of the above mentioned principles of sustainable development. These principles shall be interwoven as elements of programmatic sustainability for actual transformation in Indian scenario.

India's National Agricultural Policy accords high priority to the sustainability of agriculture. The National Agricultural Research System (NARS), comprising ICAR and the State Agricultural Universities, also need to emphasize the importance of incorporating the sustainability perspective into the research and education programmes. But this requires an analytical framework for sustainable agriculture that can guide a transition from research and education directed towards productivity goals that addresses productivity issues keeping sustainability concerns in sight. The National Mission for Sustainable Agriculture (NMSA), which is one of the eight Missions (now nine) under the National Action Plan on Climate Change (NAPCC) seeks to address issues regarding 'Sustainable Agriculture' in the context of risks associated with climate change by devising appropriate adaptation and mitigation strategies for ensuring food security, equitable access to food resources, enhancing livelihood opportunities and contributing to economic stability at the national level.

Sustainability as defined by International Fund for Agriculture Development (IFAD) comes very close to explaining how to do this. Sustainability here is seen as a process essential for ensuring that the institutions supported through projects and the benefits realized are maintained and continued even after the completion of the developmental projects. It would be useful to take cognizance of the following four sustainability elements while devising the response for achieving the SDG2 in Indian context:

1. Institutional sustainability: establishment and nurturing of functional institutions which are self-sustaining even after the project ends.
2. Household and community resilience: making communities resilient so that they are readily able to anticipate and adapt to changes through clear decision-making processes, collaboration, and management of resources internal and external to them.
3. Environmental sustainability: This must be integral to the projects and overall developmental strategy as it has to ensure that environmentally sustainable systems to maintain a stable resource base, avoid overexploitation of renewable resources and preserve biodiversity
4. Structural change: Given the extent of poverty and hunger in India, it is essential that the structural dimensions of poverty specific to India are addressed through the empowerment of poor and marginalized rural households.

Attaining sustainable agriculture will require internalizing all the four sustainability elements discussed above. This means actual efforts towards effective capacity building resulting in empowerment of communities engaged in agriculture. This shall not only give them capacities but also ensure sustainability of the natural resources and ecology of their area to ensure the sustained growth.

Capacity building measures in relation to realizing the SDG2 shall be devised considering the contextual fit for the communities engaged in agriculture across India. Broad principles for this purpose may include:

Increased stakeholder participation	<ul style="list-style-type: none"> <li>• Establish strong linkages with other organizations and people</li> </ul>
Enhancement of their problem assessment capacities	<ul style="list-style-type: none"> <li>• Enhanced stakeholder capability to ask questions</li> </ul>
Development of local leadership	<ul style="list-style-type: none"> <li>• Increased community stakeholder control over programme management</li> </ul>
Establishment of empowered	<ul style="list-style-type: none"> <li>• Creation of an environment necessary</li> </ul>



organizational structures	for establishment of an equitable relationship of community stakeholders with outside agents
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### 1.3 Indian efforts towards ending hunger through Agriculture policies in India

India has tried to address the issues of poverty, hunger and nutritional deficiency through various policies and programmes since its independence. This is clearly visible in various initiatives beginning from community development programmes right after independence to introduction of public distribution system (PDS), Integrated Child Development Scheme (ICDS), Mid Day Meal programmes, Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) and finally bringing the Food Security Bill.

There are four broad policy instruments which the Indian government has employed to achieve its diverse food security objectives. These are market support policies, trade policies, input subsidies and food distribution policies. Each of them is briefly explained below:

#### Market support policies

Agricultural marketing, essentially a sub-set of the overall marketing system, involves the procurement of farm inputs by the farmers and the movement of agricultural produce from the farms to the consumers/manufacturers/exporters. An efficient marketing system minimizes costs and maximizes benefits to all the sections of the society including the producing farmers. It ought to provide remunerative prices to the farmer, food of the required quality at reasonable prices to the consumers and adequate margins to the middlemen. The regulated markets have been organized (beginning 1951) in most of the states to facilitate trading in transparent manner in specified commodities at specified places with minimum margin. To achieve this, comprehensive rules have been framed and market committees have been set up to enforce discipline among the participants under the respective State Agricultural Produce Marketing Regulations Acts. As mentioned earlier, central government has passed a model APMC act 2003, but many of the states have to enact state act on this. While regulated markets have helped in mitigating the market handicaps of the producers/sellers at the

wholesale level, the rural periodic markets in general and the tribal markets in particular remained out of its developmental ambit.

The Agricultural Prices Commission was set up in January 1965 to advise the Government on price policy for agricultural commodities. The basis for setting up the Commission was to develop a balanced and integrated price structure in the perspective of the overall needs of the economy and with due regard to the interests of the producer and the consumer. Currently the Commission (renamed Commission for Agricultural Costs and Prices) sets Minimum Support Prices (MSP) for 24 commodities and a Fair and Remunerative Price (FRP) for sugarcane.

For most products, other than tariffs, there is no effective mechanism to ensure that prices do not fall below the MSP. Procurement is used for some products like rice, wheat, sugarcane, cotton and jute in a few states. Procurement has led to higher public stocks in recent years, creating challenges for stock management and for redistribution and the prevention of product waste.

### **Trade Policy**

To stabilize of prices at levels that are regarded as remunerative to producers and reasonable to consumers government of India has public trading policy. Under this, the government purchases specified commodities at notified procurement prices (MSP) directly from producers and distributes the purchased items among consumers through a network of fair price shops at notified issue prices under revamped public distribution system. The increasing procurement, coupled with declining off-take, had raised the level of food stocks as against the buffer stock norms in the recent past years. The cost of operations of the procurement agencies has therefore gone up substantially and the open-ended procurement by these agencies has become unsustainable.

India has been an active participant in the World Trade Organization (WTO), and a key member of both the G33 and G20 groups of negotiating countries. Its stance with respect to the agriculture negotiations reflects its objective to safeguard the livelihoods of its 650 million people who are reliant on a primarily smallholder based agricultural sector. In this context, it has been one of the main proponents of the introduction of an effective special safeguard mechanism (SSM), resistant to significant reductions in bound tariffs for key commodities and the main proponent in seeking

dispensation to undertake commodity procurement at above market prices for food stockholding for the purposes of food security.

### **Food distribution policies**

India has provided food grain (mainly, wheat and rice) at favourable prices through its Public Distribution System (PDS). This has involved the distribution of products that have been procured by the Department of Food and Public Distribution at minimum support prices to about 30 per cent of the Indian population covering qualifying groups in rural and urban areas depending on their income status (over or under the poverty line) and if they belonged to severe poverty group known as Antyodaya-Anna-Yojana (AAY).

In the last ten years, the expenditure on PDS has increased substantially as minimum support prices were raised, from about USD 5 billion in 2002-03 to almost USD 14 billion in 2012-13.

From September 2013, a new National Food Security Act (NFSA) was enacted. It is the most ambitious "right to food" programme yet to be applied in history, covering over 800 million people and providing 60 kg of food grain per person each year at prices that are about 10 per cent of current retail prices for food grains. The programme extends the previous distribution programme for wheat and rice. The NFSA now provides up to 5 kg per person per month for 67 per cent of the population at prices of INR 3/kg for rice, INR 2/kg for wheat and INR 1/kg for coarse grain. This programme, if fully implemented, would be the largest food distribution programme ever to be undertaken. But as mentioned in the earlier sections, its implementation is a major challenge for the country.

The government's food distribution policy has to be transformed to deal with surpluses rather than only shortages. State Governments need to be given larger role in procurement and distribution of food grains for the PDS in their respective states. This will greatly reduce in the cost of food grain procurement, storage, transportation and distribution.

### **1.4 Climatic Changes and the need for a sustainability framework for achieving the SDG-2**

Climatic Change and its adverse impact on ecology and human society are now a well established and accepted phenomena including by the

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Intergovernmental Panel on Climate Change (IPCC). The literature and the scientific evidence on the subject suggests that climatic changes can threaten the basic elements of life like, access to water, food production, health, and use of land and the environment. Most of the developing economies like India are prone to such impacts given their proximity to equator. They are vulnerable to temperature and monsoon variations induced by climatic changes. India's economy is still propelled by the significant contributions coming from agriculture. Indian agriculture and animal husbandry is heavily dependent on monsoon for irrigation and drinking water. Both these activities also contribute to the phenomena of climate change if practiced in unsustainable manner. Agriculture-water and energy nexus is well debated topic which has severe climatic implications.

OECD (2015) summarises the impact of unsustainable agricultural practices and their impact on climatic behaviour. Scientific evidences suggests that 'agriculture is also contributing a significant share of the greenhouse gas (GHG) emissions that are causing climate change - 17per cent directly through agricultural activities and an additional 7per cent to 14percent through land use changes'.

Given the above context, it is important to factor in these elements while devising the strategy for realising the targets under SDG 1 and 2 as it can affect the food production adversely thereby affecting small and marginal farming communities and the food security in the country. The SDG-1 refers to poverty alleviation whereas the SDG-2 is about ending hunger. The strategy for this purpose will require greater scientific understanding of the climate change phenomena by the agriculture and allied fraternity on one hand and the policy making establishment on the other to make well informed policy decisions. Timing of the actions are crucial in dealing with the adverse impacts of climate change (flood, drought, pest attacks etc.), hence a countrywide remote sensing/GIS based IT infrastructure for monitoring and issuing advisories is must for timely actions by all concerned agencies and farmers themselves. It also means capacity building of farmers and all concerned with agriculture which itself is a huge task. If this is not done effectively, India's poor and disadvantaged population will suffer most whereas it will also affect the balance of the food supplies for rest of the population. Hence, the framework for realising the SDG-2 builds in the necessary provisions which empower the

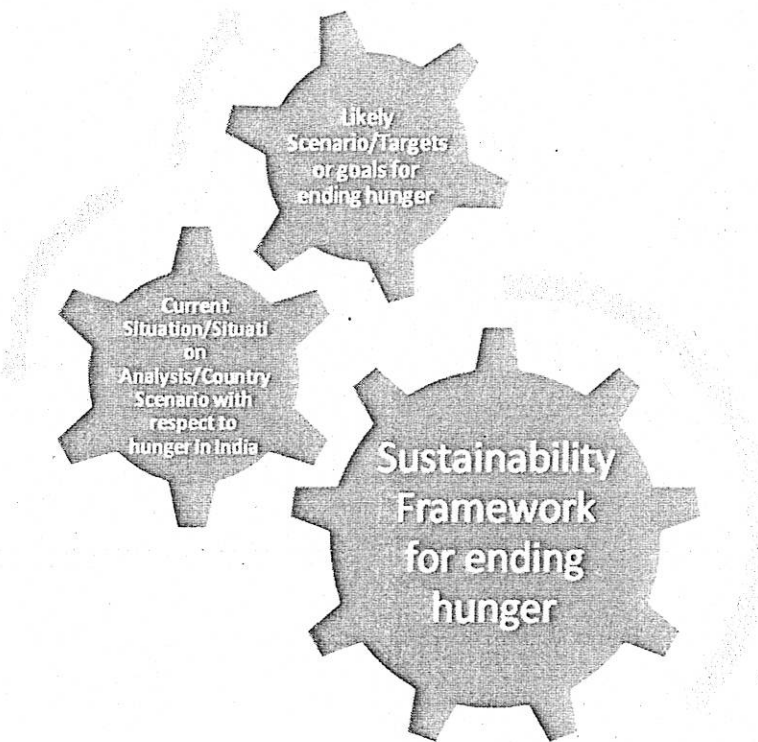


farmers and governments concerned to cope with the impacts of climate change effectively.

## 2.0 Sustainability Framework for Ending hunger, achieving food security and improved nutrition and promote sustainable agriculture

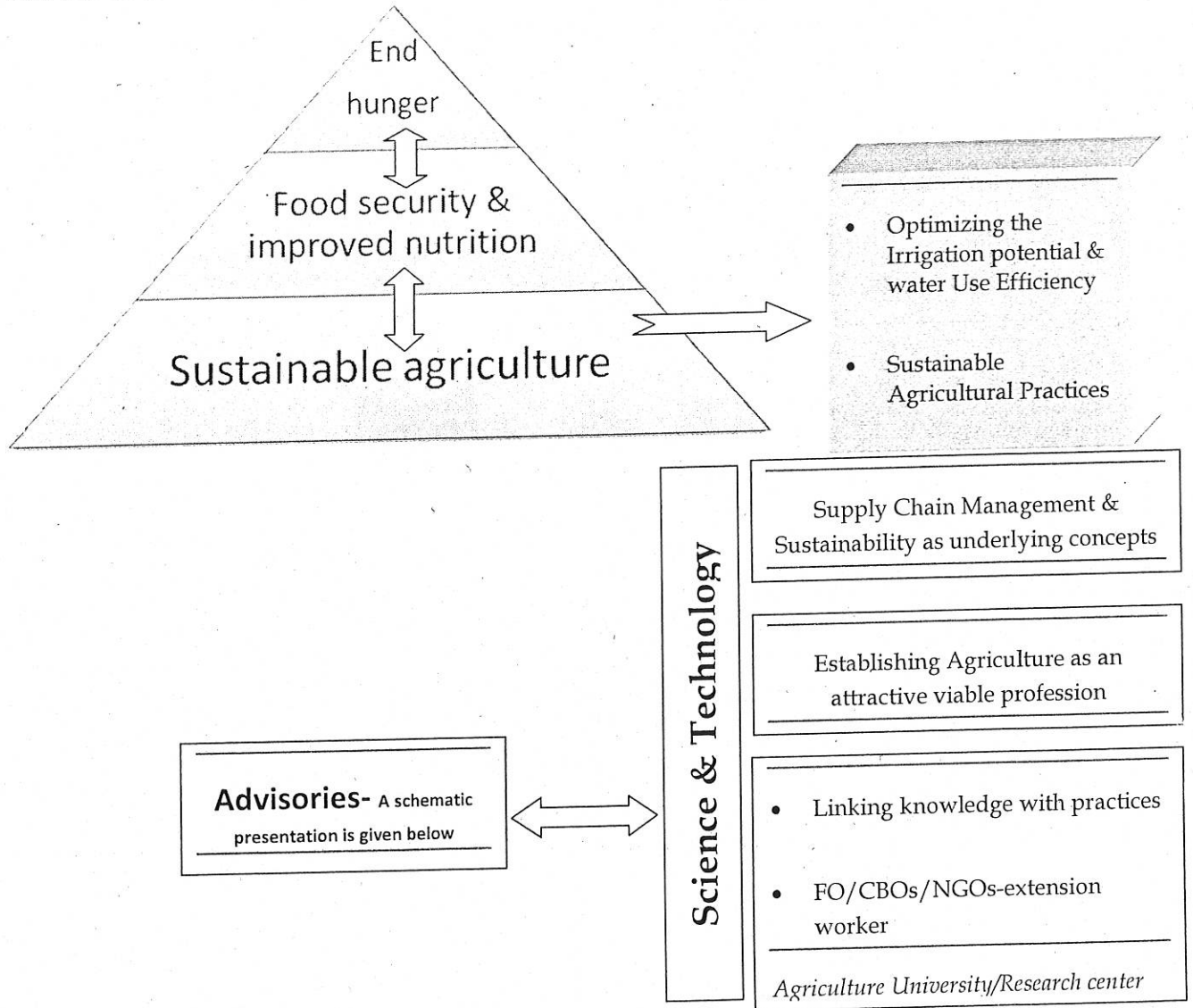
Sustainability Framework for ending hunger is based on situation analysis for India presented in this paper and country specific strategies presented in the following sections in the light of hunger specific likely scenarios for the country in next few decades

**Figure 2.1. Diagrammatic presentation of the process for arriving at Sustainability Framework for SDG-2**

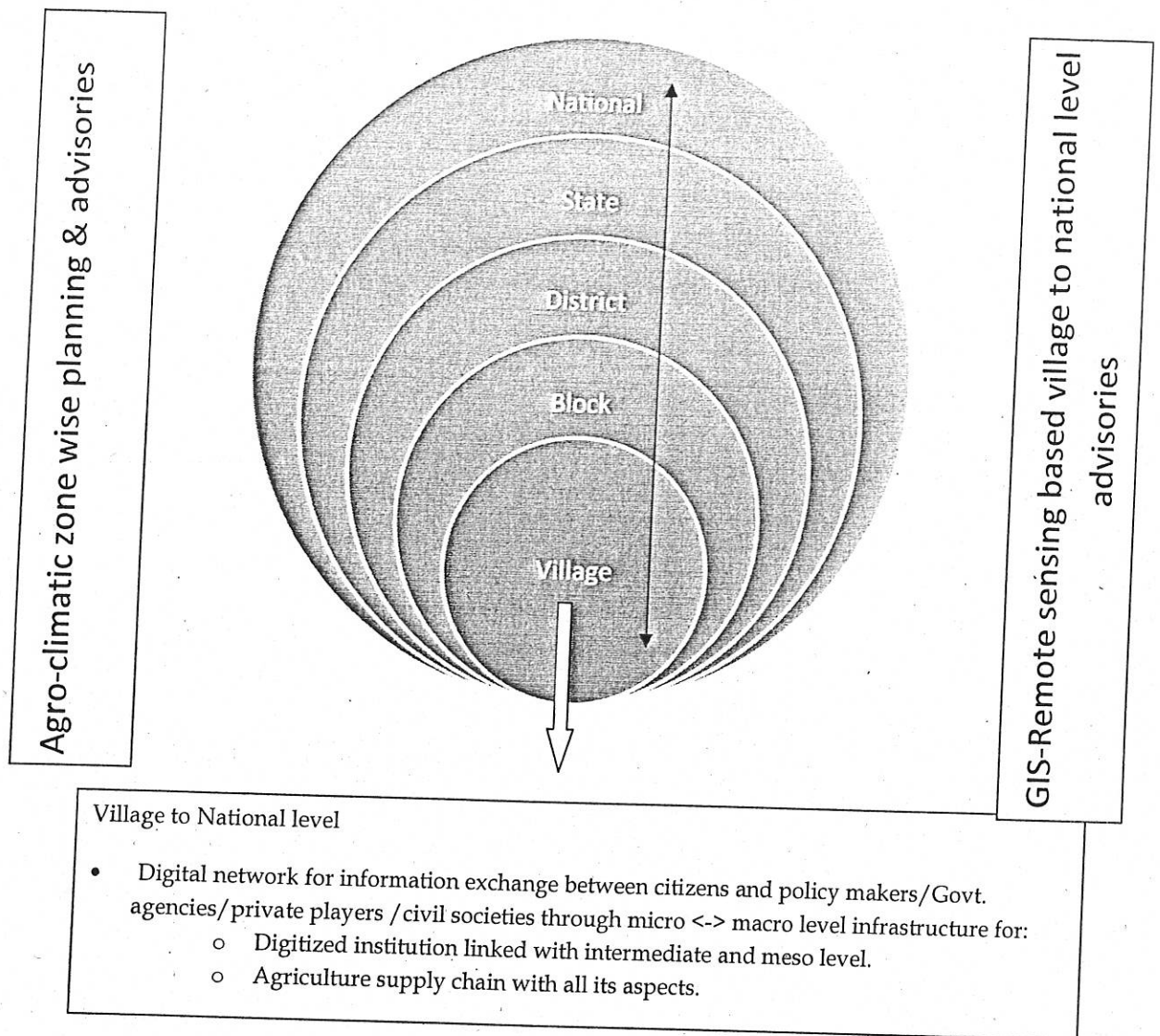


The schematic diagram shown in the Figure 2.1 depicts the thought process behind the development of the framework for ending hunger, ensuring food security, increased nutrition and sustainable agriculture in India. It considers the analysis presented in the earlier sections about various aspects of SDG2 like hunger, poverty, agriculture, sustainability etc.

Figure 2.2 Diagrammatic presentation of the Sustainability Framework for SDG-2



2.3 Diagrammatic presentation of the Sustainability Framework for SDG-2 (IT enabled digital infrastructure for dynamic exchange of information)



## 2.1 Explaining the Framework

Figure 2.2 and 2.3 present inter relatedness of three elements within SDG-2 namely, ending hunger, ensuring food security and sustainable agriculture.

The framework for realising SDG2 is fundamentally based on the premises that Sustainable Agriculture is the bed rock for achieving the targets under SDG2. If sustainable agriculture can be actually translated into reality, India can very easily achieve the SD goals. Sustainable agriculture can ensure rural prosperity, thereby removing the poverty across the section of society if coupled well with other complimentary measures. On the other



hand it can produce sufficient nutritious food basket at affordable but rational rates to the people. Cumulative effects of these two can lead to final outcome of realizing the SDGs including SDG2 on ending hunger, Food Security and increasing nutrition.

While government has several initiatives/schemes/programmes to optimize the production of various crops and food items but in the absence of sustainability mechanisms in place, they do not yield the desired results.

Hence the framework suggests some measures for sustainable agriculture. Some of them are:

A. Sustainable Agricultural Practices:

- Optimising the Irrigation Potential and Water Use Efficiency: Increasing the irrigation potential through effective Demand and Supply side management of water and efficient use of water
- Integrated Nutrient Management (INM)/Bio-Fertilisers/ Organic Farming/ Mechanisation and Technology
- Integrated Pest Management
- Improved Farm Practices/Crop Diversification
- Conserving Indigenous Genetic Resources/ Conserving Agricultural Heritage/ITK
- Agroforestry
- Promotion of climate resilient practices and conserving Agro-biodiversity through in-situ & ex-situ measures, increase nutritional value etc
- Forward-backward linkages
- Cold storage chain
- Warehouses

B. Supply Chain Management and Sustainability as umbrella concepts for making agriculture sustainable and an instrument of rural transformation as discussed in earlier sections

C. Establishing agriculture as an attractive viable profession

D. Linking knowledge with practices

E. Establishment and nurturing of FO/CBOs/NGOs-extension workers as local institutions for rural transformation

- F. Cutting edge knowledge on Farming and Agricultural Supply Chains: A constant dialogue among multiple stakeholders: ICAR, Agriculture University/Research centers and Farmers/FO/CBOs/NGOs-extension workers
- G. Peri-urban Agriculture: Demographic and economic expansion of cities, through processes such as migration and industrialization, trend to be accompanied by spatial expansion, resulting in encroachments by cities upon adjacent peri-urban areas. At the same time, areas that were earlier distant from the city and rural in character will subsequently start falling within the cities reach. Typically, increased interaction with and access to the city economy, in terms of capital, labour (public & private) goods and services will subsequently trigger the transformation of the rural to peri-urban areas. The rural-peri-urban-urban continuum itself is thus dynamic in nature and the changes will be more marked around cities that are rapidly urbanizing or growing both economically and spatially, as compared to slower-growing or stagnant urban cores.

Science and Technology shall be integrated in agriculture in their entirety and also in all other related departments to make them more relevant and competitive with the rest of the world. IT enabled digital infrastructure for dynamic exchange of information is the driving force that can not only play an instrumental role in making agriculture sustainable but also transform the way India manages its natural resources well integrated with the governance system and also address the challenges posed by climatic changes.

### **3.0 Situation Analysis: A statistical overview in relation to designing the framework for achieving the targets under SDG2**

This section analyses the Indian context in relation to key indicators having influence on vision and planning for realising the SDGs in general and SDG2 in particular.

### 3.1. Demographic/Socio-economic indicators

Demographically, Indian population has increased almost four times since 1951 (from 361 Million to 1235 Millions). India has also seen a remarkable improvement in the death rate (from 27.4 in 1950-51 to 7 in 2012-13) and Life expectancy at Birth has also increased from 32.1 years in 1950-51 to 67.5 years in 2012-13. Whereas the Birth rate has declined from 39.9/1000 to 21.4/1000 in the similar period it will be a while when India's population growth stabilizes at a rate which is healthy for the overall prosperity in the country. It would be worthwhile to note that despite that fact that India's total land area is only 2.2 per cent of the world's land area, it supports more than 15 per cent of the global population. This also indicates the challenge while planning food security for India's population which is projected to be 140 Crores (1400 million) by 2026 (GoI, 2011 and 2015).

### 3.2. Poverty in India and dealing with hunger

Below Poverty Line population in India stood at 21.92 percent of the total population (1235 million) in 2012-13 (GoI, 2015). This finding is based on Tendulkar Methodology. It simply means almost 22 per cent of population of India is still below poverty lines as on 2011-12. Given the fact that almost 46 percent of India's current population is between the age group of 15 to 44 years, any strategy to address poverty and hunger will have to consider this population as part of its action plans and strategies.

Composition of criteria for deciding the Below Poverty Line population has invited a major controversy in the recent years. The core of the matter is decision on selecting the indicators for deciding the poverty line. Most of the food security measures and social security measures are aimed at population falling below this poverty line. In this case it becomes crucial in case of India as almost 22 percent population is still below poverty line as per Tendulkar Committee criteria. It would be worthwhile to revisit the criteria because a minor negligence of some criteria may leave out a substantial portion of the poor and disadvantaged from availing the state support for securing their basic needs. Several news items on the subject during last few months suggest that current central government

recognizes this concern and it may constitute a panel for re-defining poverty in India.

### **3.3. All India Rural and Urban Unemployment Rates (2011-12)**

The NSSO Report (68<sup>th</sup> Round) on employment and unemployment in India highlights the daily unemployment rates in rural and urban India. Interestingly there is only marginal difference between overall unemployment in rural areas (5.7 percent) and urban areas (5.4 percent). It also means the SDG-2 related vision, strategy and action plan shall factor in these elements by targeting the younger population by creating opportunities for them and utilizing their capabilities in achieving the targets under SDG2 and other relevant SDGs.

### **3.4. Agriculture Land use and its contribution to GDP in India**

The agriculture land use in India has remained more or less constant since 1950-51 to 2012-2013 except the fact that there is an increase of 1 per cent in Net Sown Area. As mentioned above the population of the country has increased by almost four folds (from 351 million in 1951 to 1235 million in 2012-13). It also means that whatever improvement in food production is achieved is more or less from the same amount of area. It also means intensity of cropped area and constant inputs are the factors behind the increase in the production. It becomes all the more important when we consider the fact that GoI (2015) figures for Gross Domestic Product (GDP) by Economic Activity at Constant (2004-05) Prices suggest that agriculture is still a key contributor to the GDP of India.

### **3.5. Population and Agricultural Workers:**

An analysis of GoI statistics (2015) on population and agricultural workers shows a significant trend about the agricultural workforce (cultivators+ agricultural labourers) from the total work force in India since 1951. Although, there is a decline from 69.7 per cent of the total workforce in 1951 to 54.6 per cent of the total workforce in 2011, but it is still more than 50 per cent of the total workforce in India. This fact warrants thinking from policy makers and the planners with respect to their livelihood, food security and over all well being. Success of the government strategy to eliminate poverty and ending hunger will depend on the successfully



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converting this demography into a more productive assets thereby transforming the economy of rural India (demographic dividend).

As discussed above, India is the second most populous country in the world. Its total population is estimated at around 1.2 billion people and in terms of GDP it is the third-largest economy in the world. Although, India has seen steady economic growth and achieved reasonably good self-sufficiency in food grains production, it is paradoxical to see high levels of poverty, food insecurity and malnutrition in India (WFP: <https://www.wfp.org/countries/india> accessed on 04/10/2016). Indian initiative to address these paradoxical situations requires not only increasing the efficiency of its governance systems but also to have a problem specific course correction wherever needed. The following section looks at vision, strategy and action plan necessary for realising the Sustainable Development Goals in general and SDG2 in particular.

#### **4.0 Vision, Strategy and Action Plan (2017 to 2030)**

The total area under cultivation covering major producing states was 122.07 million ha in the year 2013-14 which was estimated to increase up to 125.04 million ha in 2014-15. Similarly, agricultural production stood at 267 million Tonnes in 2014-15. Provisional figures for cultivable area under irrigation for the year 2012-13 was 51.2 per cent of the total cultivable area.

Since area/ production is low in individual states, the call by GoI for doubling the income of farmers by 2022 warrants strategies that can help in realising this goal through farm and allied activities along with non-farm economic activities complementing the former. These goals also require a thorough planning. To achieve the target of doubling the income by 2022 a targeted planning can be done with resources and relevant programmes.

#### **4.1: A 15 Year Vision: Making Indian Agriculture Sustainable to ensure food security and enhanced nutrition levels necessary for ending hunger**

1. Sustainable use and availability of natural resources like land, water and the forests. Efficient and Effective input and nutrient management, Sustainable on farm practices. The policy of NMSA

- needs to be framed to introduce economically viable, technically sound, environmentally non-degrading and non-hazardous and socially acceptable use of natural resources of the country for promoting the concept of sustainable agriculture.
2. Viability of agriculture has become a challenge due to continuous division & fragmentation of land. Hence land pooling should be given priority so that FPOs, contract farming can take the advantage of the scales of economy. Further it will help in leasing without comprising the original right & title of the tenants.
  3. Supply chain management as an umbrella concept for the day to day management of agriculture (for planners and managers)/ inputs (quality soil/ irrigation water/seed/fertilizers/pesticides/growth promoters/ mechanization/ knowledge and practices both climate resilient traditional & scientific etc.).
  4. What leads to Food Security: Sufficient food production/ purchasing capacity of the people (increase in the income levels)/ restructured and targeted subsidy for those who can't purchase at normal rate/ mechanism for easy access to affordable food products.
  5. What enhances the nutrition levels: Food Basket filled with options of nutritious food (horticulture-fruits/vegetable/ dairy products/ poultry / fisheries/ Agro forestry -forest produce like honey / Revival of climate resilient and nutritious Agro-biodiversity / In-situ conservation etc.). Again here mechanism for easy access to affordable nutritious food products to every citizen is a must.
  6. Encourage application of biotechnology (especially drought tolerance technology, remote sensing technologies, energy saving technologies, pre- and post-harvest technologies, and technology for environmental protection. Moreover, an attempt by the government is needed to move towards a regime of financial sustainability of extension services in a pleased manner.
  7. What all leads to ending hunger: 1, 2, 3 together will make it possible to end hunger.
  8. Special attention to be focused on application of breakthrough technologies for substantive increase in yield by cultivation of

genetically drought and pest resistance varieties with the aim to use low consumption of water.

#### 4.2: A 7 Year Strategy

A calibrated effort from all concerned ministries, departments, NGOs and other civil society groups can ensure the successful realization of the above mentioned vision through a strategy implemented through an action plan. This will have the following as strategy:

In order to achieve the target of doubling of farmers' income by 2022 which in itself can become a vehicle for fulfilling the SDG2 if complemented well with other supporting measures. The Government of India has laid out a strategy with:

1. Well-designed programmes/initiatives
2. Adequate resources and
3. Good governance in implementation

The Government of India has laid out a strategy, well-designed programmes, adequate resources and good governance in implementation, the target of doubling of farmers' income by 2022 which is achievable. Focusing only on income from cultivation for facilitating doubling of income will prove to be inadequate. Policy measures aimed at increasing net income of households from allied activities will be the key driver of incomes in agricultural households.

But focusing only on income from cultivation for facilitating doubling of income will prove to be inadequate. Policy measures aimed at increasing net income of households from allied activities will be the key driver of generating additional incomes in agricultural households. The strategies of the Government include:

1. Big focus on irrigation with large budgets, with the aim of "per drop, more crop'
2. Promotion & provision of drought resilient seeds and nutrient use, based on soil health of each field (Still the question of what will be supply mechanism is missing and that is crucial for the success of this initiative). Now focus on addressing micro nutrient efficiency.



3. Integrated Pest Management
4. Improved Farm Practices/Crop Diversification
5. Conserving Indigenous Genetic Resources/ Conserving Agricultural Heritage/ITK/
6. Promotion of Agroforestry
7. Promotion of climate resilient and nutritious Agro-biodiversity / In-situ conservation to tackle climate change, increasing nutritional value
8. Large investments in infrastructure particularly post harvest infrastructure (common farmers don't even know whether such facilities exist and where or how to access them to their advantage) and cold chains (creating new cold storages is one effort but putting the existing or already created cold storages to proper use -which are totally unused at times -will have a cascading effect on this aspect) to prevent post-harvest crop losses (Cold chain and other relevant technologies for this purpose shall be explored, tested and promoted).
9. Promotion of value addition through food processing
10. Creation of a national farm market, removing distortions and e-platform across 585 stations (It can be a part of dynamic digital platform suggested in the Framework)
11. Have a farmers friendly Safety net.
12. Upscaling of Integrated Farming System (IFS).
13. Interventions under all the schemes needs to be emphasized to reduce the cost of cultivation in subsequent years.

#### **4.3: A 3 Year Action Plan (2017-18, 2018-19, 2019-20)**

1. Big focus on Water use efficiency (WUE), utilization of created potential, WUE enhancement: Only 85% created irrigation potential is being utilized, 15% gap is due to various reasons i e. lack of conveyance system, improper crop/cropping system etc. Besides, WUE in India is about 35-40% which requires to be increased by integration of water source, distribution and application & enhance adoption of precision-irrigation & other water conservation technologies.
2. **Provision of quality seeds and nutrients based on soil health of each field:** Yearly targets for creation of Soil Testing facilities at least at block levels, input supply mechanism with seasonal targets/feedback mechanism on the progress of these activities/liasoning between government agencies-knowledge institutions-

farmer's organisation, farmers and the input supplier. NB: Establishment of Farm Schools at the levels of clusters of villages run by village level incentivised development worker will go a long way in achieving multiple goals.

3. Integrated Pest Management and nationwide early (adjacent areas and crop wise) pest monitoring net work.
4. Improved Farm Practices/Crop Diversification
5. Conserving Indigenous Genetic Resources/ Conserving Agricultural Heritage/ITK/
6. Promotion of Agroforestry
7. Promotion of climate resilient practices and conserving Agro-biodiversity through in-situ & ex-situ measures, increase nutritional value etc
8. **Large investments in warehousing and Cold Chains to prevent post-harvest crop losses:** First year-mapping of such facilities and awareness creation among farming communities along with targets for creation of new facilities, second year -targets for consolidating the first year's process, Third year targets- new facilities/consolidation of year-1 and 2, feedback on status of functional apparatus with identification of issues before proceeding in the next phase of implementation.
9. **Promotion of value addition through food processing :** Year-1 and 2-creation of digital infrastructure and pilots across the states for promoting value addition among famers and other stakeholders
10. **Creation of a national farm market, removing distortions and e-platform across 585 stations:** a) Year wise targets for creation of National Farm Market, b) Automation to facilitate the smooth interface between farmers and buyers to remove exploitation and ensure fair play at APMCs, c) also APMCs are already being covered under a devoted e-networks that can provide solid ground for the nationwide dynamic digital platform
11. **Introduction of a new crop insurance scheme to mitigate risks at affordable cost:** Already in place but its impact needs to be studied in Year-1; Year-2- bottlenecks identified shall be dynamically addressed through an accessible mechanism to further expand it with yearly targets for Year-2 and 3.
12. **Promotion of ancillary activities like poultry, beekeeping and fisheries:** a) Year-1- Mapping their numbers, performance; b) yearly targets for scaling each of them up; c) yearly targets for promoting the use of cutting edge knowledge and technology for each of them



## Annex I

Sustainability Framework for SDG2: End Hunger, achieve food security and improved nutrition and promote sustainable agriculture

Instruments	Elements of Sustainable Agriculture	Mapping of successful regional models of Sustainable Agricultural Practices across India	Capacity building	Scaling up of regional models of Sustainable Agricultural development Practices	Revisiting the Policies and institutions to refine the Agriculture policy/institutional infrastructure in India
Outcomes		2016-2017	2017-2018	2018-2019	2018-2019
Outcome 1 : Establishing, introducing and strengthening Sustainable agricultural development	Umbrella concepts guiding each key actor within the Indian Agriculture <ul style="list-style-type: none"> <li>• Supply Chain Management and</li> <li>• Sustainability</li> </ul>	Mapping the agricultural practices /best practices based on understanding of supply chain management and sustainability concepts	Capacity Building of Multiple Stakeholders on various aspects of sustainable agriculture supply Chain management	Implement inclusive, efficient and sustainable supply /value chains across states	Building in the Supply Chain Management and Sustainability concepts into policies, legislations and / or guidelines for establishing the evidence-based, outcome-driven

Instruments	Elements of Sustainable Agriculture	Mapping of successful regional models of Sustainable Agricultural Practices across India	Capacity building	Scaling up of regional models of Sustainable Agricultural development Practices	Revisiting Policies and institutions to refine the Agriculture policy/institutional infrastructure in India
Outcomes		2016-2017	2017-2018	2018-2019	2018-2019
t practices in India (2016-2017 to 2017-2018 and 2018-2019)	Sustainable Agricultural Practices: 1. Optimising Irrigation Potential and Water Use	Mapping the agricultural practises/ best practises based on Sustainable Agricultural Practices	Capacity Building of Multiple Stakeholders on various aspects of Sustainable Agricultural Practices	Up scaling Sustainable Agriculture Development Models/ projects using GoI /UN Agencies/ Private	Building in the Sustainable Agricultural concepts into policies, legislations and/ or guidelines for establishing the

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Instruments	Elements of Sustainable Agriculture	Mapping of successful regional models of Sustainable Agricultural Practices across India	Capacity building	Scaling up of regional models of Sustainable Agricultural development Practices	Revisiting Policies and institutions to refine Agriculture policy/institutional infrastructure in India
Outcomes	Efficiency: Increasing the irrigation potential through effective Demand and Supply side management of water and its efficient use	2016-2017	2017-2018	2018-2019	2018-2019
	2. Integrated Nutrient Management			sector finance/financing in several states.	evidence-based, outcome-driven sustainable agricultural development practises across India

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Instruments	Elements of Sustainable Agriculture	Mapping of successful regional models of Sustainable Agricultural Practices across India	Capacity building	Scaling up of regional models of Sustainable Agricultural development Practices	Revisiting Policies institutions to refine Agriculture policy/institutional infrastructure in India
Outcomes	(INM) / BIO-Fertilisers/ Organic Farming 3. Mechanisation and Technology 4. Integrated Pest Management 5. Improved Farm Practices/Crop Diversification 6. Conserving	2016-2017	2017-2018	2018-2019	2018-2019

Instruments Outcomes	Elements of Sustainable Agriculture	Mapping of successful regional models of Sustainable Agricultural Practices across India	Capacity building	Scaling up of regional models of Sustainable Agricultural development Practices	Revisiting Policies institutions and to refine the Agriculture policy/institutional infrastructure in India
	Indigenous Genetic Resources / Conserving Agricultural Heritage/ITK	2016-2017	2017-2018	2018-2019	2018-2019
	7. Promotion of Agroforestry 8. Revival of climate resilient and nutritious Agro-biodiversity				

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Sustainability Framework for realizing SDG2

Instruments	Elements of	Mapping of successful regional models of Sustainable Agricultural Practices across India	Capacity building	Scaling up of regional models of Sustainable Agricultural development Practices	Revisiting Policies institutions to refine Agriculture policy/institutional infrastructure in India
Outcomes	Sustainable Agriculture				
	/ In-situ conservation to tackle climate change, increasing nutritional value etc. 9. Forward-backward linkages 10. Cold storage chain/Warehous	2016-2017	2017-2018	2018-2019	2018-2019

Instruments Outcomes	Elements of Sustainable Agriculture	Mapping of successful regional models of Sustainable Agricultural Practices across India	Capacity building	Scaling up of regional models of Sustainable Agricultural development Practices	Revisiting Policies and institutions to refine the Agriculture policy/institutional infrastructure in India
	e	2016-2017	2017-2018	2018-2019	2018-2019
	11. Promotion of ancillary activities like poultry, beekeeping and fisheries and Integrated Farming System				
	Establishing agriculture as an attractive viable	Mapping the best practises examples	Capacity building of potential	Replicating Agriculture based	Building in the Agriculture based

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Instruments	Elements of Sustainable Agriculture	Mapping of successful regional models of Sustainable Agricultural Practices across India	Capacity building	Scaling up of regional models of Sustainable Agricultural development Practices	Revisiting Policies and institutions to refine the Agriculture policy/institutional infrastructure in India
Outcomes	profession: Introduction of a new crop insurance scheme to mitigate risks at affordable cost	of Agri-based entrepreneurship/ start ups	entrepreneurs and pilots on Agriculture based start-ups through incubation Centres across country	start-ups based on sustainable Agriculture Development Models using Gol/UN agencies/ Private sector finance/ financing in several states.	start-ups /entrepreneurship based on sustainable Agriculture Development Models into policies, legislations and/ or guidelines for promoting agribusiness enterprises across India
		2016-2017	2017-2018	2018-2019	2018-2019

Instruments Outcomes	Elements of Sustainable Agriculture	Mapping of successful regional models of Sustainable Agricultural Practices across India	Capacity building	Scaling up of regional models of Sustainable Agricultural development Practices	Revisiting Policies and institutions to refine the Agriculture policy/institutional infrastructure in India
	Linking knowledge with practices (Knowledge Institutions Practitioners including farmers)	Mapping the best practises examples of institutionalised exchange of expertise between Knowledge Institutions Practitioners	Capacity building of identified Knowledge Institutions Practitioners including farmers on effective knowledge exchange	Up scaling of best practice examples of institutionalised exchange of expertise between Knowledge Institutions Practitioners across states	Integrating institutionalized exchange of expertise between Knowledge Institutions Practitioners into policies, legislations and/ or guidelines for promoting agribusiness enterprises across

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Instruments	Elements of Sustainable Agriculture	Mapping of successful regional models of Sustainable Agricultural Practices across India	Capacity building	Scaling up of regional models of Sustainable Agricultural development Practices	Revisiting the Policies and institutions to refine the Agriculture policy/institutional infrastructure in India
Outcomes	Establishment and nurturing of FO/CBOs/NGOs-extension workers as local institutions for rural	Mapping the best practice examples of FO / CBOs / NGOs-extension workers as local institutions for rural	Capacity Building of selected FO/ CBOs/ NGOs-extension workers as local institutions for rural transformation - across country	Scaling up of potential FO/ CBOs / NGOs-extension workers as local institutions for rural transformation - across country	India: Prepare the ground for Digitally dynamic knowledge platform across country
					Providing enabling policies, legislations and/ or guidelines for promoting and strengthening of FO/CBOs/NGOs-extension workers as

Instruments Outcomes	Elements of Sustainable Agriculture	Mapping of successful regional models of Sustainable Agricultural Practices across India	Capacity building	Scaling up of regional models of Sustainable Agricultural development Practices	Revisiting the Policies and institutions to refine the Agriculture policy/institutional infrastructure in India
	transformation	2016-2017 transformation	2017-2018	2018-2019	2018-2019
	IT enabled digital infrastructure for dynamic exchange of information	Mapping best practice examples of IT enabled digital infrastructure for dynamic exchange of information on sustainable Agriculture	Capacity Building of selected IT enabled digital infrastructure for dynamic exchange of information on sustainable Agriculture Supply Chains	Scaling up/Linking local regional IT enabled digital infrastructure for dynamic exchange of information on sustainable Agriculture Supply Chains across states	Providing enabling policies, legislations and/ or guidelines for promoting and strengthening of IT enabled digital infrastructure for dynamic exchange of information on

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Instruments Outcomes	Elements of Sustainable Agriculture	Mapping of successful regional models of Sustainable Agricultural Practices across India	Capacity building	Scaling up of regional models of Sustainable Agricultural development Practices	Revisiting the Policies and institutions to refine the Agriculture policy/institutional infrastructure in India
		2016-2017	2017-2018	2018-2019	2018-2019
		Supply Chains and Creation of a national farm market, removing distortions and e-platform across 585 stations	Capacity building for Creation of a national farm market, removing distortions and e-platform across 585 stations	Scaling up of National farm market, removing distortions and e-platform across 585 stations by linking them with the IT enabled digital infrastructure for dynamic exchange of information on sustainable Agriculture Supply	sustainable Agriculture Supply Chains across country and Providing enabling policies, legislations and/ or guidelines for promoting and strengthening of national farm market, removing distortions and e-



Instruments	Elements of	Mapping of	Capacity building	Scaling up of	Revisiting the	
Outcomes	Sustainable Agriculture	successful regional models of Sustainable Agricultural Practices across India		regional models of Sustainable Agricultural development Practices	and to the institutions to refine the Agriculture policy/institutional infrastructure in India	
		2016-2017	2017-2018	2018-2019	2018-2019	
	Sharing of Local and Cutting edge knowledge on Farming and Agricultural Supply Chains (IT/RADIO/TV/CELL etc.): A constant dialogue among	This can be a full-fledged dynamic system supported sharing/exchange among multiple stakeholders for sustainable agriculture and also round the year monitoring and strengthening of agriculture outcomes in the country resulting in Outcome 2: Achieving Food and nutrition security Targets partially during (2016-2017, 2017-2018 and 2018-2019) and later with these things in full swing it may be possible to achieve SDGs earlier than the stipulated time frame.				platform across 585 stations as part of the above mentioned digital platform.

Instruments	Elements of Sustainable Agriculture	Mapping of successful regional models of Sustainable Agricultural Practices across India	Capacity building	Scaling up of regional models of Sustainable Agricultural development Practices	Revisiting Policies institutions and the to refine Agriculture policy/institutional infrastructure in India
Outcomes	multiple stakeholders	2016-2017	2017-2018	2018-2019	2018-2019

**A model Action Plan for doubling the farmer incomes by 2022:**

**Over all Vision: Realising Sustainable Development Goal (SDG)-2 by Achieving Sustainable Agriculture for ending hunger, ensuring food security and improving the nutrition (2030)**

Vision	Target	Specific Targets (Annual targets need to be worked out by the ministry and all concerned)	7 year Strategies (2017-18 to 2023-2024) (Pls. see the comments against each points in the framework document)	Action Plans and Out Lays (Pls. see the comments against each points in the framework document)
Stage-1 for realising SDG2: Doubling the Farmer's Income by 2022  NB: <b>Stage-1 for realising SDG2:</b> It is assumed that this will be the first step towards realising the SDG2. It is possible to achieve it by 2022-23 with the strategy laid out by the	Current average annual Income/Farmer: Rs. 78000  Doubling it by 2022-23 means: Rs. 1,56,000	i) Per farmer annual income targets for 2017-18 ii) Per farmer annual income targets for 2018-19 iii) Per farmer annual income targets for 2019-20 iv) Per farmer annual income targets for 2020-21 v) Per farmer annual income targets for 2021-22	1. Big focus on irrigation with large budgets, with the aim of "per drop, more crop," Provision of quality seeds and nutrients based on soil health of each field. 2. Integrated Pest Management 3. Improved Farm Practices/Crop Diversification	<ul style="list-style-type: none"> <li>• Proportional irrigation targets</li> <li>• Provision of quality seeds and nutrients based on soil health of each field: Annual Targets</li> <li>• Large investments in warehousing and Cold Chains to prevent post-harvest crop losses: Annual Targets</li> <li>• Promotion of value addition through</li> </ul>

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<p>government to be complemented by some of the measures suggested as part of the SDG2 related framework.</p> <p><b>Stage-2 for realising SDG2:</b> As the farmer would have doubled the income by 2022-23, it is assumed that it will lead to increased purchase power of rural farming communities including the economic activity in rural India that can trigger to an economic activity that can lead to a level of prosperity</p>		<p>vi) Per farmer annual income targets for 2022-23: Rs. 1,56,000</p>	<p>4. Conserving Indigenous Resources / Conserving Agricultural Heritage/ITK/</p> <p>5. Promotion of Agroforestry</p> <p>6. Promotion of climate resilient and conserving Agro-biodiversity through in-situ &amp; ex-situ measures, increase nutritional value etc</p> <p>7. Large investments in warehousing and cold chains to prevent post-harvest crop losses</p> <p>8. Promotion of value addition through</p>	<p>food processing : Annual Targets</p> <ul style="list-style-type: none"> <li>• Creation of a national farm market, removing distortions and e-platform across 585 stations: Annual Targets</li> <li>• Introduction of a new crop insurance scheme to mitigate risks at affordable cost: Annual Targets</li> <li>• Promotion of ancillary activities like beekeeping and fisheries : Annual Targets</li> </ul>
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necessary for realizing SDG2 by 2030.			food processing	
			<p>9. Creation of a national farm market, removing distortions and e-platform across 585 stations.</p> <p>10. Introduction of a new crop insurance scheme to mitigate risks at affordable cost.</p> <p>11. Promotion of ancillary activities like poultry, beekeeping and fisheries and Integrated farming System</p>	

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**A model Action Plan for doubling the farmer incomes by 2022: It can also be developed for the following initiatives/schemes/ programmes by GoI**

- Pradhanmantri Krishi Sinchayee Yojana (PMKSY)
- Rashtriya KrishiVikas Yojana (RKVY)
- National Food Security Mission (NFSM)
- National Mission on Sustainable Agriculture (NMSA)-Rainfed Area Development (RAD)
- Sub-Mission on Agro-forestry (SMAF)
- Horticulture Missions/ Boards with allied institutions
- Pramparagat Krishi Vikas Yojana (PKVY)/SHC
- National Mission for Agricultural Extension and Technology (NMAET) including SAME, SMSP, SMAM, SMPP
- Rashtriya Gokul Mission
- Other Schemes of DAC&FW /Dept/Ministeries relates to SDG 2 and mapped by NITI AYOOG

