

Rural development and agriculture

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ABSTRACT

Food security and future oriented development areas remain challenging in many areas of the world. GIZ offers regionally adapted development approaches to support sustainable agrifood systems and to ensure the right to food.

We advise our partners on agricultural and rural development policy. Farmers and associations are involved in decisions and organizational deficits are addressed. This is the only way to give poor people in rural areas access to land, water, loans and training. In cooperation with academic institutions and the private sector, we develop strategies for increasing production and income under changing conditions in agriculture and fishing, in ways which do not burden the environment or reduce biodiversity. At the same time, it is important to develop rural infrastructure and create access to markets.

We help make better use of the existing. We help make better use of the existing potential of a region in order to develop local opportunities resulting from demand in national and international Markets. Our adviser help optimize value chains and



establish global standards for internationally traded products. We secure opportunities for life in rural areas, offering long-term success through sustainable strategies.

The role of NGOs/non-profits in developing countries

Because decentralization policies made development problems the responsibility of local governments, it also opened the door for non-governmental organizations (NGOs), nonprofits, and



other foreign actors to become more involved in the approach to these issues. For example, the elimination of statist approaches to development caused an exponential increase in the number of NGOs active in Africa, and additionally caused them to take on increasingly important roles. Consequently, nonprofits and NGOs are also greatly involved in the provisioning of needs in developing countries and they play an increasingly large role in supporting rural development.

INTRODUCTION

Rural development is the process of improving the quality of life and economic well-being of people living in rural areas, often relatively isolated and sparsely populated areas.

Rural development has traditionally centered on the exploitation of land-intensive natural resources such as agriculture and forestry. However, changes in global production networks and increased urbanization have changed the character of rural areas. Increasingly rural tourism, niche manufacturers, and recreation have replaced resource extraction and agriculture as dominant economic drivers. The need for rural communities to approach development from a wider perspective has created more focus on a broad range of development goals rather than merely creating incentive for agricultural or resource-based businesses.

Education, entrepreneurship, physical infrastructure, and social infrastructure all play an important role in developing rural regions. Rural development is also characterized by its emphasis on locally produced economic development strategies. In contrast to urban regions,

which have many similarities, rural areas are highly distinctive from one another. For this reason there are a large variety of rural development approaches used globally.

Approaches to Rural Development

Rural development actions are intended to further the social and economic development of rural communities.

Rural development programs were historically top-down approaches from local or regional authorities, regional development agencies, NGOs, national governments or international development organizations. However, a critical 'organization gap' identified during the late 1960s, reflecting on the disjunction between national organizations and rural communities led to a great focus on community participation in rural development agendas. Oftentimes this was achieved through political decentralization policies in developing countries, particularly popular among African countries, or policies that shift the power of socio-politico-economic decision-making and the election of representatives and leadership from centralized governments to local governments. As a result, local populations can also bring about endogenous initiatives for development. The term rural development is not limited to issues of developing countries. In fact many developed countries have very active rural development programs.

AGRICULTURE

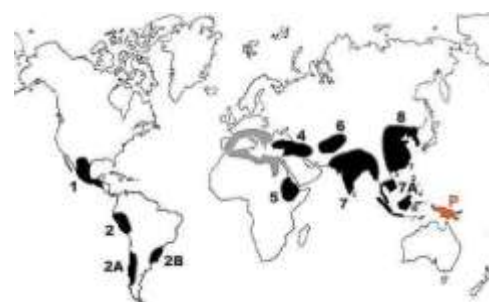
Agriculture encompasses crop and livestock production, aquaculture, fisheries and forestry for food and non-food products. Agriculture was the key development in the rise of sedentary human civilization, whereby farming of domesticated species created food surpluses that enabled people to live in cities. While humans started gathering grains at least 105,000 years ago, nascent farmers only began planting them around 11,500 years ago. Sheep, goats, pigs and cattle were domesticated around 10,000 years ago. Plants were independently cultivated in at least 11 regions of the world. In the twentieth century, industrial agriculture based on large-scale monocultures came to dominate agricultural output.

Today, small farms produce about a third of the world's food, but large farms are prevalent. The largest one percent of farms in the world are greater than 50 hectares and operate more than 70 percent of the world's farmland.^[2] Nearly 40 percent of agricultural land is found on farms larger than 1,000 hectares.^[2] However, five of every six farms in the world consist of less than two hectares and take up only around 12 percent of all agricultural land.^[2]

The major agricultural products can be broadly grouped into foods, fibers, fuels, and raw materials (such as rubber). Food classes include cereals (grains), vegetables, fruits, cooking oils, meat, milk, eggs, and fungi. Global agricultural production amounts to approximately 11 billion tonnes of food, 32 million tonnes of natural fibres and 4 billion m³ of wood. However, around 14 percent of the world's food is lost from production before reaching the retail level.

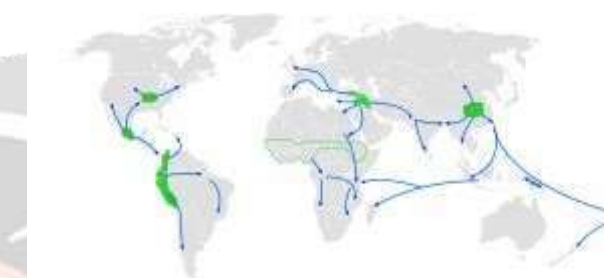
HISTORY

Centres of origin, as numbered by Nikolai Vavilov in the 1930s. Area 3 is no longer recognised as a centre of origin
New Guinea (area P) was identified more recently.



CIVILIZATIONS

In Eurasia, the Sumerians started to live in villages from about 8,000 BC, relying on the Tigris and Euphrates rivers and a canal system for irrigation. Ploughs appear in pictographs around 3,000 BC; seed-ploughs around 2,300 BC. Farmers grew wheat, barley, vegetables such as lentils and onions, and fruits including dates, grapes, and figs. Ancient Egyptian agriculture relied on the Nile River and its seasonal flooding. Farming started in the predynastic period at the end of the Paleolithic, after 10,000 BC. Staple food crops were grains such as wheat and barley, alongside industrial crops such as flax and papyrus. In India, wheat, barley and jujube were domesticated by 9,000 BC, soon followed by sheep and goats. Cattle, sheep and goats were domesticated in Mehrgarh culture by 8,000–6,000 BC. Cotton was cultivated by the 5th–4th millennium BC. Archeological evidence indicates an animal-drawn plough from 2,500 BC in the Indus Valley civilisation.



Map of the world showing approximate centers of origin of agriculture and its spread in prehistory. DNA studies have shown that agriculture was introduced in Europe by the expansion of the early farmers from Anatolia about 9,000 years ago.

REVOLUTION

In the Middle Ages, compared to the Roman period, agriculture in Western Europe became more focused on self-sufficiency. The agricultural population under feudalism was typically organized into manors consisting of several hundred or more acres of land presided over by a lord of the manor with a Roman Catholic church and priest.

Thanks to the exchange with the Al-Andalus where the Arab Agricultural Revolution was underway, European agriculture transformed, with improved techniques and the diffusion of crop plants, including the introduction of sugar, rice, cotton and fruit trees (such as the orange).



Agricultural calendar, c. 1470, from a manuscript of Pietro de Crescenzi

TYPES



Harvesting wheat with a combine harvester accompanied by a tractor and trailer



Reindeer herds form the basis of pastoral agriculture for several Arctic and Subarctic peoples.

Pastoralism involves managing domesticated animals. In nomadic pastoralism, herds of livestock are moved from place to place in search of pasture, fodder, and water. This type of farming is practised in arid and semi-arid regions of Sahara, Central Asia and some parts of India.

In shifting cultivation, a small area of forest is cleared by cutting and burning the trees. The cleared land is used for growing crops for a few years until the soil becomes too infertile, and the area is abandoned. Another patch of land is selected and the process is repeated. This type of farming is practiced mainly in areas with abundant rainfall where the forest regenerates quickly. This practice is used in Northeast India, Southeast Asia, and the Amazon Basin.

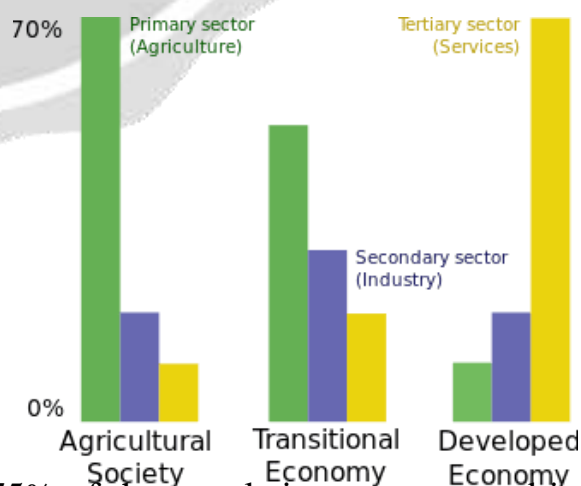


Spreading manure by hand in Zambia

Workforce






















Agriculture provides about one-quarter of all global employment, more than half in sub-Saharan Africa and almost 60 percent in low-income countries. As countries develop, other jobs have historically pulled workers away from agriculture, and labour-saving innovations increase agricultural productivity by reducing labour requirements per unit of output. Over time, a combination of labour supply and labour demand trends have driven down the share of population employed in agriculture.

On the three-sector theory, the proportion of people working in agriculture (left-hand bar in each group, green) falls as an economy becomes more developed.



During the 16th century in Europe, between 55 and 75% of the population was engaged in agriculture; by the 19th century, this had dropped to between 35 and 65%. In the same countries today, the figure is less than 10%. At the start of the 21st century, some one billion

Largest countries by agricultural output (in nominal terms) according to IMF and CIA World Factbook, at peak level as of 2018

Economy	Countries by agricultural output (in nominal terms) at peak level as of 2018 (billions in USD)
(01)  China	1,117
(02)  India	414
(—)  <i>European Union</i>	308
(03)  United States	185
(04)  Brazil	162
(05)  Indonesia	141
(06)  Nigeria	123
(07)  Russia	108
(08)  Pakistan	76
(09)  Argentina	70
(10)  Turkey	64
(11)  Japan	62
(12)  France	59
(13)  Iran	57
(14)  Australia	56
(15)  Mexico	51
(16)  Italy	50
(17)  Spain	43
(18)  Bangladesh	41
(19)  Thailand	40
(20)  Egypt	40
The twenty largest countries by agricultural output (in nominal terms) at peak level as of 2018, according to the <u>IMF</u> and <u>CIA World Factbook</u> .	

Further industrialization led to the use of monocultures, when one cultivar is planted on a large acreage. Because of the low biodiversity, nutrient use is uniform and pests tend to build up, necessitating the greater use of pesticides and fertilizers. Multiple cropping, in which several crops are grown sequentially in one year, and intercropping, when several crops are grown at the same time, are other kinds of annual cropping systems known as polycultures.



Intercropping of coconut and Mexican marigold

Important categories of food crops include cereals, legumes, forage, fruits and vegetables. Natural fibers include cotton, wool, hemp, silk and flax. Specific crops are cultivated in distinct growing regions throughout the world. Production is listed in millions of metric tons, based on FAO estimates.

Top agricultural products, by crop types (million tonnes) 2004 data	
Cereals	2,263
Vegetables and melons	866
Roots and tubers	715
Milk	619
Fruit	503
Meat	259
Oilcrops	133
Fish (2001 estimate)	130
Eggs	63

Top agricultural products, by individual crops (million tonnes) 2011 data	
Sugar cane	1794
Maize	883
Rice	722
Wheat	704
Potatoes	374
Sugar beet	271
Soybeans	260
Cassava	252
Tomatoes	159

Pulses	60
Vegetable fiber	30
<i>Source: Food and Agriculture Organization</i>	

Barley	134
<i>Source: Food and Agriculture Organization</i>	



Production practices

Tillage is the practice of breaking up the soil with tools such as the plow or harrow to prepare for planting, for nutrient incorporation, or for pest control. Tillage varies in intensity from conventional to no-till. It can improve productivity by warming the soil, incorporating fertilizer and controlling weeds, but also renders soil more prone to erosion, triggers the decomposition of organic matter releasing CO₂, and reduces the abundance and diversity of soil organisms.



Tilling an arable field

Agricultural automation

Different definitions exist for agricultural automation and for the variety of tools and technologies that are used to automate production. One view is that agricultural automation refers to autonomous navigation by robots without human intervention. Alternatively it is defined as the accomplishment of production tasks through mobile, autonomous, decision-making, mechatronic devices. However, FAO finds that these definitions do not capture all the aspects and forms of automation, such as robotic milking machines that are static, most motorized machinery that automates the performing of agricultural operations, and digital tools (e.g., sensors) that automate only diagnosis. FAO defines agricultural automation as the use of machinery and equipment in agricultural operations to improve their diagnosis, decision-making or performing, reducing the drudgery of agricultural work or improving the timeliness, and potentially the precision, of agricultural operations.

Effects of climate change on yields

Main article: Effects of climate change on agriculture

Climate change and agriculture are interrelated on a global scale. Climate change affects agriculture through changes in average temperatures, rainfall, and weather extremes (like storms and heat waves); changes in pests and diseases; changes in atmospheric carbon dioxide and ground-level ozone concentrations; changes in the nutritional quality of some foods; and changes in sea level. Global warming is already affecting agriculture, with effects unevenly distributed across the world.



Winnowing grain: global warming will probably harm crop yields in low latitude countries like Ethiopia.

Crop alteration and biotechnology

Plant breeding

Crop alteration has been practiced by humankind for thousands of years, since the beginning of civilization. Altering crops through breeding practices changes the genetic make-up of a plant to develop crops with more beneficial characteristics for humans, for example, larger fruits or seeds, drought-tolerance, or resistance to pests. Significant advances in plant breeding ensued after the work of geneticist Gregor Mendel. His work on dominant and recessive alleles, although initially largely ignored for almost 50 years, gave plant breeders a better understanding of genetics and breeding techniques.



Wheat cultivar tolerant of high salinity (left) compared with non-tolerant variety

The Green Revolution popularized the use of conventional hybridization to sharply increase yield by creating "high-yielding varieties". For example, average yields of corn (maize) in the US have increased from around 2.5 tons per hectare (t/ha) (40 bushels per acre) in 1900 to about 9.4 t/ha (150 bushels per acre) in 2001. Similarly, worldwide average wheat yields have increased from less than 1 t/ha in 1900 to more than 2.5 t/ha in 1990. South American average wheat yields are around 2 t/ha, African under 1 t/ha, and Egypt and Arabia up to 3.5 to 4 t/ha with irrigation.



Seedlings in a green house. This is what it looks like when seedlings are growing from plant breeding.

Genetic engineering

Genetically modified organisms (GMO) are organisms whose genetic material has been altered by genetic engineering techniques generally known as recombinant DNA technology. Genetic engineering has expanded the genes available to breeders to use in creating desired germplines for new crops. Increased durability, nutritional content, insect and virus resistance and herbicide tolerance are a few of the attributes bred into crops through genetic engineering. For some, GMO crops cause food safety and food labeling concerns.

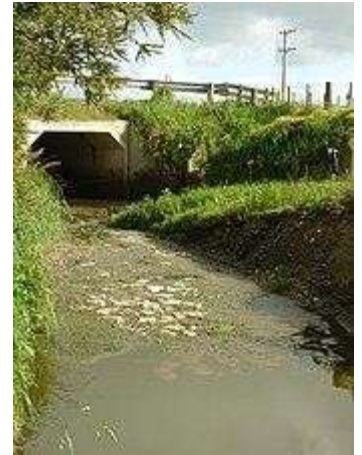


Genetically modified potato plants (left) resist virus diseases that damage unmodified plants (right).

Environmental impact

Effects and costs

Agriculture is both a cause of and sensitive to environmental degradation, such as biodiversity loss, desertification, soil degradation and climate change, which cause decreases in crop yield. Agriculture is one of the most important drivers of environmental pressures, particularly habitat change, climate change, water use and toxic emissions. Agriculture is the main source of toxins released into the environment, including insecticides, especially those used on cotton. The 2011 UNEP Green Economy report stated that agricultural operations produced some 13 per cent of anthropogenic global greenhouse gas emissions. This includes gases from the use of inorganic fertilizers, agro-chemical pesticides, and herbicides, as well as fossil fuel-energy inputs.



Water pollution in a rural stream due to runoff from farming activity in New Zealand

Livestock issues

A senior UN official, Henning Steinfeld, said that "Livestock are one of the most significant contributors to today's most serious environmental problems". Livestock production occupies 70% of all land used for agriculture, or 30% of the land surface of the planet. It is one of the largest sources of greenhouse gases, responsible for 18% of the world's greenhouse gas emissions as measured in CO₂ equivalents. By comparison, all transportation emits 13.5% of the CO₂. It produces 65% of human-related nitrous oxide (which has 296 times the global warming potential of CO₂) and 37% of all human-induced methane (which is 23 times as warming as CO₂.) It also generates 64% of the ammonia emission. Livestock expansion is cited as a key factor driving deforestation; in the Amazon basin 70% of previously forested area is now occupied by pastures and the remainder used for feed crops.



Farmyard anaerobic digester converts waste plant material and manure from livestock into biogas fuel.

Land and water issues

Land transformation, the use of land to yield goods and services, is the most substantial way humans alter the Earth's ecosystems, and is the driving force causing biodiversity loss. Estimates of the amount of land transformed by humans vary from 39 to 50%. Land degradation, the long-term decline in ecosystem function and productivity, is estimated to be occurring on 24% of land worldwide, with cropland overrepresented. Land management is the driving factor behind degradation; 1.5 billion people rely upon the degrading land. Degradation can be through deforestation, desertification, soil erosion, mineral depletion, acidification, or salinization.



Pesticides

Pesticide use has increased since 1950 to 2.5 million short tons annually worldwide, yet crop loss from pests has remained relatively constant. The World Health Organization estimated in 1992 that three million pesticide poisonings occur annually, causing 220,000 deaths. Pesticides select for pesticide resistance in the pest population, leading to a condition termed the "pesticide treadmill" in which pest resistance warrants the development of a new pesticide.



Spraying a crop with a pesticide

Sustainability

Current farming methods have resulted in over-stretched water resources, high levels of erosion and reduced soil fertility. There is not enough water to continue farming using current practices; therefore how water, land, and ecosystem resources are used to boost crop yields must be reconsidered. A solution would be to give value to ecosystems, recognizing environmental and livelihood tradeoffs, and balancing the rights of a variety of users and interests. Inequities that result when such measures are adopted would need to be addressed, such as the reallocation of water from poor to rich, the clearing of land to make way for more productive farmland, or the preservation of a wetland system that limits fishing rights.



Terraces, conservation tillage and conservation buffers reduce soil erosion and water pollution on this farm in Iowa.

Energy dependence

Since the 1940s, agricultural productivity has increased dramatically, due largely to the increased use of energy-intensive mechanization, fertilizers and pesticides. The vast majority of this energy input comes from fossil fuel sources. Between the 1960s and the 1980s, the Green Revolution transformed agriculture around the globe, with world grain production increasing significantly (between 70% and 390% for wheat and 60% to 150% for rice, depending on geographic area) as world population doubled. Heavy reliance on petrochemicals has raised concerns that oil shortages could increase costs and reduce agricultural output.

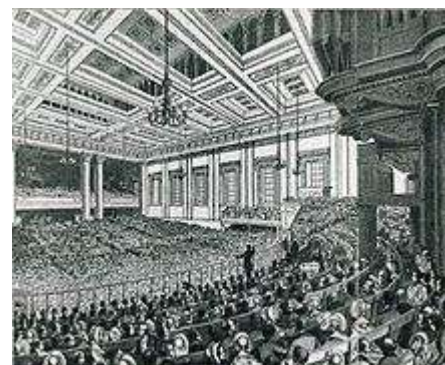


Mechanised agriculture: from the first models in the 1940s, tools like a cotton picker could replace 50 farm workers, at the price of increased use of fossil fuel.

Disciplines

Agricultural economics

Agricultural economics is economics as it relates to the "production, distribution and consumption of [agricultural] goods and services". Combining agricultural production with general theories of marketing and business as a discipline of study began in the late 1800s, and grew significantly through the 20th century. Although the study of agricultural economics is relatively recent, major trends in agriculture have significantly affected national and international economies throughout history, ranging from tenant farmers and sharecropping in the post-American Civil War Southern United States to the European feudal system of manorialism. In the United States, and elsewhere, food costs attributed to food processing, distribution, and agricultural marketing, sometimes referred to as the value chain, have risen while the costs attributed to farming have declined. This is related to the greater efficiency of farming, combined with the increased level of value addition (e.g. more highly processed products) provided by the supply chain. Market concentration has increased in the sector as well, and although the total effect of the increased market concentration is likely increased efficiency, the changes redistribute economic surplus from producers (farmers) and consumers, and may have negative implications for rural communities.



In 19th century Britain, the protectionist Corn Laws led to high prices and widespread protest, such as this 1846 meeting of the Anti-Corn Law League.

Agricultural science

Agricultural science is a broad multidisciplinary field of biology that encompasses the parts of exact, natural, economic and social sciences used in the practice and understanding of agriculture. It covers topics such as agronomy, plant breeding and genetics, plant pathology, crop modelling, soil science, entomology, production techniques and improvement, study of pests and their management, and study of adverse environmental effects such as soil degradation, waste management, and bioremediation.



An agronomist mapping a plant genome

Policy

Direct subsidies for animal products and feed by OECD countries in 2012, in billions of US dollars

Product	Subsidy
Beef and veal	18.0
Milk	15.3

Pigs	7.3
Poultry	6.5
Soybeans	2.3
Eggs	1.5
Sheep	1.1

Projects



A Study on Evaluation of Price Stabilization Fund and Price Support Scheme

The present evaluation study will evaluate the Price Stabilization Fund (PSF) and Price Support Scheme (PSS) schemes through a Primary survey to assess how these schemes are meeting the objective. This Evaluation study will cover Onion and five Pulses (namely Moong, Masur, Gram, Toor and Urad) to evaluate these schemes.



Improving Economic Viability of Gaushalas for Production and Promotion of Bio-Fertilisers

To devise innovative ways and policy to promote cattle economy and use of cow manure as bio-fertilizer and bio-energy especially for Gaushalas to convert cattle into economic assets and to explore Public Private Partnership model with various stakeholders including Gaushalas, Dairy cooperatives and Farmer Producer Organization for production of enriched solid and liquid bio-fertilizer and bio energy.



Study to Assess the Demand for the Fisheries Sector in India

The major objective of this study is to assess the demand for fish across species in 24 states of India and project demand for the same until 2031. The primary survey has started and the result is yet to be analysed.



White Paper on Farm Mechanisation in India

NCAER will prepare a white paper that will focus on recommendations for creating an industrial and trade Policy to make India a powerhouse in the farm machinery sector. The overall objective of this paper is to recommend policymakers, key strategic actions to be taken to foster the growth of the Farm Machinery Industry (other than tractors) based on evidence that would enable India to become a global leader in this sub-sector.

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**National Council
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Research**

An Evaluation of India's Rashtriya Gram Swaraj Abhiyan (RGSA)



Report September
20210911 2021



An Evaluation of India's Rashtriya Gram Swaraj Abhiyan (RGSA)

An important concern regarding the devolution of funds to Panchayati Raj Institutions by the Centre and State is whether they have sufficient administrative and technical capacity, as it has been found lacking in many cases. As an outcome of this, the Rashtriya Gram Swaraj Abhiyan (RGSA) scheme was launched in 2018 by the Government of India, across all states / UTs, to strengthen the capacities of the Panchayats to meet local development challenges in

various areas linked with attaining the Sustainable Development Goals, such as poverty, gender inequality, water supply and sanitation, and so on.



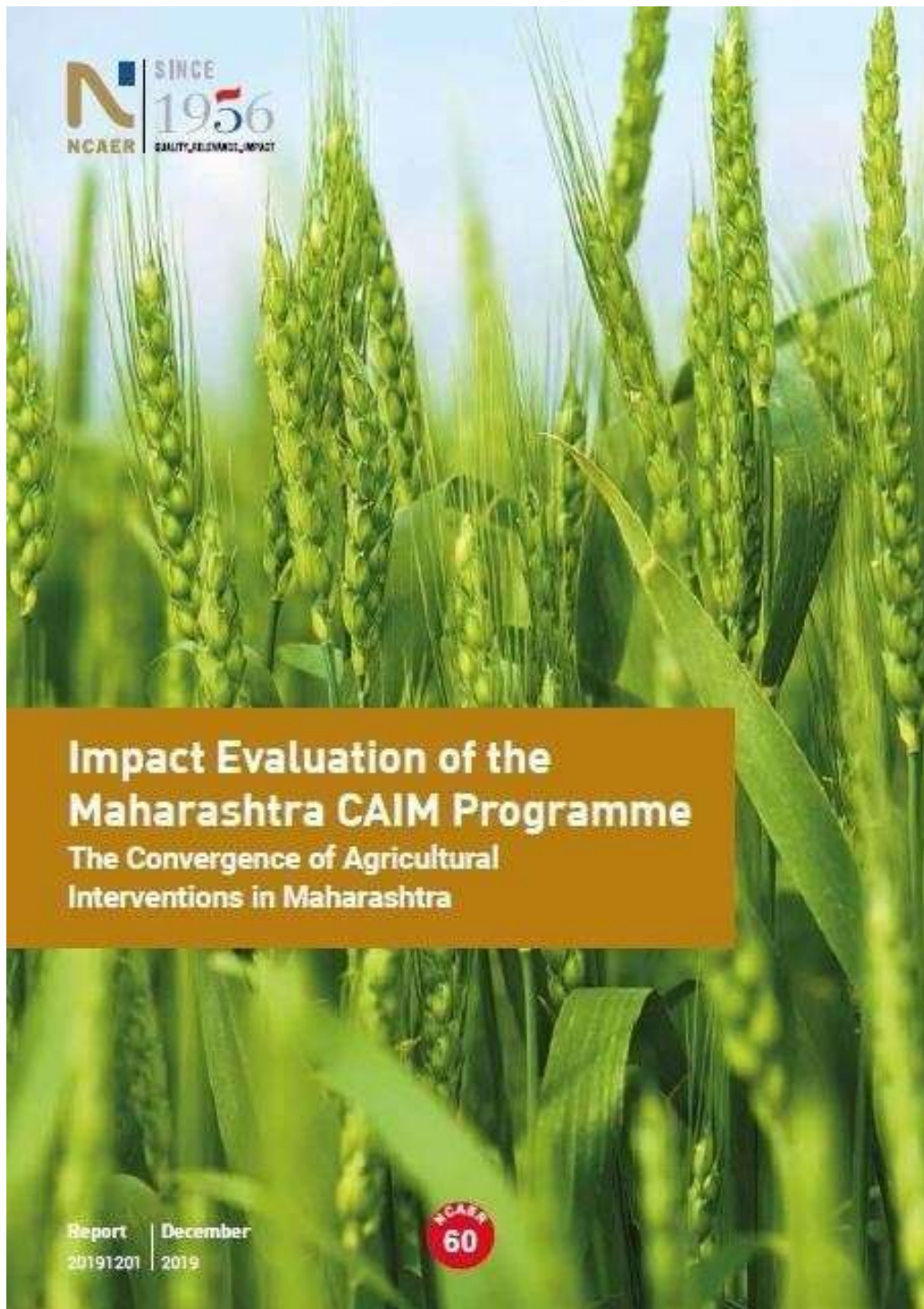
Study to Assess the Availability of Resources for Creating the Assets and Initiatives Taken for Generating Various Own Sources of Revenue

In order to improve the financial base of the Local Bodies including Panchayati Raj Institutions, Central and State Finance Commissions have been providing many recommendations towards augmentation of the Own Source of Revenues of the panchayats to complement the grants provided to them by the Central and State Governments.



Analysing Socio-Economic Impact of the NDP-1 The National Dairy Plan of India

The main objectives of the NCAER study were (i) to Identify and measure indicators demonstrating the impact of dairy involvement in socio-economic development, family welfare, and income generation;(ii) assess the social impact of the project in terms of provision of livelihoods, especially for vulnerable groups, and empowerment of women; (iii) Carry out an ex-post economic and financial evaluation of the design and delivery of the project with a focus on the two main components of NDP-I viz.: (a) Productivity Enhancement, which would increase milk productivity through improved animal breeding, nutrition, and delivery of Artificial Insemination services, and (b) Milk Collection and Bulking, which would provide access to markets through investment in village level milk collection and bulking facilities, and formation of producer companies and dairy cooperative societies.



Impact Evaluation of the Maharashtra CAIM (Convergence of Agriculture Intervention in Maharashtra) Programme

A socio-economic impact evaluation study was carried out by NCAER during January-June, 2019 to document the impact attributed to CAIM interventions on (i) Reduction of household poverty, (ii) Sustainable increase in household incomes, and (iii) Increased household resilience to climate and market risks.



Agricultural Diagnostic for Bihar State of India

This NCAER study is aimed at undertaking a diagnostic of the agricultural sector to help inform and operationalise the Government of Bihar vision for agriculture in the next 5 years. The study will (a) assess the drivers of agricultural productivity and growth in Bihar; (b) assess and rank the obstacles to inclusive growth; (c) identify actions to increase this sector's productivity and promote inclusive growth to help this sector move to a sustained higher-growth path. The policy recommendations of this diagnostic will help policy makers, donors and other stakeholders to the success of Bihar's agricultural sector enhance the decisions they make on policies and programmes to deliver inclusive growth of this sector and greater food security for the state of Bihar.



Doubling Farmer's Income

The Government of India has focused its attention on doubling the farmers' income during the seven-year period from 2015–16 to 2022–23, marking a significant departure from past policies when the emphasis had been only on production rather than the marketability of the produce. In order to provide analytics for this focus, a Committee on Doubling Farmers' Income was constituted in April 2016 under the chairmanship of Dr Ashok Dalwai, Additional Secretary, Ministry of Agriculture and Farmers Welfare. The Committee has adopted three institutes as its knowledge partners. While the National Council of Applied Economic Research (NCAER) is one of them, the other two are the National Institute of Agricultural Research Policy (NIAP), and the National Centre for Cold Chain Development (NCCD). The DFI Committee has held multiple consultations with stakeholders across the country and has co-opted more than 100 resource persons to help it in drafting the Report. These members have been drawn from among researchers, academics, non-government organisations, farmers' organisations, professional associations, trade, industry, commerce, consultancy bodies, policymakers at the Central and State levels, and many others with various domain strengths. While thirteen volumes of the DFI Committee Report have already been prepared, Volume XIV on the Comprehensive Policy Recommendations of the DFI Committee is in the process of finalisation.

Data and analysis

Up to date information on agricultural markets, the allocation of funding, and the economy of farms and rural areas.



Markets

Monitoring the price situation and the market outlook for agricultural commodities and food.



Financing

Figures on the CAP budget and expenditure from the European agricultural guarantee fund (EAGF) and European agricultural fund for rural development (EAFRD).



Employment and growth in rural areas

Overview of economic growth and population trends, as well as further details on employment in rural areas.



Farm structures and economics

Information on farm structures and yields, production, costs, subsidies, crops, and other performance indicators.

Market outlooks



The Commission regularly publishes short and medium-term market outlooks for agricultural commodities and food. These provide summaries and forecasts of prices, demand and general market activity to keep farmers, food producers and retailers informed of what to expect.

Agriculture by country

Information on the CAP in each EU country, EU country factsheets, and rural development factsheets.

Sustainability and organic farming

Information related to sustainability such as environmental protection, farm methods such as organic farming, and quality products.

Trade and international policy analysis

Information on statistics, trade and policy analyses, agri-food monitoring reports and studies used to ensure delivery of CAP objectives.

Agricultural markets and prices

Price monitoring, outlooks, briefs and reports on market developments for agricultural commodities and food in the EU.

Agriculture & Rural Development facts :

- Most farmers in the developing world are smallholders.
- Agricultural development is one of the most powerful tools to end extreme poverty and to feed a projected 9.7 billion people by 2050: growth in the agriculture sector is two to four times more effective in raising incomes among the poorest compared to other sectors.
- The current food system threatens the health of people and the planet: agriculture accounts for 70 percent of water use and generates unsustainable levels of pollution and waste. 1/3 of food produced globally is either lost or wasted.



AGRICULTURAL AND RURAL DEVELOPMENT

I. RETROSPECT – THE LAST FIVE YEARS (2002-2006)

Researches in the above theme encompass wide area of issues related to agriculture and rural development. The IEG has been contributing significantly to the ongoing debate on sustainable agricultural development; this tradition continued in the recent past even after initiating a separate theme on Environmental Economics in the institute. Pattern of growth in agriculture its sources, determinants and implications have been drawing attention of researchers of this institute from time to time; these issues were visited during the recent period as well. Several studies have assessed trade related issues in agriculture in the recent past (2002-2006).

II. MEDIUM TERM VISION: THE NEXT FIVE YEARS

A number of newer areas of work have emerged mainly out of the expanding interest and expertise of the existing faculty members, as also the requirement of policy formulation by the Ministry. The research areas that are likely to receive attention in the next five years are as under.

Crop-Forecasting using Remote Sensing Data and Econometric Techniques

The need for more accurate crop forecasts has assumed renewed importance in India in view of the recent decline in public participation of food management and a consequent need for

correct assessment of the future deficits/surpluses in agriculture sector. An important attempt in this direction is being made in one of the studies at IEG.

Trade and WTO related Issues in Indian Agriculture

The current round of WTO negotiations and future rounds of talk has posed certain challenges and opportunities for Indian agriculture; this needs to be assessed on a continuous basis taking into account strength and weaknesses of the country. Researches in this unit would aim at preparing India's agriculture sector in the emerging international trade order.

Rural Development, Infrastructure and Institutions

With the increased pressure on land importance of non-farm activities increases. Previous studies show that robust growth in agriculture is instrumental in development-induced rural diversification in the country. One of the recent studies of the unit however shows weakening of the above linkage in rural economy. Reasons for weakening of such linkages and strategies for balanced development of rural sector would be of interest for researchers of this institute. In non-farm activities a higher growth in manufacturing is important for development-induced rural diversification in the country and agro-processing is one manufacturing activity wherein rural sector has certain advantages.

III. TEACHING OF AGRICULTURE AND RURAL DEVELOPMENT

Faculty of this unit share responsibility of teaching agriculture and rural development related issues to Indian Economic Service (IES), Indian Statistical Service (ISS) probationers / in service officers. This unit also organizes short-term (one week) training programmes on agriculture and rural development for probationers and in-service officers of Central Services as that of NABARD officers. A continuation and consolidation of such teaching and research activities is envisaged in the medium run.

Rural Development & agriculture Data and Statement

Crop Intensity

Crop intensity is an index of agriculture development and is directly related to irrigation facilities. It is the percentage ratio of gross cropped area to net area sown. Crop intensity, therefore, refers to raising a number of crops from the same field during one agricultural year. The index of crop intensity is 100 if one crop has been grown in a year and it is 200 if two crops are raised. Higher the index, greater is the efficiency of land use. The crop intensity has a direct correlation with assured irrigation which enables farmers to go in for multiple cropping and use a higher dose of fertilizers and HYV seeds. The information regarding the crop intensity of Delhi during the last 10 years is presented in Statement 7.1.

Statement 7.1

CROP INTENSITY OF DELHI DURING 2011-12 TO 2020-21

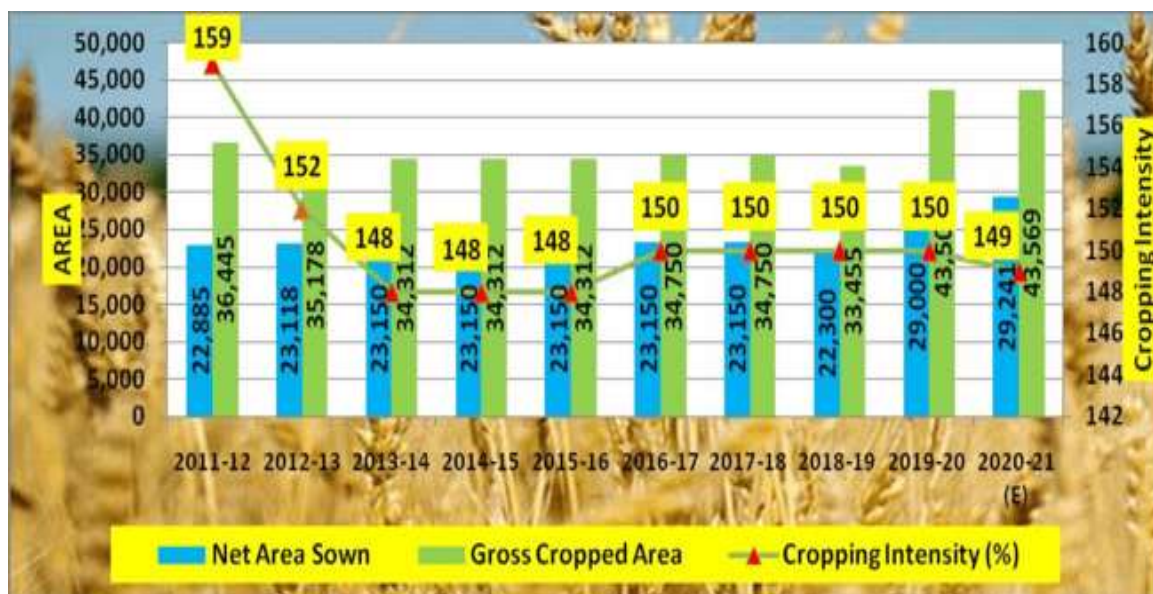
(in Hectares)

S.No.	Year	Net Area Sown	Gross Cropped Area	Cropping Intensity (%)
1	2011-12	22,885	36,445	159
2	2012-13	23,118	35,178	152
3	2013-14	23,150	34,312	148
4	2014-15	23,150	34,312	148
5	2015-16	23,150	34,312	148
6	2016-17	23,150	34,750	150
7	2017-18	23,150	34,750	150
8	2018-19	22,300	33,455	150
9	2019-20	29,000	43,500	150
10	2020-21 (Estimated)	29,241	43,569	149

Source: Development Department, GNCTD and Delhi Statistical Handbook

Chart 7.1

CROPPING INTENSITY OF DELHI



It may be observed from Statement 7.1 that the cropping intensity got reduced from 159% in 2011-12 to 149% in 2020-21 (Est). In addition, the area under the food-grain crops have been decreased during this period but the same in vegetables increase being one of the fast growing mega cities in India, showing the importance of agriculture activity with the limited available land.

Cropping Pattern

Cropping pattern is the sequential arrangement of crops of Paddy, Jowar and Bajra during Kharif and Wheat & Mustard crops during the Rabi seasons are the major crops in Delhi. The cultivation of vegetables is a continuous process throughout the year. The information regarding the area, production and yields of some of the selected crops in Delhi during 2020-21 is presented in Statement 7.2.

Statement 7.2

AREA, PRODUCTION & YIELD OF CROPS IN DELHI 2020-21

S. N.	Name of the Crops	Area (Hectare)	Production (Metric Ton)	Yield (Kg. per Hectare)
1.	Wheat	19,220	82,870	4,311
2.	Barley	60	180	3,000
3.	Bajra	1,075	2,361	2,196
4.	Maize	20	102	5,100
5.	Paddy	5,840	25,200	4,315
6.	Gram	02	04	2,000
7.	Mustard	3,094	3,902	1,261

Horticulture/ Floriculture

Horticulture is the major diversified activity involving production of fruits, vegetables, spices, mushroom & flowers. Directorate of Horticulture is running schemes with mandate to create awareness and demonstrate growing techniques about flowers & vegetables cultivation, vermi-composting, organic farming etc. 2800 farmers were imparted trainings on latest techniques in horticulture/ floriculture in 100 Kissan Gosthies organized in 2019-20. Nurseries at Dwarka, Patparganj, Hauzrani, Libaspur, Masoodabad, Chilla and KharKhari Nahar are mainly concerned for development / production of Vegetables seeds & seedlings, Mushroom production, Vermi Compost, Ornamental Flower plants, Medicinal Plants etc. Details of achievements made in respect of these items in 2019-20 and 2020-21 (Upto Dec., 2020) in Delhi is available at statements 7.3 & 7.4.

Statement 7.3

AREA & PRODUCTION UNDER HORTICULTURE/ FLORICULTURE CROPS

S. No.	Description of items	2019-20		2020-21	
		Target	Achievement	Target	Achievement upto Dec'2020
1.	Area brought under Floriculture (in Hac.)	6525	6229	6530	6291
2.	Area brought under Vegetables (in Hac.)	23470	24297	23500	21832
3.	Production of Fruits/ Vegetables (in MT)	370476	352972	370500	317537
4.	Plantation on Gaon Sabha / Community/ Govt. lands (in Nos)	2000	2430	1500	400

Statement 7.4**PRODUCTION OF SEEDS, PLANTS, SEEDLINGS & WORMY COMPOST**

S. No.	Description of items	2019-20		2020-21	
		Target	Achievement	Target	Achievement upto Dec'2020
1	Ornamental plants (in Nos)	37000	38988	37000	15530
2	Bulbs of bulbous plants (in Nos)	74000	16600	74000	4400
3	Flower Seedling (in Nos)	500000	505175	300000	270000
4	Flower seeds (in Kg.)	60	21	60	40
5	Vegetable seedlings (in No's)	550000	592740	600000	370000
6	Vegetable seeds (in Kg.)	700	998	700	670
7	Wormy Compost (Kg.)	30000	53575	30000	23740
8	Medicinal saplings (in Nos)	30000	16840	27800	10435

Soil Testing & Soil Reclamation

Services are being provided for testing of Soil & Water Samples of the farmers of NCT of Delhi. The following activities / parameters achieved during 2019-20 and 2020-21 (Upto Dec., 2020) against the targets as mentioned in the Statement 7.5:

Statement 7.5**SOIL TESTING AND ISSUANCE OF SOIL HEALTH CARDS**

S.No	Activity (in No's)	2019-20		2020-21	
		Target	Achievement	Target	Achievement upto Dec, 2020
1	Testing of Soil samples	800	2210	400	408
2	Testing of Water samples	50	27	45	28
3	Soil Health cards issued	800	410	400	Nil

Prampragat Krishi Vikas Yojana

“Prampragat Krishi Vikas Yojana” is the Centrally Sponsored Scheme being implemented in Delhi with focus on Soil Health Management (SHM) of National Mission of Sustainable Agriculture (NMSA). Under PKVY, organic

farming is promoted through adoption of organic village by cluster approach and PGS certification. It aims to motivate farmers for natural resources mobilization for input production and thus will raise farmer's income and create market for traders.

Irrigation in Delhi

Irrigation in Delhi mainly depends upon groundwater and partly upon surface water. Irrigation from the groundwater is provided through the shallow cavity and the deep cavity state tube-wells, whereas surface irrigation provided by way of utilizing treated effluent available from existing sewage treatment plants located at coronation pillar, Okhla and Keshopur. Water from the Western Yamuna Canal system under the control of Haryana Govt. is also utilized for irrigation purpose.

Due to fast urbanization taking place in the rural areas of Delhi, cultivable command area under irrigation is getting reduced day by day. In Master Plan of 2021 for Delhi, Delhi Development Authority has also proposed complete urbanization of Delhi. Hence any increase in the command area in future is not possible. The information regarding the source-wise irrigation and irrigated area in Delhi during the last nine years is presented in Statement 7.6

Statement 7.6

SOURCE-WISE IRRIGATION & IRRIGATED AREA IN DELHI 2011-12 TO 2019-20

(Area in hectares)

S. No	Sources	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
1.	Canals	2225	2225	2225	2225	2218	2240	2246	2236	2235
2.	Wells	19561	19561	19561	19561	19533	19727	19777	19635	19635
3.	Area Irrigated	18581	21786	21786	21786	21751	21967	22023	21871	21870
4.	Area Irrigated under more than one crop	7875	7875	7875	7900	7678	7756	7775	7762	7760
5.	Gross Area Irrigated	29661	29661	29661	29661	29429	29723	29798	29633	29630

Rainfall is also one of the other main sources of irrigation in Delhi. Generally,

rainfall in Delhi is concentrated in three months viz. July, August and September. The detail of rainfall during the last fourteen years in Delhi especially in the months of July, August and September is presented in Statement 7.7.

Statement 7.7

RAINFALL IN DELHI (JULY - SEPTEMBER)

(in mm)

S.No.	Details	July	August	September
1.	Normal	210.60	247.70	125.40
2.	2006	313.30	98.00	129.60
3.	2007	163.10	214.30	85.60
4.	2008	146.20	301.70	165.40
5.	2009	161.20	216.60	191.20
6.	2010	239.60	455.10	332.90
7.	2011	111.70	190.30	225.80
8.	2012	94.80	378.80	54.80
9.	2013	340.50	321.40	94.40
10.	2014	103.00	139.10	82.60
11.	2015	235.20	181.60	22.00
12.	2016	292.50	122.70	75.00
13.	2017	170.5	173.00	158.50
14.	2018	313.2	198.5	237.8
15.	2019	199.2	119.8	74.1

Animal Husbandry

Raising livestock is an important source of livelihood of people all over the world. It is an important component in the agriculture sector which affects the development of the economy directly and indirectly. Animal husbandry is the occupation which takes care of domestic animals that are used primarily as food or product source. The Animal Husbandry Unit has started 24X7 emergency Animal Healthcare services at Tis Hazari Hospital and 8X8 Animal Healthcare services at Veterinary Hospital at Palam and Veterinary Hospital at Gazipur.

The information regarding the livestock Census in Delhi during 2012 and 2019 is presented in Statement 7.8.

Statement 7.8

LIVESTOCK IN DELHI AND ITS GROWTH: 2012 AND 2019

S. No	Livestock	Livestock Census (Number) Livestock Census (Number)		Growth (%)	
		2012	2019	% (during 2012-2019)	Per annum
1	Cow	86433	124638	44.2	6.31
2	Buffalo	162142	157675	-2.75	-0.39
3	Sheep	932	2003	115	16.42
4	Goat	30470	17085	-44	-6.28
5	Others	86420	5866	-93	-13.28
	Total	366397	307267	-16.13	-2.30

Veterinary Facilities

There are 48 Govt. Veterinary hospitals, 29 Veterinary Dispensaries, 1 laboratory, 01 Farmers Information Centre, and two (2) Ambulatory clinics for providing veterinary facilities in Delhi. The main objective is to control contagious/infectious diseases like Hemorrhagic Septicemia (Galgotu) and Footand Mouth Disease (Muh-Khur), Rinder-Pest, Rabies etc. Free Artificial insemination with frozen semen in cows and buffalos are provided for genetic up gradation of livestock. Training camps are organized for live stock farmers. Training to SC/ST candidates is also conducted on modern poultry farming. Animal disease diagnostic facility is available at disease diagnostic laboratory at Palam. Testing of samples is done free of cost. The number of animals treated in Govt. Veterinary Hospitals/ Dispensaries has increased from 4.16 lakh during 2011-12 to 5.82 lakh during 2019-20 and 3.60 lakh up to December 2020. It may be due to enhancement of education and awareness among the farmers and animal owners. The information regarding Veterinary services being provided in Delhi is presented in statement 7.9 & 7.10.

Statement 7.9**VETERINARY SERVICES IN DELHI DURING 2011-12 TO 2020-21**

S. No.	Years	Veterinary Facilities (No.)			Animal treated
		Hospitals (inc. one Vety. Poly. Clinic)	Dispensaries	Labs	
1	2011-12	46	28	2	415986

2	2012-13	47	28	1	391152
3	2013-14	47	28	-	378359
4	2014-15	47	28	-	367518
5	2015-16	47	28	2	412363
6	2016-17	47	28	2	438504
7	2017-18	49	26	2*	469474
8	2018-19	49	26	2*	460769
9	2019-20	48	29	2*	582242
10	2020-21 (up to Dec. 2020)	48	29	2*	359971

Statement 7.10

PHYSICAL ACHIEVEMENTS 2019-20 & 2020-21

S. No	Activity	Target 2019-20	Achievement 2019-20	Target 2020-21	Achievement 2020-21(up to Dec. 2020)
1.	Treatment of Sick Animals (In lakh)	5.50	5.82	6.00	3.60
2.	Vaccination against Hemorrhagic Septicemias and FMD Disease	1.0 Lakh	92732	HS-2.5 lakh	27048
		1.5 Lakh	1250	FMD- 2.5 lakh	153094
3.	Anti-Rabies Vaccination of dogs DHLPPi	100000	36928	100000	23491
		--	--	--	11070
4.	Animal to be benefited in Go- Sadans	22000	17382	22000	6283
5.	Treatment of Sterility Cases	25000	15428	25000	13494
6.	Laboratory Test Conducted	4500	4661	5000	3467

Fisheries

The Fisheries Unit regulates fishing in public water under the Punjab fisheries Act 1914, and the Indian fisheries Act 1897, to prevent destructive practices and unscrupulous fishing. The year wise information regarding the production of fish seed and fish is presented in Statement 7.11

Statement 7.11

FISH SEED AND FISH PRODUCTION IN DELHI 2011-12 TO 2020-21

S.No	Years	Fish Seed Production (lakh)	Fish Production (Tons)
1.	2011-12	13.00	740
2.	2012-13	15.25	690
3.	2013-14	18.25	680
4.	2014-15	16.20	675
5.	2015-16	16.20	710
6.	2016-17	16.15	740
7.	2017-18	20.00	801
8.	2018-19	2.02	785
9.	2019-20	15.00	860
10.	2020-21	-	505*

* till December, 2020

6. Conclusion

The agricultural sector is of vital importance for the region. It is undergoing a process of transition to a market economy, with substantial changes in the social, legal, structural, productive and supply set-ups, as is the case with all other sectors of the economy. These changes have been accompanied by a decline in agricultural production for most countries, and have affected also the national seed supply sectors of the region. The region has had to face problems of food insecurity and some countries have needed food aid for IDPs and refugees.

Due to the relatively low demographic pressure projected for the future, the presence of some favourable types of climates and other positive factors, including a very wide formal seed supply sector, it should be possible to overcome problems of food insecurity in the region as a whole, and even to use this region to provide food to other food-deficient regions. Opportunities must therefore be created to reach these results.

In order to address the main constraints affecting the development of the national and regional seed supplies that are mentioned here, the region requires integrated efforts by all national and international stakeholders and institutions involved in seed supply and plant genetic resource management. On practical issues, lessons learned by some countries could be shared with other countries; e.g. on how to progress with the transition or how to recognize the most immediate needs of farmers. Appropriate policies should also be established, at various levels, in order to facilitate seed investment and development in the region.

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