



TIGR²ESS

Transforming India's Green Revolution
by Research and Empowerment for
Sustainable food Supplies



2022

State of Agriculture in Punjab



UNIVERSITY OF
CAMBRIDGE



GLOBAL
FOOD SECURITY



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Research Fund



Life of an Organic Farmer

*Though mosquitoes suck my blood without my permission,
They rely after all on our blood donation.
The sharp sugar cane leaves do cut my flesh while weeding,
No pain no gain, plants will grow well, thanks to my bleeding.
Horse flies do harass me too, thinking I'm a donkey,
Or because I'm white, they assume I am a Yankee.
Ants hiding behind the leaves bite me mercilessly,
They save themselves, nothing against me personally.
While sweating like a horse, I think life is beautiful,
I don't have to go to the Turkish bath, and that's cool.
Like a soldier, a farmer has to shed sweat and blood.
He may harvest his crop after facing drought or flood.
The monsoon can bring hope, but also devastation,
He prays for it, rains guarantee food for the nation.
A farmer can sow seeds, work hard and hope for the best,
For it is through God's Grace, if one day he can harvest.
In Punjab, wheat and rice are the main cultivation,
The only crops favoured by the green revolution.
Punjabis don't relish rice, it's not their cup of tea,
To grow food we don't eat is a great absurdity.
Organic farmers don't believe in using pesticide,
To work against nature is like committing suicide.
To pollute soil and water is not sustainable,
And produce pure and safe food, is only sensible.
Multi cropping combined with a wise crop rotation,
Can protect the soil from any deterioration.
Such farming does not rely on petrochemistry,
It provides healthy food for home and the country.
Such farmers who produce their food are self-reliant,
They won't make a fortune, but they are self-sufficient.
Hard work and organic food keep the farmer healthy,
If one stays in poor health, what's the point of being wealthy.
Farmers who feed the world are looked upon with contempt,
But when there is a lockdown, they are self-sufficient.
Do boost your immune system in time of pandemic,
Organic food will help you along with turmeric.*

Darshan Singh Rudel
(Raza Farm, Nurpur Bedi)

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About TIGR²ESS

Objectives and Outcomes Jointly Framed by the Consortium Partners

India's Green Revolution produced significant benefits. The greatest positive impact was felt in regions and on farmers who were able to harness benefits from the combination of new technologies, increased inputs and research-led innovation that have characterised agrarian transformation over the last fifty years. Despite these positive outcomes, there is widespread agreement that the 21st century demands new thinking to address new and emergent challenges, driven by changes in migration and settlement patterns, new forms of economic activity, changes in global commodity markets, and significant environmental challenges.

Objectives

1. To define the requirements and set the policy agenda for a second Green Revolution in India, framed by demographic changes affecting rural communities and feminisation of smallholder farming systems.
2. To develop and strengthen alliances across a carefully selected network of UK and Indian experts, to build a collaborative, long-term research partnership in sustainable agriculture that will set India on the path to a second Green Revolution.

Flagship Projects

Objectives were attained through fundamental research, structured into six Flagship Projects.

- **FP1** Sustainable and Transformative Agrarian and Rural Trajectories (START);
- **FP2** Crop Sciences: Water Use and Photosynthesis;
 - Improving Water Use and Yield Stability in Millet and Sorghum;
 - Crop Sciences: Enhancing Photosynthesis;
- **FP3** Heat and Drought Resilience in Wheat;
- **FP4** Water Use and Management in a Changing Monsoon Climate;
- **FP5** Supply Chains: Modelling Water Use for Sustainable Livelihoods;
- **FP6** Impacting Wellbeing in Rural and Urban Communities: Education, Empowerment and Entrepreneurship Leading to Improved Human Nutrition;
 - Education Food, Nutrition and Empowerment (EFNE);
 - Education, Employment, Empowerment and Entrepreneurship (4E);
 - Cross-Cutting FP6 Projects are the Mobile Teaching Kitchens and the Innovation Farm Model.

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Executive Summary

Historically, Punjab is considered a symbol of India's grain surpluses, giving the nation needed food security. However, over the past six decades, farmers have been entrapped in an unviable cropping pattern with concomitant commercial fallouts. As a result, the contribution of agriculture as a percentage of Punjab's gross and net state income has declined drastically since the early 1990s. The present study maps the state of agriculture in Punjab since the advent of the Green Revolution.

The intensive agriculture development program of the mid-1960s led to the establishment of the wheat-rice cropping pattern and heavy reliance on underground water resources, agricultural machinery, chemical fertilisers and pesticides. Further, the State government provided price subsidies for the power and irrigation required to produce high-yielding varieties. As an institutional mechanism, the MSP incentivised farmers to adopt the hybrid seeds-chemical fertilizer-heavy irrigation technology package by ensuring a support price for wheat and rice. These policy tools resulted in significantly increased farm incomes and personal prosperity.

Punjab's historic strengths and productivity performance in agriculture are not without cost. The green revolution has completed an entire cycle in Punjab – from high growth and stagnation to the present crisis. The irrational use of fertilisers and pesticides and the adoption of unsustainable cropping practices and technologies increased indebtedness and distress among farmers. Diminishing water resources and soil toxicity increased the pollution of underground water. Excessive mechanisation had a deleterious effect on soil properties, resulting in decreased yield and farm returns. The burning of wheat and paddy straw has led to the loss of beneficial biomass, with the pollutants being a significant health hazard. The agrarian crisis has put farmers' livelihoods and lives through an unprecedented predicament.

Considering ecological and social risk assessments, new interventions must be implemented to protect the State from the harmful consequences on agriculture, human health, and biodiversity. Given the increasing demand for safe and nutritious food, sustainable farming is the way forward. The government must invest in research and development, extension services and marketing facilities to facilitate this shift. In addition, initiatives to create off-farm employment opportunities and alternate sources of livelihood, especially in rural areas, are required.

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Our young talented research team's consistent perseverance and efforts are highly appreciated. Their multitasking skills contributed to every aspect of research, from field surveys and data collection to analysis

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Suveera Gill

29th July 2022

Abbreviations

AI	All India
CACP	Commission for Agricultural Costs and Prices
CAGR	Compound Annual Growth Rate
DAC&FW	Department of Agriculture Cooperation and Farmers Welfare
eNAM	electronic National Agriculture Market
GRACE	Gravity Recovery and Climate Experiment
GWh	Gigawatt-Hours
Ha	Hectares
K	Potassium
Kg	Kilogram
L	Location
MSP	Minimum Support Price
N	Nitrogen
NSSO	National Sample Survey Office
P	Phosphorous
Pb	Punjab
RSC	Residual Sodium Carbonate

Conversion Table

Length

1 kilometre (km) = 1000 metres (m)

1 km = 0.6214 miles

1 m = 1.0936 yards

1 m = 3.2808 feet

1 mile = 1760 yards

1 mile = 1.609 km

1 yard = 0.9144 m

1 foot = 0.3048 m

Area

1 km² = 100 hectare (ha)

1 km² = 0.3861 square mile

1 km² = 247.105 acre

1 m² = 10.7639 square feet

1 ha = 10.000 m²

1 ha = 2.4711 acres

1 square mile = 2.59 1 km²

1 acre = 0.4047 ha

1 acre = 4046.86 m²

1 acre = 4840 square yard

1 square yard = 9 square feet

1 square yard = 0.8361 m²

1 square foot = 0.0929 m²

Weight

1 tonne = 1000kg

1 tonne = 1.1023 US ton

1 US ton = 0.9072 tonnes

1 hg = 100 gram

1 kg = 2.2046 pounds (lb)

1 kg = 35.274 ounce (oz)

1 lb = 0.4536 kg

1 oz = 28.3495 gram

Units

1 crore = 10 million

1 million = 10 lakh

1 lakh = 100000

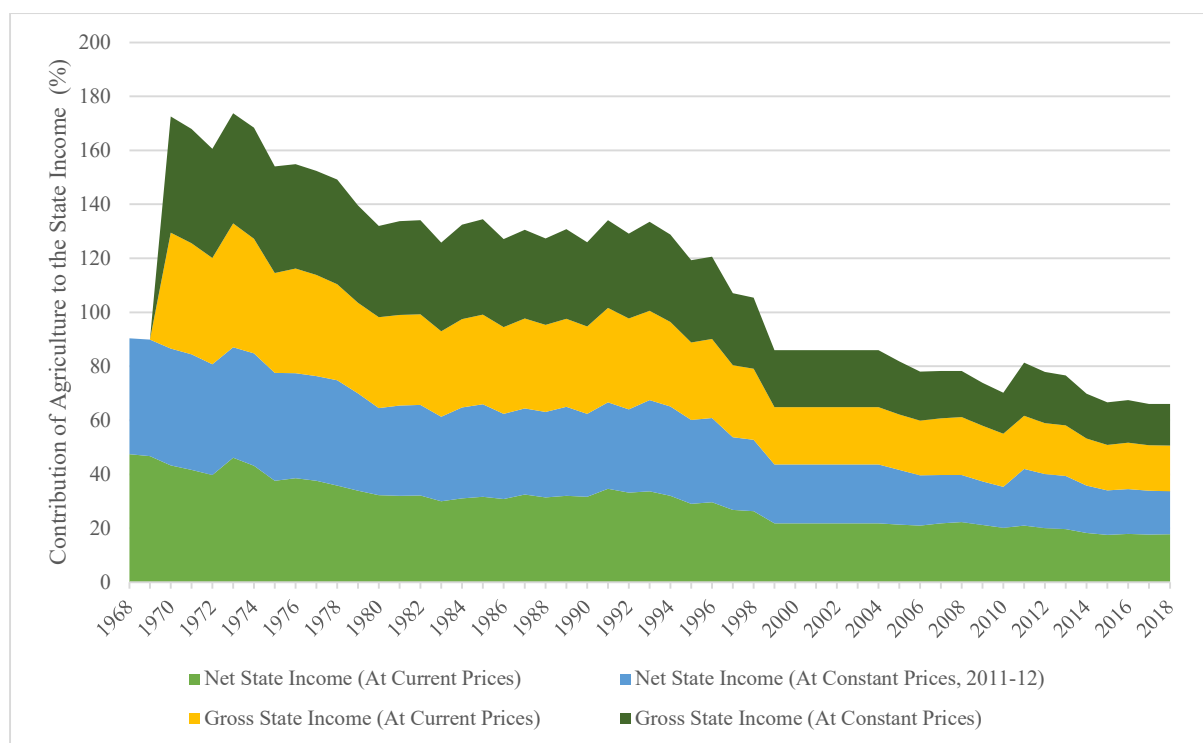
1 billion = 1000 million

1 Contribution of Agriculture to the State Income

Productivity, prosperity, and polarisation were the three patterns observed by Ladejinsky (1969) after his field trips to Punjab in late February and mid-May of 1969 to observe wheat, around which the Green Revolution revolved in the State. A spectacular increase in productivity was first observed with wheat surpluses and subsequent rice that helped India free itself from food aid. Punjab's agricultural gross domestic product grew at 5.7 per cent per annum from 1971-72 to 1985-86, which was more than double the rate clocked at the all-India level (Gulati et al., 2021). Punjab became a symbol of India's grain surpluses, giving India needed food security.

The contribution of agriculture as a percentage to Punjab's gross and net state income, at both current and constant prices, since 1968 is depicted in Figure 1. The gross state income is the total amount of money earned by a state's people and businesses. The net state income is the gross national income minus the depreciation of fixed capital assets through wear and tear and obsolescence. As can be seen, the trajectory of fall in the contribution of agriculture to the state income has been visibly large since 1994. In 2018, agriculture contributed its lowest at 15.31 per cent and 16.03 per cent to the gross and net state income (at constant prices), respectively.

Figure 1 Contribution of Agriculture to Total Income of Punjab (1968 to 2018)



Source: Compilation by Gill from Department of Planning, Punjab (<https://punjab.data.gov.in/>).

The present study is an attempt to trace the state of agriculture in Punjab over the last six decades based on secondary data. Agricultural intensification through government intervention subsequent to India's Green Revolution has been mapped to capture the changing cropping pattern, production and yields, consumption of fertilisers, pesticides and energy, together with ground water assessment and offtake of agricultural credit. Being an agrarian State, the need to meet the challenge of agricultural ecosystem trade-off and policy choices have been put forth.

2 Agricultural Holdings and Work Force Distribution

Primarily, the operational holding of farmers in India is either marginal (below one hectare) or small (between one and two hectares). The operational holding is all land used wholly or partly for agricultural production and is operated as one technical unit by one person alone or with others without regard to title, legal form, size or location.¹ In Punjab, as can be seen in Table 1, the farmers mainly fall into the semi-medium (between two and four hectares) and medium (between four and ten hectares) category, with 61.6 per cent of the area under farming in 2015-16. For the same period, the marginal (14.13%) and small (18.98%) farmers accounted for 9.69 per cent of the area. Large farmers accounted for only 5.28 per cent of the total farmers in 2015-16, down from 7.28 per cent in 1995-96, a fall in area under the holding of 7.24 per cent. During the same period, the number and the holding size for small and semi-medium farmers increased, though it decreased for marginal ones. Further, there is a decline in the average landholding size from 3.79 hectares in 1995-96 to 3.62 hectares in 2015-16.

Table 1 Operational Holdings in Punjab (1995-96 to 2015-16)

Category	Size Class	1995-96			2010-11			2015-16		
		Area (%)	No. (%)	Holding Size	Area (%)	No. (%)	Holding Size	Area (%)	No. (%)	Holding Size
Marginal	Below 1 hectare	2.95	18.65	0.60	2.55	15.62	0.61	2.36	14.13	0.60
Small	1-2 hectares	5.78	16.78	1.31	6.78	18.57	1.38	7.33	18.98	1.40
Semi-medium	2-4 hectares	20.08	29.31	2.6	21.56	30.83	2.64	24.87	33.67	2.67
Medium	4-10 hectares	42.29	27.98	5.74	43.18	28.35	5.74	43.75	27.93	5.67
Large	10 hectares & above	28.89	7.28	15.05	25.93	6.62	14.75	21.65	5.28	14.85
All groups & classes		100	100	3.79	100	100	3.77	100	100	3.62

Source: Compiled by Gill from various issues of Statistical Abstracts, Punjab.

¹<https://agcensus.nic.in/acindianeedoph.html#:~:text=As%20such%2C%20operational%20holding%20defined,d ata%20collection%20in%20Agriculture%20Census.>

As apparent from Table 2, there has been an increase in the total workforce that has depended on agriculture and allied activities since 1961. Out of the entire workforce, there has been a decrease in the percentage of agricultural workers and cultivators from 1961 to 2011 by 20.03 per cent and 26.69 per cent, respectively. However, there has been an increase in the workforce engaged as farm labour as a percentage of the total from 17.27 per cent in 1961 to 45.08 per cent as per the 2011 census data.

Table 2 Work Force Distribution in Punjab

S. No.	Particulars	1961	1971	1981	1991	2001	2011
(1)	Total agricultural work force ('000)	1,937	2,452	2,860	3,370	3,555	3,523
(2)	Total work force ('000)	3,466	3,913	4,928	6,098	9,127	9,897
(3)	Agricultural workers [as a % of (2)]	55.89	62.67	58.02	55.26	38.95	35.59
(4)	Agricultural labour [as a % of (1)]	17.27	32.09	38.2	43.22	41.61	45.08
(5)	Agricultural cultivators [as a % of (1)]	82.73	67.91	61.80	56.89	58.09	54.93
(6)	Agricultural labour [as a % of (2)]	9.65	20.11	22.16	23.82	16.32	16.04
(7)	Agricultural cultivators [as a % of (2)]	46.24	42.56	35.86	31.44	22.96	19.55

Note: Total agricultural workforce includes main and marginal workers.

Source: Compiled by Gill from various issues of Statistical Abstracts, Punjab.

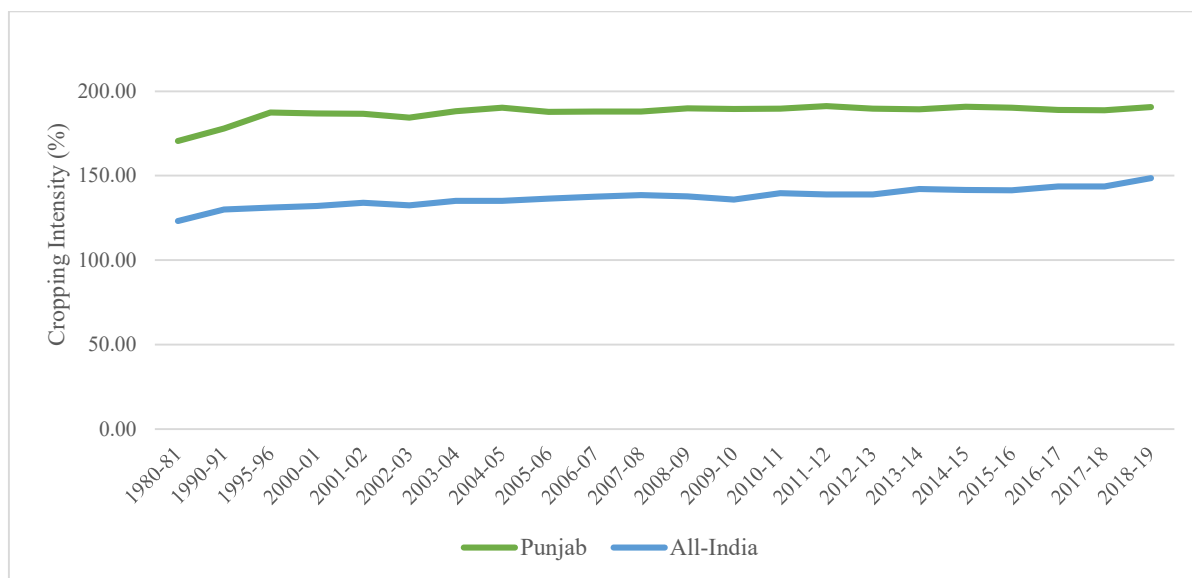
3 Cropping Intensity

Land under cropping is changing due to human interventions. Contrary to natural vegetation, wherein the growth process takes years, the cropping cycle completes within a year. Further, the latter process is more complex since phenological changes vary under different cropping systems in different regions (Yu et al., 2014; Waha et al., 2020). Cropping intensity is the ratio of gross cropped area to net cropped area in percentage terms. The gross cropped area is the total area sown once and more than once, while the net cropped area is the total area planted only once in a particular year. The intensity of crop cultivation is the number of crops a farmer grows in a given agricultural year on the same field (Raut et al., 2011). Thus, a higher cropping intensity implies higher productivity per unit of arable land during one agricultural year.

The average cropping intensity for Punjab rose from 171 per cent in 1980-81 to 191 per cent in 2018-19, with a compounded annual growth rate of 0.29 per cent. For the same period, the gross sown area has increased from 7,158.3 million hectares to 7,837.6 million hectares, while the net sown area fell to 4,126.5 million hectares in 2018-19 from 4,196.5 million hectares in 1980-81. Thus, the area cropped more than once (double-cropped area) increased to 3,655 million hectares in 2018-19 from 2,963 million hectares in 1980-81. As a whole for

the country, the compounded annual growth rate was 0.49 per cent, with the cropping intensity of 123 per cent in 1980-81 and 149 per cent in 2018-19. However, as shown in Figure 2, although the cropping intensity for Punjab is higher than the All-India, the same has stagnated since 2002-03.

Figure 2 Cropping Intensity for Punjab and All-India (1980-81 to 2018-19)



Source: Compiled by Gill from Directorate of Economics and Statistics (<https://desagri.gov.in/>).

4 Area Under Major Crop

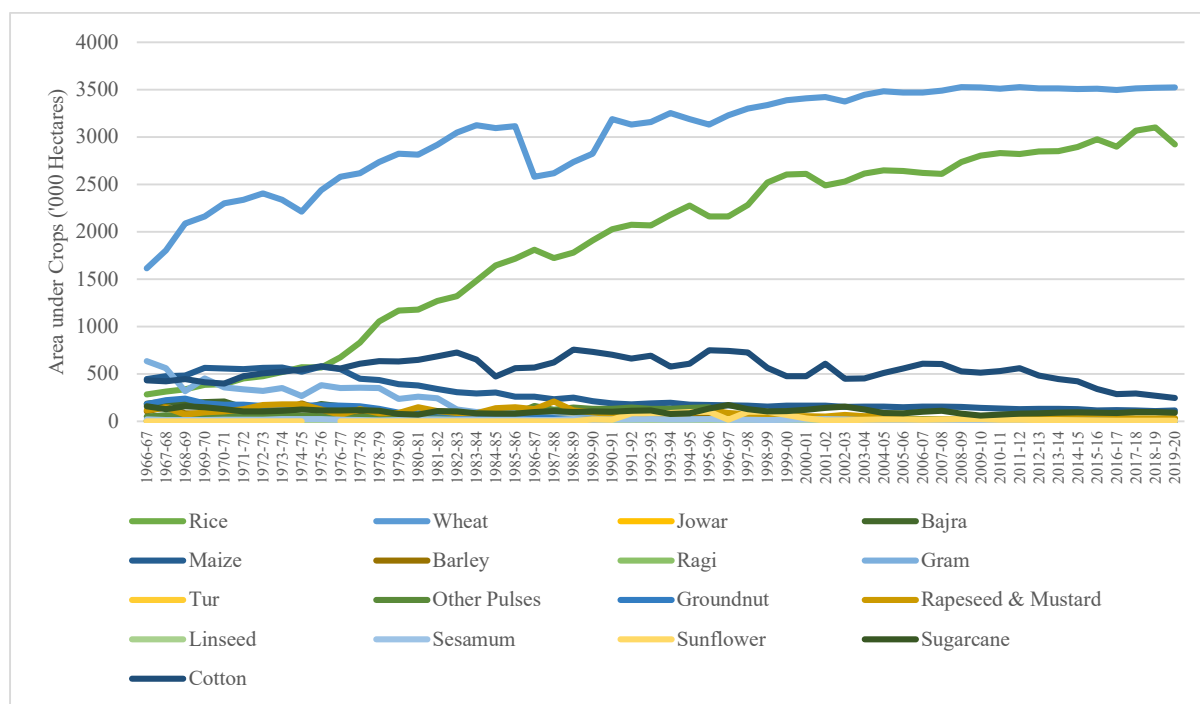
With 5,036 thousand hectares of land, Punjab has a 1.53 per cent share in the geographical area of India. The cultivable area is 4,200 thousand hectares (83.34% of the total geographical area), while the net area sown is 4,023 thousand hectares (95.79% of the cultivable area).² In 2019-20, the gross area sown in Punjab was 7,800 thousand hectares, with ten prominent food and seven non-food crops occupying 6,975 thousand hectares. The food and non-food crops considered include rice, wheat, jowar, bajra, maize, barley, ragi (finger millet), gram, tur (arhar), other pulses, groundnut, rapeseed and mustard, linseed, sesamum, sunflower, sugar cane, and cotton.

The total cropped area under these food grains (rice, wheat, jowar, bajra, maize, barley, ragi, gram, tur, and other pulses) has increased from 3,321.10 thousand acres in 1966-67 to 6,595.8 thousand acres in 2019-20 (cf. Annexure A). On the other hand, for the same period, the total cropped area for oilseeds (groundnut, rapeseed and mustard, linseed, sesamum, and sunflower) has decreased from 317.5 thousand hectares to 39.7 thousand hectares and for cash crops (sugarcane and cotton) from 588 thousand hectares to 339 thousand hectares. Since the

² <https://farmech.dac.gov.in/FarmerGuide/PB>

advent of the Green Revolution, the area under rice and wheat has expanded exponentially, as is evident from Figure 3. As of 1996-97, rice and wheat together occupied 1,900 thousand acres or 45.46 per cent of the total cropped area (4,173 thousand acres) in comparison to 6,441 thousand hectares or 82.58 per cent of the total cropped area in 2019-20. In the pecking order, the area under rice, wheat and cotton was 41.87 per cent, 50.48 per cent, and 3.56 per cent of the total cropped area for seventeen major crops in 2019-20. Contrary to this, the order was wheat (38.21%), gram (14.99%), maize (10.50%), rice (6.74%), and bajra (4.35%) in 1966-67.

Figure 3 Area under Food and Non-Food Crops for Punjab (1966-67 to 2019-20)



Source: Compiled by Gill and Kaur from the Directorate of Economics and Statistics (<https://desagri.gov.in/>).

The area under wheat touched 49 per cent of the total cropped area for main crops in 1971-72. However, it dipped to an average of 45 per cent between 1986-87 and 1989-90 and has been hovering around 49 per cent of the total cropped area since then. On the other hand, the total cropped area for rice shows an increasing trajectory to around 42 per cent in the last five cropping seasons. This is plausible because millets and other pulses that were grown at the cusp of the Green Revolution were replaced by paddy.

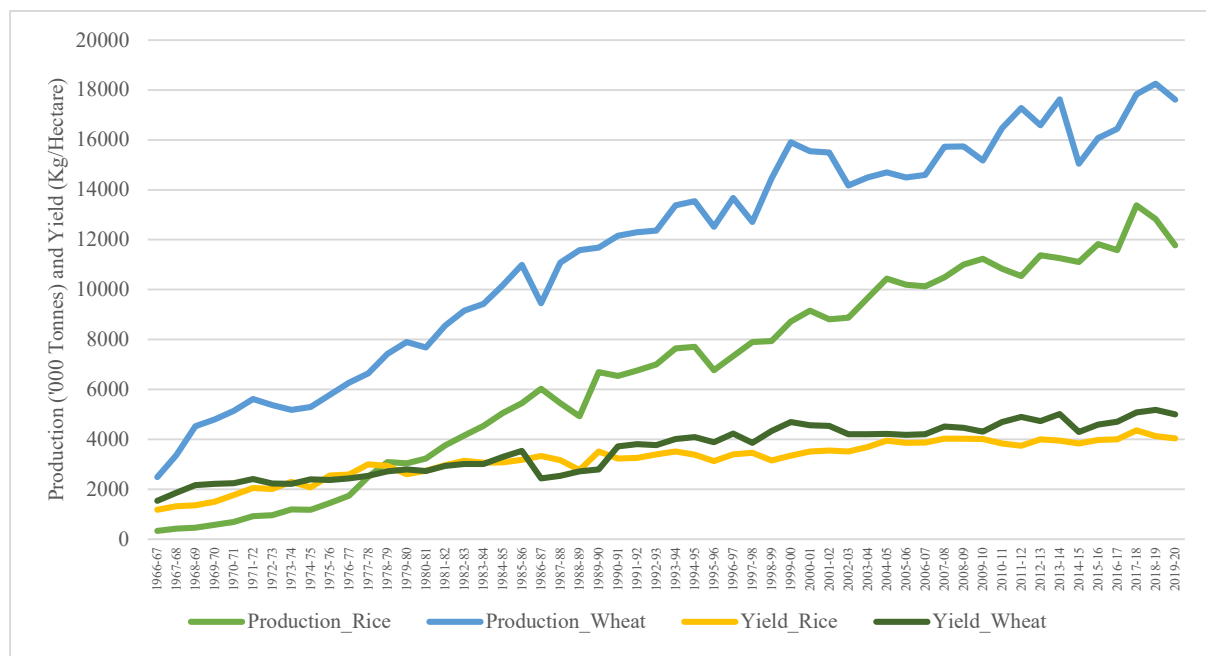
5 Production and Yield of Major Crops

Rice and wheat together contributed 29 per cent towards the production in 1966-67, which touched the highest during 2010-11 (84%), before resting at 77 per cent in 2019-20, as can be seen from Figure 4. With time, from 1966-67 to 2019-20, the production of wheat in Punjab grew at a compound annual growth rate of 3.69 per cent and that for the country at a much

higher rate at 4.25 per cent. Interestingly, for the same period, rice production expanded by 6.8 per cent for Punjab vis-à-vis 2.39 per cent for the rest of India. Except for other pulses (i.e., Urad, Moong, and Masur), where production increased from 23.5 thousand tonnes to 25.18 thousand tonnes from 1966-67 to 2019-20, the output for all food crops and oilseeds declined drastically (cf. Annexure B). Millets like ragi and jowar have altogether disappeared from the basket of options, while the production of bajra is at only 0.32 thousand tonnes in 2019-20. However, between 1966-67 and 2019-20, the production of sugarcane and cotton increased from 4,360 thousand tonnes and 767 thousand tonnes to 7,302 thousand tonnes and 1,206 thousand tonnes, respectively.

The production per unit of area for the harvested crop is its yield. The yield multiple for rice has hovered around three since 2003-04, i.e., increased by three times the base year 1966-67. Similarly, the wheat yield has stabilised at around three since 2009-10. A similar yield increase (3 multiple) can be observed for rapeseed and mustard as well as cotton. However, the maximum increase in the yield was clocked by barley, i.e., it increased four times from 848 kg per hectare to 3,644 kg per hectare from 1966-67 to 2019-20 (Annexure C). The crops whose yield doubled during this period are maize, groundnut, and sugarcane.

Figure 4 Production and Yield for Wheat and Rice in Punjab (1966-67 to 2019-20)



Source: Compiled by Gill and Kaur from the Directorate of Economics and Statistics (<https://desagri.gov.in/>).

As shown in Table 3, Punjab has been India's second-largest total food grains producing state between 2005-06 and 2014-15, with 14.49 million tonnes and 15.78 million

Table 3 Position of Punjab Amongst the Largest Crop Producing States of India

Crop	Crops	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
A. Food Grains																
Rice	Position	–	–	–	–	Second	–	–	Third	–	–	Third	Third	Second	Third	Third
	Production (Million Tonnes)	–	–	–	–	11.24	–	–	11.37	–	–	11.82	11.03	13.38	12.82	11.78
	All-India	–	–	–	–	89.09	–	–	104.40	–	–	104.32	110.15	112.91	116.42	118.43
	Percentage in All-India Production	–	–	–	–	12.62	–	–	10.89	–	–	11.33	10.01	11.85	11.01	9.95
Wheat	Position	Second	Second	Second	Second	Second	–	Second	Second	Second	Second	Third	Third	Second	Second	Third
	Production (Million Tonnes)	14.49	14.60	15.72	15.73	15.17	–	17.21	16.11	17.04	15.78	16.08	16.44	17.85	18.24	17.57
	All-India	69.35	75.81	75.81	78.60	80.80	–	93.90	92.46	95.91	88.94	93.50	98.38	99.70	102.19	107.59
	Percentage in All-India Production	20.89	19.26	20.74	20.01	18.77	–	18.33	17.42	17.77	17.74	17.20	16.71	17.90	17.85	16.33
Total Food Grains	Position	Second	Second	Second	Second	Second	–	Second	Second	Second	Second	Third	Third	Third	Third	Third
	Production (Million Tonnes)	25.18	25.31	25.31	26.82	26.95	–	28.35	28.07	28.90	27.46	28.41	27.99	31.71	31.52	30.02
	All-India	208.60	217.28	217.28	230.90	218.11	–	257.44	252.36	264.77	252.68	252.22	275.68	284.83	284.95	296.65
	Percentage in All-India Production	12.07	11.65	11.65	11.62	12.36	–	11.01	10.99	10.92	10.87	11.26	10.15	11.13	11.06	10.12
B. Other Cash Crops																
Cotton ^a	Position	Third	Third	–	Third	Third	–	–	–	–	–	–	–	–	–	–
	Production (Million Tonnes)	2.40	2.68	–	2.68	2.68	–	–	–	–	–	–	–	–	–	–
	All-India	18.50	22.63	–	22.63	22.63	–	–	–	–	–	–	–	–	–	–
	Percentage in All-India Production	12.97	11.84	–	11.84	11.84	–	–	–	–	–	–	–	–	–	–

Notes: ‘–’ implies not available or not applicable; ^a Production in a million bales of 170 kgs each.

Source: Compiled by Gill from the Directorate of Economics and Statistics (<https://desagri.gov.in/>).

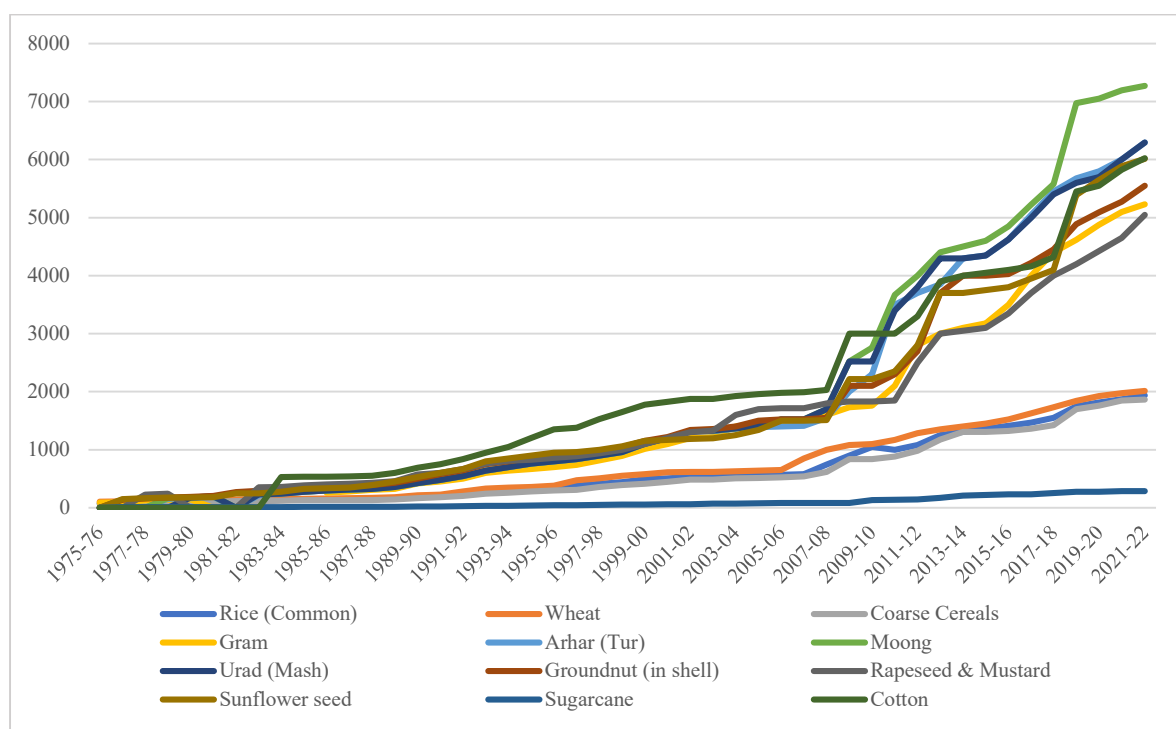
tonnes, respectively. However, from 2015 to 2016, though the total foodgrain production increased from 28.41 million tonnes to 30.02 million tonnes from 2016-17 to 2019-20, Punjab lost its coveted second position to Madhya Pradesh, to rank third.

As a percentage of total production, the contribution of Punjab to the national basket has reduced from 12.07 per cent in 2005-06 to 10.12 per cent in 2019-20. The wheat production has been stellar next only to Uttar Pradesh during 2005-15 and 2017-19. In 2019-20, it stood third with a production of 17.57 million tonnes, next to Uttar Pradesh and Madhya Pradesh. Punjab has held third place for paddy cultivation, next to West Bengal and Uttar Pradesh. For cotton, a major cash-producing crop, Punjab could hold its third spot only till 2009-10.

6 Minimum Support Price

The minimum support price (MSP) is a ‘minimum price’ for any crop that the government considers remunerative for farmers, hence deserving ‘support’. It is also the price government agencies pay whenever they procure a particular crop; it is not legally binding and thus not enforceable. The Central Government fixes it on the recommendations of the Agricultural Costs and Pricing Commission generally at the time of the start of the crop cycle. Over the last four decades, the highest increase in announced MSP has been for pulses, with a compound annual growth rate of 9.23 per cent for gram, 9.2 per cent for moong, 9 per cent for tur and 8.9 per cent for urad dals (Figure 5 and Annexure D).

Figure 5 MSP for Select Crops (Rs. Per Quintal for 1975-76 to 2021-22)



Source: Compiled by Gill and Kaur from the Directorate of Economics and Statistics ([https://desagri.gov.in /](https://desagri.gov.in/)).

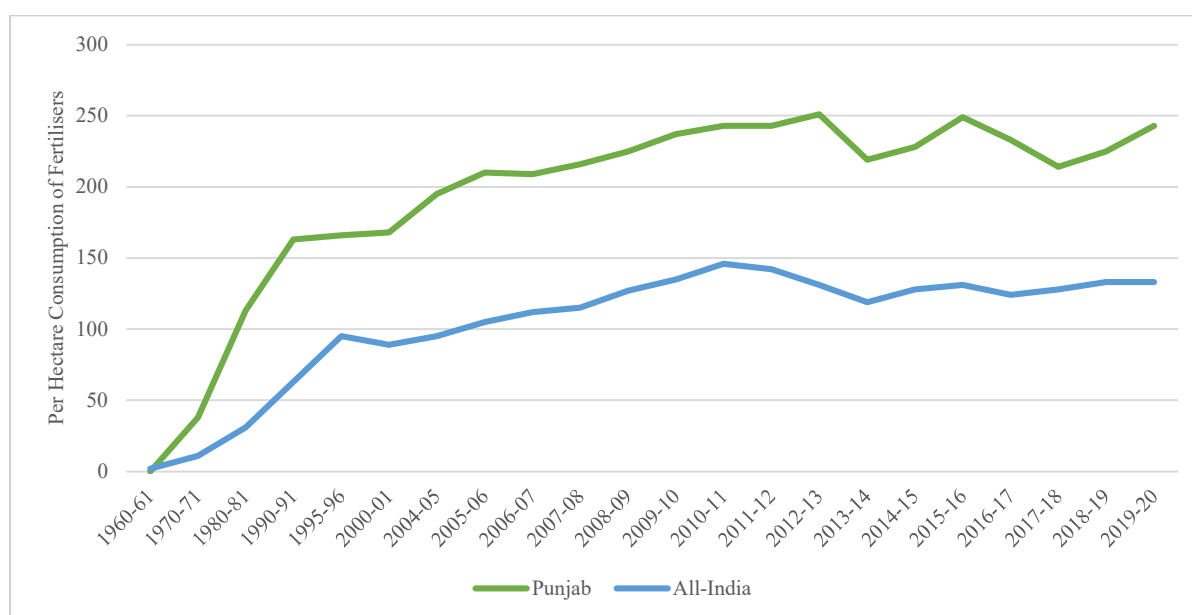
One of the lowest increases in MSP has been for wheat and cotton, at a compounded rate of 6.63 per cent and 6.45 per cent, respectively. Surprisingly, the MSP for rice (common), which the farmers in Punjab have favoured, stood at Rs. 1,940 per quintal in marketing season 2021-22, an increase of 7.36 per cent compounded annually from Rs. 74 in 1975-76. The compounded growth in MSP for rice is marginally higher for coarse cereals (7.27%), which has been to a very large abandoned by the farmers in favour of the cultivation of paddy.

7 Farm Inputs

The farm inputs include resources used in farm production, including seed, chemicals, equipment, and energy. Good quality seed of high-yielding varieties has played the most critical role in increasing agricultural production in Punjab. For the wheat crop, the total seed requirement grew from 3,48,700 tonnes in 2007-08 to 3,49,500 tonnes in 2016-17. For the same period, seeds for the paddy crop increased from 52,180 tonnes to 60,920 tonnes. Throughout this period, the seed prices for wheat and rice grew at the compounded annual rate of 7.05 and 8.01 per cent, respectively.

In terms of fertiliser usage, the comparison of the use of nitrogen (N), phosphorus (P) and potassium (K) in thousand tonnes over the last six decades in Punjab and at the all-India level is shown in Table 4. It can be seen that in 2019-20 the usage of these three major plant nutrients in Punjab (All-India) was 1,500 (19,101) thousand tonnes, 363 (7,662) thousand tonnes, and 43 (2,607) thousand tonnes, respectively. Figure 6 highlights that the usage of fertilisers (N + P + K) in kilograms per hectare is much higher in Punjab (CAGR of 9.55%)

Figure 6 Consumption of Fertilisers in Punjab (Kgs. per Hectare for 1960-61 to 2019-20)



Source: Compiled by Gill and Kaur from the Directorate of Economics and Statistics (<https://desagri.gov.in/>).

Table 4 Fertiliser Consumption and NPK Ratio for Punjab and India

<i>Panel A: Consumption of Nitrogen, Phosphorus and Potassium (Thousand Tonnes)</i>								
Fertiliser	Location	1960-61	1970-71	1980-81	1990-91	1995-96	2000-01	2005-06
N	Punjab	5	175	526	877	1,020	1,008	1,255
	All-India	210	1,487	3,678	7,997	9,823	10,920	12,723
P	Punjab	–	31	207	328	227	282	369
	All-India	53	462.0	1,213.6	3,221	2,898	4,215	5,204
K	Punjab	–	7	29	15	16	23	63
	All-India	29.0	228	624	1,328	1,156	1,568	2,414
T	Punjab	5	213	762	1,220	1,263	1,313	1,687
	All-India	292	2,177	5,516	12,546	13,876	16,702	20,341
Fertiliser	Location	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
N	Punjab	1,299	1,317	1,332	1,348	1,403	1,417	1,486
	All-India	13,773	14,419	15,091	15,580	16,558	17,300	16,821
P	Punjab	354	341	379	383	435	449	462
	All-India	5,543	5,515	6,506	7,274	8,050	7,914	6,653
K	Punjab	38	37	55	56	73	53	24
	All-India	2,335	2,636	3,313	3,632	3,514	2,576	2,062
T	Punjab	1,691	1,695	1,766	1,787	1,912	1,918	1,972
	All-India	21,651	22,570	24,909	26,486	28,122	27,790	25,536
Fertiliser	Location	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
N	Punjab	1,364	1,352	1,510	1,409	1,324	1,388	1,500
	All-India	17,750	16,945	17,372	16,735	16,958	17,628	19,101
P	Punjab	325	328	452	386	299	330	363
	All-India	5,634	6,098	6,979	6,705	6,854	6,968	7,662
K	Punjab	24	38	78	46	51	42	43
	All-India	2,099	2,532	2,402	2,508	2,779	2,779	2,607
Total	Punjab	1713	1,718	2,040	1,891	1,674	1,760	1,906
	All-India	24,482	25,576	26,753	25,949	26,591	27,375	29,369
<i>Panel B: Consumption of Fertilisers (Kilograms per Hectare)</i>								
Fertiliser	Location	1960-61	1970-71	1980-81	1990-91	1995-96	2000-01	2005-06
N + P + K	Punjab	–	38	113	163	166	168	195
	All-India	2	11	31	63	95	89	95
Fertiliser	Location	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
N + P + K	Punjab	209	216	225	237	243	243	251
	All-India	112	115	127	135	146	142	131
Fertiliser	Location	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
N + P + K	Punjab	219	228	249	233	214	225	243
	All-India	119	128	131	124	128	133	133
<i>Panel C: Proportion of Nitrogen, Phosphorus and Potassium</i>								
Fertiliser	Location	1960-61	1970-71	1980-81	1990-91	1995-96	2000-01	2005-06
N: P: K	Punjab	–	25:4:1	18:7:1	58:22:1	64:14:1	44:12:1	20:6:1
	All-India	7:2:1	7:2:1	6:2:1	6:2:1	8:3:1	7:3:1	5:2:1
Fertiliser	Location	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
N: P: K	Punjab	34:9:1	36:9:1	24:7:1	19:6:1	19:6:1	27:8:1	62:19:1
	All-India	6:2:1	5:2:1	5:2:1	4:2:1	5:2:1	7:3:1	8:3:1
Fertiliser	Location	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
N: P: K	Punjab	57:14:1	36:9:1	19:6:1	31:8:1	26:6:1	33:8:1	35:8:1
	All-India	8:3:1	7:2:1	7:3:1	7:3:1	6:2:1	6:3:1	7:3:1

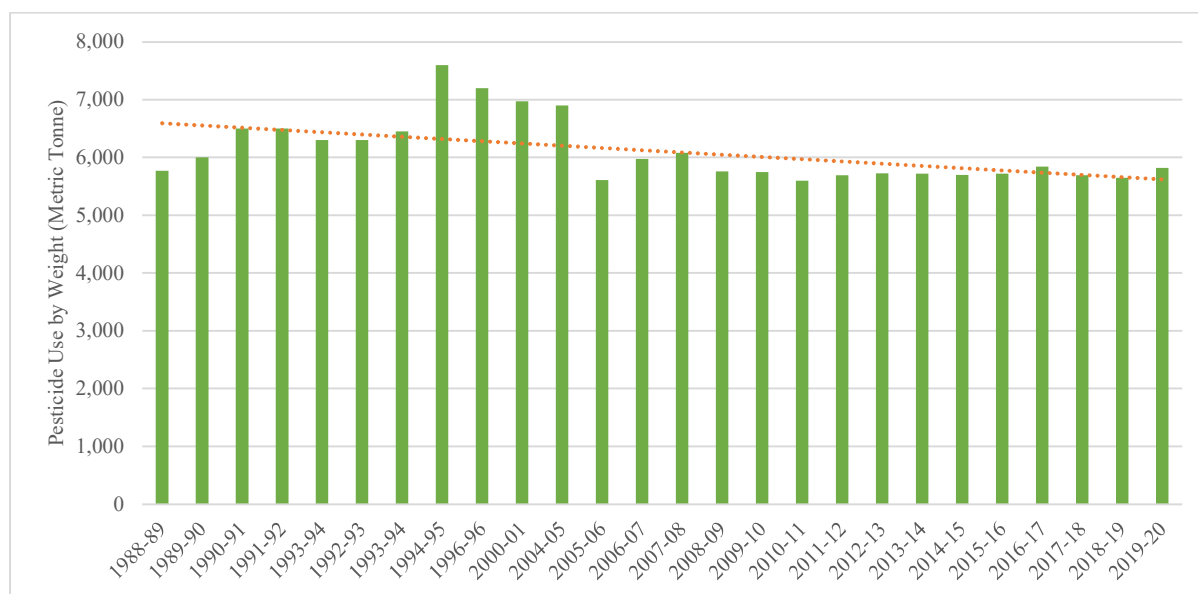
Note: N, P, and K are for Nitrogen, Phosphorus, and Potassium, respectively; ‘–’ implies not available or not applicable.

Source: Compiled by Gill and Kaur from Agricultural Statistics at a Glance, Ministry of Agriculture and Farmers Welfare, Government of India (<https://www.rbi.org.in/Scripts/PublicationsView.aspx?id=20070>).

than for the country (CAGR of 4.2%) as a whole. The NPK ratio of Punjab is 35:8:1 in comparison to 7:3:1 at an All-India level in 2019. The ratio was alarmingly high for 1990-96 and 2012-14. According to Chand and Pavithra (2015), balanced use of fertiliser requires N, P, and K to be in the ratio of 4:2:1, with a deviation from this standard resulting in constricting crop productivity. As apparent, the usage of fertilisers is at an obnoxiously high level.

The term pesticide covers many compounds, including insecticides, fungicides, herbicides, rodenticides, molluscicides, nematocides, plant growth regulators, and others (Akhtar et al., 2019). The pesticide consumption in India increased from 434 metric tonnes to 46,195 metric tonnes during the period 1954-2000. During this period, Punjab was the second-highest consumer of pesticides trailing only Andhra Pradesh. Figure 7 displays that the usage of pesticides reached a very high level between 1994-95 and 2004-05, with an average use of 7,168 metric tonnes. After that, there has been a decline in usage, though Punjab stood in the third spot after Maharashtra and Uttar Pradesh in terms of pesticide consumption across the country. As of 2019-20, the consumption of fertilisers is at 5,820 metric tonnes, registering a three per cent rise in consumption from the previous year.

Figure 7 Consumption of Pesticides in Punjab (Metric Tonne for 1988-89 to 2019-20)



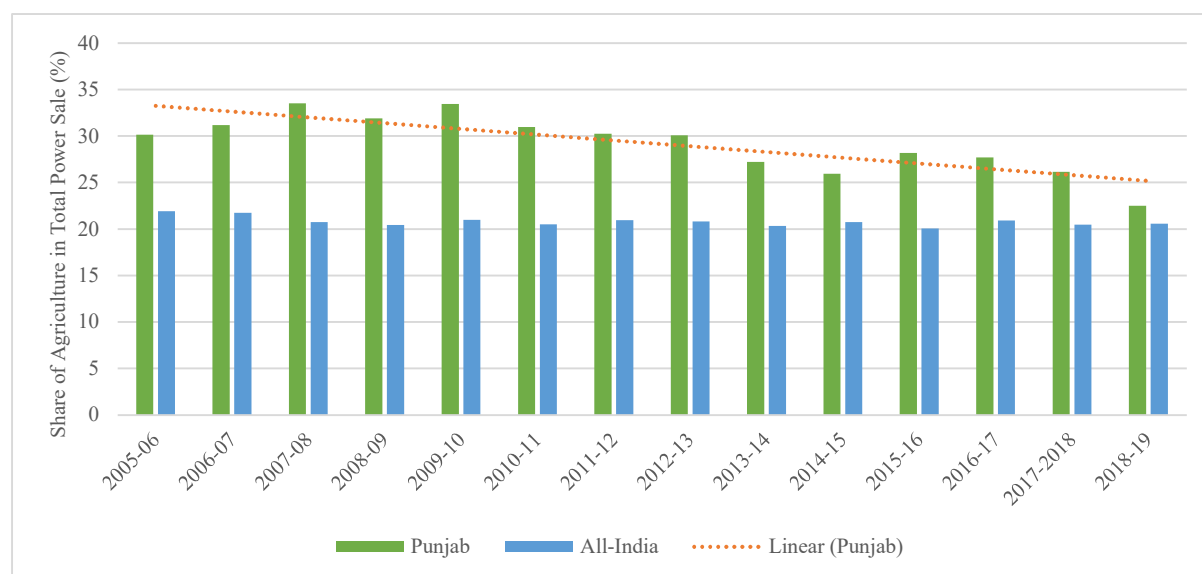
Source: Compiled by Gill from the Department of Planning, Punjab (<https://punjab.data.gov.in/>).

There has been a significant increase in farm mechanisation in Punjab with an increasing number of tractors, disc-harrows, self-propelled combines and tube wells. According to Gulati and Juneja (2020), the source of mechanical power on the farms can be mobile (tractors, power tillers and self-propelled machines) or stationary (oil engines and motors). The number of tractors in the State was 5,281 in 1970-71, which increased to 4,50,200

in 2018-19. Punjab is one of the leading states for the number of tractors in terms of density per 1,000 hectares of net sown area, which stands at an average of 79. Based on the research of Gulati and Juneja (2020), Punjab farmers prefer 41-50 horsepower tractors. Similarly, the number of electrical/diesel pump sets has increased from 80,000 in 1950-51 to 14,75,700 in 2018-19. For the mechanisation of paddy crop residue management, 75,000 machines were provided to the farmers and custom hiring centres from 2018 to 2021.

Electricity for the agricultural sector in Punjab has been made free since 1997. In 2005-06, a little more than 30 per cent of the total electricity sold was used for agricultural purposes in Punjab vis-à-vis 22 per cent at the country level. In absolute terms, the electricity consumed by the state agriculture sector was 7,313.85 gigawatt-hours (GWh). In 2018-19, electricity consumed by the agricultural sector was 11,268.38 GWh, an increase of 54 per cent from 2005-06 usage. This was 22 per cent of total electricity sold in the State, though higher than the corresponding 21 per cent registered at the all-India level. Figure 8 highlights a decrease in electricity consumption by the agricultural sector over the years in Punjab. Besides the shortage of electricity, there is a considerable impact of weather, especially seasonal rainfall and temperature variability, on demand for power in the agricultural sector (Bhargava et al., 2009).

Figure 8 Consumption of Electricity by the Agricultural Sector (2005-06 to 2018-19)



Source: Compiled by Gill from Directorate of Economics and Statistics (<http://desagri.gov.in/>).

8 Irrigation and Groundwater

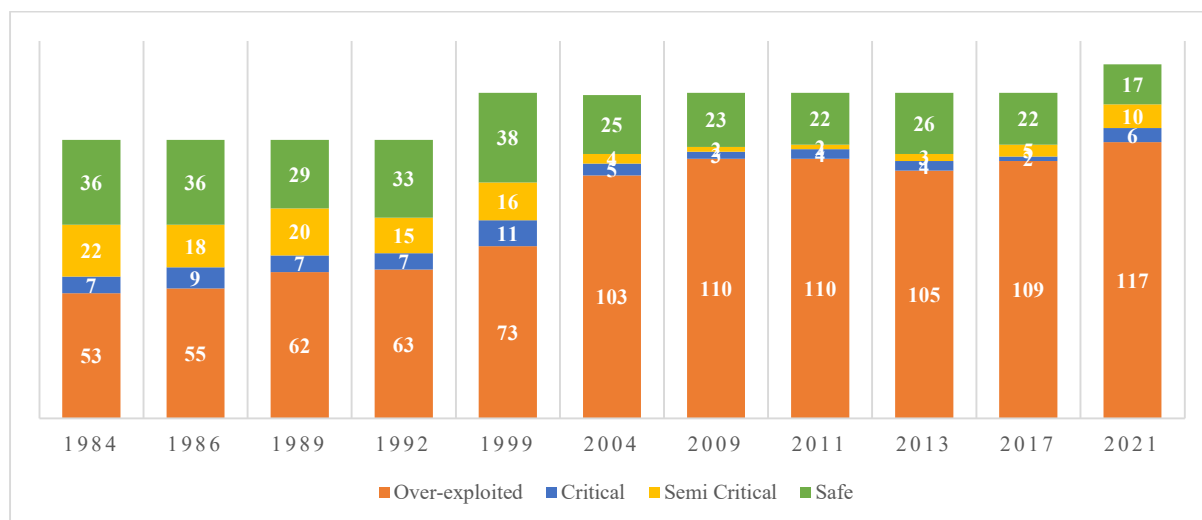
Around 85 per cent of the water resources in Punjab are consumed for irrigation purposes through tubewells (ground water) and the canal system. At the dawn of the Green Revolution in the State in mid-sixties, the number of tube wells were a meagre 50,000, which increased to

1,92,000 in 1970-71, 6,00,000 in 1980-81, 8,00,000 in 1990-91, 10,73,000 in 2001-02, and 13,81,606 in 2010-11. In 2019-20, there were 29,47,916 tubewells, which is 71.44 per cent of the net irrigated area (area irrigated once in a year for a particular crop), with the remainder (28.56%) being met through canal water. There is a vast network of canals with about 1,00,000 km of water courses with a total culturable command area of 30,88,000 hectares, fed by three perennial rivers, viz., Sutlej, Beas and Ravi.³ The State has successfully achieved almost 100 per cent net irrigated area (Punjab Economic Survey, 2021).

Whether deficient or excessive, rainfall has a vital role in determining agricultural output. Though agriculture in Punjab has limited dependence on rainfall, the distribution is erratic both in time and space (Central Ground Water Board, 2021). Further, rainfall variability influences groundwater systems, which is the principal source of recharge (Dey et al., 2020). In Punjab, there have been 35 years of deficient rain between 1901 and 2017, out of which ten years of deficiency were recorded between 2000 and 2019, which means a 29 per cent of deficit in just over two decades.⁴

According to the Central Ground Water Board (2021) estimates, the State’s overall stage of ground water extraction is 164 per cent. Figure 9 provides the assessment of groundwater from 1984 to 2021. As of 2021, 78 per cent of the area of the State is over-exploited, which was around 50 per cent until 1992. As a result, there has been overexploitation of ground water to meet the agriculture requirement pushing the net annual ground water

Figure 9 Ground Water Assessment in Punjab (Number of Blocks)



Source: Central Ground Water Board (2021).

³ <http://punenvis.nic.in/index2.aspx?slid=5618&mid=1&langid=1&sublinkid=935>

⁴ <https://indianexpress.com/article/explained/the-declining-monsoon-rainfall-in-punjab-over-last-two-decades-7572517/>

availability for irrigation to zilch since 2017, as highlighted in Panel A of Table 5. Further, the ground water quality has vast variation, with the quality changing from good to poor from north to south/south-west Punjab. As revealed in Panel B of Table 5, based on the computation of Residual Sodium Carbonate (RSC) values of ground waters (also called Eaton’s Index), 51.66 per cent of the waters are safe, 14.57 per cent are marginal, and 33.77 per cent are unfit for irrigational uses.

Table 5 Ground Water Availability for Irrigation in Punjab

<i>Panel A: Annual Net Availability for Irrigation</i>			
	Average Gross Unit Draft (ham)	Million Acre Feet	
1984	3,01,929	2.44	
1989	67,914	0.55	
1992	1,03,177	0.84	
1999	27,101	0.22	
2004	(9,88,926)	(8.01)	
2009	(14,57,475)	(11.81)	
2011	(14,83,189)	(12.02)	
2013	(11,62,414)	(9.42)	
2017	0	0	
2021	0	0	
<i>Panel B: Suitability for Irrigation (2015-19)</i>			
No. of Samples (Districts)	EATON’s INDEX (RSC in meq/L)		
	Safe (< 1.25)	Marginal (1.25 - 2.50)	Unsafe (> 2.50)
302 (22)	156	44	102

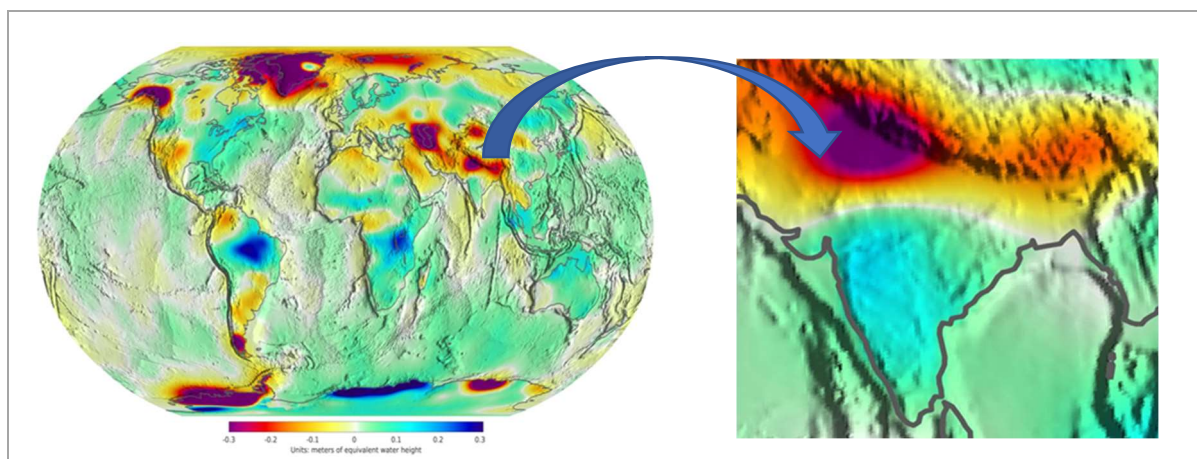
Source: Central Ground Water Board (2021).

Worldwide, the Gravity Recovery and Climate Experiment (GRACE) data have been used to monitor variability and trends in total water storage. Researchers have investigated the global scale relationships between GRACE trends, climate models, precipitation, and irrigation (Bruss et al., 2019). Figure 10 shows the GRACE-FO satellite image for India with warm colours (red, orange and yellow), indicating below-average terrestrial water amounts (including ice, snow, soil moisture and groundwater). Punjab and adjoining states show a decrease (-0.3 to -0.1) in territorial water storage as of February 2022 relative to 2005-2010.

9 Agricultural Credit

Many independent researchers (e.g., Gill and Vashisht, 1972; Singh, 1972; Singh, 1974) highlight that the proportion of indebted cultivators increased in the Green Revolution period in Punjab. Unproductive use of loans taken at a high interest rate was one of the leading causes of indebtedness. Due to polarisation between the rich and poor farmers, the small and marginal

Figure 10 Terrestrial Water Storage (February 2022 relative to 2005-2010)



Source: NASA's Gravity Recovery and Climate Experiment (GRACE) Follow-On Data (<https://photojournal.jpl.nasa.gov/jpeg/PIA20206.jpg>).

farmers were more adversely affected by the Green Revolution as they were the most debt-burdened (Kaur, 2021).

According to the National Sample Survey Office (NSSO) 70th Round (January-December, 2013), Situation Assessment Survey of Agricultural Households, in 2013, the average monthly income of farmers stood at ₹6,426.⁵ In 2016-17, it increased to ₹8,931 between 2012-13 and 2016-17.⁶ Further, according to NSSO (2014), the proportion of indebted agricultural households in Punjab was 53.2 per cent compared to 51.9 per cent at the national level.⁷

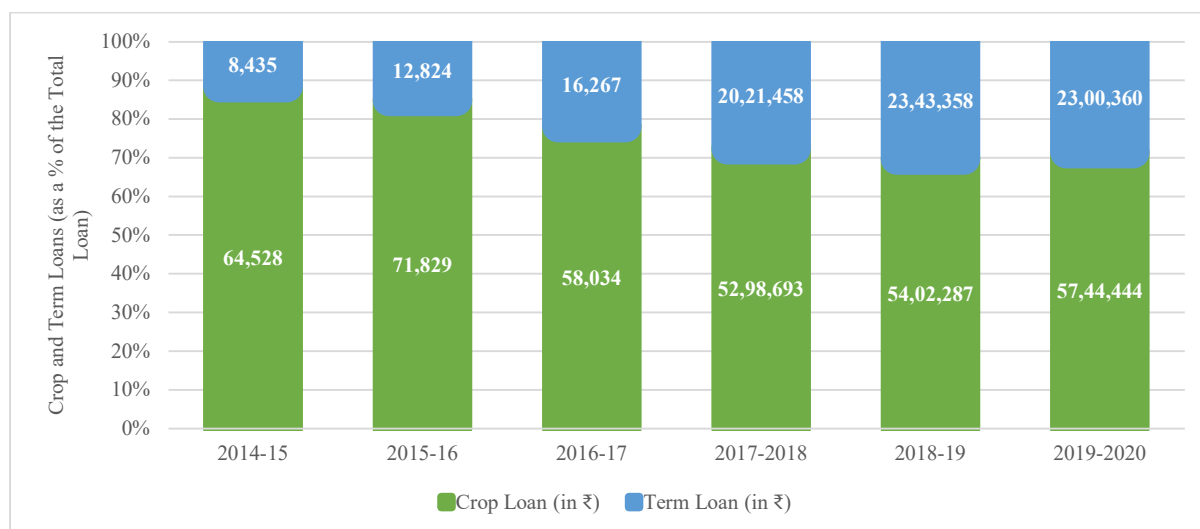
The nature of the loan disbursed can be short-term (also called crop loan or Kisan Credit Card or Retail Agri Loan) to meet working capital needs of one season cultivation or long-term (also called term loan) to specific agricultural activities with an extended repayment period of up to 15 years. As evident from Figure 11, the share of crop loans to total loans, though in the majority, has decreased from 88.44 per cent in 2014-15 to 71.41 per cent in 2019-20. At the all-India level, the crop and term loan ratio were 75:25 in 2014-15 to 59:41 in 2019-20. Overall, there has been an off-take of long-term loans for agricultural purposes at the State and national levels.

⁵ <http://microdata.gov.in/nada43/index.php/catalog/133>

⁶ https://www.nabard.org/auth/writereaddata/tender/1608180417NABARD-Repo-16_Web_P.pdf

⁷ A major definitional shift occurred during the 70th round of NSS, resulting in replacing the concept of 'farmer household' with 'agricultural household,' resulting in a comparison of indebtedness among farmers across the last two surveys infeasible. Agricultural household is any household receiving the value of produce more than ₹3,000 from varied kinds of agricultural activities and having at least one member self-employed in agriculture, either in the principal status or in subsidiary status, during the last 365 days.

Figure 11 Disbursement of Agricultural Loans (2014-15 to 2019-20)



Source: Punjab Economic Survey (2021).

10 Agricultural Infrastructure

Since the Green Revolution, Punjab has been pivotal to India's food grain procurement system. Thus, the procurement of paddy and wheat from farmers at MSP remains intrinsic to the state's agricultural policy. Under the Agricultural Produce Markets Act, 1961, the market charges have been regularised, and transactions are conducted by open auction in the regulated markets. The Punjab Mandi Board is the coordinating body for market committees and plays a lead role in facilitating the efficient marketing of farm produce and the agricultural input delivery system. However, since the public procurement opens on schedule and all farmers sell their produce at MSP in the regulated mandis, farmers have little incentive to invest in marketing or storage.

Since the State carries out the post-harvest management of the produce, the agricultural infrastructure setup is well in place. As put forth in Table 6, the number of regulated markets (with attached sub-yards) has increased from 88 (154) in 1970-71 to 154 (283) in 2019-20. However, during the same period, the average number of villages and area served per regulated market has decreased by 58 and 237, respectively. In addition, the state-owned storage capacity has increased from 11,763 thousand tonnes in 1985-86 to 26,944 thousand in 2019-20.

Besides the regulated mandis, there are 1,390 rural primary markets, and 488 farmers' markets called Apni Mandis, where farmers directly sell to retail consumers (Punjab Economic Survey, 2021). Further, to integrate nationwide trade in agriculture commodities on an electronic platform, National Agriculture Market (eNAM) was founded by the Government of India in 2016. Currently, 37 Agricultural Produce and Livestock Market Committees have

registered, but none are currently trading online. Other stakeholders, as of March 2022 registered, include traders (2,421), commission agents (8,705), farmer producer organisations (10) and farmers (2,17,425).

Table 6 Ground Water Availability for Irrigation in Punjab

Infrastructure Type	Unit	1970-71	1985-86	2000-01	2010-11	2019-20
Regulated markets	Number	88	130	144	146	154
Sub-yards attached	Number	154	516	519	294	283
Average villages served per regulated market	Number	139	94	86	84	81
Average area served per regulated market	Square kilometre	573	387	350	345	336
Focal Points	Number	–	362	597	596	396
Marketed surplus of foodgrains and non-foodgrains handled	Thousand tonnes	–	13,240	27,056	32,696	31,623
Villages linked with metalled roads	Number	–	97.59	99.24	100	100
State-owned storage capacity	Thousand tonnes	–	11,763	25,159	22,633	26,944
Storage capacity for the procurement of paddy and wheat	%	–	88.11	121.22	99.66	92.70

Note: ‘–’ implies not available.

Source: Compiled by Gill from the Statistical Abstracts, Punjab and Punjab Economic Survey (2021).

11 Conclusion and Recommendations

The idea behind the Green Revolution, to combat hunger and poverty, benefited the nation. The new disease-resistant and fast-growing seeds, increased area under cultivation, double cropping, augmented use of inorganic fertilisers and pesticides, improved irrigation facilities, and better-quality farm implements and crop protection measures resulted in high crop productivity. In addition, the rolling out of assured procurement of wheat and rice by the central government at its annually declared MSP and providing price subsidies for the power and irrigation by the State government increased farm incomes and personal prosperity. However, the inequitable agrarian system left the marginal and small farmers discontented and disillusioned.

Post-green revolution, the area under cultivation of rice and wheat increased manifold but at the cost of destruction of genetic diversity and reduced cultivation of indigenous coarse grains and pulses. The irrational use of fertilisers and pesticides and the adoption of unsustainable cropping practices and technologies increased indebtedness and distress among the farmers. Diminishing water resources and soil toxicity increased the pollution of underground water. The practice of monoculture (only wheat-rice cultivation) fuelled through distorted incentive structure, the MSP that operates primarily in wheat and rice, with subsidised

power and fertilisers, has led to environmental havoc. Further, excessive mechanisation had a deleterious effect on soil properties, resulting in decreased yield and farm returns. Together with the burning of wheat and paddy straw has led to the loss of beneficial biomass, with the pollutants being a major health hazard. The agrarian crisis has put farmers' livelihoods and lives through an unprecedented predicament.

In conclusion, the effects of the green revolution persist. Considering ecological and social risk assessments, new interventions need to be implemented to bail out the State from the harmful consequences on agriculture, human health, and biodiversity. Given the declining average holding size, continued production of cereals will be inadequate to sustain the farmers economically. Therefore, there is a need to move toward crop diversification, especially fruits, vegetables and oil seeds, and integrated farming, which are remunerative. Due to the increasing demand for safe and nutritious food, organic or natural farming is the way forward. Similarly, sustainable agricultural techniques, such as intercropping, conservation tillage, legume intensification, and biological control, with essential principles involving enhancing nature's processes and eliminating external inputs, can be practised.

Facilitating dialogue requires trusted people, organisations, and policy briefs to act as conduits between stakeholders. Collectives such as cooperatives and self-help groups can further contribute to this reduction by helping the farmers to improve their farm practices by providing better access to appropriate technology, extension services, improved processing and marketing links and risk management techniques. Digitisation of agriculture can leapfrog Punjab's agriculture. Public policy at the national level can play an important role. The Central Government is giving impetus to natural and organic farming by launching various schemes. However, while doing so, it has failed to revoke or reduce the support provided through subsidies and waivers on chemical fertilisers or synthetic pesticides, seeds, and power. Thus, sending mixed signals. Further, the state governments should abandon the populist approach that has offered piecemeal solutions from time to time without addressing the underlying predicament. To facilitate this shift to sustainable farming, the government must invest in research and development, extension services and marketing facilities. In addition, initiatives to create off-farm employment opportunities and alternate sources of livelihood in the state, especially in rural areas, are required. Various commissions and committees have recommended this, but concerted steps for the same are not evident.

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ANNEXURE A

Estimates of Area Under Food and Non-Food Crops for Punjab and All-India ('000 hectares, 1966-67 to 2019-20)

Crop	L	Season	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75
A. Food Grains											
Rice	Pb	Kharif	285.0	314.0	338.0	384.4	389.9	450.0	475.5	520.0	569.0
	AI		33932.4	34912.1	35306.1	35817.9	35950.8	36086.9	35075.3	36487.4	35957.2
Wheat	Pb	Rabi	1615.0	1804.0	2086.0	2162.0	2299.2	2335.4	2404.3	2337.8	2213.0
	AI		12837.6	14998.2	15958.1	16625.5	18240.5	19138.9	19463.6	18583.3	18010.3
Jowar	Pb	Kharif	5.8	6.0	3.0	3.0	5.1	3.1	6.7	4.6	3.3
	AI		11284.5	11689.2	11377.5	11500.6	10924.5	9872.0	10202.9	10667.4	9883.8
Bajra	Pb	Kharif	184.0	209.0	192.0	201.3	207.1	145.2	128.6	147.4	131.0
	AI		12239.7	12807.5	12051.8	12492.8	12913.4	11773.3	11816.8	13933.4	11258.1
Maize	Pb	Kharif	444.0	476.0	481.0	562.9	554.6	547.6	561.7	567.2	522.0
	AI		5073.8	5583.4	5715.8	5862.2	5852.3	5667.6	5837.8	6015.4	5863.1
Barley	Pb	Rabi	103.8	149.0	82.0	80.0	56.6	48.4	55.7	109.7	189.0
	AI		2824.8	3375.2	2758.2	2764.9	2554.6	2455.3	2448.9	2648.3	2884.9
Ragi (Finger Millet)	Pb	Kharif	0.5	0.1	0.2	–	–	–	–	0.2	0.1
	AI		1984.2	2291.2	2238.2	2783.4	2472.4	2425.0	2329.3	2359.9	2463.6
Gram	Pb	Rabi	633.6	560.0	317.0	450.0	357.9	335.4	319.1	351.5	266.0
	AI		8003.2	8256.7	7105.5	7751.5	7838.7	7912.4	6967.5	7760.8	7041.6
Tur (Arhar)	Pb	Kharif	1.7	1.7	1.0	1.0	3.0	2.0	2.1	4.7	3.2
	AI		2521.0	2664.7	2528.9	2668.7	2655.0	2345.5	2424.1	2646.0	2528.9
Other Pulses	Pb	Kharif & Rabi	47.7	63.1	62.3	62.3	52.8	47.5	59.1	73.6	58.5
	AI		11597.1	11727.2	11629.6	11602.8	12040.3	11892.7	11523.6	13019.7	12453.9
B. Oilseeds											
Groundnut	Pb	Kharif	181.6	222.4	240.3	188.8	173.8	173.5	160.4	154.7	164.0
	AI		7299.1	7552.7	7088.1	7125.4	7326.2	7510.2	6990.0	7023.7	7062.6
Rapeseed & Mustard	Pb	Rabi	116.0	143.0	69.8	92.0	103.0	127.9	172.0	178.8	179.0
	AI		3005.9	3243.7	2870.2	3172.6	3323.1	3613.9	3318.7	3456.8	3680.4
Linseed	Pb	Rabi	2.0	2.0	3.7	3.0	2.7	2.4	2.7	2.7	2.2
	AI		1495.4	1776.7	1696.9	1802.8	1896.8	2064.4	1725.6	2038.2	2070.7
Sesamum	Pb	Kharif	17.9	13.5	11.7	11.1	14.6	15.3	16.4	20.5	22.3
	AI		2793.4	2654.3	2422.8	2308.7	2433.2	2391.5	2288.4	2385.8	2234.3
Sunflower	Pb	Kharif	–	–	–	–	–	–	–	–	–
	AI		–	–	–	–	–	–	–	–	–
C. Other Cash Crops											
Sugarcane	Pb	Kharif	156.0	127.0	156.0	148.6	127.7	103.0	102.5	110.3	123.0
	AI		2301.3	2046.5	2460.7	2748.8	2615.1	2390.4	2451.6	2752.1	2894.2
Cotton	Pb	Kharif	432.0	420.0	444.0	410.0	397.4	475.0	505.5	523.1	547.0
	AI		7835.7	7995.3	7685.3	7731.2	7605.1	7799.7	7678.6	7574.1	7561.8

Crop	L	Season	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90
A. Food Grains																	
Rice	Pb	Kharif	567.0	674.0	831.0	1052.0	1167.0	1178.0	1270.0	1319.0	1481.0	1644.2	1714.0	1809.0	1720.0	1778.0	1908.0
	AI		37441.7	37106.7	38416.6	38419.8	37598.0	38441.1	38892.4	36411.3	38954.0	39169.1	39232.6	38437.4	35846.5	38944.4	39293.4
Wheat	Pb	Rabi	2438.6	2579.0	2617.0	2736.0	2823.0	2812.0	2917.0	3047.0	3125.0	3094.5	3112.0	2579.0	2617.0	2736.0	2823.0
	AI		20453.8	20921.5	21455.7	22641.2	22171.7	22278.8	22144.4	23567.4	24671.5	23564.9	22997.4	20921.5	21455.7	22641.2	22171.7
Jowar	Pb	Kharif	5.2	4.1	1.8	1.8	1.4	1.2	2.5	1.4	1.0	0.6	—	0.2	0.7	3.1	0.5
	AI		10208.2	10085.2	10393.8	10012.8	10115.1	10181.2	10477.0	9833.1	10178.0	9457.1	9550.4	9732.1	9597.9	8949.5	8762.2
Bajra	Pb	Kharif	181.7	157.0	105.0	97.0	46.0	71.0	60.0	42.0	44.0	59.3	31.0	23.0	13.0	16.0	11.0
	AI		11571.3	10750.8	11103.8	11392.9	10579.3	11657.1	11783.9	10942.2	11832.4	10619.2	10651.8	11266.0	8713.4	12045.7	10899.5
Maize	Pb	Kharif	577.3	550.0	447.0	433.0	390.0	378.0	339.0	305.0	294.0	303.8	260.0	260.0	233.0	249.0	210.0
	AI		6030.7	6000.3	5682.0	5760.3	5720.6	6004.8	5934.7	5720.3	5858.6	5799.5	5797.2	5923.1	5560.9	5896.7	5915.1
Barley	Pb	Rabi	120.2	64.0	49.0	38.0	49.0	65.0	87.0	80.0	60.0	48.7	49.8	39.0	39.0	46.0	39.0
	AI		2801.8	2241.4	2001.4	1827.8	1771.2	1807.0	1727.5	1482.8	1386.1	1253.1	1368.8	1224.7	1142.7	1081.1	990.6
Ragi (Finger Millet)	Pb	Kharif	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	AI		2629.5	2496.3	2599.8	2705.1	2614.8	2525.0	2610.4	2411.7	2558.2	2386.9	2400.6	2404.7	2262.0	2317.3	2343.0
Gram	Pb	Rabi	381.2	349.0	353.0	351.0	236.0	258.0	243.0	124.0	97.0	101.6	108.0	114.0	66.0	73.1	54.4
	AI		8320.1	7974.8	7973.7	7708.0	6985.0	6584.8	7868.1	7398.9	7161.0	6904.2	7804.5	6983.6	5567.0	6809.5	6470.5
Tur (Arhar)	Pb	Kharif	5.6	3.8	4.4	7.7	17.0	17.9	11.6	18.1	39.7	42.5	40.0	30.2	30.5	25.3	16.0
	AI		2671.0	2566.0	2626.6	2634.9	2731.0	2842.2	3004.8	2926.0	3218.4	3154.2	3183.9	3147.5	3333.1	3488.7	3599.7
Other Pulses	Pb	Kharif & Rabi	51.7	39.7	42.8	51.0	52.0	61.6	65.7	65.9	61.1	59.6	76.7	161.4	120.5	142.1	131.4
	AI		13462.6	12437.5	12890.1	13311.4	12534.0	13017.7	13073.4	12618.7	13277.7	12698.5	13551.3	25006.3	23392.7	24702.0	25629.2
B. Oilseeds																	
Groundnut	Pb	Kharif	168.4	164.0	156.0	129.0	91.0	83.0	92.0	78.0	58.0	45.2	45.0	43.0	32.0	19.0	15.0
	AI		7221.5	7042.8	7028.5	7433.3	7164.8	6801.3	7429.6	7214.3	7538.7	7168.0	7123.8	6982.1	6844.0	8528.6	8710.2
Rapeseed & Mustard	Pb	Rabi	122.0	67.0	128.0	83.0	88.0	146.0	108.0	85.0	83.0	137.6	146.0	128.0	208.0	114.0	93.0
	AI		3339.4	3128.6	3583.9	3543.5	3470.5	4112.9	4399.3	3826.7	3873.5	3986.9	3979.9	3718.6	4619.2	4832.2	4967.0
Linseed	Pb	Rabi	2.1	1.0	1.0	1.9	1.5	1.7	1.3	1.1	0.8	1.2	1.3	0.9	1.2	1.2	1.0
	AI		2118.7	1888.4	2009.9	2091.5	1613.6	1673.3	1820.2	1404.0	1487.3	1395.2	1423.7	1155.3	1150.7	1198.9	1124.4
Sesamum	Pb	Kharif	23.0	16.0	13.1	10.1	11.5	17.3	19.4	14.3	13.8	13.8	13.7	13.3	11.3	21.0	13.2
	AI		2170.1	2278.8	2384.3	2389.1	2377.2	2471.9	2593.2	2216.7	2203.6	2117.4	2217.4	2163.8	2153.3	2447.9	2386.5
Sunflower	Pb	Kharif	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20.0
	AI		254.5	270.3	181.9	61.3	119.4	281.8	462.2	696.0	834.6	751.6	1022.5	1651.3	1103.8	1192.3	
C. Other Cash Crops																	
Sugarcane	Pb	Kharif	114.2	113.0	116.0	110.0	77.0	71.0	106.0	104.0	84.0	78.7	78.0	97.0	106.0	97.0	103.0
	AI		2762.2	2865.3	3151.1	3087.8	2610.2	2666.6	3193.3	3357.6	3109.6	2953.4	2849.2	3078.7	3278.6	3328.9	3437.9
Cotton	Pb	Kharif	580.4	557.0	606.0	633.0	629.9	648.0	683.0	724.0	650.0	472.4	559.6	567.0	621.0	758.0	732.0
	AI		7349.8	6929.9	7865.9	8119.3	8126.2	7823.4	8057.4	7870.8	7721.0	7382.1	7532.7	6948.0	6459.3	7342.6	7694.8

Crop	L	Season	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
A. Food Grains																	
Rice	Pb	Kharif	2024.0	2074.0	2065.0	2179.0	2277.0	2161.0	2159.0	2281.0	2519.0	2604.0	2611.0	2487.0	2530.0	2614.0	2647.0
	AI		39701.6	39594.1	38900.5	39139.8	39440.5	39440.0	39786.8	39824.9	40455.6	40948.9	40702.6	40619.4	38037.2	39230.5	38364.0
Wheat	Pb	Rabi	3189.0	3131.0	3158.0	3251.0	3189.0	3131.0	3229.0	3300.0	3338.0	3388.0	3408.0	3420.0	3375.0	3444.0	3482.0
	AI		24167.1	23261.9	24588.9	25147.0	25699.8	25011.0	25887.0	26695.9	27523.3	27486.0	25730.5	26344.7	25195.7	26594.7	26382.9
Jowar	Pb	Kharif	0.3	0.2	0.1	0.3	0.3	2.6	2.6	0.2	0.2	0.0	0.1	0.1	0.0	-	-
	AI		8589.6	7542.1	7624.0	6838.0	5948.7	5686.5	5756.0	5203.5	5042.7	4826.3	4863.0	4472.8	4243.4	4462.5	4098.5
Bajra	Pb	Kharif	11.0	10.0	8.0	16.0	11.0	8.0	6.0	8.0	4.0	5.0	5.0	7.0	7.0	8.0	7.0
	AI		10476.4	10027.5	10616.9	9905.7	10222.5	9319.1	9980.2	9887.7	9297.2	8897.1	9828.9	9529.1	7739.8	10612.3	9232.9
Maize	Pb	Kharif	188.0	177.0	189.0	194.0	174.0	171.0	166.0	165.0	154.0	163.0	165.0	165.0	152.0	154.0	154.0
	AI		5904.3	5859.4	5511.0	5586.3	5514.1	5519.6	5713.4	5761.5	5591.0	5726.9	5987.1	5933.8	5976.1	6590.1	6594.2
Barley	Pb	Rabi	37.0	50.0	46.0	36.0	45.0	38.0	33.0	37.0	31.0	30.0	32.0	23.0	26.0	23.0	22.0
	AI		962.2	953.9	915.6	794.1	890.8	823.5	757.4	857.8	792.8	724.5	777.5	659.5	701.6	657.0	616.5
Ragi (Finger Millet)	Pb	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	AI		2171.3	2129.9	1905.3	1884.3	1763.6	1773.7	1784.2	1656.6	1758.2	1634.4	1759.1	1646.7	1415.0	1666.4	1552.7
Gram	Pb	Rabi	60.7	24.8	27.2	20.0	19.1	19.5	15.7	13.3	13.2	6.3	7.7	7.1	7.0	6.0	5.1
	AI		7521.3	5579.9	6453.7	6358.9	7542.6	7116.1	6846.7	7563.2	8469.1	6146.3	5185.3	6416.2	5906.4	7048.1	6714.6
Tur (Arhar)	Pb	Kharif	13.6	12.9	10.5	10.7	10.8	9.8	12.9	10.7	8.7	8.9	8.7	9.2	7.8	9.7	8.9
	AI		3593.0	3627.0	3575.6	3531.7	3314.3	3446.7	3513.3	3358.7	3439.3	3426.8	3632.1	3327.7	3358.9	3515.6	3518.5
Other Pulses	Pb	Kharif & Rabi	131.4	144.2	128.8	129.0	141.4	146.4	69.0	63.9	55.6	50.8	43.6	37.4	28.5	32.2	25.6
	AI		25629.2	26140.5	25741.2	23767.6	23856.9	22730.2	12086.9	11949.1	11592.1	11542.9	11530.7	12264.5	11230.9	12894.4	12529.9
B. Oilseeds																	
Groundnut	Pb	Kharif	10.0	12.0	11.0	10.0	8.0	9.0	9.0	8.0	6.0	5.0	4.0	4.0	5.3	4.4	4.3
	AI		6823.5	7269.1	6873.0	7014.9	6635.3	6525.0	6456.8	6064.9	5886.2	5808.8	5705.2	5461.0	5272.4	5196.2	5786.3
Rapeseed & Mustard	Pb	Rabi	73.0	92.0	70.0	63.0	88.0	117.0	86.0	72.0	73.0	56.0	53.0	50.0	66.0	52.0	60.0
	AI		5782.1	6553.4	6192.8	6289.4	6058.2	6546.7	6545.4	7041.0	6513.2	6026.8	4476.7	5073.0	4544.0	5428.1	7316.4
Linseed	Pb	Rabi	0.6	0.7	0.4	0.5	0.6	0.5	0.4	0.4	0.3	0.4	0.6	0.3	0.2	0.3	0.3
	AI		1099.1	886.2	895.4	953.4	947.8	843.1	827.4	793.9	749.4	593.1	579.9	535.8	450.1	476.5	448.7
Sesamum	Pb	Kharif	18.1	18.2	22.5	18.3	17.6	22.7	16.4	14.3	12.1	15.3	19.2	20.6	17.3	10.6	10.1
	AI		2515.5	2626.8	2128.6	2217.4	1971.5	1825.9	1991.7	1660.0	1609.0	1560.2	1720.0	1670.6	1444.4	1700.3	1844.0
Sunflower	Pb	Kharif	14.0	82.9	85.0	85.0	95.0	103.0	14.0	103.0	99.0	67.0	28.0	9.7	7.4	14.1	20.0
	AI		1632.8	2113.8	2085.3	2667.8	1998.3	2120.9	1632.8	1931.7	1743.4	1824.7	1288.1	1073.8	1176.8	1642.2	2003.5
C. Other Cash Crops																	
Sugarcane	Pb	Kharif	101.0	109.0	112.0	77.0	83.0	132.0	173.0	126.0	103.0	108.0	121.0	142.0	154.0	123.0	86.0
	AI		3686.0	3844.4	3572.7	3421.6	3866.8	4147.4	4174.1	3929.8	4054.9	4219.7	4315.7	4411.6	4520.3	3938.4	3661.5
Cotton	Pb	Kharif	701.0	660.0	690.0	577.0	606.0	750.0	742.0	724.0	562.0	476.0	474.0	607.0	449.0	452.0	509.0
	AI		7439.6	7661.4	7541.9	7320.5	7871.0	9035.3	9120.3	8868.0	9342.2	8709.5	8534.4	9131.8	7669.6	7597.9	8786.6

Crop	L	Season	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
A. Food Grains																	
Rice	Pb	Kharif	2642.0	2621.0	2610.0	2735.0	2802.0	2831.0	2818.0	2845.0	2851.0	2894.0	2975.0	2898.00	3065.00	3103.00	2920.00
	AI		39335.2	39601.2	39472.3	40810.0	37618.2	38048.8	44006.3	42753.9	44136.0	44110.6	43499.2	39845.77	39349.27	39964.35	39012.96
Wheat	Pb	Rabi	3468.0	3467.0	3488.0	3526.0	3522.0	3510.0	3528.0	3512.0	3512.0	3505.0	3508.0	3495.00	3512.00	3520.00	3521.00
	AI		26483.6	27994.5	28038.6	27752.4	28457.4	29068.6	29864.8	29995.3	30473.2	31465.6	30417.8	30785.23	29650.59	29318.78	31357.02
Jowar	Pb	Kharif	–	–	0.1	0.1	0.1	0.0	–	–	–	–	–	–	–	–	–
	AI		3763.2	3738.1	3499.6	2892.5	3239.0	3072.2	2620.0	2426.2	2277.7	2268.8	2138.1	2059.38	2059.87	1754.69	1755.17
Bajra	Pb	Kharif	5.0	6.0	4.0	5.0	3.0	3.0	3.0	3.0	0.8	0.0	–	1.20	1.00	1.10	0.50
	AI		9581.2	9507.9	9571.3	8752.5	8904.2	9612.3	8776.7	7297.4	7810.7	7318.0	7128.6	7458.50	7480.60	7105.03	7542.68
Maize	Pb	Kharif	148.0	154.0	153.0	151.0	139.0	133.0	126.0	129.0	130.0	126.0	115.0	116.00	114.00	109.00	114.60
	AI		6960.4	7118.7	6894.7	7063.4	7282.0	7381.2	8781.9	8672.6	9066.3	9185.4	8806.1	7433.69	7330.57	7552.90	16053.06
Barley	Pb	Rabi	19.0	19.0	16.0	16.0	14.0	12.0	12.0	13.0	12.0	11.0	9.0	8.30	7.70	6.80	6.20
	AI		629.9	646.2	602.6	705.7	623.8	705.4	643.4	695.1	673.5	707.5	589.4	656.25	660.80	575.60	589.57
Ragi (Finger Millet)	Pb	Kharif	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	AI		1533.9	1177.4	1387.1	1381.4	1268.0	1286.2	1175.8	1131.0	1193.6	1208.1	1138.2	1016.11	1194.29	890.94	1004.46
Gram	Pb	Rabi	4.0	3.8	2.8	2.9	3.0	2.1	2.0	2.0	1.9	1.8	1.7	1.60	1.70	1.90	1.50
	AI		6926.4	7493.9	7543.7	7892.5	8169.2	9185.6	8299.1	8521.8	9927.4	8251.1	8399.0	9626.16	10560.43	9547.03	9698.75
Tur (Arhar)	Pb	Kharif	7.8	7.2	6.0	5.9	4.6	4.2	3.0	3.1	2.9	2.6	2.6	5.70	2.60	2.30	2.00
	AI		3580.7	3561.6	3725.8	3377.9	3465.7	4366.7	4007.4	3892.9	3904.4	3853.5	3963.3	5337.89	4438.31	4549.54	4532.44
Other Pulses	Pb	Kharif & Rabi	20.8	20.9	19.8	15.1	12.7	14.9	14.0	59.3	40.6	44.8	40.8	29.90	25.90	25.30	30.00
	AI		11884.2	12136.2	12363.5	10823.8	11647.5	12849.4	12155.7	10842.1	11386.0	11448.1	12548.9	14481.00	14814.31	15059.05	13756.12
B. Oilseeds																	
Groundnut	Pb	Kharif	3.4	4.4	3.1	2.7	2.5	2.2	2.0	1.7	1.3	1.4	1.00	1.20	1.20	1.30	1.80
	AI		5739.7	4780.3	5312.1	5285.8	4616.0	4977.4	4316.0	3931.4	4645.4	4013.5	3837.8	4578.46	4142.03	4131.94	4160.49
Rapeseed & Mustard	Pb	Rabi	17.4	15.2	15.9	13.7	12.8	15.9	29.0	32.0	32.0	31.0	31.0	31.70	30.50	30.50	31.00
	AI		7276.5	6790.0	5825.5	6298.1	5588.0	6900.5	5893.5	6362.6	6645.7	5799.1	5745.5	6073.82	5977.16	6123.93	6856.27
Linseed	Pb	Rabi	0.2	0.2	0.1	0.1	0.2	–	–	–	–	–	–	–	–	–	–
	AI		436.8	436.5	467.9	407.9	342.0	359.2	322.6	296.3	293.1	285.5	262.9	325.22	326.18	172.71	179.90
Sesamum	Pb	Kharif	11.3	9.5	8.2	8.3	7.3	5.7	5.0	5.1	4.1	4.7	4.7	3.00	2.70	2.90	2.60
	AI		1723.2	1703.2	1799.1	1809.1	1942.1	2083.2	1901.5	1705.8	1678.9	1746.1	1950.9	1666.93	1579.77	1419.97	1622.60
Sunflower	Pb	Kharif	17.8	15.3	20.0	21.6	21.6	14.6	14.0	12.6	10.7	8.5	6.4	5.80	5.70	5.00	4.30
	AI		2339.6	2164.8	1911.6	1812.8	1476.5	929.0	731.9	830.5	671.5	589.8	486.8	381.11	283.51	262.01	228.28
C. Other Cash Crops																	
Sugarcane	Pb	Kharif	84.0	99.0	110.0	81.0	60.0	70.0	80.0	83.0	89.0	94.0	90.0	88.00	96.00	95.00	91.00
	AI		4201.7	5150.8	5055.2	4415.4	4174.6	4884.8	5037.7	4998.9	4993.3	5066.8	4927.1	4435.69	4737.06	5061.09	4602.68
Cotton	Pb	Kharif	557.0	607.0	604.0	527.0	511.0	530.0	560.0	480.0	446.0	420.0	339.0	285.00	291.00	268.00	248.00
	AI		8677.1	9144.5	9413.7	9406.7	10131.7	11235.0	12178.0	11977.0	11960.0	12819.0	12292.0	10826.40	12586.00	12614.00	13477.00

Notes: L, Pb and AI connote Location, Punjab and All India; '–' implies not available or not applicable; Other pulses include Urad (Mash), Moong, and Masur (Lentil)

Source: Directorate of Economics and Statistics, DAC&FW (<http://desagri.gov.in>)

ANNEXURE B

Estimates of Punjab vis-à-vis All-India Production of Food and Non-Food Crops ('000 tonnes, 1966-67 to 2019-20)

Crop	L	Season	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75
A. Food Grains											
Rice	Pb	Kharif	338.0	415.0	460.0	572.9	688.0	920.0	955.0	1189.0	1179.0
	AI		28621.8	35313.0	37127.7	37591.2	39558.8	39992.7	36324.5	40903.8	35925.4
Wheat	Pb	Rabi	2493.9	3352.0	4520.0	4800.0	5145.0	5618.0	5368.0	5181.0	5300.0
	AI		11392.8	16540.1	18651.6	20093.3	23832.5	26409.9	24734.6	21777.5	24104.4
Jowar	Pb	Kharif	2.6	4.0	3.0	3.0	2.8	3.0	3.4	2.7	2.1
	AI		5328.5	6735.4	6206.3	6425.2	5818.7	5361.0	5346.8	5951.9	7025.6
Bajra	Pb	Kharif	150.0	208.0	201.0	221.9	243.0	171.0	108.0	144.0	116.0
	AI		4468.3	5184.9	3801.8	5326.8	8028.8	5319.1	3929.4	7519.2	3271.9
Maize	Pb	Kharif	614.0	774.0	750.0	826.8	861.0	857.0	906.0	764.0	898.0
	AI		4893.6	6269.3	5701.1	5674.3	7485.6	5100.5	6388.5	5803.5	5558.9
Barley	Pb	Rabi	88.0	148.0	70.0	80.0	57.0	55.0	59.0	94.0	218.0
	AI		2348.4	3503.6	2423.8	2716.3	2784.4	2577.0	2379.1	2371.3	3134.7
Ragi (Finger Millet)	Pb	Kharif	0.1	—	—	—	—	—	—	0.1	—
	AI		1630.6	1884.2	1648.0	2117.2	2155.0	2208.5	1922.9	2071.9	2135.6
Gram	Pb	Rabi	508.0	472.0	216.0	400.0	284.0	282.0	267.0	315.0	216.0
	AI		3622.0	5971.5	4309.5	5545.6	5199.2	5080.7	4536.8	4099.2	4014.8
Tur (Arhar)	Pb	Kharif	1.1	1.5	1.0	1.0	1.2	0.9	0.9	2.3	1.6
	AI		1129.7	1741.1	1815.8	1842.2	1883.3	1683.0	1927.6	1408.2	1844.2
Other Pulses	Pb	Kharif & Rabi	21.0	32.1	30.9	30.9	23.9	22.3	26.1	35.0	27.0
	AI		3595.4	4390.1	4292.5	4302.9	4735.3	4329.7	3442.3	4500.1	4163.9
B. Oil Seeds											
Groundnut	Pb	Kharif	164.0	168.4	194.5	239.9	222.6	159.5	168.5	183.0	153.0
	AI		7062.6	7221.5	4410.9	5730.9	4630.7	5130.1	6111.1	6180.5	4091.6
Rapeseed & Mustard	Pb	Rabi	122.0	61.0	66.0	36.1	54.2	57.0	82.0	106.8	136.2
	AI		3339.4	1227.9	1567.7	1346.7	1563.6	1975.3	1432.8	1807.8	1704.3
Sesamum	Pb	Kharif	6.6	5.1	4.3	4.2	5.7	6.2	6.4	7.4	8.0
	AI		416.0	445.0	422.5	448.1	562.3	449.5	385.4	484.3	392.2
Linseed	Pb	Rabi	1.0	1.0	1.6	2.0	1.1	1.0	1.2	1.3	1.3
	AI		259.9	438.0	329.2	469.3	473.8	529.5	428.1	503.9	563.8
Sunflower	Pb	Kharif	—	—	—	—	—	—	—	—	—
	AI		—	—	—	—	—	—	—	—	—
C. Other Cash Crops											
Sugarcane	Pb	Kharif	4360.0	4550.0	5160.0	6180.0	5270.0	4030.0	4690.0	5820.0	6150.0
	AI		92826.1	95499.7	117571.7	135024.3	126368.0	113569.5	124866.7	140804.5	144288.9
Cotton	Pb	Kharif	767.0	779.0	775.0	802.0	818.5	971.5	1075.0	1157.3	1198.6
	AI		4973.0	5453.8	5270.4	5254.8	4498.8	6564.0	5735.4	6308.8	7155.5

Crop	L	Season	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90
A. Food Grains																	
Rice	Pb	Kharif	1447.0	1741.0	2494.0	3091.0	3041.0	3223.0	3755.0	4147.0	4536.0	5052.0	5448.9	6022.0	5442.0	4925.0	6697.0
	AI		44744.8	39265.5	48947.0	49336.7	38486.3	50089.5	49244.7	43164.4	55052.2	53781.7	59390.6	53560.9	49049.3	63376.3	65877.8
Wheat	Pb	Rabi	5788.0	6272.0	6642.0	7423.0	7896.0	7677.0	8553.0	9157.0	9422.0	10176.0	10988.0	9458.0	11084.0	11580.0	11681.0
	AI		28846.3	29009.9	31749.2	35507.8	31830	36312.6	37451.8	42793.9	45476.3	44068.8	47051.8	44322.9	46169.4	54110.2	49849.5
Jowar	Pb	Kharif	3.1	2.5	1.2	1.3	0.8	0.8	1.9	1.9	1.1	0.6	—	0.2	0.6	3.1	0.5
	AI		6993.9	7358.1	8890.3	7925.1	7720.7	7503.2	8770.2	7476.9	8658.9	7751.2	7272.0	6470.3	8561.4	7061.7	9228.7
Bajra	Pb	Kharif	189.0	145.0	119.0	94.0	47.0	89.0	60.0	50.0	54.0	60.0	27.0	27.0	13.0	13.0	10.0
	AI		5735.8	5853.4	4730.2	5566.4	4047.9	5343.0	5537.3	5131.2	7725.9	6046.4	3663.8	4513.5	3297.5	7779.7	6649.1
Maize	Pb	Kharif	846.0	629.0	700.0	698.0	672.0	605.0	623.0	542.0	538.0	576.0	412.0	526.0	365.0	293.0	399.0
	AI		7255.8	6361.2	5973.3	6199.4	5602.9	6956.9	6897.1	6548.5	7922.2	8441.8	6643.7	7592.8	5721.3	8228.7	9651.3
Barley	Pb	Rabi	152.0	77.0	68.0	54.0	76.0	108.0	174.0	126.0	94.0	83.0	109.4	80.0	89.0	123.0	99.0
	AI		3191.9	2343.8	2311.2	2141.7	1623.7	2293.1	1992.6	1866.8	1833.5	1555.9	1962.3	1669.4	1576.8	1721.6	1485.7
Ragi (Finger Millet)	Pb	Kharif	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	AI		2796.7	2044.7	2866.0	3200.4	2721.6	2419.9	2960.5	2223.1	2831.0	2530.1	2518.1	2708.3	2319.0	2409.7	2766.5
Gram	Pb	Rabi	376.0	311.0	322.0	284.0	162.0	150.0	115.0	62.0	58.0	60.0	98.4	82.0	29.0	72.1	38.7
	AI		5879.5	5424.3	5409.5	5738.8	3356.3	4327.7	4642.1	5289.9	4750.6	4561.4	5787.9	4531.8	3625.5	5129.1	4217.3
Tur	Pb	Kharif	2.8	1.8	2.3	5.0	12.4	18.2	9.5	18.6	35.7	46.3	43.7	30.2	25.8	17.1	14.6
	AI		2099.3	1725.3	1929.7	1887.4	1757.0	1957.3	2236.5	1988.9	2576.4	2585.2	2441.0	2271.6	2282.3	2717.7	2746.6
Other Pulses	Pb	Kharif & Rabi	23.5	18.3	21.2	23.6	22.2	31.7	34.4	41.0	41.9	45.1	61.6	133.4	85.9	80.7	91.6
	AI		5060.8	3379.1	4818.3	4841.7	941.3	5510.4	5264.6	5074.9	5652.9	4681.4	6268.6	9517.1	9822.5	11634.2	11389.7
B. Oil Seeds																	
Groundnut	Pb	Kharif	176.0	150.0	154.8	114.0	81.0	104.0	90.0	63.0	42.0	45.0	43.3	42.0	23.0	18.0	18.0
	AI		6754.7	4825.0	5205.0	5207.7	4727.3	3714.4	5520.0	3744.3	5279.1	4691.2	3755.7	4426.5	4182.6	7489.3	6096.7
Rapeseed & Mustard	Pb	Rabi	78.0	46.0	64.0	57.0	63.0	77.0	72.0	64.0	73.0	148.0	148.0	118.0	209.0	120.0	84.0
	AI		1935.8	1550.7	1649.7	1860.1	1428.0	2304.2	2381.5	2207.2	2608.1	3073.0	2680.5	2604.7	3454.5	4376.8	4125.3
Linseed	Pb	Rabi	1.1	0.5	0.5	1.0	1.0	0.7	0.6	0.8	0.4	0.7	0.7	0.6	0.1	0.7	0.6
	AI		597.8	418.8	526.8	535.1	269.3	423.0	482.5	375.4	444.3	389.0	376.2	316.6	393.3	361.4	325.6
Sesamum	Pb	Kharif	7.8	5.5	3.5	3.9	5.6	6.1	5.2	4.8	4.8	5.5	5.5	5.8	4.3	6.3	4.6
	AI		479.2	520.2	514.1	347.7	445.8	590.2	551.7	558.8	520.7	501.0	520.2	447.7	583.1	681.8	745.1
Sunflower	Pb	Kharif	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25.00
	AI		137.6	141.4	98.8	31.8	66.3	95.4	137.8	178.9	263.9	168.7	419.9	635.3	370.1	631.3	
C. Other Cash Crops																	
Sugarcane	Pb	Kharif	6130.0	6070.0	6520.0	6240.0	3930.0	3920.0	6120.0	6340.0	5530.0	4920.0	5050.0	6110.0	5820.0	6000.0	6500.0
	AI		140603.5	153006.7	176965.5	151655.1	128833.4	154248.0	186357.6	189505.6	174076.3	170319.2	170648.1	186089.5	195737.0	203036.8	225569.2
Cotton	Pb	Kharif	1235.0	1138.0	1224.0	1339.0	1207.0	1178.0	1270.0	1218.0	707.0	1241.0	1403.0	1691.0	1859.0	2118.0	2454.0
	AI		5949.5	5839.3	7243.4	7957.8	7647.7	7010.0	7883.9	7534.5	6386.3	8506.6	8727.0	6905.2	6382.0	8743.7	11421.8

Crop	L	Season	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
A. Food Grains																	
Rice	Pb	Kharif	6535.0	6755.0	7002.0	7642.0	7703.0	6768.0	7334.0	7904.0	7940.0	8716.0	9154.0	8816.0	8880.0	9656.0	10437.0
	AI		66317.1	66367.8	65242.8	70723.7	72602.7	67878.8	71319.6	72529.9	72720.1	77480.5	72778.4	80521.8	63083.1	78618.5	72230.0
Wheat	Pb	Rabi	12155.0	12295.0	12369.0	13377.0	13542.0	12518.0	13672.0	12715.0	14460.0	15910.0	15551.0	15499.0	14175.0	14489.0	14698.0
	AI		55134.5	55689.5	57210.1	59840.3	65767.4	62097.4	69350.2	66349.9	71287.5	76368.9	69680.8	72766.3	65760.8	72156.2	68636.9
Jowar	Pb	Kharif	0.3	0.2	0.1	0.3	0.3	2.2	2.2	0.2	0.2	0.0	0.1	0.1	0.0	-	-
	AI		8327.1	5710.4	9380.6	7283.9	5874.4	5662.4	6990.5	4962.5	5279.9	4818.5	4561.3	4228.6	4222.7	4843.6	4044.4
Bajra	Pb	Kharif	12.0	11.0	8.0	19.0	12.0	8.0	6.0	8.0	4.0	4.0	5.0	7.0	6.0	8.0	7.0
	AI		6893.8	4665.0	8880.7	4973.5	7159.2	5380.8	7870.2	7644.4	6955.6	5782.2	6759.2	8284.0	4718.9	12109.3	7931.3
Maize	Pb	Kharif	336.0	347.0	434.0	359.0	324.0	307.0	352.0	345.0	352.0	420.0	461.0	449.0	310.0	459.0	422.0
	AI		8961.7	8064.4	8942.9	8528.3	7643.4	8280.1	9174.1	9429.8	9538.7	9706.2	10219.6	11248.3	9272.4	12734.4	11476.4
Barley	Pb	Rabi	102.0	147.0	119.0	99.0	145.0	119.0	107.0	111.0	100.0	106.0	109.0	78.0	85.0	77.0	74.0
	AI		1632.4	1698.7	1512.4	1312.7	1727.2	1510.2	1462.0	1679.4	1537.8	1447.0	1430.6	1424.5	1407.4	1297.6	1207.1
Ragi (Finger Millet)	Pb	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	AI		2340.0	2581.8	2531.1	2597.2	2342.0	2501.4	2340.1	2086.8	2608.1	2289.5	2731.7	2374.6	1315.7	1965.7	2432.4
Gram	Pb	Rabi	45.2	17.5	18.3	16.3	18.9	17.4	14.4	11.0	10.4	6.1	7.3	6.2	6.7	5.4	4.4
	AI		5356.4	4121.0	4416.7	4980.8	6435.5	4979.0	5569.9	6132.2	6800.7	5118.1	3855.4	5473.0	4236.8	5717.5	5469.4
Tur	Pb	Kharif	11.2	12.8	9.3	9.5	10.6	8.6	10.9	8.2	5.4	7.4	7.6	7.9	6.7	9.0	7.7
	AI		2416.8	2133.1	2330.8	2692.5	2143.8	2309.4	2659.6	1849.5	2707.9	2693.8	2246.3	2259.8	2185.8	2356.4	2346.9
Other Pulses	Pb	Kharif & Rabi	104.0	98.6	94.0	109.8	122.0	116.0	54.8	40.8	34.9	31.9	29.5	21.9	20.5	25.0	19.6
	AI		12594.9	11264.4	11753.0	10790.3	10419.9	9721.2	5918.2	4989.1	5398.5	5606.2	4973.7	5635.3	4702.4	6831.3	5313.2
B. Oil Seeds																	
Groundnut	Pb	Kharif	8.0	12.0	12.0	9.0	8.0	8.0	9.0	8.0	5.0	5.0	4.0	4.0	3.8	4.0	3.6
	AI		5121.9	4994.5	6659.5	5706.0	6059.0	6052.3	6202.6	5900.4	6910.0	3800.0	4910.0	5622.3	3094.8	6859.5	5262.1
Rapeseed & Mustard	Pb	Rabi	73.0	94.0	66.0	72.0	101.0	130.0	109.0	63.0	69.0	63.0	64.0	60.0	60.0	62.0	62.0
	AI		5229.3	5862.5	4803.4	5327.9	5757.9	5999.5	6659.9	4699.9	5659.9	5790.0	4190.0	5082.6	3879.8	6291.4	7593.1
Linseed	Pb	Rabi	0.5	0.6	0.4	0.5	0.6	0.5	0.4	0.3	0.3	0.4	0.6	0.3	0.2	0.2	0.2
	AI		332.0	292.0	278.4	329.7	322.6	291.9	310.0	240.0	270.0	240.0	200.0	209.1	176.7	196.5	169.7
Sesamum	Pb	Kharif	6.8	6.8	6.8	7.5	7.0	8.6	6.6	4.3	4.2	5.3	7.6	7.8	4.9	3.6	4.1
	AI		835.3	705.9	758.3	563.7	586.7	531.0	640.0	570.0	530.0	479.9	520.0	697.8	441.3	782.1	674.1
Sunflower	Pb	Kharif	22.5	145.1	146.0	146.0	147.0	159.0	159.0	143.0	92.0	38.0	11.2	10.5	22.0	34.0	30.5
	AI		873.3	1193.8	1181.7	1348.2	1219.5	1257.2	1249.7	889.6	950.1	690.1	649.9	679.5	872.6	930.4	1186.7
C. Other Cash Crops																	
Sugarcane	Pb	Kharif	6000.0	6920.0	6369.0	4710.0	5160.0	8620.0	11040.0	7150.0	6130.0	6770.0	7770.0	9250.0	9290.0	6620.0	5170.0
	AI		241045.5	253995.1	228033.4	229659.3	275539.9	281099.5	277560.0	279540.0	288720.0	299320.0	295960.0	297207.8	287383.2	233861.8	237088.4
Cotton	Pb	Kharif	1909.0	2357.0	2314.0	1514.0	1779.0	1950.0	1925.0	937.0	595.0	952.0	1199.0	1307.0	1083.0	1478.0	2087.0
	AI		9842.4	9705.9	11402.5	10740.6	11887.6	12860.7	14230.0	10850.0	12290.0	11530.0	9520.0	9997.0	8623.7	13729.0	16428.6

Crop	L	Season	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
A. Food Grains																	
Rice	Pb	Kharif	10193.0	10138.0	10489.0	11000.0	11236.0	10837.0	10542.0	11374.0	11267.0	11107.0	11823.0	11586.20	13381.79	12821.60	11779.28
	AI		78271.9	80170.8	82702.9	84951.4	75957.8	80694.0	92737.7	92368.4	91496.8	91391.6	91412.8	96302.79	97135.16	102039.99	102276.51
Wheat	Pb	Rabi	14493.0	14596.0	15720.0	15733.0	15169.0	16472.0	17280.1	16591.0	17620.0	15050.0	16077.0	16440.48	17830.42	18261.76	17615.56
	AI		69354.5	75806.7	78570.2	80679.4	80803.6	86874.0	94882.1	93506.5	95849.8	86526.6	92287.5	98510.22	99869.52	103596.23	107860.51
Jowar	Pb	Kharif	-	-	0.1	0.1	0.1	0.0	-	-	-	-	-	-	-	-	-
	AI		4071.6	3706.8	4114.9	3051.9	2763.2	3439.1	3320.3	2840.3	2392.5	2300.3	1816.29	1964.36	2273.81	1735.04	1696.97
Bajra	Pb	Kharif	5.0	6.0	4.0	5.0	4.0	3.0	3.0	3.0	0.8	-	-	0.70	0.60	0.72	0.32
	AI		7684.0	8423.7	9970.1	8887.1	6506.4	10369.9	10276.0	8742.0	9250.1	9184.2	8066.6	9729.84	9208.85	8664.13	10362.60
Maize	Pb	Kharif	403.0	481.0	521.0	514.0	475.0	491.0	502.0	475.0	507.0	460.0	424.0	445.00	422.71	395.13	410.38
	AI		12155.9	11556.3	15106.7	14120.5	12293.3	16637.4	21759.4	22258.2	24259.5	24172.7	22567.3	20118.39	19413.60	19429.22	2236
Barley	Pb	Rabi	63.0	64.0	57.0	55.0	47.0	44.0	47.0	47.0	46.0	39.4	33.3	31.50	29.88	25.48	22.59
	AI		1220.6	1327.9	1196.1	1689.1	1354.7	1662.9	1618.7	1752.4	1830.7	1613.0	1437.5	1747.45	1780.81	1633.07	1721.83
Ragi (Finger Millet)	Pb	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	AI		1443.6	2152.2	2039.9	1888.5	2193.5	1929.2	1929.2	1574.4	1982.9	2060.9	1821.9	1385.11	1985.24	1238.70	1755.06
Gram	Pb	Rabi	3.0	3.8	2.8	3.4	3.4	2.7	2.0	2.8	2.3	1.9	2.2	2.20	2.01	2.53	1.83
	AI		5599.9	6333.7	5748.6	7060.2	7475.9	8221.1	7702.3	8832.5	9525.9	7332.3	7057.6	9377.56	11379.19	9937.99	11078.50
Tur	Pb	Kharif	6.9	6.7	5.4	5.7	4.4	3.9	3.0	2.8	2.6	2.4	2.6	4.90	2.68	2.41	2.19
	AI		2738.0	2314.1	3075.9	2265.5	2464.6	2861.1	2654.1	3022.7	3174.4	2807.3	2561.0	4873.24	4289.82	3315.44	3891.69
Other Pulses	Pb	Kharif & Rabi	16.3	16.6	14.8	12.6	10.2	12.7	10.0	47.4	34.7	37.3	38.7	25.90	21.77	22.73	25.18
	AI		5046.5	5549.7	5937.0	5240.7	4721.3	7158.7	6732.5	6487.3	6554.7	7012.7	6729.6	8880.14	9746.91	8822.53	8055.06
B. Oil Seeds																	
Groundnut	Pb	Kharif	3.0	3.8	2.7	2.5	3.1	3.9	3.0	3.0	2.4	2.6	1.9	2.30	2.34	2.57	3.56
	AI		6297.9	3294.2	7362.4	5617.1	3852.2	6642.8	6963.7	4693.9	9713.9	7401.7	6733.3	6047.64	7595.36	5386.97	8388.95
Rapeseed & Mustard	Pb	Rabi	54.0	46.0	33.0	33.0	39.0	41.0	37.0	41.0	41.8	38.7	41.8	44.80	45.69	46.48	45.94
	AI		8131.2	7437.8	5833.6	7200.7	6608.1	8178.7	6603.7	8028.9	7876.7	6282.4	6796.7	7917.23	8429.85	9255.66	9123.64
Linseed	Pb	Rabi	0.1	0.1	0.1	0.1	0.1	-	-	-	-	-	-	-	-	-	-
	AI		172.5	167.9	163.4	169.2	153.7	146.5	152.5	148.6	141.7	154.6	125.5	184.25	173.76	99.07	120.66
Sesamum	Pb	Kharif	3.8	3.2	2.7	2.8	2.6	2.3	2.0	1.7	1.4	1.4	1.6	1.10	0.93	0.79	0.94
	AI		641.1	618.4	756.9	640.3	588.4	893.0	810.3	685.0	714.6	827.8	850.1	747.03	755.43	689.31	657.50
Sunflower	Pb	Kharif	28.7	25.1	38.0	37.8	38.6	24.3	26.0	23.7	18.6	15.0	11.5	9.60	10.49	9.67	7.99
	AI		1439.0	1227.5	1463.1	1158.0	850.7	651.1	516.6	544.1	503.9	434.2	296.3	98.30	84.75	90.28	91.74
C. Other Cash Crops																	
Sugarcane	Pb	Kharif	4860.0	6020.0	6690.0	4670.0	3700.0	4170.0	5653.0	5919.0	6675.0	7039.0	6607.0	7152.00	8023.68	7773.66	7302.02
	AI		281171.8	355519.7	348187.9	285029.3	292301.6	342381.6	361036.5	341199.7	352141.8	362332.8	348448.4	306069.0	379904.9	405416.2	370500.3
Cotton	Pb	Kharif	2395.0	2678.0	2355.0	2285.0	2006.0	2100.0	2300.0	2000.0	1968.0	1600.0	750.0	1031.03	1283.00	1222.00	1206.00
	AI		18499.0	22631.8	25884.1	22276.2	24021.8	33000.0	35200.0	34220.0	35902.0	34805.0	30005.0	32577.41	32805.00	28042.00	36065.00

Notes: L, Pb and AI connote Location, Punjab and All India; '-' implies not available or not applicable; Other pulses include Urad (Mash), Moong, and Masur (Lentil)

Source: Directorate of Economics and Statistics, DAC&FW (<http://desagri.gov.in>)

ANNEXURE C

Estimates of Yield of Food and Non-Food Crops for Punjab vis-à-vis All-India (kg/hectare, 1966-67 to 2019-20)

Crop	L	Season	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75
A. Food Grains											
Rice	Pb	Kharif	1186	1322	1361	1490	1765	2044	2008	2287	2072
	AI		843	1011	1052	1050	1100	1108	1036	1121	999
Wheat	Pb	Rabi	1544	1858	2167	2220	2238	2406	2233	2216	2395
	AI		887	1103	1169	1209	1307	1380	1271	1172	1338
Jowar	Pb	Kharif	448	667	1000	1000	549	581	507	587	636
	AI		472	–	–	–	–	–	524	558	711
Bajra	Pb	Kharif	815	995	1047	1102	1173	1178	840	977	885
	AI		365	405	315	426	622	452	333	540	291
Maize	Pb	Kharif	1383	1626	1559	1469	1552	1565	1613	1347	1720
	AI		964	1123	997	968	1279	900	1094	965	948
Barley	Pb	Rabi	848	993	854	1000	1007	1136	1059	857	1153
	AI		831	1038	879	982	1090	1050	971	895	1087
Ragi (Finger Millet)	Pb	Kharif	200	0	0	–	–	–	–	500	0
	AI		822	822	736	761	872	911	826	878	867
Gram	Pb	Rabi	802	843	681	889	794	841	837	896	812
	AI		453	723	607	715	663	642	651	528	570
Tur	Pb	Kharif	647	882	1000	1000	400	450	429	489	500
	AI		448	653	718	690	709	718	795	532	729
Other Pulses	Pb	Kharif & Rabi	440	509	496	496	453	469	442	476	462
	AI		310	374	369	371	393	364	299	346	334
B. Oil Seeds											
Groundnut	Pb	Kharif	1071	1079	926	845	970	1055	954	970	860
	AI		604	759	653	720	834	823	585	845	724
Rapeseed & Mustard	Pb	Rabi	526	462	517	589	553	641	621	762	782
	AI		408	483	469	493	594	396	545	493	612
Linseed	Pb	Rabi	500	500	432	667	407	417	444	481	591
	AI		174	247	194	260	250	256	248	247	272
Sesamum	Pb	Kharif	369	378	368	378	390	405	390	361	359
	AI		149	168	174	194	231	188	168	203	176
Sunflower	Pb	Kharif	–	–	–	–	–	–	–	–	–
	AI		–	–	–	–	–	–	–	–	–
C. Other Cash Crops											
Sugarcane	Pb	Kharif	27949	35827	33077	41588	41269	39126	45756	52765	50000
	AI		40336	46665	47780	49121	48322	47511	50933	51163	49855
Cotton	Pb	Kharif	302	315	297	333	350	348	362	376	373
	AI		108	116	117	116	101	143	127	142	161

Crop	L	Season	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90
A. Food Grains																	
Rice	Pb	Kharif	2552	2583	3001	2938	2606	2736	2957	3144	3063	3073	3179	3329	3164	2770	3510
	AI		1195	1058	1274	1284	1024	1303	1266	1185	1413	1373	1514	1393	1368	1627	1677
Wheat	Pb	Rabi	2373	2432	2538	2713	2797	2730	2932	3005	3015	3288	3531	2432	2538	2713	2797
	AI		1410	1387	1480	1568	1436	1630	1691	1816	1843	1870	2046	1387	1480	1568	1436
Jowar	Pb	Kharif	596	610	667	722	571	667	760	1357	1100	1000	1000	857	1000	1000	1000
	AI		685	4483.2	5251.0	4876.3	5112.1	737	837	760	851	820	665	892	789	1053	665
Bajra	Pb	Kharif	1040	924	1133	969	1022	1254	1000	1190	1227	1012	871	1174	1000	813	909
	AI		496	544	426	489	383	458	470	469	653	569	344	401	378	646	610
Maize	Pb	Kharif	1465	1144	1566	1612	1723	1601	1838	1777	1830	1896	1585	2023	1567	1177	1900
	AI		1203	1060	1051	1076	979	1159	1162	1145	1352	1456	1146	1282	1029	1395	1632
Barley	Pb	Rabi	1265	1203	1388	1421	1551	1662	2000	1575	1567	1704	2197	2051	2282	2674	2538
	AI		1139	1046	1155	1171.7	916.7	1269	1153	1259	1323	1242	1434	1363	1380	1592.5	1499.8
Ragi (Finger Millet)	Pb	Kharif	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	AI		1064	819	1102	1183.1	1040.8	958	1134	922	1107	1060	1049	1126	1025	1039.9	1180.8
Gram	Pb	Rabi	986	891	912	809	686	581	473	500	598	591	911	719	439	986	711
	AI		707	680	678	745	481	657	590	715	663	661	742	649	651	753	652
Tur	Pb	Kharif	500	474	523	649	729	1017	819	1028	899	1089	1093	1000	846	676	913
	AI		786	672	735	716	643	689	744	680	801	820	767	722	685	779	763
Other Pulses	Pb	Kharif & Rabi	455	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	AI		376	–	–	–	–	–	–	–	–	–	–	–	–	–	–
B. Oil Seeds																	
Groundnut	Pb	Kharif	1045	915	992	884	890	1253	978	808	724	996	962	977	719	947	1200
	AI		935	724	809	773	738	629	866	604	835	779	602	733	737	1066	733
Rapeseed & Mustard	Pb	Rabi	639	687	500	687	716	527	667	753	880	1076	1014	922	1005	1053	903
	AI		580	496	460	525	411	560	541	577	673	771	674	700	748	906	831
Linseed	Pb	Rabi	524	500	500	526	667	412	462	727	500	583	538	667	83	583	630
	AI		282	222	262	256	167	253	265	1400	299	279	264	274	342	301	290
Sesamum	Pb	Kharif	339	363	420	347	339	324	314	364	348	348	401	436	381	300	348
	AI		221	185	218	215	146	180	228	249	254	246	226	207	271	279	312
Sunflower	Pb	Kharif	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1250
	AI		–	541	523	543	519	555	564	497	429	527	374	411	385	335	529
C. Other Cash Crops																	
Sugarcane	Pb	Kharif	53678	53717	56207	56727	51039	55211	57736	60962	65833	62516	64744	62990	54906	61856	63107
	AI		50903	53400	56160	49114	49358	57844	58359	56441	55980	57669	59893	60443	59701	60992	65612
Cotton	Pb	Kharif	362	347	343	360	326	309	316	286	185	447	426	507	509	475	570
	AI		138	143	157	167	160	152	166	163	141	196	197	169	168	202	252

Crop	L	Season	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
A. Food Grains																	
Rice	Pb	Kharif	3229	3257	3391	3507	3383	3132	3397	3465	3152	3347	3506	3545	3510	3694	3943
	AI		1670	1676	1677	1807	1841	1721	1793	1821	1798	1892	1788	1982	1658	2004	1883
Wheat	Pb	Rabi	3715	3803	3770	4011	4090	3884	4234	3853	4332	4696	4563	4532	4200	4207	4221
	AI		2281	2394	2327	2380	2559	2483	2679	2485	2590	2778	2708	2762	2610	2713	2602
Jowar	Pb	Kharif	1000	1000	1000	1000	1000	846	846	1000	1000	–	1000	1000	–	–	–
	AI		969	757	1230	1065	988	996	1214	954	1047	998	938	945	995	1085	987
Bajra	Pb	Kharif	1091	1100	1000	1188	1091	1000	1000	1000	1000	800	1000	1000	857	1000	1000
	AI		658	465	836	502	700	577	789	773	748	650	688	869	610	1141	859
Maize	Pb	Kharif	1787	1960	2296	1851	1862	1795	2120	2091	2286	2577	2794	2721	2039	2981	2740
	AI		1518	1376	1623	1527	1386	1500	1606	1637	1706	1695	1707	1896	1552	1932	1740
Barley	Pb	Rabi	2757	2940	2587	2750	3222	3132	3242	3000	3226	3533	3406	3391	3269	3348	3364
	AI		1697	1781	1652	1653	1939	1834	1930	1958	1940	1997	1840	2160	2006	1975	1958
Ragi (Finger Millet)	Pb	Kharif	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	AI		1078	1212	1328	1378	1328	1410	1312	1260	1483	1401	1553	1442	930	1180	1567
Gram	Pb	Rabi	745	706	673	815	990	892	917	827	788	968	948	873	957	900	863
	AI		712	739	684	783	853	700	814	811	803	833	744	853	717	811	815
Tur	Pb	Kharif	824	992	886	888	981	878	845	766	621	831	874	859	859	928	865
	AI		673	588	652	762	647	670	757	551	787	786	618	679	651	670	667
Other Pulses	Pb	Kharif & Rabi	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	AI		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
B. Non-Food Crops																	
Groundnut	Pb	Kharif	800	1000	1091	900	1000	889	1000	1000	833	1000	1000	1000	717	909	837
	AI		904	818	1049	941	1027	1007	961	973	1174	654	861	1030	587	1320	909
Rapeseed & Mustard	Pb	Rabi	1000	1022	943	1143	1148	1111	1267	875	945	1125	1208	1200	909	1192	1033
	AI		904	895	776	847	950	916	1017	668	869	961	936	1002	854	1159	1038
Linseed	Pb	Rabi	833	857	1000	1000	1000	1000	1000	750	1000	1000	1000	1000	1000	667	667
	AI		302	329	1564	346	340	346	375	302	360	405	345	390	393	412	378
Sesamum	Pb	Kharif	376	374	302	410	398	379	402	301	347	346	396	379	283	340	406
	AI		332	269	356	254	298	291	321	343	329	308	302	418	306	460	366
Sunflower	Pb	Kharif	1607	1750	1718	1718	1547	1544	1544	1444	1373	1357	1155	1419	1560	1700	1826
	AI		535	565	567	505	610	593	491	406	328	423	573	501	510	501	587
C. Other Cash Crops																	
Sugarcane	Pb	Kharif	59406	63486	56866	61169	62169	65303	63815	56746	59515	62685	64215	65141	60325	53821	60116
	AI		65395	66069	63827	67120	71258	67777	65395	66496	71133	71203	70934	68578	67370	63576	59380
Cotton	Pb	Kharif	463	607	570	446	499	442	441	220	180	340	430	366	410	556	697
	AI		225	215	257	249	257	242	265	208	224	225	190	186	191	307	318

Crop	L	Season	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
A. Food Grains																	
Rice	Pb	Kharif	3858	3868	4019	4022	4010	3828	3741	3998	3952	3838	3974	3998	4366	4132	4034
	AI		1990	2024	2095	2082	2019	2121	2311	2373	2319	2295	2305	2417	2469	2553	2622
Wheat	Pb	Rabi	4179	4210	4507	4462	4307	4693	4898	4724	5017	4294	4583	4704	5077	5188	5003
	AI		2619	2708	2802	2907	2839	2989	3177	3117	3145	2750	3034	3200	3368	3533	3440
Jowar	Pb	Kharif	–	–	1000	1000	1000	–	–	–	–	–	–	–	–	–	–
	AI		1082	992	1176	1055	853	1119	1257	1171	1050	1014	850	954	1104	989	967
Bajra	Pb	Kharif	1000	1000	1000	1000	1333	1000	1000	1000	1000	–	–	583	598	651	635
	AI		802	886	1042	1015	731	1079	1171	1198	1184	1255	1132	1305	1231	1219	1374
Maize	Pb	Kharif	2723	3123	3405	3404	3417	3692	3984	3682	3900	3651	3687	3836	3708	3625	3581
	AI		1740	1660	2122	2048	1740	2285	2234	2246	2346	2249	2413	2706	2648	2572	7841.69
Barley	Pb	Rabi	3316	3368	3563	3438	3357	3667	3917	3615	3833	3582	3700	3795	3880	3747	3644
	AI		1938	2055	1985	2394	2172	2357	2516	2521	2718	2280	2439	2663	2695	2837	2920
Ragi (Finger Millet)	Pb	Kharif	–	–	–	–	–	–	–	–	–	–	3963	3990	4341	4114	4016
	AI		1534	1226	1552	1477	1489	1705	1641	2116	1661	1706	2065	2188	2259	2320	2370
Gram	Pb	Rabi	750	1000	659	1172	1133	1286	1000	1400	1211	1056	1294	1375	1181	1330	1219
	AI		808	845	762	895	915	895	928	1036	960	889	840	974	1078	1041	1142
Tur	Pb	Kharif	885	931	876	966	957	929	1000	903	897	923	1000	860	1030	1047	1095
	AI		765	650	826	671	711	655	662	776	813	729	646	913	967	729	859
Other Pulses	Pb	Kharif & Rabi	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	AI		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
B. Oil Seeds																	
Groundnut	Pb	Kharif	882	864	871	926	1240	1773	1500	1765	1846	1857	1900	1917	1950	1980	1980
	AI		1097	689	1386	1063	835	1335	1188	811	1735	1478	1399	1321	1834	1304	2026
Rapeseed & Mustard	Pb	Rabi	1102	1122	1179	1222	1300	1323	1276	1281	1306	1248	1348	1413	1498	1524	1497
	AI		1117	1095	1001	1143	1183	1185	1121	1262	1185	1083	1183	1304	1410	1511	1345
Linseed	Pb	Rabi	500	500	1000	1000	500	–	–	–	–	–	–	–	–	–	–
	AI		395	385	349	415	449	408	473	502	484	541	477	567	533	574	581
Sesamum	Pb	Kharif	336	337	329	337	356	404	400	333	341	298	340	367	344	273	363
	AI		372	363	421	354	303	429	426	402	426	474	436	448	478	485	405
Sunflower	Pb	Kharif	1612	1641	1900	1750	1787	1664	1857	1881	1738	1765	1797	1655	1840	1933	1950
	AI		692	661	870	696	700	748	783	674	808	781	660	708	924	874	1066
C. Other Cash Crops																	
Sugarcane	Pb	Kharif	57857	60808	60818	57654	61667	59571	70663	71313	75000	74883	73411	81273	83580	81828	80242
	AI		66919	69022	68877	64553	70020	70091	71668	68254	70522	71511	70720	69001	80198	80105	80497
Cotton	Pb	Kharif	731	750	663	737	667	674	698	708	750	648	376	615	750	775	827
	AI		362	421	467	403	403	499	491	486	510	462	415	512	443	378	455

Notes: L, Pb and AI connote Location, Punjab and All India; '–' implies not available or not applicable; Other pulses include Urad (Mash), Moong, and Masur (Lentil)

Source: Directorate of Economics and Statistics, DAC&FW (<http://desagri.gov.in>)

ANNEXURE D

Minimum Support Price (MSP) for Prominent Crops (₹ per quintal, 1975-76 to 2021-22)

Crop	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
A. Food Grains																
Rice (Common)	74	74	77	85	95	105	115	112	132	137	142	146	150	160	185	205
Wheat	105	110	112	115	117	130	142	151	152	157	162	166	173	183	215	225
Coarse Cereals	74	74	74	85	95	105	116	118	124	130	130	132	135	145	165	180
Gram	90	95	125	140	145	–	–	235	240		260	280	310	325	421	450
Arhar (Tur)	–	–	–	155	165	190	–	215	245	275	300	310	325	360	425	480
Moong	–	–	–	165	175	200	–	240	250	275	300	315	325	360	425	480
Urad (Mash)	–	–	–	–	175	200	–	230	245	275	300	315	325	360	425	480
B. Oil Seeds																
Groundnut (in shell)	–	140	160	175	190	206	270	295	315	340	350	370	390	430	500	580
Rapeseed & Mustard	–	–	225	245	–	–	–	355	360	385	400	415	430	460	575	600
Sunflower seed	–	150	165	175	175	183	250	250	275	325	335	350	390	450	530	600
C. Other Cash Crops																
Sugarcane ^e	–	8.5	8.5	10	12.5	13	13	13	13.5	14	16.5	17	18.5	19	23	22
Cotton	–	–	–	–	–	–	–	–	527	535	535	540	550	600	690	750
Crop	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
A. Food Grains																
Rice (Common)	230	270	310	340	360	380	415	440	490	510	530	530	550	560	570	580
Wheat	280	330	350	360	380	475	510	550	580	610	620	620	630	640	650	850
Coarse Cereals	205	240	260	280	300	310	360	390	415	445	485	485	505	515	525	540
Gram	500	600	640	670	700	740	815	895	1,015	1,100	1,200	1,220	1,400	1,425	1,435	1,445
Arhar (Tur)	545	640	700	760	800	840	900	960	1,105	1,200	1,320	1,320	1,360	1,390	1,400	1,410
Moong	545	640	700	760	800	840	900	960	1,105	1,200	1,320	1,330	1,370	1,410	1,520	1,520
Urad (Mash)	545	640	700	760	800	840	900	960	1,105	1,200	1,320	1,330	1,370	1,410	1,520	1,520
B. Oil Seeds																
Groundnut (in shell)	645	750	800	860	900	920	980	1040	1,155	1,220	1,340	1,355	1,400	1,500	1,520	1,520
Rapeseed & Mustard	670	760	810	830	860	890	940	1000	1,100	1,200	1,300	1,330	1,600	1,700	1,715	1,715
Sunflower seed	670	800	850	900	950	960	1000	1060	1,155	1,170	1,185	1,195	1,250	1,340	1,500	1,500
C. Other Cash Crops																
Sugarcane ^e	26	31	35	39	43	46	48	53	56	60	62	70	73	75	80	80
Cotton	840	950	1,050	1,200	1,350	1,380	1,530	1,650	1,775	1,825	1,875	1,875	1,925	1,960	1,980	1,990

Crop	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
A. Food Grains															
Rice (Common)	745	900	1050	1000	1,080	1,250	1,310	1,360	1,410	1,470	1,550	1,750	1,815	1,868	1,940
Wheat	1,000	1,080	1,100	1,170	1,285	1,350	1,400	1,450	1,525	1,625	1,735	1,840	1,925	1,975	2,015
Coarse Cereals	620	840	840	880	980	1,175	1,310	1,310	1,325	1,365	1,425	1,700	1,760	1,850	1,870
Gram	1,600	1,730	1,760	2,100	2,800	3,000	3,100	3,175	3,500	4,000	4,400	4,620	4,875	5,100	5,230
Arhar (Tur)	1,550	2,000	2,300	3,500	3,700	3,850	4,300	4,350	4,625	5,050	5,450	5,675	5,800	6,000	6,300
Moong	1,700	2,520	2,760	3,670	4,000	4,400	4,500	4,600	4,850	5,225	5,575	6,975	7,050	7,196	7,275
Urad (Mash)	1,700	2,520	2,520	3,400	3,800	4,300	4,300	4,350	4,625	5,000	5,400	5,600	5,700	6,000	6,300
B. Oil Seeds															
Groundnut (in shell)	1,550	2,100	2,100	2,300	2,700	3,700	4,000	4,000	4,030	4,220	4,450	4,890	5,090	5,275	5,550
Rapeseed & Mustard	1,800	1,830.0	1,830	1,850	2,500	3,000	3,050	3,100	3,350	3,700	4,000	4,200	4,425	4,650	5,050
Sunflower seed	1,510	2,215	2,215	2,350	2,800	3,700	3,700	3,750	3,800	3,950	4,100	5,388	5,650	5,885	6,015
C. Other Cash Crops															
Sugarcane ^e	81	81	130	139	145	170	210	220	230	230	255	275	275	285	290
Cotton	2,030	3,000	3,000	3,000	3,300	3,900	4,000	4,050	4,100	4,160	4,320	5,450	5,550	5,825	6,025

Notes: ‘-’ implies not available or not announced; From 1997-98, MSP has been announced for two varieties of paddy, i.e., Common and Grade ‘A’ vis-à-vis earlier three categories of common, fine and super fine; Wheat prices for 1992-93 and 1993-94 includes a central bonus of ₹25 per quintal; Wheat price for 2006-07 and paddy common for 2007-08 include an additional incentive bonus over the MSP of ₹100 per quintal; Wheat prices for 1996-97 includes a central bonus of ₹60 per quintal payable up to June 30, 1997; Wheat prices for 2005-06 and 2010-11 include a bonus of ₹50 per quintal payable over the MSP; paddy common for 2006-07 include an additional incentive bonus of ₹40 per quintal on procurement between October 1, 2006 to March 31, 2007; Arhar, Moong, and Urad for 2007-08 includes a bonus of ₹40 per quintal payable over and above the MSP; An additional incentive bonus of ₹50 per quintal over the MSP included for paddy common for 2008-09 and 2009-10; For Arhar, Moong and Urad for 2010-11 and 2011-12 an additional incentive at the rate of ₹ 500 per quintal payable during the harvest/arrival period of two months is included; For Arhar, Moong and Urad for 2015-16 and 2017-18 bonus of ₹200 per quintal payable over and above the MSP; Gram for 2016-17 includes a bonus of ₹ 75 for quintal and for 2017-18 includes a bonus of ₹ 200 per quintal on and above MSP; Arhar, Moong and Urad for 2016-17 includes a bonus of ₹ 425 per quintal over and above MSP.

Sources: Ministry of Agriculture & Farmers Welfare, Government of India; Commission for Agricultural Costs & Prices (CACP).



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