

Overview of Agricultural Subsidies in India and Its Impact on Environment

AARTI DEVESHWAR* and SALONI PANWAR

Department of Management Studies, Deenbandhu Chhotu Ram University of Science and Technology, Murthal, Sonapat, Haryana, India.

Abstract

Agriculture is vital to India's economic development, providing food security to over 1.4 billion people and employing 58% of the population, while contributing 19-20% to GDP. The government's spending on the agricultural sector has been increasing annually, reaching Rs. 1,25,036 crores in 2023, up from Rs. 1,22,836 crores in 2022. The government provides various forms of agricultural subsidies, both direct and indirect, aimed at spurring growth in the sector. However, the efficacy of these subsidies in achieving intended outcomes remains questionable. This paper provides an overview of agricultural subsidies in India by examining the allocation of funds under different schemes. It also analyzes the different types of subsidies and impact on the environment. The study utilizes secondary data from government and research publications. The findings suggest that while agricultural subsidies help the sector, mismanagement hampers their reach and effectiveness for farmers and the environment. Subsidies have both positive and negative environmental externalities. The paper argues that improved targeting of subsidies is critical to maximize benefits for farmers and minimize unintended consequences. More focused allocation can enhance the efficiency of public expenditure on agricultural subsidies and make them more ecologically sustainable. The study provides insights into reforming India's agricultural subsidy regime to balance productivity, equity, and sustainability concerns.



Article History

Received: 12 September 2023

Accepted: 16 April 2024

Keywords

Agriculture;
Environment;
India; Subsidies

Introduction


Agriculture is the backbone of India's economy, providing livelihoods to a majority of the population.

More than 60 percent of India's population earns a living from agriculture, as it provides employment to around 58 percent of people (GOI). Given

CONTACT Aarti Deveshwar ✉ artideveshwar.mba@dcrustm.org 📍 Department of Management Studies, Deenbandhu Chhotu Ram University of Science and Technology, Murthal, Sonapat, Haryana, India.



© 2024 The Author(s). Published by Enviro Research Publishers.

This is an  Open Access article licensed under a Creative Commons license: Attribution 4.0 International (CC-BY).

Doi: <http://dx.doi.org/10.12944/CWE.19.1.33>

agriculture's immense contribution, the sector requires special policy attention and support to sustain growth. In recent years, India's focus has shifted more towards industrial advancement, which has led to a decline in agriculture's contribution to GDP. Therefore, revitalizing the agricultural sector's growth is critical (Kumar, 2020). The government plays a vital role in developing the agricultural sector by providing various kinds of financial and technical support. These efforts aim to ensure food self-sufficiency, provide technical assistance to small-scale producers for adopting modern technologies, maintain price stability, boost employment generation, and increase farmer incomes. The government forms various policies to support agriculture, including input subsidies (fertilizer, electricity, seeds) to lower costs, minimum support price (MSP) mechanisms, concessional trade policies for import-export of farm products, and direct income transfers. Overall, agricultural subsidies refer to financial transfers given by the government to farmers and agribusinesses with the aim of enhancing farm incomes (Salunkhe & Deshmukh, 2012).

According to the WTO, subsidies represent financial contributions by the government or public entities that confer benefits to the general public. Subsidies can provide economic benefits to the agriculture sector. Input subsidies help provide essential inputs like fertilizers, electricity, and water to farmers at affordable rates. Such input subsidies form a significant portion of overall agricultural subsidies. Subsidies may also take the form of direct cash transfers to producers or tax rebates on the import and export of farm products. As agricultural subsidy is most debatable issue in the world. Many researchers have presented their thought on the agricultural subsidies on the national as well as international level through research papers and articles. Swaminathan (1975) highlight the role of subsidies in promoting the usage of high yielding crop varieties and modern farming practices, which led to increased food production. This period marked the beginning of the government's intervention in agricultural markets through price support, input subsidies, and credit facilities. Gulati *et al.* (2005) and Kumar and Joshi (2018) have examined the relationship between agricultural subsidies and productivity. While some argue that subsidies have

played a crucial role in increasing crop yields and food security. Others have raised concerns about their efficiency and the unintended consequences, such as soil degradation and excessive water use. Mathur *et al.* (2006) looked at the patterns in the rise in agricultural output in India and the factors influencing that expansion. The results of the study showed growth in Indian agriculture sector has a declining trend during the study period. Authors suggested that for the future growth of the agricultural sector government need to increase its expenditure by 10 to 15 percent and provides basic infrastructure to the rural area. Kaur and Sharma (2012) have examined the agricultural subsidy in India during the time period 1980-81 to 2008-09. They consider input subsidy like fertilizer, seed, electricity, irrigation and machinery subsidy. The result showed increasing trends in all these subsidies during the study period. There is a need to form rational policy for to improve the efficiency of agricultural subsidy. Salunkhe and Deshmukh (2012) tried to seek insight about the agricultural subsidies and their distribution in India. This research was conducted using secondary data. The conclusion of the study showed that government of India provides many types of subsidies to the agriculture. It also showed that the trends of the investment in agriculture has been increased but at the same time total cultivated area also increased. Authors suggested that policy maker should focus more on the agriculture sector so that growth for the same can be possible. Gautam (2015) review the argument for and against the agricultural subsidy. Effectiveness of the program depend on the three issues, targeting the needed people other than who want subsidies, second one is it should be effective by the insuring positive impact and reducing wastage. Third on is, it should be sustainable by reduce environmental footprint. Lovelace and Diamond (2017) discussed about the supply management and subsidy in agriculture. They provide some insight about the US farm bill through the Polonyian and Food regime Political-economic theories. In the conclusion authors revealed that there were some problems associated with the supply management, farm policy and over production. To deal with overproduction, an efficient supply management policy is necessary. It was recommended that a cross border alliance may aid in the export of food commodity and that a policy for coordination be put forward. Farmers

need to understand the supply management in agriculture. Anand and Sha (2020) investigated the importance of the agricultural subsidies in India. The factors that studied were agricultural finance, irrigation, production, infrastructure and technology. The study shows that the agriculture subsidy was helpful for the growth of the agriculture sector but the some mismanagement, corruption and hurdle in the distribution system make it difficult to reach the benefit to the real beneficiary. Kumar (2020) examined the impact of agricultural subsidies on the agriculture sector in India. It was a review based study. The conclusion of the study revealed that various study recommended the withdrawal of agricultural subsidies because that fund can be used in other development activities. But it also creates fear of reduction in agricultural production and income of the farmers. Author suggested that government should frame such policy which makes distribution of agricultural subsidies more transparent and policy should be farmers friendly. It will helpful in the increase of production and income of farmers.

There are many researchers, those tried to explain various aspects of the agricultural subsidy and how it is evolve with the time. It can be extract that agriculture is important part for the government of India as it can stimulate the economic condition and political viability of the country. Examining the budgetary allocations, expenditure related to agricultural subsidies and the impact they have on environment is the goal of current study.

Methodology

Based on the secondary data obtained from various government agencies and research publications, including Agricultural Statistics at a Glance, Demand for Grants, Fertilizer association of India, Central Electricity Authority and Central Water Commission, the present study was carried out. The effect of agricultural subsidy on environment has been driven from the view point of different researchers.

Agricultural Status of India

Focus of the study is to know the state of agriculture sector through the subsidy provided by the central and state. Agriculture was the top in the list to contribute in the Indian GDP. Now agriculture is third largest contributor to the Indian GDP, with 20.19%

share, following to service sector (53.89%) and Industry sector (25.92%). Agriculture is important sector of India, employing a significant portion of the population and contributing to the GDP (Arun, 2017). However, it faces challenges such as food consumption and population growth, which demand increased output (Balkrishna *et al.*, 2021). Sustainable agriculture is proposed as a solution to these challenges. The sector also needs to be strengthened through education, reforms, and development, particularly for small and marginal farmers (Amutha, 2013). The agricultural sector in India faces major challenges that hinder its growth and development. A key issue is the lack of investments in research, infrastructure, and technology adoption (Kumar, 2019). This is a major obstacle to achieving the aim of doubling farmer incomes by 2022, as envisioned by the current government. To support the sector, the Indian government provides financial assistance through various agricultural schemes and programs. However, the shift from traditional low-input farming to more intensive inorganic practices has not necessarily translated into sustained improvements in farmer livelihoods (Parsad *et al.*, 2020). In the 2021-22 budget, the agricultural ministry received a 14% increase in allocation over 2019-20 levels. Key budget proposals for agriculture include an agriculture infrastructure cess on certain imported goods to finance infrastructure development, integration of over 1000 Agricultural Produce Market Committees (APMCs) into the electronic National Agriculture Market (e-NAM) platform, and expansion of the Operation Greens scheme which provides subsidies for storage and transportation of perishable commodities, now covering 22 products to support value addition and exports.

Importance of Subsidy in SDGs

Subsidies play a complex role in achieving the Sustainable Development Goals (SDGs). While they can support the transition to sustainability, their impact can be negative, particularly in the case of financial subsidies for self-help groups (Pati, 2009). In the agricultural sector, subsidies can be both beneficial and harmful to the environment, and their effectiveness depends on their design and implementation (Heyl *et al.*, 2022). Public service, including the provision of subsidies, is crucial for achieving the SDGs (Jackson, 2020). However,

the scope and limits of subsidies must be carefully considered, as they can be a powerful tool for income redistribution and addressing market failures (Goldstein, 2009). India has a complex system of agricultural subsidies that aims to achieve food security and support farmer livelihoods, but has mixed results in aligning with the SDGs. India's fertilizer, power, irrigation, and procurement subsidies total over \$25 billion annually (Gulati and Juneja, 2019). On hunger and food security (SDG 2), India's input subsidies have helped boost production and self-sufficiency in staple grains. However, subsidies are not sufficiently targeted, allowing disproportionate gains for larger farmers (Krishnapriya, 2021). Persistent malnutrition also underscores the need for more nutrition-sensitive agriculture. On reducing inequality (SDG 10), 89% of agricultural subsidies go to medium and large farmers, while smallholders receive only 11%, exacerbating inequality (Gulati *et al.*, 2021). Reforms to target marginalized farmers could better align with SDG 10. On sustainability (SDGs 12, 15), current subsidies incentivize chemical input overuse,

water depletion, and biodiversity loss (Nandi *et al.*, 2019). Increased subsidies for agroecology, organic practices, and water conservation could mitigate these impacts. Trade-offs exist between subsidies and investments in health, education, and infrastructure (SDGs 3, 4, 9). Reducing untargeted subsidies could free up fiscal resources for these other priorities (Krishnapriya, 2021). Experts recommend refocusing India's agricultural subsidies on sustainability and equity through better targeting, incentives for regenerative practices, and support for women and marginalized farmer groups (Gulati *et al.*, 2021; Nandi *et al.*, 2019).

Investment in Agriculture Sector

Capital investment in the agriculture sector shows increasing trends. It was Rs. 273870 crore in 2011-12 to reach at Rs. 557570 crore in 2020-21. This increase depicts the government intention to insure growth in agriculture and sustainability in agriculture sector. Gross Capital Formation (GCF) is the indicator for the capital investment in relation to the Gross Domestic Product (GDP).

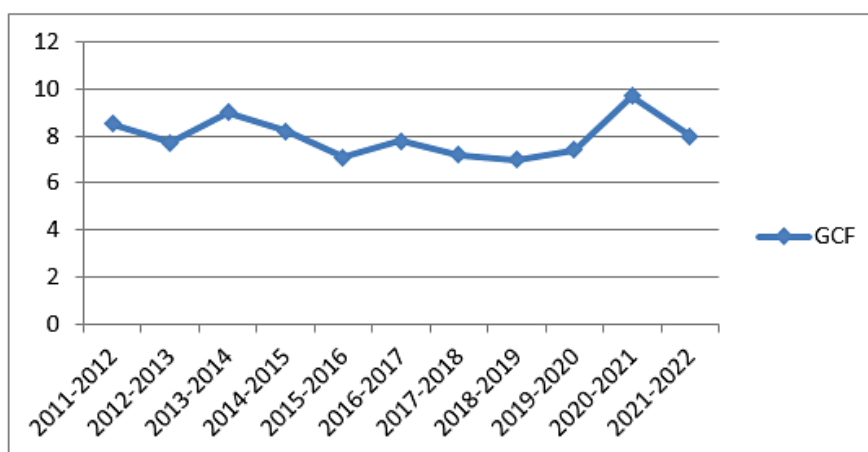


Fig. 1: Gross Capital Formation (GCF) in Agriculture & Allied sector at Current Prices

Source: Agricultural Statistics at a Glance, 2021

The above figure displays the percentage of GCF in the agriculture and related sectors. The percentage of the agriculture and related sectors has decreased from 8.5 percent in 2011–2012 to 7.4 percent in

2019–2020, notwithstanding an increase in capital investment. It increases to a peak of 9.7 percent in 2020–2021.

Table 1: Fund allocated by the Ministry of agriculture to the departments

Department	Actual allocation for 2021-22	Revised 2022-23	Budget allocation for 2023-24	Percentage change (annualised) in 2023-24 over 2021-22
Agriculture, Cooperation and Farmers' Welfare	1,14,468	1,10,255	1,15,532	5%
Agricultural Research and Education	8368	8,659	9,504	10%
Total	1,22,836	1,18,913	1,25,036	5%

Source: Demand for Grants 2023-24 Analysis.

As shown in table 1, fund distributed in different department. Agriculture, cooperation and Farmers' Welfare received around 94 % of total fund and Agricultural Research and Education received 6 %. Fund allocated in 2021-22 budget, is 14% more than the fund allocated in 2019-20 budget

for the Department of Agriculture, Cooperation and Farmers' Welfare. Fund for the Agricultural Research and Education this increase is 6 %. This shows that government is looking forward to boost the agriculture through the increased (14%) financial assistance.

Table 2: Allocation of funds under Department of Agriculture, cooperation and Farmers' Welfare (Rs. crore)

Schemes	Actual allocation for 2020-21	Budget allocation for 2021-22	Revised for 2021-22	Budget allocation for 2022-23	Percentage change in BE 2022-23 over RE 2021-22
Rashtriya Krishi Vikas Yojana and Green Revolution	9,748	13,408	8,889	17,616	98%
Interest subsidy	17,790	19,468	18,142	19,500	7%
Formation and Promotion of 10,000 Farmer Producer Organisations	241	700	250	500	100%
PM-KISAN	60,990	65,000	67,500	68,000	1%
Pradhan Mantri Krishi Sinchai Yojana	2,562	4,000	2,000	-	-
Agriculture Infrastructure Fund	22	900	200	500	150%
Pradhan Mantri Fasal Bima Yojana	14,161	16,000	15,989	15,500	-3%
Market Intervention Scheme and Price Support Scheme (MIS-PSS) *	1,358	1,501	3,596	1,500	-58%
Total	1,08,273	1,23,018	1,18,294	1,24,000	4%

*for procurement of pulses and oilseeds

Sources: Demand for Grants 2022-23 Analysis.

Government provides financial support to the agricultural sector through various schemes. These schemes are beneficial for the farmers. The purpose of the financial support is to improve productivity and increase the income of farmers. As table 2 shows that around 83% of the department has been proposed to spend on three income support schemes. These programs included the PM-KISAN (55%), Pradhan Mantri Fasal Bima Yojana (13%), and interest subsidies on short-term loans to farmers (16%). There is a downward tendency in farm spending. However, programs like the Green Revolution/

Rashtriya Krishi Vikas Yojana (98%), the Agriculture Infrastructure Fund (150%), and the Formation and Promotion of 10,000 Farmer Producer Organizations (100%), show a considerable increase. The Pradhan Mantri Fasal Bima Yojana (-3%) and the Market Intervention Scheme and Price Support Scheme (MIS-PSS) (-58%), among other programs, saw a decrease in government spending. The overall funding allotted to the Department of Agriculture, cooperation, and Farmers' Welfare has increased by 4%, according to these figures.

Table 3: Allocation of funds in the Department of Agricultural Research and Education (Rs. crore)

	Actual allocation for 2022-23	Budget allocation for 2023-24	Revised for 2023-24	Budget allocation for 2024-25	Percentage change (annualized) in BE 2024-25 over 2023-24
Agricultural education	454	415	377	398	16%
ICAR headquarters	5934	6385	6576	6379	-3%
Central agricultural universities	609	652	671	724	8%
Animal sciences	343	450	457	-	0
Crop sciences	718	926	1180	1187	1%
Department	8058	8828	9261	8688	-6%

Sources: Demand for Grants 2022-23 Analysis

The funds allotted to the Department of Agricultural Research and Education are displayed in Table 3. The Indian Council of Agricultural Research (ICAR) will receive around 73% of the department's overall funding in 2024–25, with the remaining 14% going to crop science. However, the funding allotted for agricultural education has increased by 16%. The government will raise funding for the central agricultural institutions by 8% in 2024–2025. The ICAR head office head receives the highest allocation of funds (73%).

The above table shows that total subsidies increases year by year. The amount was Rs. 55461.71 crore in the year 2000-01, that reached to 251045.07 crore in the year 2020-21. In the context of Gross Cropped area also shows increasing trends, it was 185.34 million hectares in the year 2000-01 and 196.50 million hectares in 2020-21. As the gross

cropped area increase but the population of India also increased (Salunkhe and Deshmush, 2012). The data shows there is great change in the share of three subsidies in total subsidy. The share of the fertilizer subsidy increase from 24.88% in 2000-01 to 53.35% in the year 2020-21 and canal irrigation subsidy share reduced to 26.53% to 6.51% in the year 2000-01 and 2020-21 respectively. For the year 2023-24, irrigation subsidy shows increase in its share in total subsidy by 9 percent.

Environmental impact of Agricultural Subsidies

Like many other countries, agricultural subsidies in India have both Positive and negative environmental impacts. These impacts can vary depending on the type of subsidy, how it implemented and distributed. There are some key environmental impacts of agricultural subsidies in India.

Table 4: Distribution of subsidies & Gross Cropped Area in India (2000-2021)

Year	Fertilizer (Rs. Crore)	Electricity (Rs. Crore)	Irrigation (Rs. Crore)	Total Subsidies (Rs. Crore)	Gross Cropped Ares (in million hectares)
2000-01	13800 (24.88)	26950 (48.59)	14711.71 (26.53)	55461.71 (100.00)	185.34
2005-06	18460 (45.15)	12490.6 (30.55)	9933.09 (24.30)	40883.69 (100.00)	192.74
2010-11	62301 (61.07)	30,332 (29.73)	9374.54 (9.19)	102007.54 (100.00)	197.68
2015-16	72415 (39.55)	91000 (49.79)	19330.44 (10.57)	1,82,745 (100.00)	197.05
2020-21	133947 (53.35)	100754 (40.13)	16344.07 (6.51)	251045.07 (100.00)	196.5
2023-24	175103 (43.22)	190005.1 (46.90)	40048.48 (9.88)	405156.58 (100.00)	-

Source: (1) Fertilizer association of India, various issues
(2) Ministry of Agriculture & Farmers Welfare, GOI, PIB,
(3) Agricultural Statistics at a Glance, 2021,
(4) Central Electricity Authority, GOI, various years,
(5) Central Water Commission, 2021

Note: Percentages are shown in parentheses

Increased Food Production

Subsidies can help increase food production, ensuring food security for the growing population like India. This can reduce the pressure on natural ecosystems caused by land conversion for agriculture (Kumar, 2022). Banga (2016) found that Green Box subsidies can increase agricultural productivity, production, and trade. However, Kumbhakar (2010) reported a negative effect of subsidies on farm productivity but a positive influence on technical efficiency.

Technology Adoption

Some subsidies promote the adoption of modern and sustainable agricultural practices, such as the use of high-yield crop varieties and efficient irrigation systems. These practices can lead to higher agricultural productivity with lower resource use (Potter and Tilzey, 2007; Fan, 2008).

Livelihood Support

By providing financial support to farmers, subsidies can help maintain rural livelihood, reducing migration to urban areas and the associated urbanization

and environmental pressures (Salunkhe, 2016). Dorward (2015) notes that while subsidies can have positive impacts on food security and poverty reduction, they can also have negative effects.

Overuse of Resources

subsidies like fertilizers and water can lead to their overuse, which can result in soil degradation, water pollution and loss of biodiversity. Excessive use of chemical fertilizer can lead to nutrient runoff and soil contamination (Singh, 2000).

Monoculture and Biodiversity Loss

Subsidies that encourage the cultivation of a few high-yield crop varieties can lead to monoculture farming, which is detrimental to biodiversity. It reduces the diversity of crops, making agriculture more susceptible to pests and diseases (Singh, 2000).

Water Depletion

Subsidized irrigation can lead to excessive groundwater pumping, depleting aquifers and causing long-term water scarcity. This is a significant concern in regions with heavy agricultural subsidies

(Badiani and Jessoe, 2019). Electricity subsidy is responsible for the increased dependence on the ground water usage and it will create a serious problem in future (Badiani *et al.*, 2012).

Greenhouse Gas Emission

Intensive agricultural practices supported by subsidies can contribute to greenhouse gas emissions, primarily through the use of fossil fuels for machinery and release of methane from livestock (Baig *et al.*, 2023).

Waste and Pollution

subsidies can lead to wasteful practices, such as overproduction of certain crops that are then discarded, contributing to food waste. Additionally, the improper disposal of agricultural waste, including plastics and chemicals, can cause pollution

(Demirbas, 2009). With availability of input on subsidized price, it encourages the more usage of inputs which lead to the wastage of input and also increase soil pollution (Gautam, 2015).

Climate Change

Agriculture makes a substantial contribution to greenhouse gas emissions. Particularly worrisome are emissions of nitrous oxide from fertilizer use and methane from cattle. Sustainable farming practices promoted through subsidies, such as agro-forestry, organic farming, and low-emission livestock management, can help reduce these emissions and contribute to climate change mitigation (Baig *et al.*, 2023 and Mowbray). Gautam (2015) indicate that use of subsidized fertilizer create nutrient imbalance and it will reduce the productivity by 25 percent.

Table 5: Contribution by Different Researcher showing Impact of Agricultural Subsidies on Environment

Authors	Year	Findings
Reddy, V. R.	2005	Electricity and irrigation subsidies in Andhra Pradesh have led to the overexploitation of groundwater resources, resulting in significant environmental and economic costs.
Femenia, F.	2015	The Common Agricultural Policy (CAP) of the European Union has caused agricultural production to intensify, leading to environmental problems such soil erosion and water pollution.
Key, N., & Runsten, D	1999	Agricultural subsidies can incentivize large-scale monoculture production, leading to deforestation, soil degradation, and biodiversity loss
Mayrand, K., Dionne, S., Paquin, D., & Makundi, W.	2003	Agricultural subsidies in Mexico have contributed to deforestation, particularly in marginalized areas with low productivity.
Singh, S.	2015	Agricultural subsidies in India, particularly for fertilizers, water, and electricity, have led to overexploitation and pollution of natural resources.
Gulati, A., & Narayanan, S.	2003	Irrigation, fertilizer, and power subsidies in India have contributed to the overuse of resources, soil degradation, and groundwater depletion.
Tripathi, A., & Prasad, A. R.	2009	Agricultural subsidies in India have contributed to the overuse of groundwater resources, leading to depletion and quality degradation

Conclusion

Despite India's growing investments and extensive arable land, the agricultural sector has shown slow

growth rates. While agricultural subsidies have increased, so has the gross cropped area, diluting benefits. On the positive side, subsidies can ensure

food security, stabilize supply, and support farmer livelihoods. They can also incentivize sustainable practices and environmental conservation. However, subsidies may distort markets, encourage overproduction of certain crops, and stifle innovation. Therefore, the impact of subsidies depends largely on design, implementation, and objectives. Policymakers must weigh social, economic and environmental trade-offs to support farmers while promoting fiscal prudence and sustainability. Moving forward, subsidy programs need better targeting to reach intended beneficiaries and not misused by undeserving groups. There is a need to evaluate subsidy schemes to strengthen positive impacts like adoption of regenerative agriculture, while mitigating negative effects like ecological damage. Impact assessments and course corrections must become integral to subsidy policy. Additionally, a nuanced mix of investments, research, and market-linked incentives is required rather than subsidies alone, to resuscitate agricultural growth. Realigning subsidies with sustainability and farmer welfare goals while harnessing technology and markets can catalyze the transformation of Indian agriculture. In summary, re-launching India's agricultural policy requires reorienting the subsidy regime towards balanced outcomes, integrating it with wider

interventions, and instituting regular impact reviews to maximize benefits for farmers, consumers and the environment.

Acknowledgement

The authors would like to thank Department of Management Studies of Deenbandhu Chhotu Ram University of Science & Technology for granting the research work.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

Conflict of Interest

The authors declare no conflict of interest.

Data Availability Statement

all the data is available on the government websites.

Ethics Approval Statement

Not applicable

Authors' Contribution

First author supervise overall manuscript. The second author compiled all the data and arranges the manuscript.

References

1. Anand R, Sha U. Impact of Subsidies on Indian Agriculture Sector: An Analysis. *Journal of Emerging Technologies and Innovative Research*. 2020;7(5):457-462.
2. Arun B.K. Indian Agriculture- Status, Importance and Role in Indian Economy. *J Stud Manage Plann*. 2017;3:212-213.
3. Badiani R, Jessoe K.K. Electricity Prices, Groundwater, and Agriculture: The Environmental and Agricultural Impacts of Electricity Subsidies in India. *Electricity Prices, Groundwater, and Agriculture: The Environmental and Agricultural Impacts of Electricity Subsidies in India*. 2019;157-183.
4. Badiani R, Jessoe KK, Plant S. Development and the Environment. *J Environ Dev*. 2012;21(2):244-262. doi:10.1177/1070496512442507
5. Baig I.A, Irfan M, Salam M, Isik C. Addressing the effect of meteorological factors and agricultural subsidy on agricultural productivity in India: a roadmap toward environmental sustainability. *Environmental Science Pollution Research*. 2023;30: 15881–15898.
6. Demirbas A. Political, Economic and Environmental Impacts of Biofuels: A review. *Applied Energy*. 2009;86(1):108-117.
7. Fan S, Gulati A, Thorat S. Investment, subsidies, and pro-poor growth in rural India. *Agricultural Economics* (2008): 39: 163-170.
8. Femenia F. Impacts of the Common Agricultural Policy on Agriculture, Trade, and the Environment [dissertation]. Swedish University of Agricultural Sciences; 2015.
9. Gautam M. Agricultural subsidies: Resurging Interest in a Perennial Debate. *Indian Journal of Agricultural Economics*. 2015;70(1):83-105.
10. Goldstein M, Estache A. The scope and limits of subsidies. 2009;75-96.

11. Gulati A, Juneja R. Agricultural subsidies in India: The case of fertilizer subsidy. In: Stabilization Experiences in Latin America and the Caribbean. *Palgrave Macmillan*; 2019;195-224.
12. Gulati A, Juneja R, Shreedhar G. Repurposing India's Agricultural Policies and Subsidies. NITI Aayog. 2021.
13. Gulati A, Narayanan S. The Subsidy Syndrome in Indian Agriculture. Oxford University Press; 2003.
14. Dorward, A.R, Morrison J.A. Heroes, villains and victims: agricultural subsidies and their impacts on food security and poverty reduction. *Research Papers in Economics* (2015): 194-213.
15. Heyl K, Ekardt F, Sund L, Roos P. Potentials and Limitations of Subsidies in Sustainability Governance: The Example of Agriculture. *Sustainability*. 2021;13:1-26.
16. Jackson E.A. Importance of the Public Service in Achieving the UN SDGs. *Encyclopedia of the UN Sustainable Development Goals*. 2020;1-16
17. Kaur R, Sharma M. Agricultural Subsidies in India Boon or Curse. *IOSR Journal of Humanities and Social Science*. 2012;2(4):40-46.
18. Key N, Runsten D. Contract farming, smallholders, and rural development in Latin America: the organization of agro processing firms and the scale of out grower production. *World Dev*. 1999;27(2):381-401.
19. Kondekar S. An Analytical Note on the Status of Agriculture Sector in Indian Economy. *PARIPEX Indian J Res*. 2023;12(1):25-17.
20. Krishnapriya PP. Sustainable Agriculture in India and the UN Development Goals. ORF Occasional Paper No. 301. Observer Research Foundation. 2021.
21. Kumar M. Agriculture: Status, Challenges, Policies and Strategies for India. *Int J Eng Res Technol*. 2019;8.
22. Kumar S. Impact of Subsidies on Agriculture Sector in India. *Agri mirror: Future India*. 2020;1(2):40-44.
23. Kumar M.B. Analysis of growth rates of agricultural subsidies and capital formation in agriculture sector of India. *The Pharma Innovation Journal*. 2022;11(8):1775-1780.
24. Kumbhakar, S.C, Lien, G. (2010). Impact of Subsidies on Farm Productivity and Efficiency. In V. Ball, R. Fanfani, & L. Gutierrez (Eds.), *The Economic Impact of Public Support to Agriculture* (pp. 109-128). New York, NY: Springer. https://doi.org/10.1007/978-1-4419-6385-7_6
25. Lovelace G.G, Diamond A. From Supply Management to Agricultural Subsidies- and Back Again? The US Farm Bill & Agrarian (in) Viability. *Journal of Rural Studies*. 2017;50: 70-83.
26. Mathur A.S, Das S, Sircar S. Status of Agriculture in India: Trends and Prospects. *Economic and Political Weekly*. 2006;41(52):5327-5336.
27. Mayrand K, Dionne S, Paquin D, Makundi W. Subsidies and Deforestation: Estimating the Impacts of Mexican Agricultural Subsidies in Forest Areas. Unisféra International Centre; 2003. Accessed March 28, 2024.
28. Mowbray A. The Impact of High-Emission Food Subsidies on Global Warming in India. Available at: URL. https://www.worldfoodprize.org/documents/filelibrary/youth_programs/2022_gyi_student_papers/Mowbray_Ash_Margot_F36E202EF9582.
29. Nandi R, Vemula M, Pokharel R, Garg V. Agricultural subsidies and the SDGs. *Council on Energy, Environment and Water*. 2019.
30. Pati A.P. Subsidy Impact on Sustainability of SHGS: An Empirical Analysis of Micro Lending Through SGSY Scheme. *Indian J Agric Econ*. 2009;64(2):276-288. Available at SSRN: <https://ssrn.com/abstract=1630274>
31. Potter C, Tilzey M. Agricultural Multi-functionality, environmental sustainability and the WTO: Resistance or accommodation to the neoliberal project for agriculture? *Geoforum*. 2007;38(6):1290-1303.
32. Prasad G.S, Sruthi P, Boda S, Singh S.M, Karmakar S, Ghosh S, Debnath R. A Bird Eye View on Status of Organic Farming in the World: An Indian Prospective. *Int J Curr Microbiol App Sci*. 2020;9(04):2882-2888. doi: <https://doi.org/10.20546/ijcmas.2020.904.337>
33. Reddy VR. Costs of resource depletion externalities: a study for groundwater in Andhra Pradesh. *Economic and Political*

- Weekly*. 2005;40(49):5148-5154.
34. Salunkhe H.A, Deshmush B.B. The overview of Government subsidies to agriculture sector in India. *IOSR Journal of Agriculture and Veterinary Science*. 2012;1(5)43-47.
35. Salunkhe H.A. A Study of Agriculture Subsidy and its Impact on Agriculture Sector with Reference to Jalgaon District. *Pratibha: International Journal of Science, Spirituality, Business and Technology*. 2006;5(1):6-10.
36. Singh, S. (2015). Environmental degradation by faulty pricing policies for natural and environmental resources in Indian agriculture. *Agricultural Economics Research Review*, 28(1), 1-18.
37. Tripathi A, Prasad AR. Agricultural development in India since independence: A study on progress, performance, and determinants. *J Emerg Knowl Emerg Markets*. 2009;1(1):4.