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"EVALUATING THE EFFECTIVENESS OF AGRICULTURE SUBSIDED ON FARMERS INCOME AND CROP YIELD"

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Executive Summary:

This research paper presents a comprehensive analysis of the effectiveness of agricultural subsidies on farmers' income and crop yield in India. The study encompasses a thorough literature review, a detailed research methodology, and an in-depth exploration of subsidy distribution and its impact.

The literature review provides a nuanced understanding of existing research on agricultural subsidies, highlighting the diverse perspectives and findings in this field. Building upon this foundation, the research methodology outlines the systematic approach employed to investigate the research objectives.

Data collection methods include the examination of subsidy distribution for irrigation, electricity, and fertilizer from 2015-16 to 2022-23, providing insights into expenditure trends and patterns. Additionally, the study compares the increment in crop yield and farmers' income before and after the implementation of agricultural subsidies, focusing on the specific impacts of irrigation, electricity, and fertilizer subsidies.

A detailed analysis of the Pradhan Mantri Kusum Yojna offers valuable insights into its role in enhancing farmer income and addressing irrigation challenges. By examining the benefits and challenges associated with PM-KUSUM the study provides a holistic understanding of its impact on sustainable agricultural practices and rural development.

In conclusion, this research paper contributes to the ongoing discourse on agricultural subsidies by offering empirical evidence and critical insights. By informing policymakers and stakeholders about the effectiveness of subsidies in improving farmers' livelihoods and fostering inclusive growth, the study aims to guide evidence-based decision-making in the agricultural sector.

KEY WORDS: Agricultural subsidies, Farmers' income, Crop yield, Literature review, Research methodology, Data collection, India, Irrigation subsidies, Electricity subsidies, Fertilizer subsidies, Expenditure trends, PM Kusum Yojna ,Sustainable agriculture, Rural development, Discoms, agriculture sector, DAP, Urea.

CHAPTER 1

INTRODUCTION

1.1 General Introduction:

Agriculture input subsidies are a way of incentivizing growers to buy inputs that they're unfit or unintentional to gain at request rates. Particularly Agriculture inputs like fertilisers as a way of incentivising relinquishment. This can appreciatively impact on adding agrarian productivity and profitability and eventually reducing poverty, adding farmers income, adding crop yields and affair and stimulating profitable growth among benifit homes therefore the use of input subventions can increase the volume and quality of inputs used at the farm. There are two effects that need to be concentrated in subvention programmes originally, when a subsidies programme is introduced, there must be a performing distribution medium in place to make the subsidies available to growers at the original position. Secondly, Implicit corruption in the force chain also needs to be addressed to help leakage or subsidies diversion. Where subsidies are made available at the original position, growers must be apprehensive of their eligibility to pierce them and fete the value of the subvention/ input to actually make use of them.

There are three types of subsidies discussed in this research:

1. **Fertilizer subsidy:** fertilizer subsidy refers to the financial assistance provided by the government to the fertilizer industry to keep the prices of fertilizers affordable for farmers. Fertilizers play a crucial role in enhancing agricultural productivity by providing essential nutrients to crops. Since a significant portion of India's population is engaged in agriculture, ensuring the availability of fertilizers at reasonable prices is essential for food security and farmers' welfare.

   The primary objective of fertilizer subsidy is to make fertilizers accessible and affordable to farmers across the country. This helps in promoting balanced fertilizer use, increasing agricultural productivity, and ensuring food security. The subsidy is applicable to various types of fertilizers, including urea, di-ammonium phosphate (DAP), muriate of potash (MOP), and complex fertilizers. Urea is the most widely used fertilizer in India. The government provides a substantial subsidy on urea to keep its price low for farmers. This subsidy is aimed at encouraging the balanced use of fertilizers, as excessive use of urea can lead to soil degradation and environmental pollution.

   Implementation: The government pays fertilizer companies the difference between the production/import cost and a set selling price. This allows farmers to buy fertilizers at a Maximum Retail Price (MRP) that's lower than the market price. Urea has a government-controlled MRP, while other fertilizers have a producer-set MRP with a per-tonne subsidy on nutrients.

   The fertilizer subsidy is a significant component of the government's agricultural budget. A substantial amount of funds are allocated annually to ensure the availability of fertilizers at subsidized rates. The government periodically reviews and revises the fertilizer subsidy policy to address inefficiencies and improve targeting. Reforms may include measures such as direct benefit transfers (DBT) to farmers, promotion of organic and bio-fertilizers, and incentivizing balanced nutrient use.

2. **Electricity subsidy:** Electricity subsidy in agriculture in India refers to the financial assistance provided by the government to farmers for electricity consumption related to

agricultural activities. This subsidy is aimed at promoting agricultural productivity, ensuring food security, and supporting the welfare of farmers.

The primary objective of electricity subsidy in agriculture is to reduce the input costs for farmers by providing them with subsidized electricity for running irrigation pumps, operating agricultural machinery, and other related activities. This helps in promoting agricultural growth, increasing crop yields, and improving farmers' incomes.

Electricity subsidy for agriculture in India is typically provided in two forms:

Flat Rate Subsidy: Under this mechanism, farmers are charged a flat rate for electricity consumption, which is lower than the actual cost of supply. The government compensates the electricity distribution companies (DISCOMs) for the revenue loss incurred due to the subsidy.

Metered Supply Subsidy: In some states, electricity subsidy is provided based on metered consumption. Farmers are charged the actual cost of supply, and the subsidy amount is credited directly to their accounts by the government.

Electricity subsidy in agriculture is implemented at the state level in India. State governments formulate policies and schemes for providing subsidies to farmers based on their specific agricultural and economic conditions. The distribution of subsidy is often managed through DISCOMs or other designated agencies. Electricity subsidy for agriculture constitutes a significant component of state budgets in India. Governments allocate funds annually to finance these subsidies, which contribute to the overall agricultural expenditure. Eligibility for electricity subsidy in agriculture varies from state to state. Generally, small and marginal farmers, who constitute a significant proportion of the farming community, are the primary beneficiaries of these subsidies. Landholding size, cropping pattern, and type of agricultural activities may also influence eligibility criteria. Governments periodically review and reform electricity subsidy policies to address inefficiencies and ensure better targeting and utilization of resources. Reforms may include measures such as promoting energy-efficient agricultural practices, incentivizing renewable energy adoption, and improving metering and billing systems.

3. **IrrigationSubsidy:**

Irrigation subsidy in agriculture in India refers to the financial assistance provided by the government to farmers for the development and adoption of irrigation facilities. This subsidy aims to promote agricultural productivity, ensure food security, and improve the livelihoods of farmers

The primary objective of irrigation subsidy is to encourage farmers to adopt modern and efficient irrigation methods, such as drip irrigation, sprinkler irrigation, and canal irrigation, to enhance crop yields and reduce dependency on rainfall.

Irrigation subsidy in India can be provided in various forms:

Capital Subsidy: This subsidy is provided to farmers for the installation of irrigation infrastructure such as drip and sprinkler systems, tube wells, pumps, and pipelines.

Operational Subsidy: Farmers may also receive subsidies on the operational costs of irrigation, including electricity or diesel used for running pumps or maintaining irrigation facilities.

The implementation of irrigation subsidy schemes is primarily managed by state governments in India. States formulate their policies and schemes based on their specific agricultural and irrigation requirements. Subsidies are often distributed through government agencies or financial institutions, and in some cases, directly credited to farmers' accounts.

Irrigation subsidy constitutes a substantial component of state agricultural budgets in India. Governments allocate funds annually to finance these subsidies, aiming to improve irrigation infrastructure and enhance agricultural productivity.

Eligibility for irrigation subsidy may vary across states and schemes. Generally, small and marginal farmers, who form a significant portion of the agricultural community, are the primary beneficiaries. Landholding size, cropping pattern, and economic status may also influence eligibility criteria.

Governments continuously review and reform irrigation subsidy policies to address inefficiencies and promote sustainable irrigation practices:

Promotion of Micro-Irrigation: Encouraging the adoption of micro-irrigation systems such as drip and sprinkler irrigation to improve water use efficiency and reduce water wastage.

Capacity Building: Providing training and extension services to farmers on modern irrigation techniques, water conservation practices, and crop water management.

Irrigation subsidy plays a vital role in promoting agricultural development and water resource management in India. However, ensuring efficient and equitable distribution of subsidies while addressing associated challenges remains essential for sustainable agricultural growth.

1.2 Objectives of the study:

As absorved and reviewed many study focus on the effectiveness of farm input subsidies in Malawi or African countries like Nigeria, Kenya. India was majorly missing and it's a great country to have focused on so the objective. of our research is to answer the question: what is the effectiveness of agriculture input subsidies on farmer's income and crop yield in India?

This question was broken down in two main research area questions:

1. What are the effects of agriculture input subsidies on agriculture productivity and farmer's beneficiary income, and what might explain variation in these effects?
2. What are the effects of agriculture input subsidies on crop yield and effect on wider economic growth?

Other objectives of this sudy:

3. What is the new kind of subsidy scheme that is helping farmers apart from fertilizer, Sinchai Yojna subsidy? – An overview on PM KUSUM YOJNA.
4. What are the challenges and future aspect of these subsidy schemes?
5. Recommendations for subsidy schemes that will contribute in covering economy gap.

1.3 Purpose of the study:

To understand the effectiveness of agriculture subsidies in increasing farmers income and crop yield. This study proposes a Distribution of Subsidies & Total expenditure in India (2015-16 to 2022-23) to identiky key trends.Additionally , it will be insightful to explore the distribution of these subsidies across different types.

1.4. RESEARCH METODOLOGY:

Research Objectives:

Main Objective: Evaluating the effectiveness of agriculture input subsidies on farmers income and crop yield.

Research Design:

Combining quantitative and qualitative data for a comprehensive understanding.

Quantitative Data:

Secondary data sources:

Government agencies: Reports from the Ministry of Agriculture (MoA), Department of Agriculture & Cooperation (DAC), National Sample Survey Organisation (NSSO) on:

- Area sown and crop yields for various crops over time.
- Farmer income data disaggregated by region, farm size, and crop type.
- Details of subsidy programs, including types, allocation, and beneficiary demographics.

Research institutions: Reports and publications by agricultural research institutes (ICAR, etc.) on the impact of specific subsidy programs on income and yield.

International organizations: World Bank and FAO data on agricultural subsidies and productivity in India (for comparison).

Qualitative Data:

Semi-structured interviews:

Farmers From different regions and farm sizes (small, medium, large) to understand:

- Their experiences with different types of subsidies.
- Perceived impact of subsidies on income and crop yields.

- Any challenges faced in accessing or utilizing subsidies.

Agricultural experts:

Consult with researchers, economists, and extension service personnel to gain insights on:

- Design and implementation of subsidy programs.
- Potential unintended consequences of subsidies.
- Alternative approaches to supporting farmers.

Data Analysis

Quantitative Data:

- Use statistical software (SPSS, R) to:
- Analyze trends in farmer income and crop yield over time, comparing periods with and without subsidies or different subsidy types.
- Assess correlations between subsidy amounts, farm size, crop type, and changes in income and yield.
- Control for other factors influencing income and yield, like weather patterns, market prices, and use of technology.

Qualitative Data:

- Identify themes in interview transcripts related to the perceived effectiveness of subsidies on income and yield improvement.
    - Analyze how farmers utilize subsidies and any challenges they face in terms of increasing crop yield.
    - Understand expert perspectives on subsidy effectiveness, potential drawbacks, and alternative strategies.

Ethical Considerations:

- Obtain informed consent from all participants in interviews.
- Ensure anonymity and confidentiality of farmer data, especially income and yield information.
- Adhere to ethical research guidelines set by universities or research institutions.

Software and Tools:

- Statistical software (SPSS, R) for quantitative data analysis.
- Qualitative data analysis software (NVivo, Atlas.ti) for analyzing interview transcripts.

CHAPTER 2

2.1 LITREATURE REVIEW:

Numerous studies have investigated the relationship between agriculture subsidies and farmers' income, employing diverse methodologies and focusing on different geographical regions and agricultural sectors. Overall, findings suggest a mixed picture regarding the effectiveness of subsidies in boosting farmers' income.

1. **Agriculture subsidies* BY Bharat Ramaswami** The paper acknowledges the well-established concept of structural transformation, where agriculture's share of income and employment declines with development and whether subsidies can fully offset the challenges of structural transformation, aligning with ongoing debates about the effectiveness of subsidies in promoting long-term agricultural development. This paper provides valuable data on the substantial financial resources allocated to agricultural subsidies in India, including central and state government programs.
2. **Income Intervention :** This quick scan commissioned by the Farmer Income Lab examines the effectiveness of agricultural input subsidies in raising smallholder farmer income within global supply chains. It summarizes existing research, suggesting limited positive impact on income, lack of long-term benefits, and minimal advantages for women farmers. Several studies have shown that input subsidies can have a weak or inconsistent effect on farmer income, particularly for smallholders. Concerns exist about the unequal distribution of subsidy benefits, with larger farms often disproportionately profiting due to economies of scale . ubsidies may provide temporary income boosts but can create dependence and distort markets, hindering long-term income growth .
3. **The Impact of Input and Output Farm Subsidies by Christopher S. Tang:** This paper proposes a novel approach to analyzing the effectiveness of agricultural subsidies by

comparing input and output subsidy programs. It utilizes a game-theoretical model with heterogeneous farmers to assess the impact on income inequality, farmer income, and consumer surplus.

4. **Overview of subsidies in agriculture sector of India by Harshal A. Salunkhe1 Dr.B.B.Deshmush2:** This paper explores the role of agricultural subsidies in India, highlighting their prevalence and the government's financial commitment to the sector. The paper rightly emphasizes the crucial role of agricultural subsidies in supporting farmers' livelihoods in India.Numerous studies acknowledge the widespread use of subsidies globally to promote agricultural development. The paper analyzes government spending on agricultural subsidies through five-year plans and annual budgets. This aligns with research examining the budgetary allocation trends for agricultural support programs and explores the various types of agricultural subsidies present in India, such as input and output subsidies.
5. **AGRICULTURAL SUBSIDIES: CURSE OR BOON? -A REVIEW aLal-Priyanka, aJarial-Sapna*, bBalwant S. Chandel :** This paper offers a novel approach to analyzing agricultural subsidies by focusing specifically on livestock subsidies. livestock subsidies are often a neglected area in subsidy research. This paper fills a gap by specifically focusing on their effects and acknowledges both the potential benefits and drawbacks of livestock subsidies, aligning with the existing body of research that presents a mixed picture and the impact of subsidies on farm income, investment, and long-term sustainability .

CHAPTER 3

3.1 DATA ANALYSIS AND INTERPRETATION:

Input subsidies are the most expensive aspect of India’s food and agriculture policy regime, requiring a steadily larger budget share. Irrigation and electricity are supplied directly to farmers by GOI at prices that are below the cost of production. These policies result in effective subsidies to the farmer of 40% to 75% for fertilizer and 70% to 90% for irrigation and electricity.

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Distribution of Subsidies & Total expenditure in India (2015-16 to 2022-23) in INR crore

Years	FERTILIZER			ELECTRICITY	IRRIGATION	TOTAL SUBSIDIES
	Urea	Nutrient based subsidy	Total			
2015-16	55,000	10,000	65,000	28,000	16,000	109,000
2016-17	60,000	10,000	70,000	30,000	18,000	118,000
2017-18	65,000	10,000	75,000	32,000	20,000	127,000
2018-19	70,000	10,000	81,000	35,000	22,000	137,000
2019-20	75,000	10,000	85,000	38,000	25,000	148,000
2020-21	80,000	10,000	90,000	42,000	28,000	160,000
2021-22	85,000	15,000	100,000	45,000	32,000	177,000
2022-23	120,000	20,000	110,000	50,000	35,000	225,222

Source: (1) Government of India, Fertilizers Association, Fertilizer Statistics, various issues, New Delhi. (2) Government of India, State Electricity Boards, Annual Reports, Various Years. (3)Pradhan mantra Krishi Sinchai Yojna
(4) Union budget, CEIC

Above figures shows the total amount India's expenditure budget on input subsidies has increased sharply in last few years: The expense of India's agricultural input subsidies as a share of agriculture output almost doubled from 109,000 crore in 2015-16 to 225,222 crore in 2022-23, For instance, in FY15, Fertilizer subsidy consistently accounted for the largest portion, ranging from 59% in 2015-16 to 53% in 2022-23. Electricity subsidy has seen a gradual increase from 25% in 2015-16 to 26% in 2022-23. Irrigation subsidy's share has remained relatively stable, increasing from 14% in 2015-16 to 18% in 2022-23.

3.2 Increment in crop yield and Farmer's income before and after Agriculture subsidies:

Factor	Before Subsidies (Estimated)	After Subsidies (Estimated)	Data Source
Farmer Income	- Average farmer income: INR 10,000 per month	- Average farmer income: INR 12,000 per month	- NSSO 2016-17 data, Government of India - International Food Policy Research Institute (IFPRI) 2017 study
Crop Yield (Wheat)	- Average yield: 3 tonnes per hectare	- Average yield: 3.5-4 tonnes per hectare	- Ministry of Agriculture & Farmers Welfare, Government of India

Crop Yield (Rice)	- Average yield: 5 tonnes per hectare	- Average yield: 5.5-6 tonnes per hectare	- Ministry of Agriculture & Farmers Welfare, Government of India
Fertilizer Cost Burden	- Average fertilizer cost: 30% of production cost	- Average fertilizer cost: 15-20% of production cost	- Centre for Sustainable Agricultural Intensification (CSAI) 2019 study
Government Expenditure	- No fertilizer subsidy expenditure	- INR 72,000 crore expenditure in 2021-22	- Union Budget of India

1) FERTILIZER SUBSIDY

The data presented suggests a potential positive impact of irrigation agricultural subsidies on both farmer income and crop yields in India. Average farmer income appears to have increased by 20% after the implementation of subsidies, while wheat and rice yields have seen improvements of 16.7% and 10-20% respectively. Additionally, the burden of fertilizer costs on farmers seems to have been reduced significantly. However, it's important to acknowledge limitations. This is a short-term comparison, and a more robust analysis would require data over a longer period to account for potential external factors influencing income and yield. Furthermore research is needed to find the long-term sustainability impact of these subsidies and their potential on other aspects of the agricultural sector. Despite these limitations, the initial indications suggest that fertilizer subsidies might be contributing to a rise in farmer income and crop production in India.

2) ELECTRICITY SUBSIDY

Factor	Before Subsidies (Estimated)	After Subsidies (Estimated)	Increase	Data Source
Farmer Income	- Average farmer income: INR 10,000 per month	- 10-15% increase in net income, particularly for small and marginal farmers.	10-15%	NCAER study (2015), World Bank report (2017)
Crop Yield (Water-intensive crops)	- National average yield: 3 tonnes per hectare (wheat), 5 tonnes per hectare (rice)	- 5-10% increase for crops like rice and sugarcane.	5-10%	ICRISAT study (2020), Government of India irrigation statistics
Irrigation Coverage	- National average: 60% of agricultural land irrigated	- 10-20% increase in irrigated land, especially in areas with limited rainfall.	10-20%	NSSO data
Production Costs	- Average fertilizer cost: 30% of production cost	- 10-15% reduction in irrigation costs for farmers using electric pumps.	10-15%	State Electricity Boards, CAGR (2010-2020) for agricultural tariffs

Government Expenditure	- No power subsidy expenditure for agriculture.	- Over INR 1 lakh crore allocated for agricultural power subsidies in 2023-24.	N/A	Union Budget of India

The data presented suggests that electricity subsidies for agriculture in India hold promise for improving the livelihoods of farmers and boosting agricultural production. The estimated 10-15% increase in net income, particularly for smaller farms, indicates a potential for improved financial security. Additionally, the 5-10% increase in yields for water-intensive crops like rice and sugarcane suggests a positive impact on production efficiency. Furthermore, the 10-20% rise in irrigated land coverage implies that electricity subsidies are enabling cultivation in areas previously limited by water availability. This can contribute to overall agricultural output and potentially reduce regional food insecurity, it's important to consider the long-term sustainability of these subsidies, particularly regarding the significant government expenditure involved. More research is needed to explore the impact of these subsidies on water resource management and potential unintended consequences on the environment. Overall, while the short-term picture appears positive, a comprehensive analysis is necessary to ensure the long-term viability and effectiveness of electricity subsidies in supporting a robust and sustainable agricultural sector in India.

3) IRRIGATION SUBSIDY

Factor	Before Subsidies	After Subsidies (Estimated)	Increase	Data Source
Crop Yield:	- National average yield: Wheat - 3 tonnes/ha, Rice - 5 tonnes/ha	- Wheat - 3.5-4 tonnes/ha, Rice - 5.5-6 tonnes/ha	5-10%	Ministry of Agriculture & Farmers Welfare
Water Use:	- Conventional irrigation: 800-1000 m^3/ha/season	- Drip irrigation: 400-500 m^3/ha/season	30-50%	NABARD, CSWCRTI
Fertilizer Use:	- Conventional irrigation: Higher fertilizer need due to nutrient leaching	- Drip irrigation: Increased fertilizer efficiency, potential reduction in use	10-20%	ICAR, IFFCO
Farmer Income:	- Variable income depending on yield and production cost	- Increased income due to:	15-25%	NABARD, IWMI
Government Expenditure:	- No specific subsidy for micro-irrigation	- INR 7,000 crore allocated in 2023-24	-	Union Budget of India

The data suggests irrigation subsidies, particularly those promoting water-efficient methods like drip irrigation, have the potential to improve agricultural productivity and farmer income in India. Crop yields for wheat and rice appear to have increased by 5-10%, potentially due to better water management and reduced water wastage.

Additionally, drip irrigation can significantly reduce water use (30-50%) compared to conventional methods. This not only conserves a precious resource but also translates to potential fertilizer savings (10-20%) due to increased efficiency. The estimated 15-25% increase in farmer income indicates a positive impact on livelihoods. However, it's important to acknowledge limitations. The data is based on estimates, and a more robust analysis would require considering factors like crop type, farm size, and regional variations. Additionally, the long-term sustainability of these subsidies and their potential impact on groundwater levels need further investigation. Overall, while irrigation subsidies appear promising for boosting agricultural efficiency and farmer income, a comprehensive approach that prioritizes water conservation and long-term sustainability is crucial.

In conclusion, a comprehensive analysis comparing crop yields and farmer income data from periods before and after the implementation of agricultural subsidies is crucial for evaluating program effectiveness. This analysis account for factors like the specific type of subsidy provided, the targeted crops or farm sizes, and the overall economic climate during each period. By statistically examining these trends, we can determine whether subsidies have demonstrably led to a statistically significant increase in crop production. Additionally, we can assess if these yield improvements have translated into higher net incomes for farmers, or if factors like market price fluctuations or changes in production costs have offset the potential gains.

Furthermore, incorporating qualitative data from farmer interviews and consultations with agricultural experts can provide a richer understanding of the program's impact beyond just statistical trends. Farmers' perspectives can shed light on how they utilize subsidies, any challenges they face in accessing or using them effectively, and their perceived impact on their income and production practices. Similarly, insights from agricultural experts can illuminate potential unintended consequences of subsidies, their long-term sustainability, and alternative policy approaches that might better support farmers and enhance overall agricultural productivity. Through this combined quantitative and qualitative analysis, policymakers can gain

a nuanced help us understand the effectiveness of agricultural subsidies and taking decisions on how to refine subsidy structures to create a more sustainable and prosperous agricultural sector.

3.3 PM KUSUM YOJNA: Policy by Government To Increase Farmer Income And Crop Yield For Short Term

The Pradhan Mantri Kisan Urja Suraksha evem Utthan Mahabhiyan (PM KUSUM) Scheme hasa been introduced by the Ministry of new and Renewable Vitality (MNRE) to help agriculturists in introducing solar oriented pumps, grid-connected solar based control plants, and other renewable vitality sources over the country. Through the use of their dry, uncultivable land, the initiative will provide rural land owners with a steady, ongoing stream of revenue for a 25-year period. Farmers will have a dependable source of irrigation thanks to the solar pumps, which will also save them the cost of using diesel pumps.
The details of KUSUM (Kisan Urja Suraksha evam Utthaan Mahaabhiyan), a new program to subsidize solar irrigation pumps (SIPs) for farmers with the option to sell surplus power to distribution companies (DISCOMs), were presented by Finance Minister Arun Jaitley in his 2018 budget speech (ET 2018a). KUSUM would require a 1,40,000 crore total expenditure spread over ten years, of which 48,000 crore would come from the central government.(ET 2018b)

Farmers must pay 30% of the capital cost through bank loans, contribute 10% of the cost up front, and split the remaining 60% between the Indian government and the corresponding state governments in the form of subsidies.

1. **Component A:** Entails establishing 10,000 MW of Decentralized Grid Connected Solar Power Plants on fallow or barren land.
2. **Component B** : Involves installing solar agriculture pumps worth Rs. 17.50 lakh; Individual farmers can use solar pumps to replace their diesel pumps under this component, swapping out the current diesel pumps .Using solar pumps will result in lower pollution levels in addition to annual irrigation expenditures of about Rs. 50,000 (for a 5 HP pump). 22lakh farmers in off-grid areas—where there is no electric power source for irrigation—will profit from this component. Additionally, it will contribute to improving the living standards and income of farmers. This component will also address

groups of farmers, such as Water User Associations, and community/cluster-based irrigation schemes.

However, small and marginal farmers would be given preference. Farmers that use micro irrigation will be given preference in order to reduce the amount of water used for irrigation,and Under the plan, solar pumps with capacities greater than 7.5 HP may also be built; however, the CFA will only be applicable to solar pumps with 7.5 HP capacities. Pumps are often only operated for a short time—roughly 150 days a year—so by employing a Universal Solar Pump Controller (USPC), the installed solar capacity can be used for the remaining days of the year.

Component C : Involves solarizing ten lakh Grid Connected Agriculture Pumps.

With all three parts working together, the plan seeks to increase solar capacity by 25,750 MW. Including service fees to state implementing agencies, the scheme's t otal federal financial contribution comes to Rs. 34,422 crore. A portion of the goverment financial support, or Rs. 10,000 Cr., is given through GBS, and the remaining Rs. 24,422 Cr. is raised by IREDA through Government Guarantee Bonds, or EBRs. Component-C of the PM KUSUM Scheme now includes solarization of agricultural feeders as an option.

If feeders have already been divided for agricultural use, they can be solarized under the program by building large enough solar power plants. The Indian government would finance the solarization of agricultural feeders with a 30% subsidy. As a result, both the expenditure of capital and power will decrease. Agriculturist will receive free or at a tariff set by their state for dependable, daytime power for irrigation.

3.4 Benefits of PM KUSUM

1. Upgrading farmers' wage is one of the most imperative approach needs of the Government. PM-KUSUM will serve this objective by supplanting tall taken a toll diesel with less costly solar based vitality beneath Component-B and
by empowering ranchers to offer overflow solar oriented control at a pre-determined rate to DISCOMS beneath Component-C.

2. As sun based control is cheaper than diesel off-grid, solar oriented pumps will decrease the fetched of water system significantly. This will increase farmers' revenue by enabling them to cultivate more crops—even those that require a lot of water—at a reduced cost.
3. Electric pumps are the most common type in Punjab, and the agriculture sector receives an annual power subsidy of almost Rs. 7000 crore. Therefore, the amount of subsidies required will be greatly reduced when agriculture feeders are solarized.
4. Selling electricity generated by solar plants to the distribution companies will also increase farmers' revenue.
5. De-Dieselization Of Cultivate Segment By Supplanting Diesel Pumps With Sun oriented Pumps Ranchers have been requesting substitution of diesel pumps by electric pumps as the previous one is exorbitant to run. By supplanting diesel pumps with sun powered pumps and boards, the agriculturists will get cheaper and more dependable control for water system coming about reserve funds in diesel taken a toll.
6. The fact that the irrigation cycle and the sun cycle coincide is the most crucial aspect of the solar pump. Thus, farmers won't need to stay up late irrigating their fields because they would be guaranteed irrigation for at least six hours throughout the day.

3.5 PROGRESS UPDATE OF PM-KUSUM ALL OVER INDIA

1. 4.9 GW Capacity Distributed beneath Component A with 63.95 MW introduced Capacity.
2. 8.07 lakhs Pumps Endorsed beneath Component B with 1.37 lakh introduced numbers
3. 25.43 lakhs Pumps Authorized beneath Component C (IPS + FLS) with 1056 solarised numbers beneath IPS .Conspire expanded till 31.03.2026

3.6 CHALLENGES IN PM-KUSUM YOJNA

Government Delays:

State Approval Delays: Bureaucracy and slow decision-making at the state government level are hindering project approval.

COVID-19 Impact: Limited access to installation sites due to the pandemic has caused delays.

Financial Constraints:

Insufficient State Funds: States lack the necessary financial resources to contribute their share of the project cost.

Component A Financing Issues: Difficulties associated with securing financing under a specific project component (Component A) are causing delays.

Rising Component Costs: Increased prices for materials like steel and glass, along with GST (Goods and Services Tax), are making project implementation more expensive.

Logistical Challenges:

Land Availability Issues: Lack of readily available land near substations in some states is creating obstacles.

Unmetered Connections: The absence of metered connections in certain areas has caused delays (mitigated by a policy relaxation).

Farmer Participation:

Farmer Investment Concerns: Difficulty convincing farmers to invest in solar power solutions under a specific component (Component C - presumably Individual Productive Solutions).

3.7 PM-KUSUM Scheme: Positive Anecdotal Evidence from Farmers

This section presents anecdotal evidence from three farmers who participated in the PM-KUSUM Yojana solar pump program. Their experiences highlight potential benefits of the scheme:

Shri Raghu Nath (Bhatinda, Punjab): The provision of a 7.5 HP solar pump facilitated hassle-free daytime irrigation, reducing reliance on diesel and enabling timely irrigation practices. He anticipates this will lead to increased crop production.

Smt. Vijyaben Vinubhai Asodariya (Junagarh, Gujarat): The installation of a solar pump eliminated electricity bills associated with irrigation. The pump's operation for 8-10 hours per day reportedly increased agricultural yield and revenue.

Shri G. Arun (Cuddalore, Tamil Nadu): Previously unable to afford diesel irrigation for his 1.61-hectare land, he primarily cultivated rain-fed pulses. After receiving a solar pump, he

transitioned to cultivating bananas, expecting improved yields. Notably, he has also implemented a drip irrigation system alongside the solar pump.

These positive experiences suggest the PM-KUSUM scheme has the potential to improve irrigation access, reduce operational costs, and contribute to higher agricultural yields for participating farmers.

CHAPTER 4

4.1 CONCLUSION

Unveiling the Impact of Agricultural Subsidies:

In this research project, we delved into the multifaceted realm of evaluating the effectiveness of agricultural subsidies on farmers' income and crop yield. Through a comprehensive literature review, we gained insights into the complexities surrounding this topic, recognizing the varied perspectives and findings from existing studies.Employing a rigorous research methodology, including data collection methods and analysis, we focus on empirical understanding of the impact of agricultural subsidies in India. Our study focused on the distribution of irrigation, electricity, and fertilizer subsidies, examining the trends in total expenditure from 2015-16 to 2022-23.

The comparison of increment in crop yield and farmers' income before and after the implementation of agricultural subsidies revealed noteworthy patterns. While subsidies such as irrigation, electricity, and fertilizer have shown potential in enhancing crop yield and income, the magnitude of their impact varied across regions and agricultural practices.

Furthermore, our detailed analysis of the Pradhan Mantri Kusum Yojna shed light on its role in augmenting farmers' income and addressing irrigation challenges. We discussed the benefits and challenges associated with PM-kusum yojna , highlighting its significance in promoting sustainable agricultural practices and rural development.

Overall, our research underscores the importance of carefully evaluating the design, targeting mechanisms, and outcomes of agricultural subsidies to maximize their effectiveness. Moving

forward, policymakers and stakeholders must prioritize evidence-based decision-making, incorporating insights from interdisciplinary research and stakeholder consultations.

As India continues its journey towards agricultural transformation and rural prosperity, initiatives like PM-KUSUM serve as crucial catalysts for empowering farmers and ensuring food security. However, addressing the inherent challenges and ensuring equitable access to subsidies remain imperative for realizing their full potential in improving farmers' livelihoods and fostering inclusive growth.

By contributing empirical evidence and critical insights to the discourse on agricultural subsidies, this research project aims to inform policy interventions and initiatives aimed at promoting sustainable agriculture and enhancing farmers' well-being in India.

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