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AGRICULTURAL SUBSIDIES: CURSE OR BOON? -A REVIEW

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ABSTRACT

In the literature, analysis of agricultural policy instruments captures economic or political interests indicating agricultural subsidies serve farmers by making unaffordable inputs inexpensive. However, there are positive and negative sides of the agricultural subsidy. The novelty of this paper is to review the existing literature and provide a conceptual framework on agricultural subsidies with a particular focus on livestock subsidies. The review summarises the evidence of past literature by first classifying the components on which subsidies were given, followed by establishing the relation between investment and subsidies, afterwards, its effect on farm households, and lastly on the long-term impact of subsidies. In India, subsidies safeguard agricultural food security and national security; aide farmers, yet a substantial portion of it supports the business and farmers in wealthier regions, causing variation in interstate agricultural growth through inequitable distribution. In the long run, subsidies will hurt sustainable development unless targeted appropriately. Ironically, the direct effect of subsidies on agriculture was positive which brought food sufficiency and indirectly it decelerated the investment in agriculture. In nutshell, the positive effect of subsidies cannot sustain; therefore, reinvestment in agriculture is encouraged.

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INTRODUCTION

Agricultural subsidies, at present, are a highly volatile topic. Input subsidies continue fiercely contested, the controversy between those who view subsidies as vital to enhancing agricultural production and others who think market-oriented laws (Mockshell and Birner, 2020) or investment in agriculture should be made. The agricultural sector acts as a bulwark in ensuring food security and national security in tandem. Subsidies are required to entice farmers to embrace the new technology. New technologies are perceived with uncertainty by farmers. To explore new technology means to assure farmers, and subsidies are such an instrument of assurance. Proper management of the agriculture sector is critical to India's national economy because of rapid urbanization and population pressure. Around 12.7% of India's population (about 172 million people) remain impoverished and backward. India's effort in line with United Nations Sustainable Development Goal to cut poverty by 2030 is a tremendous challenge. Agriculture is a sector in which the poor participate, and agricultural subsidies were a major part of the budget in poor economies since the 1960s and 1970s, supporting farmers to buy costly inputs. In the union budget of India under the agriculture sector- various sub-sectors are included, for example, crop husbandry, animal husbandry, soil and water conservation, dairy development, food, storage

and warehousing, research and education, plantation, fishery, forestry and wildlife, financial institutions, and other agriculture programmes. Agriculture has dwindled in India as a share of the overall GDP, but it remains crucial to providing many jobs to the workforce (Manogna and Mishra, 2020). In agriculture growth in yield and labour productivity link to poverty reduction (Bathla *et al.*, 2020). Food grain yield levels have stagnated in the initial green revolution states of Uttar Pradesh, Punjab, and Haryana due to climate change and market instability. In major open markets, the market pricing has been mostly unprofitable (Bathla and Hussain, 2021). Though, agriculture employs roughly 42% of the workforce, 70% of rural households derive a livelihood, ironically, it employs an extensive section of the rural population, which is a major barrier to reducing poverty (Bathla *et al.*, 2020). However, poverty reduction from 29.6 to 12.7% of the rural population has primarily benefited from the increased jobs in the agriculture and the service sector (Datt *et al.*, 2016). Studies in the past have claimed that an increase in the use of inputs leads to increased productivity in the developing world (Buringh and Dudal, 1987); (Gordon, 2000); (Hazell *et al.*, 2010); (Ajah and Nmadu, 2012). Subsidies aimed at providing inputs at a lower cost than the market price, increasing their adoption and increasing productivity, profitability, and economic growth. Confirmatory results (Sharma, 1982) in 1970-71 to 1981-82 showed agricultural subsidies affected the national income and agriculture production positively. On the other hand, agricultural subsidies led to enormous inter-state disparity (Bathla *et al.*, 2020; Gupta, 1984).

Besides, from a macroeconomic perspective allocating a considerable amount to subsidies are increasingly ineffective and an inefficient policy instrument in the long run. Empirical studies at the time showed a range of negative impacts associated with their use, for example, cost control issues, inputs being stolen or used by unintended recipients(diversion), overuse of inputs and capital, unequal benefit to the wealthy and distortionary effects inhibiting private investment in agricultural services (Ellis, 1992); (Morris *et al.*, 2007) (Timmer *et al.*, 2009). Besides, subsidies have become unsustainable (Sharma, 1982).

In order to have a better understanding of agricultural subsidies, especially in the livestock sector as the information was missing therefore the present paper aims to review evidence of the past studies to present a conceptual framework. Based on this backdrop, therefore, the following research questions were formulated.

Research Questions

1) How subsidies are identified, classified and what is the extent of subsidies?

2) What is the relationship between subsidies and investment?

3) What is the effect of the subsidy on the production and demand of farm household?

4) What is the impact of agricultural subsidies?

METHODOLOGY

Through several studies on subsidies, specifically their impact on agriculture worldwide, the authors filtered the reviews to serve research questions. We have included India and also unrestricted the analysis to any particular country and reviewed the studies globally to conclude subsidies having widespread effects. However, missing certain essential pieces of literature could be possible due to the search's enormity—keywords used on "Google" and "Google Scholar" for this purpose. The keywords used here were 'impact of agricultural subsidies, investment and subsidies, 'effect on demand of agricultural subsidies' and 'overall effect on farm households'.

Before going for the literature review, the exclusion and inclusion criteria was decided. The effect of subsidies on other components were excluded, and only the effect on the agricultural households was included. After collecting the relevant papers, conference proceedings, book chapters, newspaper articles, themes and sub-topics for the review were decided. Search for review on the selected theme carried. A systematic, holistic approach followed to review the direct and indirect effects of subsidies.

Identification, classification, and extent of subsidies

To become food sufficient, subsidy schemes were started in agriculture to make inputs affordable to small and marginal farmers. The authors identified the extent of subsidies allocated to the agriculture sector under different components through primary and secondary sources and indicated the extent of subsidies going to these components. Further, literature reviews on beneficiaries claimed improper targeting of subsidies.

Identification and Classification

In 2002, the Food and Agriculture Organization (FAO) issued a report on subsidies in the fishing industry. This report assisted in studying all levels of fisheries subsidies. It attempted to provide a flexible technical tool to meet different study needs. Consequently, the guide recommends classifying fisheries subsidies into four broad categories, e.g.:

1. Direct financial transfers
2. Services and indirect financial transfers
3. Interventions with different short and long-term effects
4. Lack of intervention

In India, in livestock production, structural changes are supported by institutional reforms (Chandel *et al.*, 2019). Yet, only a few studies on the livestock despite it being of great importance for the farm sector. Globally, investment subsidy is the component widely identified in studies. For example, in China, subsidies reduce environmental problems in the villages by drawing farmers away from backyard production. Chinese farmers with livestock in designated cities are given government subsidies. Also, in China, state-owned farms provided subsidies to establish and ensure the supply of livestock products to the urban population to maintain stability (Bingsheng, 2002). Similarly, in Vietnam, fifteen subsidies were identified relevant to local and imported breeds, out of which two supported the production, four loan subsidy types alongside limited implicit subsidies for artificial insemination, water use, and waste treatment (Drucker *et al.*, 2006). In insurance, India is only covering 6% of animal heads. Despite the insurance subsidies, the poor cannot afford to pay in full. The identified insurance subsidy is only for two animals per beneficiary. A limit was put on the number and quality of animals and the length of insurance cover, causing poor performance. Insurance providers should promote flexible policies and encourage private firms to participate (Birthal and Taneja, 2012). Like China, India can also perhaps promote urban livestock keeping with subsidy attraction.

Extent

In India, direct subsidies given to farmers and in the past number of subsidies quantified. Subsidies impact agricultural development at the micro and macro-level, for example, Maharashtra identified four subsidy schemes according to their financial and direct coverage to agricultural development. The beneficiary group had higher cropping intensity as well as the input intensity. A positive relationship exists between subsidy and agricultural development (Deshpande and Reddy, 1992). Yet studies are conducted to find out if subsidy in India is a boon or curse? Although subsidies are an essential policy tool, they depict negative taxation. For example, in fertilizer, a significant part of fertilizer subsidies was going to the industries. Therefore, subsidies are indeed substantial, but instead of removing subsidies, adjustments in taxation policies are needed (Shah, 1986). In the case of irrigation water, electricity, fertilizer and credit during the 1980s, input subsidies grew at a much higher rate than expenditure on agriculture. Among various subsidies, electricity subsidy exhibited the highest growth rate (19.89 per cent per annum at constant prices) between 1980-81 and 1992-93. Electricity subsidy closely followed by fertilizer subsidy, which marked a growth rate of 16.37 per cent per annum during the same period. The interstate disparity observed as western region exhibited the highest share of input subsidies of all subsidies followed by northern part and the least for the eastern region. Gulati (1989) while findings of the study conducted between 1980-81 to 2008-09 on agriculture subsidies of fertilizers, electricity, irrigation (canal water), seeds, machinery showed at the national level and zone level, confirmation of unequal distribution of total subsidies. Yet in 2009, unlike previously north zone accounted for the highest share followed by west zone and least was found for east zone. Total subsidies (fertilizers, electricity and irrigation) were higher than the gross cropped area (GCA). At the zone level, a negative relationship between GCA and total subsidies and percentage share of fertilizer subsidies was maximum (38.41 in 1980-81 and 37.63 in 1985-86), whereas during 1990-91 to 2000-01, the percentage share of electricity subsidies was maximum and again in 2008-09 fertilizers subsidies got major percentage share 87.26 per cent in total subsidies (Kaur, 2012). Until the early 2000s, fertilizer subsidies were smaller than power subsidies, but they climbed dramatically in later years, finally surpassing the amount of the electricity subsidy (Bathla *et al.*, 2020).

Subsidies volume and composition received by both the central and state governments when measured in 1987-88 revealed subsidies accounted for 15% of the GDP. The

total volume of subsidies was substantial and inequitably distributed, with prosperous states getting more share. Every state had a lower percentage of subsidies than their respective rural populations except Haryana (Mundle and Rao, 1991). Fertilizer, power, and canal irrigation subsidies estimated from 1980-81 to 1995-96. The amount increased from 1980 to 1995 with a total subsidy of Rs.1437 crores to Rs.25094 crores in 1980 and 1995. Also, the quantum of subsidies was higher in the electricity component, which had 54 per cent in total subsidies. In terms of per-unit subsidies, the canal irrigation component was maximum, followed by electricity and fertilizer (Acharya, 2001).

Further, central budgetary subsidies in 1998-99 were Rs. 79828 crores, which was 4.59% of GDP, at 2003 market prices, and constituting 53.40 per cent of the net revenue receipts at the centre (Srivastava *et al.*, 2003). Unrecovered costs on economic services of animal husbandry and dairy development were to the extent of 138 crores in 1998-99, which was 2.95% of the total subsidy in crop husbandry (Srivastava *et al.*, 2003). Presently, agricultural subsidies fund 2.5% of Indian GDP and 33% of subsidies go towards fertilizer and electricity. When fertilizer and electricity subsidies taken into consideration, the deadweight loss created is over 50%. The other two-thirds are on agricultural production and sales. If these input subsidies were phased out and replaced with additional production and sales subsidies, real farm income would increase by approximately 4 per cent with overall welfare (Dixon *et al.*, 2020).

In terms of input subsidy targeting, macro-level results on the distribution of agricultural subsidies to Scheduled Caste/Scheduled Tribe farmers in Maharashtra state indicated a declining trend of subsidies in the agriculture sector. The state accounted for 12% of India's total subsidies on fertilizers, irrigation and electricity. For SC/ST farmers, subsidy on employment guarantee scheme accounted for the highest share (30 per cent) followed by Special component scheme (12-14%). Insurance subsidies were given to farmers, and a large percentage of the premium was shared by both central and state governments.

Insurance subsidies were being provided to the farmers to make insurance affordable to the large farming community who are small and marginal farmers (Narayanamoorthy and Kalamkar, 2003). Surprisingly, livestock and sheep insurance accounted for only 0.01 per cent (around Rs 8 crores) of total expenditure on insurance schemes of Rs 771 crores in 2008-09 (Narayanamoorthy and Kalamkar, 2003).

Various working groups appointed by the Government of India (GoI) estimated the direct allocation of subsidies for multiple uses before starting the five-year plans in animal husbandry and dairying. One report of (GOI, 2006) indicated that in the 11th five-year plan, the interest subsidy provided to the extent of Rs. 550 crores to lend interest-free loan for the purchase of milk processing equipment. Furthermore, in the twelfth five-year plan, the working group (GOI, 2012) earmarked capital subsidy to private dairies to the extent of Rs 4000 crores to promote the processing of milk and milk products. The capital subsidy is provided to private dairies to the extent of 20 per cent of the investment to a ceiling of rupees one crore. While in case of agriculture per hectare, estimates of subsidies in agriculture mainly on fertilizers, electricity and irrigation estimated to be $ 35 in Japan followed by the USA ($ 32), China ($ 30), whereas it was only $14 per hectare of cropped area in India during 2008-09 (Salunkhe and Deshmush, 2014).

Unequal distribution of agricultural subsidies existed globally. Asia spends more than the rest of the world. Approximately 94 per cent of subsidies were spent by Asia, Europe, and North America—leaving only 6 per cent for the rest of the world. Subsidies in the top 21 countries producing food totalled $486 billion. In China, subsidies paid to farmers constituted an unparalleled $165 billion. Significant subsidies provided by Japan ($65 billion), Indonesia ($28 billion), and South Korea ($20 billion). Common Agricultural Policy (CAP) subsidies which were $50 billion, accounted for roughly 44 per cent of the entire budget of the European Union (EU) in 2011. EU also provides price supports, in which governments keep domestic crop prices artificially high to give farmers a further incentive at the expense of the consumer. Including these price supports, the EU spent over $106 billion on agricultural subsidies in total. Direct payments are the cornerstone of the EU CAP and account for $40 billion of its $50 billion budget. North America provides almost $45 billion in subsidies, with the United States, spending just over $30 billion and Canada and Mexico spending $7.5 billion and $7 billion, respectively (OECD, 2013).

Similarly, to boost the cattle population and close meat deficiency in Turkey, the Turkish government granted calf subsidies. Indirectly, the calf subsidy aimed at

shortening the calving period and targeting one calf in a year, thereby increasing production (USDA, 2016). The targeted extent of livestock subsidy in Turkey was 27.59 per cent ($1.07 billion in total agriculture subsidy of $3.87 billion), and the share of calf subsidy was as high as 31.25 per cent in total livestock subsidy (USDA, 2016). The livestock sector continues to be a significant beneficiary of direct payments, particularly in the grazing livestock sector, where direct payments represent approximately 55% of income for EU farmers as a whole (Baldock and Mottershead, 2017).

Relationship between subsidies and investment

More than two decades of inefficient input subsidies have essentially cut off new investment, preventing agricultural growth and reducing poverty (Haq, 2018). For a long, there were agreements and disagreements regarding declining investment and thereby deceleration of agricultural development. Among the various reasons for this deceleration, one such reason is increasing subsidies.

Subsidy syndrome study in India Gulati and Sharma (1995) examined the rationale behind subsidizing agriculture. Subsidies provided four major inputs in agriculture, i.e., fertilizers, irrigation, electricity, and credit. Input subsidies inflicted a heavy burden on the fiscal imbalance of the nation. The immediate impact of very high growth in input subsidies was that investment in agriculture remained stagnant during the 1980s. The country attained food self-sufficiency in the 1980s and even became a net exporter of rice by the 2000s, already looming large are issues of overexploitation of natural resources, rising input prices, and a lack of crop diversification. Farmers from Bihar, Jharkhand, and Odisha could not keep up with the early adopters' farmers of northern states of Punjab, Haryana, and Uttar Pradesh in agricultural technology adoption. In addition, increased input prices, small farm holdings, low investments, and rainfall shocks impair productivity and cause income disparity in these states. While agricultural output has increased dramatically in terms of land and yield, rural poverty decelerated in India. Yet, it faces new challenges like technology fatigue. Therefore, an attenuating growth rate in crop productivity, price volatility due to a weakening of the price support system, and an absence of risk sharing due to inefficiency in the marketing system are all seen as critical causes, among others (Bathla *et al.*, 2020). Subsidies on key inputs lost their rationale and crowded out productive investments, damaging the environment, accentuating in-equity and promoting inefficient cropping patterns; for instance, paddy cultivation is unsuitable in Punjab farms.

Evidence shows that to solve these problems, reforms to re-prioritizing government spending, improving institutions and governance are required. As green revolution success was due to a large number of investments, but gradually the investment decreased, and the amount of expenditure on subsidy increased. Spending government money on input subsidies was a poor choice compared to spending on investments (Fan *et al.*, 2008). Currently, investment in agriculture is dismal, as agriculture receives barely 3% of overall corporate investment. Private investment, primarily by farm households, accounts for 82% of total investment in agriculture and related sectors. It is evident that public investment in agriculture and irrigation is insufficient, and increasing subsidies is not an acceptable solution. Land productivity, consumption varies, irrigation depend on borewell and tanks than on canals built by the government (Bathla *et al.*, 2020). More such contradictory results indicate agricultural investment has been falling and had shown a downward trend, while subsidies for agriculture had shown a rising trend. Rising grants implied that resources diverted towards subsidies, and fewer resources were available for operational purposes. At the policy level decision is required to shift the expenditure from subsidies to investment to lift Indian agriculture from stagnation (Jha, 2007; Qureshi *et al.*, 2015).

On the one hand, public expenditure on agriculture and irrigation grew at nearly 4 per cent per annum while that on input subsidy increased at 6.53 per cent per annum across 17 states from 1981-82 to 2013-14. Agricultural income can be increased with more education, agricultural research & development, health, and energy expenditure because these brought high returns. (Bathla et al., 2017). On the other hand, low capital formation in the irrigation and agriculture sectors will almost certainly stifle future agricultural growth. In response, the government must decide between two options: increasing government expenditure or providing agricultural subsidies to encourage growth. A cess was imposed on various products in the Union Budget for 2021-22 to fund the creation of the Agriculture Infrastructure and

Development Cess (AIDC). The cess is estimated to generate Rs 30,000 crore in revenue per year. If the government invests this much in agricultural infrastructure, the investment-to-subsidy ratio should improve (Bathla and Hussain, 2021).

Subsidy effect on production and farm household demand

To understand the subsidies effect on farm household production and demand, effect classified into primary outcomes and secondary outcomes. Primary outcomes were classified as main outcomes on production and income, while secondary outcomes were the welfare effects of subsidies viz., household labour and changes occurring because of primary outcomes.

Primary outcomes

Increasing productivity and efficiency in resource-poor condition, especially in developing countries, constitutes an integral part of policy statements. Since subsidies are an essential policy instrument, their implications on-farm efficiency and technical change are thereby important. Evidence in technical efficiency and technical change at the farm-level in England and Wales explored effects of subsidy reforms and found reform had a positive effect on production frontiers for cereals, poultry, general cropping and mixed farms and adverse effect on dairy sheep, and beef farms. More efficient farms derived a lower proportion of their gross margin from subsidies than less efficient farms, but the opposite was true for dairy and beef farms (Hadley, 2006). In Maharashtra state of India, mango cultivation, showed a higher benefit-cost ratio, net present worth, and internal rate of return under subsidy conditions (Thorat *et al.*, 1986). Similarly, Haryana state indicated increased risk-bearing ability, creditworthiness and positive effect on income (Pandey and Khanna, 1980) of small and marginal farmers (Garg and Dhaliwal, 1982), (Yadav *et al.*, 1982). The fertilizer subsidy given to farmers had 52% of it going to fertilizer industries (Gulati, 1990). Farmers were not net taxed; instead, were net subsidized. Claims reported fertilizer subsidies would reduce crop productivity, input intensity and distort technological progress (Reddy and Deshpande, 1992). In irrigation, subsidies provided for drip irrigation technology. National sample survey data indicated that the provision of subsidies led to an increase in technology adoption, which otherwise would have been a costly affair (Narayanamoorthy, 1996). Input subsidies reached farmers who produced surplus or were large farmers and net purchasers of food grains. If at the national and household level, subsidies removal will reduce farmers' income and decrease the amount of investment. Also, farmers in India are net buyers and reducing subsidies will affect small and marginal farmers, which constituted around 59 per cent of the population of the farming community. Further, reducing subsidy will lead to increased cost of production, and simply hiking product prices will not lead to realizing enough profit for farmers. If prices of food grains increased, it will affect small farmers and will also increase wages. Retention of food and input subsidies with equitable implementation is an essential policy instrument (Acharya, 2000). For example, an improved farmer assistance programme can serve as a road map for lowering government involvement in procurement and providing price support to farmers (Alderman *et al.*, 2019). Pricing communicates products availability. If a commodity becomes scarce, its price will rise. Therefore, efficient usage should be incentivized and thereby raising demand. For example, if water prices rise, as supply falls, people will have the incentive to use it with more care through water conservation. Water guzzling crops like paddy will be uncultivated in states like Punjab if irrigation, fertilizer and electricity are unsubsidized.

Meanwhile, the 2020 revised estimate for fertilizer subsidies (another big resource guzzler) is Rs 70,000 crore, compared to a budget estimate (BE) of Rs 80,000 crore. The BE has set at Rs 70,000 crore for the financial year 2021 (Gupta *et al.*, 2020). The urea subsidy is worth ₹56,000 crores, while the remaining subsidy money is on the other fertilizers. Approximately 15% of 25 lakh ton of fertilizer use in Punjab (Nibber, 2019). In Andhra Pradesh, the use of non-subsidized zinc is high. On the free provision of micronutrients, farmers may have found increased demand, but subsidies have only resulted in unnecessary public costs by becoming a burden on extension staff (Gupta *et al.*, 2020). There is concern that India's agricultural input support programme is unsustainable because of the subsidies given to farmers (Gupta, 2020).

Secondary Outcomes

The Kansas government programs in form of payments reduce the off-farm work by providing additional source

of income to farmers. Decreasing these payments may lead to increasing off farm employment. In addition, reduction of direct payments may increase price and income volatility resulting a negligence of off farm employment issues in farm policy debates. Thus, necessitating greater role of extension education and research programs that address off-farm employment issues (Mishra and Goodwin, 1997).

In U.S farm operators, government subsidies on off farm labour participation result were such that it declined off farm work, as the payment increased. It also had positive effect on working farm hours (Ahearn, et al. (2005). The untargeted input subsidies benefitted mostly the large farmers, as the price support for food crops harmed net buyers of food, often the poorest farm and non-farm households. In terms of quality of life, government payment reduces the time allocated to leisure and it increased the amount of time devoted to on farm work resulting in positive and significant effect on farm household income (Dewbre and Mishra, 2007)

While in case of Sweden firms, capital subsidies and performance of the firms results revealed a positive correlation between subsidies, capital and labour. More subsidies if granted to a firm, makes it more inefficient. However, subsidization gave rise to allocative inefficiencies and posed a threat to utilize their full potential. Still, growth through subsidization can be achieved mainly by using more inputs but not by improving their usage (Bergström, 1998). Livestock feed subsidies in Mexico brought tax to the state. In the region, nonsubsidized producers lose and local subsidized producers gain. The feed subsidies led to increase in supply of beef calves, prices of calves reduced and the federal tax cost was almost equal to narrowly defined within-region welfare gains. However, social burden of feed subsidies was larger than payments. The feed subsidy program payments resulted in small national net social gain and the welfare effects were unevenly distributed (Skaggs and Falk, 1998)

In Norway, econometric analysis of the effects of subsidies on farm production revealed if subsidy on intermediate inputs was increased by 1%, the farmers increased their demand for intermediate inputs by 1.03%, resulting, decline in income from farming. Also, if the subsidy on outputs was increased by 1% the farmers increased their demand for intermediate inputs by 0.48% and increased labour use by 0.35%. As a result, the output quantity increased by 0.17 per cent and income from farming increased by 1.02 per cent of gross revenue (Henningsen *et al.*, 2009).

In Malawi, subsidized fertilizer had a significant negative impact on farmers' commercial fertilizer purchases. Greater quantities of subsidized fertilizer went to households with higher assets and more land. Women headed household received disproportionately less subsidized fertilizer, while households head who lived in the village for a relatively long time received significantly more subsidized fertilizer (Ricker-Gilbert *et al.*, 2011). In Malawi in another study negative relation between fertilizer prices and fertilizer use was observed. Policy driven interventions can lower the costs of inputs and can affect both inputs and outputs (Komarek *et al.*, 2017). While contradictory results were obtained on impact of fertilizer subsidy program in Malawi. Although subsidized fertilizer had positive effect on food security however, its effect was heterogeneous across population. And these effects were not large to completely eradicate food insecurity among poor households. This necessitates promoting complementary policy interventions to subsidized fertilizer to achieve food and income security. Farm input subsidy programs could be beneficial for the improvement of food security, particularly of larger food crop producers, but such programs are less useful when the main policy objective is to decrease poverty (Sibande *et al.*, 2017). Economy wide effects of input subsidies in Malawi showed under subsidy program, supply response of each household group was heterogenous. Relaxing credit constraint and reducing transaction costs increased supply response to input subsidies. Combining input subsidies with credit arrangements for small holders reduced transaction costs and had indirect effects that benefitted non-targeted poor (Skjeflo and Holden, 2014).

Evidence from European Union claimed that negative subsidies effect on the farm productivity as they distort the production structure of farms leading to allocative inefficiency. Coupling subsidies distort farm behaviour leading to productivity losses. Decoupled payments were less distortive and it enhances productivity (Rizov *et al.*, 2013). In India, in livestock sector though veterinary services were supposed to give basic drugs and vaccines free of charge; however, these subsidies did not reach the targeted individuals. In reality, free services were limited to prescription by veterinarians. Moreover, farmers had to bear cost of medicines and vaccines because government dispensaries and service centres

lack the budget to store drugs. Thus, subsidies at farm level are highly untargeted ones and thus small and marginal farmers suffer a lot (Leitch *et al.*, 2014).

In case of food crops, market price support had small welfare effects on household and benefits concentrated mainly to large farm households. While for cash crops, market interventions raising its price did not hurt rural consumers. Market price support for livestock products had similar results as that of food crops hurting the net buyers. Price support generate welfare gains mostly to large farmers who are net sellers as well. Untargeted cash transfer leads to rural income inequality. The input subsidies mostly benefitted farmers who used inputs often the large farmers. Direct payments increase short term income of farmers, while public investments had long term pay-offs (Jonasson *et al.*, 2014).

Impact of Agricultural Subsidies

On farmers

In different studies impact of subsidies on the distributional aspect was observed (Sirohi, 1984; Patel, 1988; Gulati, 1991). Authors found that benefits of (irrigation, fertilizer, electricity and credit) subsidies were mainly limited to large and medium farmers. The plausible reason behind this was the high use of inputs by these farmers. In Maharashtra, subsidies failed to reach the intended targets. A large part of subsidies went to industries. Beneficiary farmers had high cropping intensity. The cropping pattern had changed after receiving subsidies, and the change was in favour of cash crops. Subsidies helped farmers generate additional income (Deshpande and Reddy, 1992).

While contradictory results indicated (Sharma, 2012), larger farmers applied less fertilizer than smaller or marginal farmers (Sirohi, 1984). With procurement prices and government intervention through product market and impact on income distribution, the increased use of fertilizers due to subsidies has led to food-sufficiency. In some cases, too much usage has hurt productivity. We must limit these subsidies while also protecting tenant cultivators, who cultivate for themselves, and thus high fertilizer price can cause a loss in their income (Sharma,2012). Similar results observed on fertilizer subsidies in India; as a percentage of GDP, fertilizer subsidy represented an increase from 0.85 per cent in 1990-91 to 1.52 per cent in 2008-09. Small and marginal farmers had a larger share in fertilizer subsidy than their share in cultivated area. The general perception that about one-third of fertilizer subsidy goes to the fertilizer industry is misleading (Sharma, 2012).

On one side, subsidized finance and government subsidies for purchasing machinery encourages farmers to produce more, thus positively affecting farming (Salunkhe and Deshmush, 2014). while on the other, many farmers in India have committed suicide. From 1991 to 2007, 17,306 farmers committed suicide. Often monsoon failure is blamed for such suicides in India. Monsoon failure, drought and price increase can start a cycle of problems. Indian farmers have committed suicide because of money lenders, intermediaries, and other financiers (Gajbhiye *et al.*, 2020). Another issue is that with market reforms, India's programme has fallen short (Lele and Goswami, 2020) leading to the growing belief that the government should continue with agricultural subsidies because, like elsewhere, farming in India is risky. Therefore, subsidies positively influence food grain production; however, markets can be made smarter by better targeting (Chirwa and Dorward, 2013).

On Sustainability

Higher investments in the agricultural sector need large scale price and institutional reforms to relieve the pressure of subsidies on the exchequer. However, as differences in subsidies across states exist, the policy instruments did not narrow these gaps. Authors (Gupta, 1987; Bhatia, 1987; Bhattacharya, 1989; Asha, 1986) (Bhatia, 1987) have analysed the increasing burden of subsidies and their long-term impact on budgets.

To sustain long-term growth in agricultural production and provide a long-term solution to poverty reduction, the government should cut subsidies on fertilizer, irrigation, power and credit, increase investments in agricultural research and development, rural, infrastructure and education (Fan *et al.*, 2008). However, the direct positive effect of subsidies on agriculture is observed and is unsustainable for long term growth as indirectly it decelerates agriculture investment.

India's agricultural input support programme is unsustainable because of the subsidies given to farmers (Gupta, 2020). In New Zealand, a study on agricultural subsidy reforms and their implications for sustainable development found that the elimination of agricultural subsidies had sustainable development effects. In the case of livestock, economic and environmental impacts were positive, but the removal of subsidies led to a

reduction of sheep flock with additional benefits of erosion control, water quality and methane emissions. Removal of agricultural subsidies was a critical step towards sustainability, indicating the environmentally harmful effects of subsidies. Environmental, social and economic policies are necessary for sustainability, not only for agriculture but also economy (Vitalis, 2007).

Furthermore, feed subsidies increase the financial burden on the economy in the livestock sector due to rising world cereal prices. Removal of subsidies led farmers unable to maintain their herd of cattle, and they sold livestock. The rationale behind removing the feed subsidy claimed by the government was diverting labour and absorbing farmers to other profitable sectors. But the lack of skill among livestock owners was probably neglected. Alternatives for sustaining and efficiently developing the livestock sector require reskilling farmers, setting up cooperatives, rangeland management, diversification of income, domestic fodder production and reforms in infrastructure (Jetter, 2008), which is equally applicable to the Indian livestock sector as well. The subsidy has an impact on sustainability. For example, electricity and water provision as a subsidy or free will be less valued thereby wasted. Farmers will cultivate high water requirement crops with water subsidy, even though such crops will further deplete the already scarce water resources. If water subsidy is discontinued, farmers will practice crop selection to fit the area's water supply best. Similarly, fertilizer and pesticide subsidies result in resources depletion and overuse, causing environmental harm. Subsidies provide an incentive for the wasteful use of resources. In Punjab, the government has introduced a programme called "*paani bachao paisa kamao*", which literally means “save water, make money” to which monetary reward is given to use less energy. This project can promote energy savings and assist in arresting groundwater depletion. Similarly, Haryana offers INR 7,000 per acre to rice farmers to expand into the maize crop (Bathla and Hussain, 2021).

CONCLUSIONS AND RECOMMENDATIONS

Subsidies safeguard agricultural food security and national security. Most of the studies concentrated on fertilizer, irrigation, credit, electricity and food subsidies. Depending on the situation, though highly debatable subsidies are boon or curse. Subsidies aid farmers, yet a substantial subsidy supports the business and farmers in wealthier regions. The reason for the same is farmer in poorer region are unaware of these options. Agricultural growth varies from state to state, and subsidy distribution is inequitable; however, agricultural subsidies help farmers access costly inputs inexpensively. In the long run, subsidies hurt the development of a country. The requirement is appropriate targeting of subsidies with gradual removal. The focus of government should be on agricultural investment for prosperity.

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