Capital Formation in Agriculture Sector in India: A Comparative Study of Western and Bundelkhand Region of Uttar Pradesh

ABSTRACT

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ABSTRACT

1.1. Introduction

The Indian economy is characterised as an agricultural economy, and two-thirds of the country's population lives in rural areas. They have depended on agriculture supports and almost 50% of total workforces are employed in agriculture sector (NSSO 2020). However, there is a disparity in the effective demand and supply of labour participation in agriculture sector. The agricultural sector is critical to economic development in developing and less developed countries such as India, but due to economic transformation, the agricultural sector's share has declined, while the share of industry and services has increased over the years of economic development (Reddy et al. 2014:3). Share of the agriculture and allied sectors in overall Gross Value Added (GVA) has decreased from 54% in 1950-51 to 15% in 2020 (NAS, 2020).

Agriculture sector has been facing structural and institutional changes since independence, mainly after economic reform period in the 1990s (Roy 2017:68; Chand 2017:9). These are the primary reasons of agricultural crisis in India. Therefore, in order to move the agriculture sector from economic stagnation to self-sustaining growth, capital formation is essential to increase agricultural production and productivity (Syed and Miayazako2013:2). It has been also confirmed by the committee on doubling the farmer's income in India, which is chaired by Ashok Dalwai under the government of India, and this committee estimated the requirement of growth of capital formation in agriculture sector to achieve the goal of doubling farmers' incomes, by the private and public sectors were 12.5% and 16.8%, respectively (Dalwai 2017:66).

Capital formation is the critical factor for determining the agricultural growth. Government expenditure on capital formation as well private investment in agriculture is positively related to agriculture output and productivity (Chand et al. 2012:186; Ma et al. 2013:170; Malik 2013:518; Bathla 2014:30). Past experience reveals that when government spending has increased by one unit then agricultural output has increased by 104 units (Mathur et al. 2006:5531). Government expenditure on agriculture investment and subsidies has increased the agricultural growth and reduced the rural poverty (Fan 2008: 164). It has also reduced the cost cultivation and increased the profitability of farmers (Mamatzakis 2003:176; Narayanamorthy 2013:117). Public investment induced the private investment in agriculture sector (Chand and Kumar 2004: 5615; Akber and Paltasingh 2019: 652). Therefore, capital formation is a factor of production and plays an important role in agriculture and economic development of India. Lack of adequate capital formation in Indian agriculture formed significant symptoms of agrarian crisis, especially due to decline with agriculture growth after 1980, and mainly after economic reform period 1990. Numerous studies delineate that public sector capital formation has declined while private sector capital formation has increased in the agricultural sector (Shetty 1990:388; Gulati & Bathla 2001:1698; Chand and Kumar 2004:5611).

1.2. Review of Literature

Yu et al. (2015:355-58) analysed the trends and composition of public expenditures in different subsectors i.e., agriculture, transportation and communication, education, health, social security and defence in developing and developed countries by using data of 147 countries from 1980 to 2010. They found that per capita spending increased at a growth rate of 1.3% but this growth was much higher at 4.2% in developed countries, compared with 1.5% in developing countries.

In contrast, overall government spending in all sectors as a proportion of GDP was higher 32% in developed, than 20.2% in developing countries. In the case of agriculture, per capita expenditure increased by 0.6% annually at the global level between 1980 and 2010. However, per capita expenditure in developed countries is higher $126 compared to $30 in the developing countries. Share of agriculture expenditure as total government expenditure has less than 2% in developed countries, while 5% in the case of developing countries.

Gandhi (1996:44-54) examined the investment behaviour in Indian agriculture and he revealed that the public account capital formation in the agriculture sector continuously increasing with 4.1% annual growth from Rs. 259 crore in 1950–51 to Rs. 675 crore in 1967-68, and to Rs.1811 crore with 7.7% annual growth in 1980–81. Thereafter, growth of public sector capital formation was declined 4.4% annual and the absolute value decreased by Rs. 1373 crore in 1986–1987. Further, it declined to 6.1% with annual growth of Rs. 1057 crore in 1992–93. This results was different in the case of private investment has continuously rising from Rs. 964 crore to Rs. 1905 crore in 1980-81 and marginally declined Rs. 2424 in 1986-87 with 1.3% negative growth, However, further increased Rs. 3450 crore in 1992-93 with 5.86 growth rate. Rural saving, high yield varieties, agriculture wage, credit from commercial banks and capital formation by significantly influenced the private investment in agriculture.

Gulati and Bathla (2001:1698) have analysed the trends of public capital formation in agriculture based on three alternative concepts of public capital formation viz., conventional (mainly major and medium irrigation), conventional including electricity power to agriculture, and economic heads of government budget expenditure in agriculture and allied activities in addition to second category. They found that public capital formation among the all areas had increased before 1980 and

thereafter it was declined till 1998-99. Chand (2001:163) observed the trends of public investment based on CSO and Broad series. The CSO series included the investment in major and medium irrigation system, and under the Broad series included investment in irrigation, rural infrastructure such as rural road, rural electrification and agriculture marketing. Public investment in agriculture based on CSO series increasing till 1980-81 and broad series till 1979-80. After this period both series are declined continuously.

Reddy and Mishra (2010:24-25) shows that share of private account increased from 56.8 percent 1980-01 to 80.6 percent in 2005-06 in total capital formation in agriculture sector whereas capital formation as percentage of agriculture GDP increased from 5.2 to 10.7 percent in same period. Chavan (2013:61) found the public capital formation increased during the period of green revolution and share of public capital formation in agriculture was highest in 1980. After this period the share of public capital formation declined from 41.7% in 1980 to 16% in 2011

Akber and Paltasingh (2019: 652) have analysed the issue of complementarity between public and private investment in Indian agriculture by using the NARDL Model, which was run on a 45 year time series data from 1971 to 2015. They had been confirmed that there is a high crowding in or out effect of public investment on private investment in sort run but a weak complementarity in long run. The canal intensity is one of the main components of public investment have complementarity between public and private investment.

1.3. Research Gap

There are many studies such as Shetty (1990:389), Gulati and Bathla (2001:1698), Chand (2001:163), Sawant et al. (2002:1068-70) and Chavan (2013:61) have analysed

the trends and growth of public and private capital formation in agriculture sector. These studies have concluded that public capital formation has declined, while private sector has increased in agriculture sector in India. Some other studies by Wagle (1994:63), Jairath & Purohit (1996:593-94), Sawant et al. (2002:1068-70), Bathla and Kumari (2017: 65) and Akber and Paltasingh (2019: 652) have examined the issue of complementarity between public and private investment in Indian agriculture. Among these studies, some studies indicated that public investment has induced the private investment in agriculture sector. However, other studies observed that a strong complementarity in long run rather than short run, and weak complementarity between public and private investment in agriculture sector. Bhatia (1999:46), Subrahmanyam and Sekhar (2003:1205-10), Narayanamoorthy and Hanjra (2006:452), Chand et al. (2012:186-190), Bathla (2014:30-31) and Ghose and Bhattacharyya (2016:70) have analysed the impact of public and private capital formation on agriculture sector. These have found that positive impact of both public and private capital formation on agriculture. Above studies have mainly focused on public sector capital formation in agriculture sector at national level and concluded that public account capital formation is declining, while private sector increasing in total investment in agriculture. It has been noted that private sector has displaced public sector investment in agriculture sector. As a result, the contribution of private sector investment has increased in agriculture sector. However, these studies have not focussed in detail on the pattern of private and public sector capital formation at regional level in backward state such as Uttar Pradesh. Further, no comparison was made among the regions of Uttar Pradesh on the basis of geographical location and availability of natural resources such as water facility including both natural rainfall and irrigation facility. Based on the evidences by the detailed literature review and subsequent gaps, this study has focussed on the shifting pattern of capital formation in

agriculture sector and pattern of household investment in agriculture at different regional level of Uttar Pradesh. Further, it focuses on differential level of capital formation based on geographical locations of regions and the availability of water.

1.4. Objectives

1. To examine the pattern and determinants of public and private capital formation in Indian agriculture from 1990 to 2020.

2. To examine the growth pattern and determinants of return from farm and non-farm activities of rural households across states in India.

3. To assess the pattern of private capital formation and agricultural credit at household level in Jalaun and Mathura districts of Uttar Pradesh.

4. To assesses the cost of cultivation, value of products and livestock farming, pattern of income and its determinants in Jalaun and Mathura district.

1.5. Hypotheses

1. Role of public sector is declining and private sector is increasing in capital formation in agriculture sector after 1990.

2. State and regional level variation in income from agriculture has influenced the capital formation in agriculture.

3. Socio-economic factors have influenced the capital formation in agriculture across two regions in Uttar Pradesh. Further, Western region has better capital formation in agriculture than Bundelkhand region in Uttar Pradesh.

4. Return from agriculture is positively associated with capital formation.

1.6. Research Methodology

1.6.1. Types of data, Sources and Period

The study is based on secondary as well as primary data. Secondary data are collected from different published sources, whereas primary data are collected from field survey.

(a) Secondary Data

Data on Gross Value Added (GVA) from agricultural and allied sector, public gross fixed capital formation, gross capital formation and change in capital stock in Indian agriculture and allied sector are collected from various years of National Accounts Statistics, Ministry of Statistics and Programme Implementation (MoSPI), Government of India. Data on private capital formation are collected from different rounds of All India Debt and Investment Survey of National Sample Survey Organisation (NSSO), MoSPI and Reserve Bank of India. Data on government expenditure in agriculture are collected from union and state government's budget, combined finance of union and states and Reserve Bank of India. Data on cost of cultivation, output and net return from crop production, animal farming and non-farm business of agriculture households in rural India are collected from different round of Situation Assessment Survey of Agriculture Household. Other data related to study are collected from annual reports of Ministry of Agriculture and Farmer Welfare, reports of Economic Survey of India, various rounds of NSSO like Agricultural and Livestock Census and other Government's reports.

(b) Primary Data and Method of Sample Design

The present study has adopted multistage sampling method from primary survey based data to elicit the capital formation, livelihood pattern and agricultural return of

farmers in the Western and Bundelkhand regions of Uttar Pradesh. In first step, two economic regions among the four economic regions were selected based on gross value of agriculture products. The gross value of agriculture products per hectare of net area sown at current price are Rs. 187206 in Western Rs. 145959 in Central, Rs. 91113 in Bundelkhand and Rs. 120444 in Eastern region of Uttar Pradesh (UPDES, 2020: 193-94). Based on the above information, Western region has highest and Bundelkhand has lowest value of agriculture output per hectare in the state. Therefore, we have selected agriculturally most and least developed regions of the state. In second step, Mathura and Jalaun districts were selected from Western and Bundelkhand regions, respectively. The criterion for the selection of these two districts was area under the surface irrigation intensity by canal irrigation. It is evidenced that 103167 hectares (38.5%) and 156772 hectares (61.4%) are covered under surface canal irrigation out of 268026 and 255053 hectare in Mathura and Jalaun district respectively (Statistical Dairy of Uttar Pradesh, 2017). In the third step, one *Block* from each district was selected, viz., Chhata from Mathura district and Dakore from Jalaun district based on similar selection criteria, i.e., surface irrigation intensity by canal irrigation, which is the highest 19520 hectares (54.33%) in Chhata and lowest 2286 hectares (8.6%) area in Baldeo in Mathura. Whereas, in Jalaun, highest 23144 hectares (86.09%) are in Dakore and lowest 8538 hectares (45.05%) are in Mahewa block. In the fourth step, five villages from each *block were* selected based on the net sown area (NSA) and surface irrigation intensity by canal irrigation. Kharka, Timron, Kusmiliya, Jaisari Kalan and Hardoi Gujar in Dakore block of Jalaun and Khaira, Tumaula, Bukharari, Paigaon and Phalain in Chhata block of Mathura district of Uttar Pradesh. In fifth Step, households were selected based on proportionate sampling method based on caste.

(c) Estimation of Sample Size

According to 2011 census, there were 418473 households in Mathura and 287509 households in Jalaun district out of total 3,32,32,433 households in Uttar Pradesh. Sample size was determined based on aggregate number of households of both district by using Yamane formula (Singh & Masuku 2014:15).

$$n= N/ 1+N*(e)^2$$

Here, n is sample size, N is total finite population and e is error percentage in sampling.

Based on the above formula, sample size was determined, which is as follows.

$$N \text{ (Numbers of Samples)} = 705982/1 + 705982*(.06)^2 = 277$$

Table 1.1: Determination of Samples Size in Surveyed Area

	Numbers of Households	Error in Percentage	Sample Size
Yamane's methods of sample determination at 95% confidence	705982	5%	400
	705982	6%	277
	705982	7%	204

Source: Estimation is based on the Yamane (1967) formula adopted from Singh & Musuku 2014:15.

Based on above formula, total samples size was fixed at 277 using level of errors at 6% along with considering the researcher's resources. Further, using proportional allocation method, sample size in each district, block and villages are determined based on its population size. Out of total 277 households, 162 households from Mathura and 115 households from Jalaun district were collected. Thus, 2 economic regions, 2 districts, 2 block, 10 villages and 277 households were selected to collect data in order to assess these objectives. Village wise number of household size is given in the following table.

Table 1.2: Number of Households and Samples Distribution in Study Area

Jalaun				Mathura			
Sr. No.	**Name of Villages**	**Number of households**	**Number of samples**	**Sr. No.**	**Name of Villages**	**Number of households**	**Number of samples**
1	Kharka	618	22	1	Khaira	891	25
2	Timron	415	15	2	Tumaula	820	22
3	Kusmiliya	675	24	3	Bukharari	619	18
4	Jaisari kalan	758	27	4	Paigaon	1512	42
5	Hardoi gujar	757	27	5	Phalain	1968	55
	Total	3223	115		Total	5810	162

Source: Estimated from Field Survey Data, 2021.

(d) Statistical Techniques and Data Analysis

Both secondary and primary data were processed through STATA version 13. At the preliminary stage, descriptive statistical techniques such as mean, mode, median, standard deviation, minimum, maximum, and frequency, and percentage distributions were calculated in different tables, and graphs in each empirical chapter. Further, Compound annual growth rate (CAGR), multiple regression and logistic regression model were used to understand the changing pattern and determinants of capital formation in agriculture sector. GDP deflator at 2011-12 price was used for comparison and analysis purposes on the pattern of trends and growth of capital formation in agriculture sector as well as agriculture production from 1991-2020.

1.7 Organization of the Thesis

Chapter first is entitled as '**Capital Formation and Agriculture Development: The Linkages'** This chapter describes the introduction, conceptual and theoretical framework to understand the different concepts of capital formation in agriculture and theories of capital formation related the agriculture development. Further, this chapter includes that research gap based on the review of literature, objectives, hypothesis, and methodology.

Chapter second is entitled as '**Role of Capital Formation in Agriculture Sector: Review of Literature'.** This chapter deals with different dimensions of capital formation in agriculture based on early studies, methods of estimation, and their observation on it's under the literature reviews. Based on the observations, we have found out the research gap for study and subsequently framed objectives and hypothesis.

Chapter third is entitled as '**Trends, Pattern and Determinants of Capital Formation in Agriculture Sector in India'.** This chapter is based on secondary data and examined the trend, growth rate and various dimension of public and private capital formation in agriculture, and identified the factor those influenced private capital formation in agriculture sector in India.

Chapter fourth is entitled as '**Pattern and Determinants of Return from Farm and Non-Farm Business of Rural Household in India'**. This chapter has analysed the growth of agriculture sector and expenditure on cost of cultivation, values of product and return from crop production, animal farming and non-farm business at state and national level of Uttar Pradesh by using unit level data of NSSO.

Chapter fifth is entitled as '**Comparative Assessment of Capital Formation in Surveyed Area of Jalaun and Mathura Districts of Uttar Pradesh'.** In this chapter, we have assessed the socio-economic profile of households, and capital formation and access to the agriculture credit at household level in surveyed area of Jalaun and Mathura districts.

Chapter sixth is entitled as '**Assessment of livelihood pattern and economic viability of rural area in Mathura and Jalaun district'.** This chapter is based on primary data. First, it estimates the cost of cultivation, value of net return and

productivity of different crops in surveyed area. Second, it assesses the cost of maintenance, value product and net return from livestock. Third, a comparative analysis is carried out to assess the pattern of income from agricultural and non-agricultural activities and its determinants in Jalaun and Mathura district.

Chapter seventh is entitled as '**Finding and Conclusion**. This chapter has summarized the major findings covering all the empirical chapters and tested the hypothesis, Based on the summary, conclusions are drawn. Further, we have brought out limitation of the study, policy recommendations and further scope of the study.

1.8 Summary and Major Findings of the Study

Chapter 1 is entitled as "**Capital Formation and Agriculture Development: The Linkages**" First, this chapter highlights different concepts of capital formation given by economists to understand the exact role of capital formation in the agriculture sector. Based on the conceptual analysis, capital formation is defined as direct and indirect investment made to build capital and assets for further production in the sector. The public and private sectors (corporates and households) are the two main sources of financing for capital formation in agriculture. Further, there are two broad concepts of capital formation: First, capital formation in agriculture is a direct method to invest, such as expenditure on major and medium canal irrigation, agriculture and allied activities (like crop husbandry, animal husbandry, food storage and warehousing, soil and water conservation, dairy development, fisheries), forestry and wildlife, cooperatives, agriculture research, and education. Second, capital formation is accomplished through indirect methods of capital formation in agriculture, such as the development of rural infrastructure. The second section deals with a theoretical framework linked with capital formation and agricultural development.

Chapter 2 entitled **"Role of Capital Formation in Agriculture Sector: Review of Literature"** deals with review of literature in five dimensions based on findings of studies on capital formation in agriculture sector. National level studies showed that the trends of public capital formation increased during the green revolution period and reached at the peak level in early 1980s. However, few studies showed different results based on the new series which includes the government expenditure on agriculture sector. These studies revealed that the public sector capital formation was declined after second half of 1980s. On the other hand, government spending on research and education in absolute values, and as a proportion of GDP has increased but its share in total government spending on agriculture investment was lowest. According to the researchers, proportion of government expenditure on agriculture subsidies in overall spending was main cause of the declining trends of public capital formation in agriculture. Therefore, the percentage of investments in overall government spending should have increased, while the share of subsidies should have declined. Their justification was that investments had a higher return than subsidies in long-term.

On the other hand, the share of private sector was increasing in total capital formation and it has been major source of recovered the public sector capital formation in agriculture. Nonetheless, it was criticized by many researchers because private sector was not capable to invest and uplift the rural infrastructure such as irrigation, electricity and transportation. Therefore, private sector has not worked as a mutual substitute of public sector capital formation in agriculture. However, literature showed that public sector has induced the private investment in short and long run but it was a weak complementarity in short and strong in long run. Further, literature expressed that capital formation has positive impact on agriculture growth. Early

studies have argued that both public and private sector investment contributed in agricultural growth but impact of private sector capital formation on agricultural income was relatively more than public sector. Government expenditure on rural infrastructure promoted technical efficiency and the crop diversification from low earnings to high earnings crops.

Public investment, rate of return by private investment, income from both agriculture and non-agriculture, formal credit, return from previous year, increasing subsidy, terms of trade, high yield varieties, productivity, prices of agriculture commodity, literacy rate, self-employment, age and family size of households were positively, whereas marginal holding, poverty, household investment in non-farm business, and residential land, and building were negatively affected the private capital formation in agriculture. In contrary, annual borrowing by state, surplus of state government budget, revenue from agriculture, state income, literacy rate and central government grants to state government were positively and subsidies and population growth were negatively associated with the public sector capital formation in agriculture sector.

Chapter 3 entitled **"Trends, Pattern and Determinants of Capital Formation in Agriculture Sector in India"** examines the trend, growth rate and various dimension of public and private sector capital formation in agriculture. Further, it identified the factor those influenced capital formation in agriculture. Growth of capital formation in agriculture declined after 1980 and sharply declined after economic reform period and revived during 2001 to 2010. Further, the share of public sector capital formation in agriculture sector had declined continuously from 1980-81 to 2019-20. State wise government and private capital formation was low in eastern state such as Bihar, West Bengal, Assam, Odisha and Chhattisgarh and high in

Haryana, Rajasthan, Punjab and Maharashtra. In Uttar Pradesh, absolute values of fixed capital formation in farm business was highest Bundelkhand region followed by Western, Eastern and Central region whereas percent share of farm in all households was highest in Western followed by Bundelkhand, Eastern and Central region of Uttar Pradesh. Share of fixed capital formation on residential land and building was highest whereas farm and non-farm business was s lowest at national and state level. Share of agriculture machinery and transport equipment increased whereas the same in orchard and plantation, land improvement declined, and livestock and wells and other irrigation resources were constant during the 1992-93 to 2018-19. Our results also confirmed that fixed capital formation in agriculture was different among regions and castes. Further, land size and education has positively affected the capital formation, whereas, family size has negatively impacted the fixed capital formation implying that bigger family size has lower capital formation. Likewise, expenditure of ST and OBC households on agriculture is low compared to that of General category households.

Chapter 4 entitled **"Pattern and Determinants of Return from Farm and Non-Farm Business of Rural Households in India"** summaries the major findings as follows. First, after economic reform period, the compound annual growth rate of Gross Value Added (GVA) of agriculture sector declined and livestock sector increased continuously from 1990-91 to 2019-20. And, the growth of forestry and fishery sectors declined in period of 2000-01 to 2009-10 and revived in period of 2010-11 to 2019-20. Similarly, CAGR of agriculture and allied sector declined in period of 2000-01 to 2009-10 and again revived in period of 2010-11 to 2019-20. On the other hand, the CAGR of gross state domestic product of most of the states except Andhra Pradesh, Assam, Madhya Pradesh, Odisha and Uttar Pradesh declined from

1991-2000 to 2011-2020. Region wise CAGR of agriculture and allied sector was highest in Central region followed by Bundelkhand, Central and Eastern region of Uttar Pradesh from 2011-12 to 2019-20. Second, the households' expenditure on input for agriculture production has major share, i.e., cost of human and animal labour, cost of fertilizer, cost of seeds and cost of hiring of machinery and lowest in cost of diesel and electricity, cost of irrigation, cost of pesticides and cost of rent on leased in land and other expenditure in total cost of cultivation. Third, return from agriculture has higher in states of Punjab, Haryana, Karnataka, Maharashtra and Gujarat and lower in states likes Jharkhand, West Bengal, Odisha and Bihar. However, the performance of Uttar Pradesh was also abysmal. Region wise return from agriculture and livestock reflects that it was highest in Western region followed by Central, Bundelkhand and eastern region. Four, the agriculture production has been influenced by the many factors. Capital expenditure such as expenditure on productive assets such as, credit to household, land holding size, caste, agriculture training and educational qualification of head of household influenced the agriculture production.

Chapter 5 entitled **"Comparative Assessment of Capital Formation in Surveyed Area of Jalaun and Mathura Districts of Uttar Pradesh"** has the major findings as follows. First, average value of capital formation by rural households is more in Mathura compared to Jalaun in surveyed area. Caste wise average values of capital formation is highest among general communities followed by OBC and SC whereas land size wise average values is highest for medium and large farmer followed by, semi-medium, small, marginal and land less farmers. The share of capital formation incurred under the component of agriculture machinery and tractor is highest followed by livestock, irrigation resources, farm building and animal sheds, land improvement,

orchard and other components of capital formation in agriculture in surveyed area. Credit is major source for providing the financial facilities for capital formation and its share was 45% in total capital formation in agriculture. Credit and average operated area and education qualification of households are positively associated with capital formation. Capital formation of households of general category is more compared to OBC/SC category in surveyed area of Jalaun and Mathura District of Uttar Pradesh.

Chapter 6 entitled **"Livelihood Pattern and Economic Viability of Rural Area: Assessment Jalaun and Mathura District of Uttar Pradesh",** attempted to understand the livelihood pattern of the households in the study area. First**,** the yield of wheat and paddy crops is more in Mathura district compared to that of in Jalaun district. In surveyed area, cost of human labour and hiring of machinery is the major share in total cost of cultivation. The share of household expenditure on inputs of labour charge, hiring of agriculture machinery, fertilizer and seed are more in total cost of cultivation paddy crop. Agriculture is main source of income of rural household but it is not enough for survival for all rural household. Therefore, livestock and wage from formal and informal sectors are significant sources of income of rural household. Agriculture is the predominant source of income for General and OBC community largely because of higher land holding size with them. However, income from agriculture for SC household less compared to OBC and General category household. The income of SC household is more or less equally derived from agriculture, livestock, wage and service. Income for SC community is not concentrated largely from agriculture sector as the land holding size is substantially low with them. Land fragmentation is one of cause of structural change in agriculture sector. The adverse impact land fragmentation is more on socially

backward castes and economically weaker sections. These households shift their occupational pattern to self-employment, wage labour in agriculture and non-agriculture sector.

1.9. Policy Recommendations

The findings of the study have the following important policy suggestions.

First, developing nations like India, which face problems of capital formation in the agriculture sector because household income from agriculture is less to be spent on productive purposes. In other words, low income affects adversely the capital formation in agriculture. Though credit to households is a crucial factor in financing capital formation in the agriculture sector, yet a higher proportion of their borrowing is spent on fulfilling their consumption needs. Therefore, policy requires enhancing capital formation in the agriculture sector by households through increase in credit facilities. Further, proper monitoring mechanism needs to develop to channelize the credit in to investment in agriculture sector.

Second, income from agriculture is relatively lower compared to the non-agriculture sector. The rural non-farm sector has a positive impact on increasing household's income, which subsequently transferred in the form of capital formation in agriculture. Therefore, there is a need of increasing the job opportunity in manufacturing and service sector by promoting skills through education and training for regular and high earning wage employment in rural areas.

Third, household income from agriculture varies at regional levels in Uttar Pradesh. This variation is caused by the unequal land distribution across castes, availability of irrigation facilities, geographical conditions, education, and rural infrastructure. Therefore, increase in public sector investment will definitely promote rural

infrastructure such as road, irrigation facility, educational institution, agricultural research and development centers to enhance household's income and to reduce the agricultural crisis.

1.10. Limitations of Study

There are a few limitations of the present study, which are as follows.

First, this study deals with only agriculture and allied sector. It covers government expenditure on capital formation, which is directly and indirectly related to asset creation for agriculture and allied sectors. However, it does not include the subsidies and revenue expenditures because these expenditures do not create any assets for further production directly. Secondly, this study covers both public and private sector capital formation. Further, private sector capital formation is divided into corporate and household sectors. Corporate and private sector capital formation is based on time series, which is beyond the scope of this study. Further, this study does not cover the spending of the corporate sector on education and research.

1.11. Further Scope of Study

This study covered the public and private sectors capital formation in agriculture. In this study, we have covered only household-level data on private capital formation in agriculture but not private corporate sector capital formation. Agriculture research and development are most important components under private sector investment. However, this study only covers the government's expenditure on agriculture research and education. Therefore, further study can be extended to the role of the private corporate sector on research and education for the development of the agriculture sector and the emerging role of the private corporate sector in capital formation for agribusiness.

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