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Original Research Article

Measuring and Evaluating Farm Income in India: Trends, Determinants, Challenges and Policy Implications

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Abstract: This research focuses on the assessment and measurement of farm income in India through the lens of trends, determinants, challenges and policy implications. The authors take a broader view of measuring farm incomes by not only looking at production; they also define farm incomes as multi-dimensional indicators of income consisting of crop and livestock earnings, as well as non-farm earnings, government subsidies, and imputed values of family labour and self-consumed goods. This research uses descriptive-analytical-based methodology and relies on secondary data from various sources, including NSSO, NSO, and NABARD, to analyse historical income data, regional discrepancies in farm incomes and limitations of the income structure. Based on the findings, farm households earn low and unstable incomes, and there are significant discrepancies between states and farms of varying size. Rising agricultural input costs, price volatility (due to international trade), small land parcels and climate-related risk factors all limit the potential for growth in farm income. Increased levels of income were driven by three factors: diversification; access to non-farm employment; and improved access to markets. Finally, this research describes the various obstacles associated with measuring farm income, including (1) data gaps; (2) issues with measuring value; and (3) variations in farm income. Therefore, a standardised, comprehensive multi-dimensional framework must be established to measure farm incomes accurately and effectively design policies to aid farm incomes in India. The authors discuss some recommendations for policies to increase farm income, including: (1) reducing production costs; (2) reforming market structure; (3) diversifying into non-farm produced; (4) providing institutional assistance; and (5) enhancing the availability of accurate information about farm earnings to develop sustainable and inclusive agricultural development in India.

Keywords: Farm income, Agricultural economics, Income measurement, Rural livelihoods, Diversification, Policy implications

INTRODUCTION

Farming has traditionally been the mainstay of the Indian economy, and remains important as a source of employment, food, livelihood and economic development. Although the country is undergoing structural transformation, much of the population is still dependent, directly or indirectly, on agriculture for their livelihood. But the economic status of agricultural households is still a cause for concern as agricultural production growth has not always been commensurate with farmers' income. The disconnect between growth in agricultural output and farm income has made measuring and assessing farm income a critical issue in the present agricultural debate (Chand, Saxena, & Rana, 2015).

Farm income is a complex term, referring to income from farming, livestock, horticulture, fisheries, agro-forestry and other allied activities, and also to the additional income from wage labour, non-farm activities, remittances, and government assistance. In the Indian agricultural economy, where most farmers are small and marginal farmers with highly fragmented lands, income is determined not only by productivity but also by access to markets and price realization, cost of production,

source of irrigation, availability of institutional credit and technology (Dev, 2012). Thus, the analysis of farm income needs to be more comprehensive than estimating farm output or yield.

The salience of farm income has become more prominent in policy circles in recent times, with the Government of India setting a goal to double farmers' income. This change in policy represented a shift from a production-focussed to an income-focussed agricultural strategy. It stressed that increasing production is not enough to improve farmers' welfare unless it also leads to an increase in net income to farmers. As a result, research and development agencies took into account farm income, farm profitability, risk management, value addition, diversification and supply chain efficiency as part of agricultural development (Chand, 2017).

There is significant regional and social variation in the trends in farm income in India. Farmers in states with higher levels of irrigation, better marketing infrastructure, higher crop diversification and access to extension services typically have higher incomes than their counterparts in rain-fed and resource-poor areas. Similarly, big farmers enjoy economies of scale, whereas small farmers have higher per-unit cost, less market power, and less access to formal credit. Market price fluctuations, climate change, pest infestation and rising input prices (seeds, fertilisers, labour, energy) also increase income inequality in the agricultural sector (Birthal, Roy & Negi, 2015). A key issue in assessing farm incomes in India is the absence of reliable data. Agricultural households have diverse income sources, which are often seasonal, informal or unreported. Current surveys vary in terms of design, period, and scope, making it hard to compare across time and regions. In addition, income variability due to weather variations, trade shocks and policy shocks makes it difficult to analyse long-term welfare patterns (National Statistical Office [NSO], 2019).

The careful study of farm income is important as it paints an accurate picture of the well-being of the farmers and assists in the formulation of policies to target poverty, create jobs, and ensure rural growth. It helps to identify vulnerable populations, evaluate the impact of subsidy and support schemes, enhance market infrastructure and build resilience in agriculture. With this background, the current research on "Measuring and Evaluating Farm Income in India: Trends, Determinants, Challenges and Policy Implications" aims to understand the dynamics of farm income in India and to recommend policy measures to improve the economic status of farm households.

What is Farm Income

Farm income is defined as the net income generated from agricultural and allied production activities in a given accounting period (usually a year). It is the return received from the use of land, labour, capital and management in the farming system.

Farm income can be measured in terms of:

- Income from sale of crops
- Income from dairy and livestock
- Income from poultry, fishery, bee-keeping etc.
- Value of produce consumed in household
- Revenues from manure, straw, fodder and other by-products
- Rent from farm buildings or machinery
- Subsidies and payments
- Value of inventories (grain, livestock, inputs, etc.)

The measurement of farm income can be in various forms depending on the purpose for which it is required (taxation, farm planning, enterprise comparison, poverty assessment, national accounting) (Kay, Edwards, & Duffy, 2016).

LITERATURE REVIEW AND RESEARCH GAP

Farm income is an important research area in agricultural economics in India, especially in the backdrop of rural poverty, agrarian distress, and the policy goal of welfare enhancement of farmers. In the past, agricultural studies in India primarily emphasised production, productivity and food security, with less emphasis on farm income. As time passed, it became clear that farm growth does not necessarily translate to farmers' welfare unless it is associated with rising net farm income (Chand, Saxena, & Rana, 2015). This research was taken to a new level by Chand *et al*. (2015), who calculated farm income growth in India for the period 1983-84 to 2011-12. They found farm income growth was period dependent and that growth after 2004-05 was not sustained beyond 2011-12. They attributed the growth in agrarian distress to stagnation in farm incomes. This study is one of the most widely-cited macro studies on India's farm income. This discussion was furthered by other studies that looked at farm household income composition and sources. Studies indicated that cultivation income is often not enough to support rural livelihoods, and many farm households rely on livestock, wage labour, remittances and/or non-farm enterprises. For instance, Kumar *et al*. (2019) in their research on Bihar, observed cultivation provided only a modest contribution to household income, but diversification, education and farm assets enhanced income. This suggests the need for diversity in sources of livelihood in rural India. (Indian Agricultural Research Journals)

A few researchers also studied the factors affecting farm income at regional and farm-size levels. Access to irrigation, improved technology, mechanisation, institutional credit, markets and extension services are found to be critical income determinants. Vatta and Budhiraja (2021) highlighted the importance of enhancing resource-use efficiency, market and credit access and diversification into high-value enterprises (such as horticulture and livestock) for speeding up income growth in India.

Another strand of research relates to farm income inequality. Research shows that there are significant interstate and intrastate variations with farm incomes in the agriculturally developed states being much higher than those in rainfed and less developed areas. Marginal farmers, who represent the majority of farm households in India, are more vulnerable to production risks, have lower bargaining power, and lesser marketable surplus, and thus face income inequality. Narayanamoorthy (2021) also debunked some myths of farm income and stressed the need for more accurate measurement of regional differences and within-region disparities among the farmers.

There has been some recent research on farm income and climate change, risk, and resilience. The variability of climate, dry and wet spells, pests and diseases, and price fluctuations decrease farm income and enhance risks. Adaptation research indicates that income, education, finance, institutional support, and other factors play an important role in determining farmers' responses to risks (Bahinipati & Patnaik, 2021).

In all, the research confirms that the income of India's farmers is determined by a combination of economic, institutional, technological and environmental factors. Further, it shows that boosting farm income demands a holistic policy approach going beyond raising agricultural production to diversification, market reforms, risk management, and non-farm development in rural areas.

RESEARCH GAP

While there is an increasing literature on farm income in India, some key areas need attention.

1. Need for Recent National Analysis

Early research is mostly based on data until 2011-12 or before. Few recent studies have provided comprehensive analysis of recent developments like digital agriculture, PM-KISAN transfers, e-NAM markets, the COVID-19 pandemic and recent inflationary effects on farmers.

2. Limited Micro and Regional Analyses

Macro-level studies provide national or state-level averages, which may mask district-level variations. There is a lack of studies on regional patterns of farm income in the eastern, northeastern, tribal and hill regions where the conditions of farming vary significantly.

3. Little Attention to Income Volatility

While available studies focus on average annual income, they pay less attention to seasonality, variability, and vulnerability due to weather shocks, price shocks or debt.

4. Limited Knowledge about Small and Marginal Farmers

While smallholder farmers are the dominant type of farmer in India, there is a lack of detailed studies on their net returns, coping strategies and strategies to build long-term income.

5. Limited Addressing of Gender and Social Aspects

Farm income studies have seldom explored the role of gender, caste, tenancy and asset ownership in farm household income generation and decision making.

6. Issues in Measuring Farm Income

We do not yet have a standardised approach to measuring farm income to consistently account for paid out costs, imputed family labour value, non-farm income, transfers and asset income across data sets.

7. Insufficient Policy Evaluation

While there are a range of policies that seek to boost farm income, there is a lack of empirical evaluation of the impact of policies related to subsidies, MSP, crop insurance, direct benefit transfers, irrigation and market reforms on farm income over time.

So, the current study attempts to address these issues by offering a holistic and recent assessment of farm income in India with a particular focus on trends, determinants, structural issues and policy insights.

OBJECTIVES OF THE STUDY

1. To understand the trends and patterns of farm income in India over time and space.
2. To explore the important factors affecting farm income, including land holding, productivity, diversification, technology, credit and market.
3. To analyse the problems in estimating farm income in India.
4. To recommend suitable policy interventions for improving farmers' income, in a sustainable and way.

RESEARCH METHODOLOGY

The current study uses a descriptive–analytical research design to investigate the multifaceted nature of farm income in India, including its trends and determinants, measurement issues and policy concerns. The approach is designed to provide a systematic analysis, valid insights and policy relevance for current policy debates.

1. Design of the Study

The study is descriptive, analytical and exploratory. The descriptive part aims to describe the current status and trends of farm income in India, whereas the analytical aspect assesses the factors, disparities and structural problems of farm income. The exploratory aspect is used to explore new issues, data limitations and policy concerns associated with the measurement and assessment of farm income.

2. Data Sources

This study has used only secondary data sources, which include a broad range of credible sources. These include:

• Reports of the National Sample Survey Office (NSSO) and National Statistical Office (NSO)
• National Bank for Agriculture and Rural Development (NABARD) - All India Rural Financial Inclusion Survey
• Economic Surveys of India
• Policy papers from various governments (e.g. NITI Aayog, agricultural policy)
• Refereed journals, books and working papers in agricultural economics
• International agencies' reports (e.g., FAO, OECD)
The multiple secondary data sources strengthen the validity and triangulation of the data.

3. Time Period

The research employs a longitudinal approach, with varying time periods depending on the availability of data, mainly from early 1980s onwards. This allows for the examination of trends and shifts in farm income over time, under different policy settings and stages of agricultural development.

4. Analytical Framework

The research uses a multi-faceted approach to analyse farm income, acknowledging that income includes more than just crop income. The framework includes the following:
• Analysis of Components of Income: Crop income, livestock income, non-farm income and transfers
• Cost-Return Analysis: Gross income, net income and profitability (after paid and imputed costs)
• Determinants Analysis: Analysis of determinants including farm size, irrigation, use of technology, diversification, access to credit and markets
• Equality and Regional Analysis: State-wise, region-wise and farm size-wise comparisons
• Analysis of Income Risk: Examination of risk stemming from climate and markets.

5. Analysis of the Data

A mix of quantitative and qualitative analysis methods are employed, such as:
• Trend Analysis to analyse the trends in farm income
• Comparative Analysis to compare regional and inter-state inequalities
• Ratio and Percentage Analysis to examine component of farm income
• Thematic and Qualitative Analysis to understand policy issues, institutional bottlenecks and measurement issues
Where necessary, evidence on past empirical studies are critically reviewed.

6. Conceptual Framework for measuring Farm Income

This paper uses a broad concept of farm income, which includes:
• Farm and other agricultural income
• Value of family labour and home consumption
• Off-farm employment and remittances
• Subsidies and transfers

In this way, farm income is considered as an overall measure of family welfare, rather than only a measure of agricultural production.

7. Study Area

The analysis is for all of India, with a focus on inter-state and regional differences. Where appropriate, we make references to variations across agro-climatic zones, resource endowments and levels of agricultural development.

RESULTS AND DISCUSSION

Assessment and measurement of farm income in India have become topics of utmost significance in agricultural economics and policy because income is the most important measure of the economic status of farmers. Despite the substantial gains in foodgrain production, irrigation and technological transformation since the Green Revolution, these gains have not trickled down to all farmers. Numerous farmers still suffer from low profitability, increasing costs, small farm sizes, market risks and climate risks. So, the success of agriculture cannot be measured only by growth in productivity or cropped area; it needs to be measured by the real income generated by farmers, considering costs, risks, and the living conditions of farmers (Narayanamoorthy, 2021).

For India, farm income is more than just crop income. Farmers' livelihoods may include a combination of agriculture with livestock husbandry, wage employment, migration, non-farm activities, and government subsidies. As a result, farm income needs to be evaluated taking into account gross and net returns, diversification of rural households, stability, and regional and farm category inequality. The results and discussion below provide insights into key empirical evidence on the measurement and evaluation of farm income in India.

Farm income in India is complex and is affected by structural, economic and institutional factors. Low average income of many households, income disparities, rising cost and vulnerability of the small farmers indicate weaknesses of the farm economy. On the other hand, diversification, non-farm income, market integration and government intervention show opportunities for income growth. The debate also shows that measuring farm income should be done from a multi-dimensional perspective, rather than just one indicator. For example, gross return, net return, family labour income, diversification index, income stability and income distribution across social and regional groups need to be taken into account. This is crucial for policymaking on agriculture and alleviation of rural poverty.

1. Income of a Large Proportion of Farm Households is Low

Perhaps the most important insight we gain from national surveys is that farm income is not high for many agricultural households. National Sample Survey

(NSS) and other studies reveal that a significant number of farm households receive a low monthly income, which is often not enough to cover consumption, education, medical care and investment. This finding suggests that farming is not enough to guarantee a decent living to many farm families. This result also indicates that growth in production may not be reflected in an increase in income. Thus, farm income, not production, should be the key measure of farm welfare and policy effectiveness.

2. High Interstate/Regional Variations in Farm Income

India has significant regional variations in farm income. Variations in irrigation and land productivity, crop composition, access to technology, market infrastructure, road network and non-farm jobs result in disparities in income. States having irrigation, diversified crop pattern and easy access to urban markets tend to have higher farm incomes compared to rainfed and low-value crop producing states.

It is observed that states like Bihar, Jharkhand, Odisha, Madhya Pradesh, Uttar Pradesh, and West Bengal were experiencing income problems as a large proportion of households were not earning a living income. By contrast, more economically successful states had commercial agriculture, dairy, horticulture and well-functioning markets. This suggests that "one size fits all" policy will not be effective in solving India's income issues. Agriculture policy needs to be localised, taking into account the resource base, cropping patterns and employment opportunities.

3. Non-Farm Incomes Needed for Rural Livelihoods

A further key finding is that non-farm income is critical for farm households. Farm income is often not sufficient and/or consistent, particularly for smallholders. Wage and salaried employment, petty trade and transport, remittances and government programs contribute a significant proportion of income.

The NABARD (2018) All India Rural Financial Inclusion Survey indicated that, out of the income of agricultural households, only approximately 43 per cent was from cultivation and allied activities, with the rest coming from wage and non-wage labour, business and other non-farm activities. This shows that crop income alone is an unreliable measure of rural income.

The finding also has an implication for policy. Rural development policies should not focus only on the agricultural sector, but also on agri-business, rural enterprises and skill building and job creation, in addition to farm growth (National Bank for Agriculture and Rural Development [NABARD], 2018).

4. Increased Cost of Cultivation Erodes Farm Incomes

India faces the problem of rising cost of cultivation. The cost of cultivation has increased for seeds, fertilisers, pesticides, irrigation, diesel and electricity, machinery services, transport and hired labour. Even with more production, it sometimes does not translate to profits due to increased input costs. Increasing production costs have caused the gap between the value of output and net returns to narrow for many crops, according to Narayanamoorthy (2021). Hence, gross income may give a false impression of wealth if cost inflation is not taken into account.

So, net farm income (after accounting for all paid-out and imputed costs) is a better indicator of economic status than gross income from production. The policies to lower input costs, enhance the efficiency in using inputs and to provide low-cost mechanisation services are needed to increase farm income.

5. Small and Marginal Farmers are More Income Vulnerable

Small and marginal farmers holding small landholdings predominate in India's agricultural sector. They have lower economies of scale, limited access to formal credit, weak bargaining power, limited storage facilities and are more susceptible to crop failure. This leads to lower and more variable incomes than those of medium and large farmers.

NABARD (2018) reported that landholding size continues to be the most significant determinant of household income, asset holdings and financial inclusion. Large farmers can diversify their farming, invest in irrigation, equipment and get access to better markets.

This suggests that income assessment should be done by size categories, not all farming households. It also suggests targeted policies such as providing income transfers, low-cost credit, tenancy and group farming to smallholders.

6. Diversification Improves Income and Reduces Risk

Increasingly, research in India demonstrates that diversification into high value crops and the allied sector can boost farm income. Vegetables, fruits, flowers, dairy, poultry, fisheries, beekeeping and mixed farming households generally have higher incomes than cereal-based households. These activities provide more regular cash returns, avoiding a single harvest.

Tripathi and Das (2024) reveal a positive link between crop diversification and farm household income in India. Crop diversification enabled risk diversification, better use of family labour and flexibility to the market. This finding suggests that farm development policies should promote a shift from a monocropping system to a high-value agriculture, integrated farming system and value addition.

7. Prices Are a Key Factor in Farm Income

Not only yields, but also prices determine farm incomes. High production may result in low income if prices plummet due to over-supply, inefficient procurement or panic selling after the harvest. On the other hand, low production sold at high prices can lead to handsome incomes.

Indian agricultural studies emphasise the need for minimum support price (MSP), storage, market information, farm producer organisations (FPOs), and direct marketing to enhance price realisation. Narayanamoorthy (2021) stressed that farmers lose income, not only due to production failure, but also due to "marketing failure". Hence, in the assessment of farm income, market factors such as farmgate price, post-harvest losses, transaction costs and price variability should be considered.

8. What Matters Is More than the Average

Average annual income is not a true measure of farm income security. Agricultural incomes in India are very dependent on monsoon rains, drought, flood, pests, disease and shocks in the market. One year's income may be acceptable, while the next year might result in losses.

This has prompted researchers to focus on income variability, stability and access to risk management mechanisms. Access to crop insurance, assured irrigation, diversification, savings and institutional credit play a key role in income stability. Indian farmers prefer stable income with moderate returns to very volatile income with uncertain returns (Narayanamoorthy, 2021).

9. Farm Income is Affected by Government Transfers

Farm income in India is becoming increasingly dependent on government support. Subsidies (PM-KISAN, fertilisers, irrigation, crop insurance, procurement, rural employment and credit) all have a direct or indirect impact on farm income.

Transfers can provide income and risk protection or reduce the costs of production. But their impact can only be assessed if market income is distinguished from transfer income. It's hard to determine whether farm families are growing rich through productivity or poor through transfers without this distinction. This implication has implications for future measurement approaches, which should clearly separate operational income from transfer income.

Thus, farm income measurement and assessment in India demonstrate that the prosperity of agriculture cannot be gauged just from increased production. Many farm households have low, volatile and diverse income streams. Increasing costs, small and fragmented farms and market distortions restrict profits, particularly for the small and marginal farmers. But diversification, higher price realisation, risk mitigation, infrastructure and targeted public investments can enhance farm incomes. So, the next frontier of agricultural policy in India should be a focus on increasing the real, stable and equitable farm income, rather than production. A multidimensional and reliable income measurement system is a must for inclusive and sustainable rural development.

PROBLEMS IN MEASUREMENT OF FARM INCOME

The measurement and assessment of farm income in India is not a simple exercise but it is key to knowing the true economic status of farm households. Indian agriculture is marked by small and fragmented farms, reliance on the monsoon, geographical variability, multi-cropping and mixed farming, and a substantial rural population which may engage in multiple farm and non-farm activities. These characteristics of agriculture make calculating farm income from crop production or annual turnover insufficient. It should account for costs of production, family labour, own consumption, livestock income, non-farm income, subsidies and temporal stability of income (Narayanamoorthy, 2021).

While policy discussions often focus on enhancing farmers' incomes, estimating and measuring farmers' income is an important task. Poor farm-level data collection, price and cost variations, weather vagaries and limitations of methodology often lead to less-than-conclusive results. Thus, recognising these challenges helps in improving the statistical system and farm policies in India (Vatta & Budhiraja, 2021).

1. Absence of Farm-Level Data and Farm Accounts

The lack of farm accounts is a major problem in India. Many farmers do not keep their records of expenses on seeds, fertilisers, pesticides, wage labour, irrigation, machinery and receipts of sales. As a result, income is estimated from recall surveys in which farmers report their costs and income. This may result in under- or overestimating income (Narayanamoorthy, 2021).

Lack of farm-level data makes it hard to compare crop profitability, regional variability or farm sizes. It also hampers the quality of evidence for policy, credit and insurance design. So, there is a need for improved record-keeping and digital bookkeeping in agriculture (Vatta & Budhiraja, 2021).

2. Small and Fragmented Landholdings

India has a predominance of small and marginal farms. Land fragmentation has significant implications for farm income measurement since income is different for the family, for the land area and for the worker. A family may cultivate multiple small and fragmented farms, and may efficiently produce crops, but the household income may be low due to the small size of the area operated (NABARD, 2018).

Fragmentation also impacts mechanisation, irrigation, economies of scale and market access which further affect income. Hence, farm comparisons without taking into account the size and fragmentation of farm operations could be misleading (Narayanamoorthy, 2021).

3. Monsoon-Dependent and Uncertain Climate

Indian agriculture is still highly dependent on erratic rainfall; it is prone to droughts, floods, cyclones, heat stress and pests. As a result, farm incomes tend to fluctuate. One year the farmer may have a high income, but the following year they may lose everything due to weather shocks (Bihari *et al*., 2019).

This presents a significant measurement challenge: one year's income may not be indicative of the longer-term economic status of the household. As such, evaluation should be based on multiple years' data and income adjusted for risk, rather than a single year's income (Vatta & Budhiraja, 2021).

4. Rising Cost of Cultivation

Another issue is increasing cost of cultivation. Farmers are paying more for fertilisers, wages, diesel, electricity, machinery hire, irrigation, transportation and pesticides. Unless analysts consider net income after deducting all costs, farmers' profitability may increase even if farm performance is not (Narayanamoorthy, 2021).

Recent research indicates for many farmers in India, the cost has increased at a rate that is faster than the growth in receipts, thus reducing profitability. So, net income (after deducting all costs) is more important than gross receipts. But the valuation of all paid and unpaid costs is hard to calculate (Vatta & Budhiraja, 2021).

5. Hard to Value Family Labour

Family labour is a significant contribution to Indian agriculture, particularly in small farms. Female, old and young family members can contribute to planting, weeding, animal husbandry, harvesting and post-harvest activities without being paid. It's hard to put a monetary value on this labour (Narayanamoorthy, 2021).

If not accounted for, farm income may be overestimated. Using market wage rates may result in lower income. So, different valuations lead to different profitability estimates, making comparisons between different studies hard to make. This is especially so in labour-intensive farming areas (Vatta & Budhiraja, 2021).

6. Diverse Household Income

Rural households in India often have sources of income other than agriculture such as wage labour, migration, small business, transportation, salary, pension, and various schemes. Therefore, it is sometimes difficult to distinguish between farm income and the total household income (NABARD, 2018).

For instance, if households use non-farm income to invest in farming or use farm assets for non-farm activities, the lines are blurred. Thus, the assessment of farm income is more complex than that of a business. Surveys that only record crop income may underestimate household well-being whereas surveys that include all incomes may exaggerate farm performance (Narayanamoorthy, 2021).

7. Valuing Subsistence and Homestead Production

In India, farm families use a significant amount of farm output for their own consumption. Grain, vegetables, milk, eggs, wood and fodder may be consumed on the farm. While these products have economic value, they don't yield cash (Narayanamoorthy, 2021).

To estimate farm income, the value of such items needs to be imputed. But prices fluctuate over seasons and geographical locations. Omitting self-consumption may lead to an underestimate of welfare, and incorrect valuation may skew comparisons (Bihari *et al*., 2019).

8. Price Volatility and Weak Market Integration

Prices are a major determinant of farm income in India. Farmers may be forced to sell their crop soon after harvest for cash requirements, lack of storage facilities or lack of bargaining power. Market prices may vary significantly between mandis, and over time (Vatta & Budhiraja, 2021).

So, two farmers selling the same volume may receive different incomes, depending on when and where they market their produce. Incomplete income estimates can be made if the marketing channels, transaction costs and price variability is not considered. So, market-related indicators are crucial in farm income assessments (Narayanamoorthy, 2021).

9. Diversity of Indian Agriculture

India has a wide range of agro-climatic zones - from irrigated Punjab to rainfed Rajasthan, plantations of Kerala, tea gardens of Assam and hilly regions of the North-east. The crops, costs, productivity, labour and risk factors are all vastly different here (Narayanamoorthy, 2021).

So there is no one income indicator that fits all. A method suitable for a wheat producing farm may not be suitable for tribal shifting cultivation or mixed livestock farms. India, therefore, needs to consider assess farm incomes in a context-specific and place-based manner (Vatta & Budhiraja, 2021).

10. Effect of Subsidies and Transfers

Government policies like crop insurance, subsidized fertiliser and water irrigation, procurement and rural employment and PM-KISAN transfers affect farm income in India. These can be in the form of increased income or lowered cost of farming (Bihari *et al*., 2019).

An analytical issue is whether the benefits are to be included as farm income, as transfer income to the household, or as cost savings. If not accounted for, actual welfare may be underestimated; if accounted for without discrimination, farm productivity may be overestimated. Thus, farm income accounting in future should account for market income and policy income (Narayanamoorthy, 2021).

OVERALL DISCUSSION

The issues highlighted above indicate that farm income in India is more than an annual profit. Structural challenges like small farms, weak accounting and livelihoods mix combine with economic aspects such as increasing costs and price variability, and environmental risks such as droughts and floods. This makes the measurement of farm income a complex exercise that must involve multiple indicators of profitability, labour, diversification, stability and policy (Narayanamoorthy, 2021).

The conversation also suggests the need for improved measurement. Electronic record keeping, panel surveys, satellite images, mobile accounting software and indicators specific to the geography of farm income measurement will enhance farm income statistics in India. Improved data will help better policy formulation and better evaluation of whether farm income is growing and the benefits trickling down to farmers (Vatta & Budhiraja, 2021).

Thus, Assessment of farm income in India is crucial for ensuring inclusive agricultural development, but it's conceptually and practically challenging. Lack of data, smallholder farmers, climate uncertainty, high costs, family labour, consumption, multiple income streams and regional variations are all challenges in measuring farm income. Hence, there's no single indicator to reflect the true state of Indian farmers. A holistic and nuanced approach is needed, which must consider not just the volume of production, but also net returns, income stability, equity and sustainability (Narayanamoorthy, 2021). Better measurement of farm income will help in poverty reduction, better policy making and sustainable prosperity in the agricultural sector in India (Vatta & Budhiraja, 2021).

SUGGESTIONS AND POLICY IMPLICATIONS

Indian agricultural development should go hand in hand with farm income measurement and assessment as income is the ultimate measure of farmers' economic status. Though India has made significant advances in food production, irrigation and technology adoption, many farmers are facing low profitability, income instability and growing costs. This suggests that farm development cannot be measured in terms of increased production or expanded area under cultivation. Agricultural development should be measured in terms of farm household net and sustainable income (Narayanamoorthy, 2021).

In India, farm income depends on various factors like farm size, productivity, prices, diversification, credit and government policies, and climate risks. So, the farm development policies should aim at improving farm income, vulnerability and ensure balanced growth across regions and farmer groups. Having a reliable measure of income is essential for policymakers to detect distressed regions, assess the impacts of policy interventions and develop policies for inclusive development in agriculture (OECD, 2015).

1. Create a Farm Income Measurement System

The first step to enhance farm incomes in India is to have a scientific farm income measurement system. Farmers often fail to keep adequate cost, labour, production and sales records. They may not be able to estimate income. The government should encourage computerised farm accounting, mobile phone-based record keeping, regular household income surveys and village data centres. These will provide reliable data on gross income, net income, cost of cultivation and income diversification. Data are vital for informed policy design and targeting of social welfare programs (Narayanamoorthy, 2021).

2. Focus on Net Farm Income, Rather than Production

The majority of Indian policy has focused on production growth. But increased production does not necessarily benefit farmers if input prices rise and/or output prices decline. So, instead of production, future policy should be based on net farm income. Farm income indicators such as profit per unit area, family labour income, return on investment and income security should be included in agricultural planning and monitoring. This will ensure that development plans and projects enhance real income instead of merely boosting production numbers (Vatta & Budhiraja, 2021).

3. Minimize Cost of Cultivation by Efficient Use of Inputs

A key factor in farm incomes in India is the increasing cost of inputs. Use of fertilizers, pesticides, irrigation water, diesel, machinery and labour have all become more expensive. Hence, policies should encourage soil testing and balanced use of fertilizers, integrated pest management, micro-irrigation, solar pumps and custom hiring centres for machinery. Encouragement of Farmer Producer Organizations (FPOs) to buy inputs in bulk can also be helpful. Reducing the cost of cultivation increases net farm

income, without having to significantly increase production (Narayanamoorthy, 2021).

4. Raise Farm Production Earnings through Better Marketing

Low prices for farmers can be due to distress selling, inadequate storage, grading and reliance on middlemen. Despite good harvests, income can be less. Governments should improve rural markets, cold chains, stores, grading facilities, e-NAM (National Agriculture Market) and farmer-buyer connects. Market information systems through digital media should also be enhanced. Improving price realization is one of the most important strategies to boost incomes in India (OECD, 2015).

5. Encourage Crop Diversification and Related Activities

Monocropping increases farmers' vulnerability to market and weather shocks. Government policies should promote diversification of fruits, vegetables, pulses, oilseeds, floriculture, dairy, poultry, fisheries, beekeeping, mushroom, and agroforestry. Crop diversification provides multiple sources of income, helps generate cash flows throughout the year and avoids complete loss of income. Livestock production has exhibited relatively stable growth in India whereas many crop products have not, which is why diversification is a key aspect of farm development.

6. Improve Access to Institutional Finance and Financial Inclusion

Access to cheap credit is needed to enable farmers to invest in irrigation, machinery, storage or superior seed. Reliance on moneylenders can decrease incomes due to interest expense. Governments and banks should increase crop loans, Kisan Credit Cards, warehouse finance, self-help group finance and mobile banking. Income assessment-based credit can enhance investments and farm development (NABARD, 2018).

7. Improve Crop Insurance and Risk Management

Indian agriculture is prone to droughts, floods, cyclones, pest and disease outbreaks, and price shocks. Consequently, policies for agricultural development need to have effective risk management systems. Crop insurance should be made simple, claim settlements should be fast and weather insurance should be introduced. Early warning and irrigation security and government compensation in case of flood or drought are also necessary. Security is as important as profitability to small farmers (Bihari *et al*., 2019).

8. Support to Small and Marginal Farmers

Most Indian farmers have small and marginal farms, so these farmers need to be given preference in policy support. Across-the-board subsidies favour large farmers as the subsidy is tied to the size of the land or saleable surplus. Subsidies on inputs and credit, special credit schemes, tenancy, and capacity building for small farmers and women farmers can help achieve better equity and income. Tailored policy interventions are needed for inclusive growth (NABARD, 2018).

9. Encourage Farmer Producer Organisations and Cooperatives

Small-scale farmers have weak market power in input and output markets. Farmer Producer Organisations (FPOs), cooperatives and self-help groups can provide them with access to lower cost inputs, superior technology, storage, processing and markets. Collective action also lowers transaction costs, and increases economies of scale. So, creating and strengthening these groups should be a policy focus in India (OECD, 2015).

10. Promote Rural Infrastructure and Value Addition

Value addition can be a way to boost farm incomes. Rural infrastructure such as roads, cold storage, food processing, packaging, renewable energy and communication technology helps minimise post-harvest losses and opens markets. Rural investments in agro-processing also generate non-farm jobs and boost local economies. Infrastructure investment thus has direct and indirect impacts on income (OECD, 2015).

11. Link Sustainability with Farm Income

Transitory income growth through soil degradation, over-extraction of groundwater and excessive pesticides is unsustainable. For sustainable farm development in India, integrated nutrient, water, crop management, organic manure, climate-smart practices and soil health are critical. Governments should provide incentives and payments for ecosystem services to farmers who practice sustainability. This is necessary for sustainable income and food security and prosperity in rural India (Narayanamoorthy, 2021).

OVERALL, POLICY IMPLICATIONS

The above proposals suggest that India's agricultural policy needs to shift from a product-based policy to an income-based policy. Government spending should be shifted from broad-based subsidies to investments in research and infrastructure, extension, digital farming, climate adaptation and farmer organisations. Regularly tracking farm incomes can help assess the impact of policy on farmers' welfare.

The second implication is that agricultural development should be assessed by not just increases in production but also by increases in net income, income stability and income equality. Agricultural growth policies that increase yields, but do not increase profitability or increase regional inequality may not lead to inclusive growth. So, farm income indicators need to be included in the agricultural planning and assessment of India (Vatta & Budhiraja, 2021).

So, farm development in terms of measuring and assessing farm income in India needs a robust policy

approach. Access to reliable income data, reduction in the cost of production, improvement in the price of products, diversification, credit, risk mitigation, institutional support, infrastructure and sustainability are all critical to enhance farm income. Farm income should be considered as the ultimate goal of agricultural policy, as it is a measure of farmers' welfare. An income-focused approach can lead to a more profitable, sustainable and equitable agricultural sector in India.

LIMITATIONS OF THE STUDY

1. This study is only based on secondary data and no primary field work.
2. The absence of standard and recent farm income data may impact analysis.
3. Variations between states and regions may be under estimated because of aggregated data used.
4. Unrecorded, seasonal and informal sources of farmhousehold income may be missed.
5. Results depend on the sources, quality and coverage of published secondary data sources.

CONCLUSION

Quantifying and assessing farm income in India is important to estimate the true livelihood status of farmers and the performance of the farm sector. It is a more relevant measure than output as it accounts for the income earned after accounting for the cost of production and taking into consideration the risks, market conditions and subsistence needs. It is a key indicator in understanding whether the benefits of agricultural growth are trickling down to farmers and improving their living standards and lifting them out of poverty. Our analysis reveals that farm income in India depends on a number of factors including farm size, productivity, increasing cost of production, price, diversification, credit, government policy and climatic risks. The fact that most farmers are small and marginal farmers often results in poor and volatile incomes. Hence, farm income needs to be evaluated using various indicators like net income, profitability, income stability and income distribution, rather than just gross production.

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