ISSN 2828-5252
EXCEL JOURNAL OF ENGINEERING TECHONOLOGY AND MANAGEMENT SCIENCE
(A Peer Reviewed International Multidisciplinary Journal)
VOL. 01 | NO. 30 | JUNE - JULY 2026

A Study of Farm Resource Management and Its Influence on Agricultural Productivity and Farmers' Income

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Abstract

Farm resource management is one of the most practical areas of agricultural management because it connects farm-level decisions with productivity, cost control and income stability. The present paper studies how better management of land, water, labour, capital, machinery, inputs, information and technology influences agricultural productivity and farmers' income. The discussion is based on secondary data and published literature from 2014 to 2026. The paper argues that productivity does not improve only through higher input use. It improves when resources are used in a balanced, timely and need-based manner. A farmer who manages irrigation, soil nutrients, seed quality, labour, farm records and market decisions carefully is more likely to reduce wastage and earn better returns. In India, where small and marginal holdings dominate, farm resource management is especially important because most farmers operate with limited land and limited financial flexibility. The paper also highlights that digital advisories, precision farming, micro-irrigation, farm mechanisation and institutional support can strengthen resource use efficiency. However, gaps remain in awareness, affordability, extension services and access to reliable markets. The paper concludes that farm resource management should be treated as an income-centred approach, not merely as a production practice.

Keywords: *Farm resource management, agricultural productivity, farmers' income, resource use efficiency, farm planning, sustainable agriculture*

1. Introduction

Agriculture remains a major source of livelihood in India, even while the structure of the economy has changed. A large number of rural households continue to depend on farming, livestock and allied activities for income, food security and employment. In this situation, the

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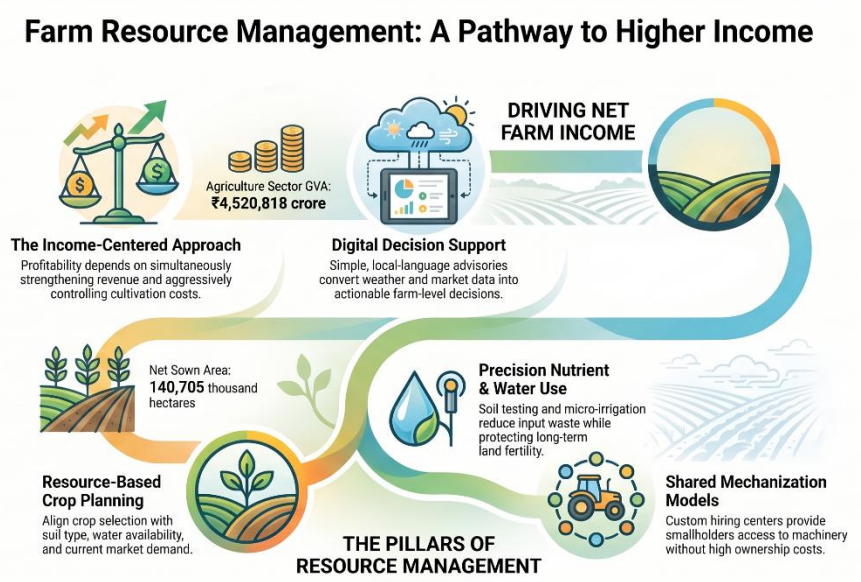
Date of submission 05-06-2026 Date of acceptance 26-06-2026

way a farmer manages available resources becomes as important as the resources themselves. Land, water, seeds, fertilizers, labour, credit, machinery and information are not separate elements. They work together inside the farm system.[1]

Farm resource management therefore refers to the thoughtful use of these resources so that production improves without unnecessary rise in cost. A farmer may own fertile land, but without timely irrigation or suitable crop choice, the full value of that land may not be realised. Similarly, using more fertilizer does not always mean higher productivity. The right dose, right time and right method matter. This is where management enters agriculture. The topic has gained more importance because farmers are facing rising input costs, uncertain rainfall, soil degradation, labour shortage and volatile market prices. These pressures directly affect farm income. At the same time, new opportunities are emerging through digital agriculture, farmer producer organisations, micro-irrigation, custom hiring centres, soil testing and market information systems. The real challenge is to convert these opportunities into practical benefits at the farm level.



2. Definitions of Key Terms

- **Farm Resource Management:** Farm resource management means planning, organising and using farm resources such as land, water, labour, capital, livestock, machinery, inputs and information in a manner that improves output, reduces waste and supports farm profitability.
- **Agricultural Productivity:** Agricultural productivity refers to the quantity or value of agricultural output obtained from a given unit of input, such as land, labour, water or

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capital. It is commonly measured through yield per hectare, output per worker or value added per farm.

- **Farmers' Income:** Farmers' income refers to the net earnings received by farmers from crop production, livestock, allied activities, sale of farm produce and other farm-related sources after deducting production costs.
- **Sustainable Agriculture:** Sustainable agriculture is a system of farming that aims to increase production and income while protecting soil, water, biodiversity and long-term ecological balance.

3. Review of Literature

3.1.FAO (2017) highlighted that the future of agriculture depends on producing more with fewer resources while also protecting natural systems. The report observed that land and water stress, climate risk and rural poverty are serious challenges for agriculture. It is relevant to the present paper because it places resource management at the centre of productivity and income improvement.[2]

3.2.Committee on Doubling Farmers' Income (2017) discussed income improvement through productivity enhancement, cost reduction, better market access, risk management and diversification. The committee clearly indicated that farmers' income cannot be improved only by increasing production. The cost side of farming must also be managed. This is directly connected with farm resource management because inefficient use of inputs reduces net income even when gross production appears high.[3]

3.3.Onyango (2021) reviewed precision agriculture practices for smallholder farmers and explained how location-specific input use can improve productivity. The study noted that precision agriculture is not limited to large mechanised farms. Even small farmers can benefit from better information, timely advisory services and careful input application. The review is useful because it shows that technology becomes meaningful only when it improves decision-making at the farm level.[4]

3.4. Jain (2023) reviewed evidence on sustainable intensification strategies in smallholder systems. The authors found that several strategies can support production and income, but their success depends on local conditions, adoption behaviour and the ability of farmers to combine practices properly. Their work is important for this paper because

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Date of submission 05-06-2026 Date of acceptance 26-06-2026

farm resource management is not a single activity. It is a bundle of decisions shaped by soil, water, crop, labour, market and household needs.[5]

4. Problem Statement

Farmers often work with limited and unevenly distributed resources. Some have land but lack irrigation. Some have labour but lack capital. Others have access to credit but do not receive timely technical guidance. In such conditions, productivity remains below potential and income becomes uncertain. The problem is not always the absence of resources. In many cases, the problem is weak planning, poor timing, low awareness, fragmented landholding and inefficient use of available resources. The study therefore focuses on the need to understand how farm resource management influences agricultural productivity and farmers' income. It also examines why better resource management should be considered a core strategy for agricultural development.

5. Objective of the Paper

The objective of the paper is to study the role of farm resource management in improving agricultural productivity and farmers' income. It also aims to understand how better use of land, water, labour, capital, inputs, technology and market information can reduce farm costs, improve output and support sustainable income growth among farmers.

6. Farm Resource Management Practices

Farm resource management begins with planning. Before selecting a crop, the farmer has to consider soil type, water availability, family labour, market demand, capital requirement and risk. A crop that gives high yield in one region may not be suitable in another region if water is scarce or market access is weak. Therefore, resource-based crop planning is one of the first steps in sound farm management.

Water management is another major area. Irrigation at the right stage can protect yield, while excess irrigation can damage soil health and increase cost. Micro-irrigation, rainwater harvesting, farm ponds and moisture conservation practices help farmers use water more carefully. In dry and semi-dry regions, efficient water use can make the difference between profit and loss. Soil and nutrient management also influence productivity. Balanced fertilizer use, organic manures, crop rotation, soil testing and micronutrient correction improve soil

Date of submission 05-06-2026 Date of acceptance 26-06-2026

health. When farmers apply inputs without knowing soil requirements, costs rise and results remain uncertain. Better nutrient planning reduces waste and protects long-term fertility. Labour and machinery management have become important because rural labour availability is changing. Timely sowing, weeding, spraying and harvesting often depend on labour or machine access. Custom hiring centres and shared machinery services can help small farmers use equipment without purchasing costly machines.

7. Farm Resource Utilisation and Agricultural Productivity

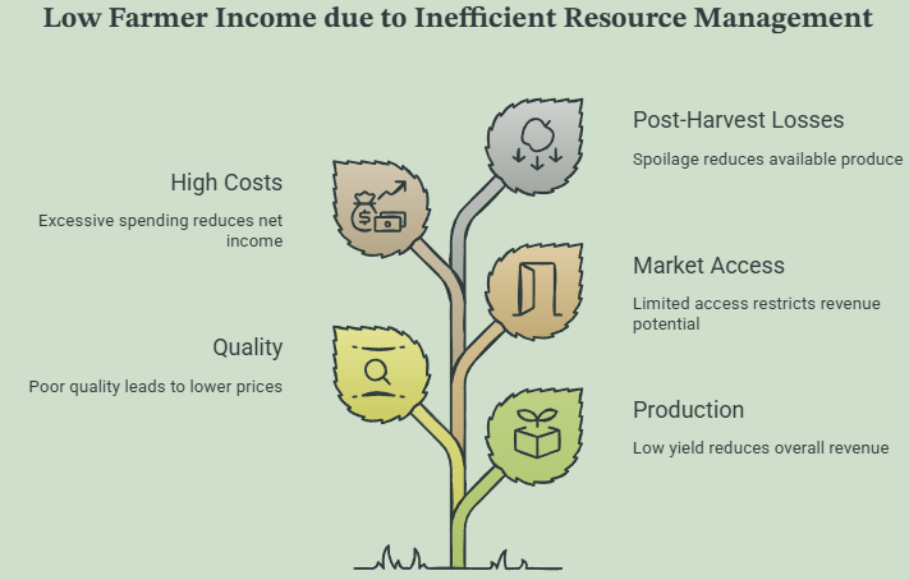
Agricultural productivity is strongly linked with the quality of resource use. Productivity may increase when improved seeds are used, but the gain will be limited if water, nutrients and pest management are weak. In the same way, irrigation alone cannot raise productivity if soil fertility is declining. Farm resources work in combination. The World Bank defines cereal yield as kilograms per hectare of harvested land and includes major cereals such as wheat, rice, maize, barley, millet and sorghum. This indicator is useful because it provides a broad view of land productivity in food crops.[6] In India, official agricultural data show that the value generated by agriculture, forestry and fishing has increased over time. However, income improvement at household level depends on whether farmers can convert this sectoral growth into better net returns. This requires efficient input use, reduction of avoidable costs and better price realisation.

8. Farm Resource Management for Enhancing Farmers' Income

Farmers' income is influenced by two sides of farming: revenue and cost. Revenue depends on production, quality, price and market access. Cost depends on seed, fertilizers, pesticides, irrigation, labour, machinery, transport, credit and post-harvest losses. Farm resource management improves income when it strengthens revenue and controls cost at the same time. For example, a farmer who uses soil testing may reduce unnecessary fertilizer expenditure. A farmer who adopts drip irrigation may save water and labour. A farmer who selects crops according to market demand may get better prices. A farmer who stores produce for a short period may avoid distress sale. These decisions are small in appearance, but together they shape income. Technology can support these decisions. Digital advisories, weather forecasts, satellite information, mobile-based market prices and farm record tools can help farmers plan better.

Date of submission 05-06-2026 Date of acceptance 26-06-2026

Yet technology alone is not a solution. It must be affordable, simple, local-language based and connected with extension support.



9. Research Methodology

9.1 Type of Data

The present paper totally relies on secondary data.

9.2 Type of Research

The research type for the present paper is descriptive and analytical.

9.3 Period of Research

The period of study is from 2014 to 2026.

9.4 Research Gap

The existing literature discusses productivity, technology, irrigation, market access and farmers' income separately in many cases. However, fewer papers bring these issues together under the single lens of farm resource management. There is also a need for more farm-level studies that show how small decisions regarding land, water, labour, capital and market timing influence net income. This paper attempts to address this gap through a conceptual and evidence-based discussion.

10. Statistical Data and Interpretation

The following table presents selected statistical figures that are directly connected with farm resource management, agricultural productivity and income potential in India. These figures

Date of submission 05-06-2026 Date of acceptance 26-06-2026

indicate the importance of land use, cropping intensity and agricultural value generation.

Table 1: Agricultural Resource and Output Indicators in India

Indicator	Year	Figure
Reported area	2022-23	306650 thousand hectares
Agricultural land	2022-23	Around 59 percent of reported area
Net sown area	2022-23	140705 thousand hectares
Gross cropped area	2022-23	219357 thousand hectares
Cropping intensity	2022-23	155.9 percent
Agriculture, forestry and fishing GVA	2022-23	₹4520818 crore at current basic prices

***Source**: Government of India, Ministry of Agriculture and Farmers Welfare, Annual Report 2024-25*[7]

The table shows that land remains the most basic farm resource, but its value depends on how intensively and sustainably it is used. A cropping intensity of 155.9 percent indicates that the same land is being used more than once in many areas. This can support higher production, but only when soil fertility, water availability and input planning are managed carefully. The increase in sectoral GVA also suggests that agriculture continues to create significant economic value, but farm-level income will improve only when farmers receive a fair share of this value.

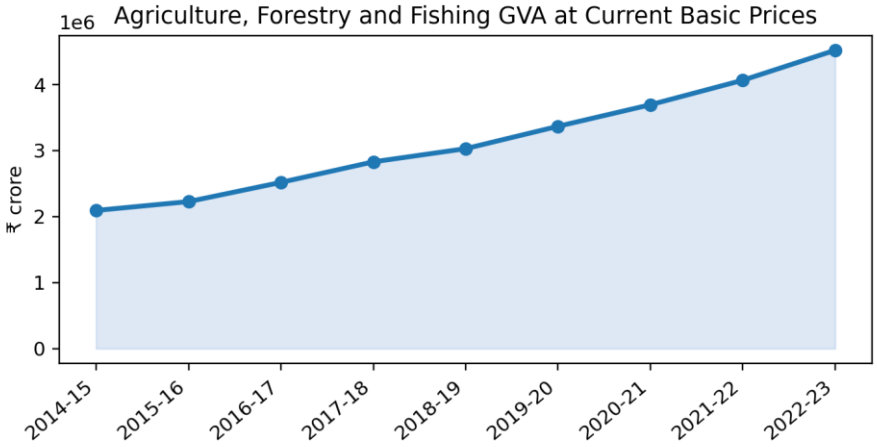


Figure 1: Growth in Agriculture, Forestry and Fishing GVA, India

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Date of submission 05-06-2026 Date of acceptance 26-06-2026

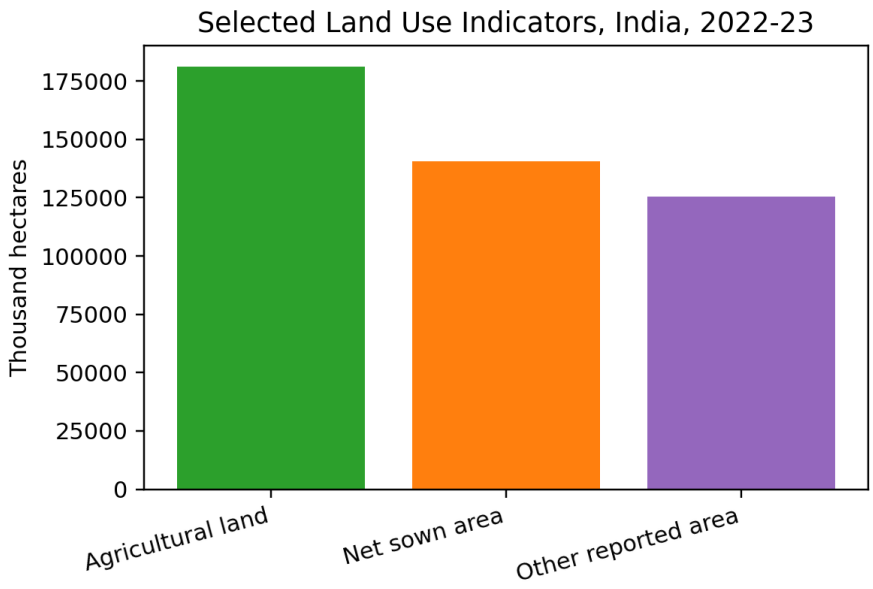

Figure 2: Selected Land Use Indicators, India, 2022-23

11. Recommendations

- It is recommended that farm planning should begin with a clear assessment of land type, water availability, soil condition and market demand. This will help farmers select crops that suit their actual resource position.
- It is recommended that soil testing and balanced nutrient application should be promoted more actively. This can reduce unnecessary input cost and protect long-term soil productivity.
- It is recommended that micro-irrigation, water harvesting and moisture conservation practices should be expanded, especially in regions facing rainfall uncertainty.
- It is recommended that small and marginal farmers should be supported through custom hiring centres, so that they can access machinery without bearing the burden of full ownership cost.
- It is recommended that digital advisories should be made simple, local-language based and linked with field-level extension workers. Farmers need usable guidance, not only information.
- It is recommended that farmers should maintain basic farm records of cost, output, labour use and sale price. Even simple records can improve decision-making in the next season.

Date of submission 05-06-2026 Date of acceptance 26-06-2026

12. Conclusion

Farm resource management is not a theoretical idea. It is a practical need for farmers who have to produce more, spend carefully and face uncertain markets. The study shows that agricultural productivity and farmers' income are closely connected with the way resources are planned and used. Better seeds, irrigation, fertilizers, machinery and technology can certainly improve farming, but only when they are used in the right combination. The paper also shows that income improvement requires attention to both production and cost. A farmer may increase yield, but if the cost of cultivation rises faster than output value, income may not improve. Therefore, farm resource management must focus on net returns. This makes the approach more meaningful for small and marginal farmers. In the coming years, the importance of farm resource management will increase further because agriculture is facing climate risk, labour changes, market competition and pressure on natural resources. Policy support, extension services, farmer organisations and digital tools can play a positive role. Still, the final success depends on whether these supports reach the farmer in a simple, timely and affordable manner. A well-managed farm is not only more productive. It is also more resilient, more sustainable and more capable of improving farmers' income.

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