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Cultural Impact and Economic Development of Agricultural Farming in Kashmir Valley

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Abstract

This study examines how the culture of the Kashmir Valley is connected with the agricultural growth. Agriculture has been a fundamental determinant of the patterns of settlement, land utilization, and community relations as it has served as a source of livelihood and a social institution. Conventional foods like paddy, maize, apple, saffron and walnut are fixed on food practices, the cycles of seasons, and ideological beliefs. The Agricultural activities preserve native knowledge on seed choice, soil management and water irrigation by using the traditional waterways. These traditions contribute to intergenerational knowledge and labour regimes that have remained to bring about social cohesion in rural regions. Nevertheless, new agricultural activities have an impact on the volume of production and the survival of cultural traditions and society. Economically, farming is also one of the principal employment sources and household incomes in the valley. Many proportion of the population relies directly or indirectly on agriculture and related initiatives. In the last few decades, horticulture has still become the most vibrant sector of agricultural economy. Apple production is the leading source of farm revenue and complementing the production are related activities like grading, cold storage, transport and marketing. The cultivation of high value crops such as saffron, walnut, and almond also offer more avenues of income especially among small and marginal farmers. Farm wages will help in increasing the standard of living, educational expenditures and development of markets in sparsely populated areas. As the study points out, not only an economic aspect can be applied to agriculture in the Kashmir Valley. Its cultural nature also plays a significant role in keeping the society united and identified. Sustainable agricultural development demands consideration of policies that enhance value chain, safeguard the indigenous knowledge, infrastructure and climate resilience practices. Farming needs to be conserved to bring about balanced development.

Keywords: Cultural impact, Horticulture, Economic development, Agricultural farming, Kashmir Valley.

Introduction

Historically, agriculture is the main constituent of the socio economic setup of Kashmir Valley and remains at the core of determining the rural livelihood and development in the region. The special geographical location, fertile alluvial soils, and moderate climate have been able to support a wide range of agricultural system which is principally paddy crops and high value horticultural produce. In addition to the role it plays in food production, agriculture in Kashmir is a multidimensional cultural institution which determines social organization, land use patterns, as well as collective activities among rural populations. This interconnection between agriculture and society in the valley is thus more than just a question of economic output but a more complex cultural connotation of a long term historical continuity. The Kashmir Valley agricultural practices are woven together with cultural practices. Rural life is structured around seasonal activities like sowing, transplanting, and harvesting and is usually accompanied by collective labor and traditional norms of collaboration. The aspects of irrigation management, crop choice and soil safeguard have been passed across different generations in traditional knowledge, which has made the local farming systems more resilient. The cultural heritage and visual landscape of the region are also comprised of agricultural landscapes such as paddy fields, orchards, and terraced slopes. The alteration of agricultural activity and land use consequently impact directly on cultural continuity and interpersonal unity.

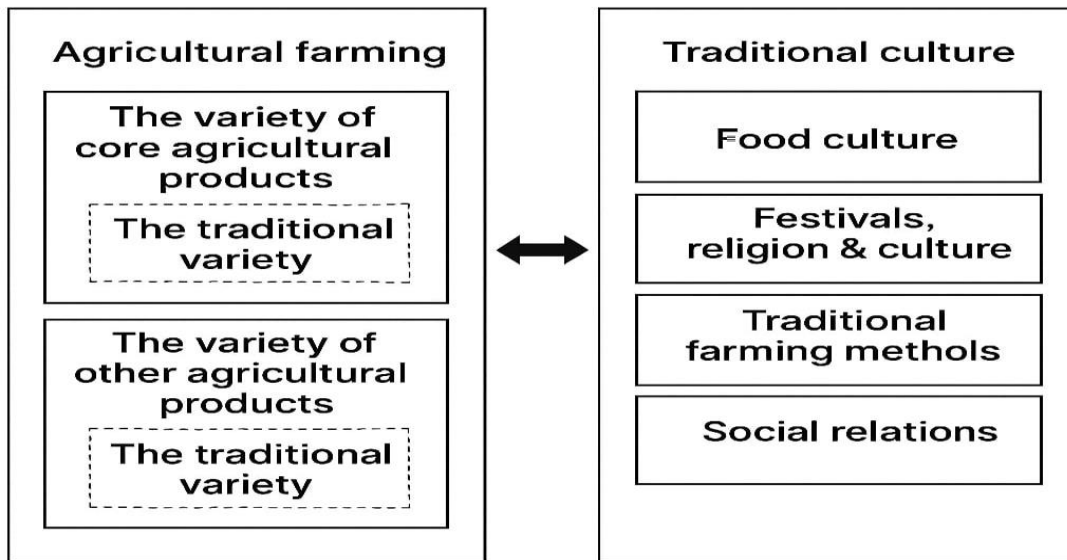
Agriculture has continued to be a significant source of livelihood and jobs to a significant percentage of the people in the valley. Food grain farming has provided security in regard to subsistence but horticultural farming has greatly changed the rural economy. The cultivation of Apple especially, has become a major income generating venture which has promoted development of other related industries like storage, transportation and marketing. Such high value crops as saffron and walnut also increase farm earnings and integration of the region into the world and national markets. The agricultural development has led to poverty eradication, standard living and stabilization of rural economies.

Nevertheless, agricultural industries in Kashmir Valley have structural and environmental issues such as disaggregated land areas, climatic variations, decreasing water supplies, and market insecurities. These issues pose threats to economic sustainability as well as cultural structures that are being related to farming. Informing the cultural influence and economic growth of agriculture is thus critical in formulating the sustainable policy which can assist rural livelihood, upholding the cultural identity and enhancing a balanced growth in the region in the Kashmir Valley.

Agriculture and Cultural Identity in Kashmir valley

Agriculture is not merely the production of food either to feed the population or to sell it, but a lifelong statement of cultural heritage, collective memory and identity of Kashmir. Kashmir is sandwiched between the Himalayas and the Pir Panjal ranges and is as varied in its land as it is in its inhabitants - paddy fields and orchards of the Kashmir Valley contrast with rolling plains of Jammu and high-altitude Ladakh pastures. This geographical diversity has spawned an equally rich array of agricultural activity, which is greatly bound up as well in the social, spiritual and economic life of the people who call this region their home. The history of agriculture in Kashmir cannot be narrated simply in terms of crop, harvests and prices. It is a tale that is threaded by centuries of acclimatization to the peculiarities of climatic conditions and the geographical landscape, by the folk traditions, the wisdom of the people and the close relationship between humans and nature. Over the generations, the farmers, orchardists, shepherds, and nomadic pastoralists in the region have devised complex regimes of knowledge to cope with frail ecologies, to exploit limited resources and to generate a mosaic of crops and animals that rely on them to feed their families and their cultural practices. Agriculture has had a key influence in determining the pace of life in this region over the course of history. Not only does it take the form of seasonal cycles in terms of when to sowing, harvesting fields, but also the rituals, feasts, and fellowship that characterize the communal life. The turning of almond trees in the spring in the Kashmir Valley marks the start of Navreh, the Kashmiri New Year, and the harvesting of saffron saffron in Pampore, which unites families to pick the fragile crimson strands that made the state become known around the globe. Baisakhi, which culminates the wheat and other Rabi harvests in the plains of Jammu, is the time of rich music, dance and feasts of the community. These cultural practices are not rituals but they are working systems based on the deep knowledge of the land and the ecological cycles. Modular irrigation systems- the kul systems of the hills and the complex Zing waterways of Ladakh- are a manifestation of community collaboration in the management of water in an area where water scarcity is normal. Farming on terrace on sloppy mountain slopes will help avoid soil erosion and exploit the limited arable land. Not only are mixed cropping, crop rotation and the planting of indigenous varieties methods of maximizing yields, but are the methods of ensuring food security, biodiversity and the maintenance of soil fertility in a vulnerable mountain environment.

Kashmir Valley



The conceptual framework of the interrelationship between agricultural biodiversity and traditional culture in Kashmir valley

1. Traditional Knowledge Systems

In the rural Kashmir valley lies a reservoir of traditional knowledge, locally developed, orally transmitted and based on profound study of natural phenomena, embedded in the agricultural identity of the Kashmir valley. Over the generations, this has helped farmers determine what, when, and how to take care of soil fertility, to save water, and to avoid pests and disease by these farmers without the use of modern chemical inputs. An example of such subtle cues that the farmers in the Valley have been using over time is the flowering of certain wild plants, the behavior of migrating birds, and the onset of snowfall to determine when they should plant and when they should harvest their crops. Another aspect where indigenous knowledge is still important is that of integrated pest management with organic means. Conventional pest control systems

comprise the application of ash, herbal formulations and intercropping, which are the natural ways of diminishing pests. As an example, farmers tend to use mustard as a trap crop on the sides of vegetable farms so that the pests can be diverted. Similarly, by planting marigold or garlic even in vegetable beds, insects are able to be driven away and therefore less use of synthetic pesticides. The management of soil fertility as well is agency of the wisdom that has been brought down the ages. The leave-forest-compost practice of manure used in characterizing farmyards is prevalent in several of the Kashmir Valley villages. In addition to making the soil fertile, this organic manure also enhances its structure and the ability to hold moisture—a very vital factor in paddy production within the peculiar wetland ecology of the Valley. Terrace farming and contour bunding have long been used in hilly areas of Jammu to reduce soil erosion and exploit rainwater to maximum potential by growing crops in dry land. One of the most outstanding features of the same traditional knowledge is that it is shared. It does not remain in individual households but is exchanged in extended families, kinship groups and village communities. Elders are significant because they are the guardians of this knowledge in the form of a story, folk songs and proverbs which usually carry concealed within their words guidelines to farm activities, weather prediction and communal coordination.

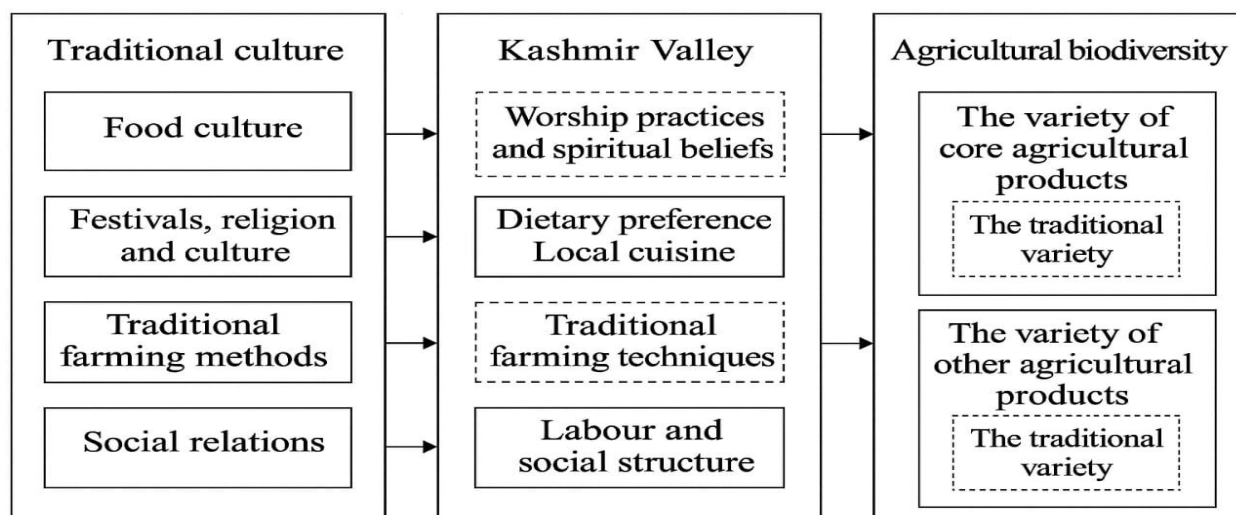


Table no 2. Adoption Levels of Cultural–Language Practices

Cultural Practice	High Adoption	Medium Adoption	Low Adoption	Not Practiced	Total (%)
Sanitation	98 (40.8%)	65 (27.1%)	54 (22.5%)	23 (9.6%)	100%
Crop Rotation	144 (60.0%)	63 (26.3%)	23 (9.6%)	10 (4.2%)	100%
Fertilization	176 (73.3%)	45 (18.8%)	12 (5.0%)	7 (2.9%)	100%
Seed Treatment	98 (40.8%)	75 (31.3%)	37 (15.4%)	30 (12.5%)	100%
Irrigation Practices	104 (43.3%)	60 (25.0%)	36 (15.0%)	40 (16.7%)	100%
Use of Sprout Inhibitor	24 (10.0%)	36 (15.0%)	48 (20.0%)	132 (55.0%)	100%
Harvest Ritual Timing	110 (45.8%)	70 (29.2%)	40 (16.7%)	20 (8.3%)	100%
Storage Hygiene Practices	90 (37.5%)	70 (29.2%)	44 (18.3%)	36 (15.0%)	100%

Source: Field Survey (2023)

The utilization of different cultural farming practices indicates a high degree of difference in the degree to which the farmers in the region have adopted both the traditional and modern farming methods. Fertilization (73.3%) and crop rotation (60.0%) were the most common practices adopted by farmers showing that they are very aware of the role of these practices in improving the soil fertility and ensuring sustainable production. Such practices are presumably advocated by agricultural extension services, and based on the long-standing agrarian knowledge and scientific advice. Conversely, sanitation (40.8%), seed treatment (40.8%), irrigation management (43.3%), and harvest ritual timing (45.8%), had moderate levels of high adoption. These numbers imply some degree of incorporating these practices into a typical farming system, which may be motivated by the differences in resource availability, the spread of knowledge, and cultural compliance.

Interestingly, sprout inhibitor had the lowest level of high adoption (10.0) and the highest percentage of non-practice (55.0) which may imply that people were not even aware of its benefits or it may not be easily accessible to this kind of input. Likewise, storage hygiene practices, though moderately used (37.5% high use), are an area that needs attention because 15.0% of the farmers do not use it at all. The causes of these discrepancies are related to both the lack of infrastructure and to the lapses in the training or extension of farmers. In general, the results point to a tendency in terms of which the practices directly related to the yield improvement are more widely distributed, whereas the ones associated with the management of the post-harvest and preventive care are comparatively under-represented. This emphasizes the necessity of a more intensive extension strategy that will alleviate the differences between the traditional cultural and the modern agricultural innovations specifically on the areas of storage, sanitation, and use of chemicals.

Language Group	Education Level	Mean Adoption Score (out of 8)	N
Kashmiri	Primary or less	4.5	40
Kashmiri	Secondary or above	6.0	60
Pahari	Primary or less	3.9	40
Pahari	Secondary or above	5.2	35
Gojri	Primary or less	3.6	40
Gojri	Secondary or above	4.8	25

Source: Field Survey (2023)

The given data point to the role that both the language group and educational level play in the adoption of typical cultural practices in agriculture. The overall pattern of all the three language groups of Kashmiri, Pahari, and Gojri is that farmers with secondary education and higher education invariably show greater mean scores on adoption relative to farmers having primary education and below. This highlights the significance of education in enabling awareness, understanding and application of better farming practices. Overall, Kashmiri-speaking respondents have the highest adoption level with the mean score of 6.0 between the more educated and 4.5 between the less educated. Such numbers are probably due to both increased institutional backing and the increased correspondence between the language of extension services and the native tongue of the farmers.

Still portraying a moderate adoption rates, Pahari-speaking farmers still has a significant education-related gap with a score of 5.2 and 3.9 in the higher and lower education categories, respectively. The respondents who use Gojri have the lowest rates of adoption-4.8 among the educated and 3.6 among the primary education and less educated. This implies that Gojri-speaking populations can be at a compounded disadvantage with reduced access to education, geographic isolation, and less linguistic representation in agricultural communication and extension literature. Generally, the findings indicate a serious overlap between language and schooling as predictors of the adoption of agricultural innovations. To deal with these differences, it needs to formulate multilingual and inclusive strategies of extension that are sensitive to the linguistic and educational characteristics of all the rural populations especially marginalized or hill populations.

Landholding Size	Avg. Score	High Adoption (%)	Low Adoption (%)
Marginal (<1 ha)	3.9	18.2%	44.5%
Small (1–2 ha)	4.7	28.4%	30.0%
Semi-medium (2–4 ha)	5.8	46.6%	13.3%
Medium & Large (>4 ha)	6.5	59.1%	6.0%

Source: Field Survey (2023)

The evidence shows that there is a large positive association between landholding size and modern agricultural practices. The lowest average adoption score (3.9) and the largest percent of low adopters (44.5) are among farmers owning marginal land (<1 hectare). Conversely, the maximum adoption score (6.5) is recorded by those holding medium and large holdings (>4 hectares) with majority being in high adoption (59.1) and only 6% in low adoption.

Such a pattern implies that the larger landowners will tend to invest and experience superior agricultural technologies and practices, potentially because of their superior financial ability, exposure to extension services, and because of lower economic risk. Conversely, small and marginal farmers might be constrained, such as by a lack of capital, or by shortages of labor or access that prevents adoption, although they represent a good share of the agricultural population.

Cultural Practice	Plains (n=80)	Valley (n=80)	Hills (n=80)	Key Observations
Sanitation	72%	88%	63%	Valley shows best hygiene due to awareness
Crop Rotation	91%	84%	65%	Less feasible in hilly areas due to terrain
Fertilization	97%	91%	95%	Uniformly high across all zones
Sprout Inhibitor	35%	25%	15%	Rare in hills; mostly used for tuber crops
Storage	74%	66%	46%	Storage infrastructure lacking in hills
Seed Treatment	82%	74%	48%	Best in plains with better input access
Irrigation	76%	64%	31%	Hilly areas depend more on rainfall

Source: Field Survey (2023)

The assimilation of cultural agricultural practices in geographical regions i.e. Plains, Valley, and Hills disclose major spatial differences. Practices that are most widely adopted in the Valley (88%), presumably because of greater awareness, are those related to sanitation. The Plains (91% and Valley (84%) have the highest rates of crop rotation, whereas the Hills (65%), where there is no chance to diversify due to terrain and smaller holdings control the situation, have lower rates.

Fertilization is also high throughout the zones and this shows a wide awareness and availability of fertilizers either chemical or organic. Sprout inhibitors are however poorly used especially in the Hills (15%), indicating that there is not much application of post-harvest treatments in the regions where the interventions might not be economically viable or even very popular.

The same can be said about storage and seed treatment practices: the adoption rates are higher in Plains, moderate in Valley, and low in Hills, which is indicative of disproportionate access to storage structures and inputs. Finally, Plains has strong irrigation practices (76%), whereas adoption in the Hills (31%), with rain-fed systems prevailing and irrigation infrastructure immature, is lower.

Such a zonal imbalance implies that there are regionally sensitive agricultural interventions, such as the provision of regional infrastructure and language-based extension services in the hilly areas.

2. Economic Development of Agricultural farming in Kashmir Valley

Economic development of agricultural farming in the Kashmir Valley has evolved through a gradual shift from subsistence oriented food grain production to a market driven and horticulture led rural economy. The region's physical advantages such as fertile soils, ample water resources, and a temperate climate have supported diverse agricultural activities. Agriculture continues to provide livelihood security to a large share of the population and remains a critical contributor to rural income, employment, and local economic stability.

Traditionally, crop farming in the valley was dominated by paddy and maize, which ensured household food security and supported rural sustenance. Over time, economic pressures, population growth, and changing market demand encouraged diversification toward high value crops. Horticulture emerged as the most dynamic component of agricultural development. Apple cultivation now occupies a central position in the rural economy and generates substantially higher returns compared to cereals. This shift has raised farm incomes and strengthened the purchasing power of rural households.

Agricultural development has also stimulated the growth of allied sectors. Expansion of orchards has increased demand for cold storage, grading units, packaging material, transport services, and wholesale trade. These activities generate non-farm employment and create backward and forward linkages within the rural economy. Income from agriculture supports education, housing, and small scale entrepreneurship, contributing to overall economic development in the valley.

Despite these gains, agricultural growth remains uneven. Small and fragmented landholdings limit mechanization and productivity. Dependence on weather conditions, limited irrigation coverage in some areas, and price volatility reduce income stability. Nevertheless, agriculture continues to function as an economic anchor, particularly in rural areas where alternative employment opportunities are limited.

Sector	Main crops or activities	Economic significance
Crop farming	Paddy, maize, vegetables	Ensures food security and provides subsistence income
Horticulture	Apple, pear, cherry	Main source of farm income and rural employment
Plantation crops	Saffron, walnut, almond	High value income with export potential
Allied activities	Dairy, poultry, beekeeping	Provides supplementary household income

Crop farming remains the foundation of the agricultural system. Paddy, maize, and vegetables primarily support household food security. Their economic contribution is stable but limited, as returns are generally low and production is largely subsistence oriented. Horticulture represents the most economically dynamic sector. Crops such as apple, pear, and cherry generate higher incomes and create large scale rural employment. This sector links farmer to regional and national markets and drives cash flow in the rural economy. Plantation crops occupy relatively smaller areas but deliver high economic returns. Saffron, walnut, and almond contribute significantly to export earnings and farmer profitability. Their high value nature makes them critical for income diversification and long term economic growth. Allied activities play a supportive role in agricultural development. Dairy, poultry, and beekeeping provide supplementary income and reduce dependence on a single crop. These activities enhance income stability and strengthen livelihood security for rural households. Overall, the table indicates a gradual shift from subsistence based crop farming toward market oriented and high value agricultural activities. This diversification strengthens rural incomes, employment opportunities, and economic resilience in the Kashmir Valley.

Crop	Average land use	Income potential	Market orientation
Paddy	Large area coverage	Low to moderate	Mainly for local consumption
Apple	Moderate area coverage	High	National level markets
Saffron	Small area coverage	Very high	National and international markets
Walnut	Scattered plantation	High	Export oriented markets

Paddy occupies the largest share of cultivated land, reflecting its importance for food security. However, its income potential remains low to moderate because production is mainly subsistence based and linked to local markets. This limits its contribution to cash income despite wide area coverage. Apple cultivation uses a comparatively moderate area but generates high income. Strong demand in national markets, along with better price realization, makes apple the most economically

significant crop in the valley. It also supports employment in storage, transport, and trade. Saffron is cultivated on a very small area, yet it offers very high income potential. Its strong demand in national and international markets makes it one of the most valuable crops per unit area. This highlights the economic importance of high value, low volume crops. Walnut plantations are scattered and not area intensive, but they generate high income due to export oriented demand. Walnut contributes to foreign exchange earnings and income diversification for farmers. Overall, the table indicates that crops with smaller land requirements often yield higher economic returns. This pattern explains the growing shift from food grain cultivation toward high value and market oriented crops in the Kashmir Valley.

Conclusion

The study demonstrates that agriculture in the Kashmir Valley extends far beyond subsistence production and functions as a core cultural and economic institution. Farming practices are deeply embedded in local history, language, rituals, and social organization, shaping community life and sustaining ecological balance through indigenous knowledge systems. Practices such as crop rotation, organic fertilization, traditional irrigation, and collective labor reflect long standing adaptive strategies that have ensured food security and environmental sustainability in a fragile mountain ecosystem. At the same time, the study reveals growing pressures on this agrarian system. Modernization, climate variability, land fragmentation, mono-cropping, and youth migration are weakening traditional practices and disrupting intergenerational knowledge transfer. The uneven adoption of agricultural practices across language groups, education levels, landholding sizes, and agro ecological zones highlights structural inequalities in access to resources, information, and extension services. These disparities underline the need for inclusive, region specific, and multilingual agricultural policies. Economically, agriculture remains central to rural development in the Kashmir Valley. The transition from food grain dominated farming to a horticulture led economy has increased farm incomes, strengthened market integration, and generated employment through allied sectors such as storage, transport, and processing. High value crops such as apple, saffron, and walnut have enhanced income diversification and export potential, while allied activities have improved livelihood stability for small and marginal farmers. The findings suggest that sustainable agricultural development in the Kashmir Valley requires an integrated approach that combines traditional cultural practices with modern innovations. Policy interventions should focus on strengthening infrastructure, improving market access, supporting indigenous knowledge, and promoting climate resilient and value added agriculture. Initiatives such as organic certification, agri tourism, community seed banks, and culturally sensitive extension services can play a critical role in preserving agricultural heritage while ensuring economic growth. Overall, sustaining agriculture is essential not only for economic development but also for protecting cultural identity, social cohesion, and long term resilience in the Kashmir Valley.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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