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Farmers' Perception Regarding Resilience of Kharchia Wheat Land Race in Saline and Resource-Constrained Agro-Ecosystems of Arid India

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Abstract

The study examines the trend of continued cultivation and conservation of Kharchia wheat (T*riticum aestivum* L.), a salt-tolerant landrace grown in the saline belt of Pali district, Rajasthan, India. Despite the availability of improved wheat varieties, an overwhelming majority of farmers (over 90%) perceive Kharchia wheat as indispensable under harsh agro-ecological conditions characterized by saline soils, saline groundwater, high temperatures, limited irrigation, good fodder yield, resistance to storage pests and low input requirements. In addition to agronomic resilience, Kharchia wheat is highly valued for its superior flour quality, taste, water-absorption capacity, shelf life of chapatis, and suitability for traditional dishes such as Baati, Churma, and Dalia. The study found little evidence of varietal replacement or genetic erosion in the area. Most farmers reported continued or even expanding cultivation of Kharchia wheat, especially as soil and water salinity increased. Although improved varieties may offer higher yields under favourable irrigated conditions, they often fail in saline and resource-poor environments. Farmers' continued reliance on Kharchia wheat reflects rational, risk-averse decision-making aimed at ensuring livelihood security, reducing dependence on external seed markets, and minimizing production costs. Beyond its local importance, Kharchia wheat has contributed significantly to formal breeding programs and has been used as donor material to develop salt-tolerant varieties, including Kharchia 65, KRL 1-4, KRL 19, and KRL 39. Its registration with the ICAR-National Bureau of Plant Genetic Resources (NBPGR), New Delhi, further underscores its strategic value. The findings emphasize that effective on-farm conservation policies must incorporate farmers' perceptions, traditional knowledge and socio-ecological realities. In the face of climate change, strengthening indigenous varieties and biocultural systems is essential for sustaining agricultural resilience, especially in marginal and saline agro-ecosystems.

Keywords: Salinity tolerance, On-farm conservation, Sustainable agriculture, Farmers' perception, Indigenous varieties

Introduction

Traditional crop varieties or landraces continue to be cultivated in many parts of the world within traditional farming systems, where they form integral components of production systems and farmers' livelihood strategies (Kumar *et al.*, 2025). These landraces are often well adapted to local agro-ecological conditions and management practices, contributing to food security, risk buffering, and cultural identity (Singh *et al.*, 2020). However, landraces across several crops have been identified as among the most threatened categories of plant genetic resources and are frequently central to debates over farmers' rights and compensation for the conservation of genetic resources (Dwivedi *et al.*, 2017). Although a precise global assessment of on-farm genetic diversity remains elusive, there is broad consensus that significant genetic erosion has occurred in the diversity underpinning global food production (Bellon *et al.*, 2018). Evidence for this erosion largely stems from short-term, country-specific, or crop-specific studies, in which diversity is often documented merely as inventories of variety names rather than through robust genetic or functional indicators (Negri, 2015). Despite these limitations, the continued presence of landraces in farming systems where modern alternatives are available underscores their private value to farmers (Sharma, 2022). This value is further reflected in farmers' active evaluation, selection and management of local varieties under diverse socio-ecological contexts (Singh *et al.*, 2026). Crop genetic resources have long been fundamental to agricultural development, prompting extensive efforts during the latter half of the twentieth century to collect, characterize and conserve this diversity through ex-situ approaches such as seed banks and botanical gardens (Singh *et al.*, 2017). While these initiatives have resulted in a global network of conservation facilities, ex-situ systems are inherently limited in their ability to capture the full spectrum of useful genetic diversity in cultivated species. More importantly, they cannot conserve the dynamic evolutionary processes, farmer-driven selection and associated indigenous knowledge systems that shape the development and continued adaptation of local cultivars (Bellon *et al.*, 2018; Fowler and Hodgkin, 2005). Consequently, over the past two decades, increasing attention has been directed toward on-farm (in-situ) conservation of crop genetic resources (Rao *et al.*, 2018). However, standardized indices capable of monitoring and scaling on-farm diversity across time and space remain largely underdeveloped. The significance of farmer-maintained diversity has further intensified under climate change, as modern agriculture increasingly relies on a narrow genetic base (Singh *et al.*, 2018), heightening vulnerability to abiotic and biotic stresses.

Empirical evidence from diverse regions highlights the adaptive value of in-situ conservation. For instance, laboratory analyses in southwest China have demonstrated that landraces maintained on farms exhibit substantially higher genetic diversity than accessions conserved ex situ for three decades (Swiderska *et al.*, 2011), underscoring the role of environmental heterogeneity and farmer selection in sustaining diversity. Similarly, in coastal Kenya, the Mijikenda sacred forests (locally known as *kaya*) conserve rich plant and animal biodiversity, serving as reservoirs of germplasm tolerant to drought, salinity, pests, and diseases under increasingly extreme climatic conditions (Tama *et al.*, 2021; Swiderska *et al.*, 2011). Communities in these regions report pronounced climatic shifts, including erratic rainfall, rising temperatures, prolonged droughts, floods and increased storm frequency with droughts occurring more frequently and with greater severity than in the past. In response, farmers employ a combination of traditional biocultural management practices and contemporary institutional interventions, highlighting the importance of community-based conservation and adaptation strategies (Meena and Singh, 2020).

In this context, supporting local landrace conservation, community seed banks and farmer-led conservation initiatives is increasingly recognised as essential for enhancing agricultural resilience under climate variability. With these considerations in mind, the present study was conducted in the Pali district of Rajasthan, India, to evaluate farmers' perceptions of the conservation and propagation of the popular landrace Kharchia wheat (*Triticum aestivum* L.) in the saline belt of the semi-arid zone. The study aims to generate insights into the socio-ecological drivers that sustain this salt-tolerant landrace and to inform strategies to strengthen on-farm conservation in marginal environments.

Material and Methods

The present study was conducted in the saline belt of Pali district, located in the semi-arid region of Rajasthan, India (situated between 24.75° and 26.48° N latitude and 72.78° to 74.30° E longitude), where Kharchia wheat (*Triticum aestivum* L.) is traditionally cultivated under saline soil (ECe 4–12 dS m^{-1}) and groundwater (ECiw 6–15 dS m^{-1}) conditions. The region is drained by seasonal rivers, including the Luni and its tributaries, which shape local hydrology through paleo-channels. While sand dunes dominate the western part of the district, the eastern areas and slopes of the Aravallis support woodland, open forests, and mesophytic grasslands. The predominant crops of the area include pearl millet [*Pennisetum glaucum* (L.) R.Br.], maize (*Zea mays* L.), guar [*Cyamopsis tetragonoloba* (L.) Taub.], sesame (*Sesamum indicum* L.), and pulses during the *kharif* season, and wheat (*Triticum aestivum* L.), barley (*Hordeum vulgare* L.), and mustard [*Brassica juncea* (L.) Czern. & Coss] during the rabi season. The district was purposively selected because the salt-tolerant landrace Kharchia wheat remains widely grown in this region despite the availability of improved wheat varieties. A field-based survey research design was adopted, and a multistage sampling technique was employed. Blocks with a significant area under Kharchia wheat cultivation were first identified, followed by the purposive selection of villages known for the continued cultivation of this landrace, in consultation with local agricultural officers and experienced farmers. The selected villages included Denda, Nimbada, Dingai, Giradara and Hemawas (Pali block); Rampura, Mukanpura, Doleria, Khandi and Kerala (Rohat block); and Kharchi, Rampura, Hingola, Bithura and Kharchia Ki Dhani (Marwar Junction block). From these villages, a total of 150 farmers (10 per village) were randomly selected using village-level lists of Kharchia wheat cultivators. From each selected village, farmers cultivating Kharchia wheat were selected using purposive and random sampling methods, and only those farmers who had been cultivating the crop continuously for the last five years were included in the study to ensure reliability of information.

From October 2021 to December 2023, information was gathered through a combination of focus group discussions (FGDs), transect walks, organised interviews, and casual contacts. A semi-structured questionnaire with both closed- and open-ended questions, administered in Hindi, served as the main instrument for data collection. Interviews took place in farmers' homes, usually lasting 45 to 50 minutes, and were repeated as needed. Both primary and secondary data were used for the study. Primary data were collected during the *rabi* season through personal interviews, field observations, and group discussions with farmers, using a structured, pre-tested interview schedule. The schedule was designed to collect information on area under Kharchia wheat, farmers' perception regarding salinity tolerance, yield stability under stress conditions, grain quality, fodder value, storage characteristics, reasons for continued cultivation and farmers' role in seed conservation. Secondary information related to Kharchia wheat, salinity-affected areas and conservation of traditional crop varieties was collected from research publications, government reports and other relevant literature. The collected data were compiled, classified, and analysed using descriptive statistical tools such as frequencies, percentages, means, and the ranking method to assess farmers' perceptions regarding the conservation and continued cultivation of Kharchia wheat in the saline agro-ecosystem.

Results and Discussion

The results presented in Table 1 clearly shows that an overwhelming majority of farmers consider Kharchia wheat inevitable under the harsh agro-ecological conditions of Pali district. Most respondents strongly agreed that Kharchia wheat is the most adapted variety to the local environment characterised by saline soil, saline groundwater and high temperature, with 92 % farmers supporting this view. Similarly, the respondents (95%) stated that Kharchia wheat gives at least some yield even under very adverse conditions, indicating its high stability and resilience compared to other varieties. A large proportion of farmers (85%) also believed that it is the most suitable variety for rainfed as well as limited irrigation conditions. Farmers further emphasized the long-term seed viability of Kharchia wheat, as 94 % of the respondents reported that its seed can be used for several years without any decline in yield or plant characteristics. About 89% of farmers indicated that, under local agro-climatic conditions, the yield of Kharchia wheat is often higher than that of improved varieties. In addition, that it remains the best option (91% respondents) available in the area because no other variety performs reliably under saline conditions. About 72 % farmers reported that they had never used any other wheat variety, which further reflects their strong dependence on this traditional landrace. This perception aligns with earlier observations that landraces, although often lower-yielding than modern cultivars, are reliable, stress-tolerant, and well-adapted to marginal environments and low-input management systems (Gunawat and Sharma, 2020). In Pali district, most farmers are

Table 1. Farmers' views on the inevitability of growing Kharchia wheat

Reasons for those who agree	% of respondents	Reasons for those who do not agree	% of respondents
Kharchia wheat is most adapted to the harsh local environment (saline soil, saline water and high temperature)	92	Due to susceptibility to disease, Kharchia wheat is no longer useful	4
Kharchia wheat gives some yield, however bad the situation is	95	Kharchia wheat yields nothing under adverse situation	2
Kharchia wheat is the most suitable for rainfed and limited irrigation conditions	85	Kharchia wheat can only be cultivated under irrigated conditions	5
Seed viability of Kharchia wheat is very high and for very long duration. It can be used for cultivation for years together without any decline in yield or plant characters	94	Kharchia wheat is to be replaced by selected seed every two years	2
In most of the cases, under local agro-climatic conditions the yield from Kharchia wheat is better as compared to improved varieties	89	Better yields are obtained from improved varieties of wheat	8
It is by default best variety as there is no other choice	91	The new varieties are better under soils which have been reclaimed by gypsum treatment and organic manure	9
I have never used any other variety	72	Improved varieties perform average under the harsh climatic conditions	6
In addition to the grain yield, the fodder yield is also high and fodder is very nutritive for animals	93	Fodder from other varieties is more	3
The storage capacity of Kharchia wheat is highest and it is least affected by insect and pest in storage	96	Kharchia wheat is susceptible to insect and pest in storage	1
Kharchia wheat is resistant to lodging and strong winds	52	In Kharchia wheat lodging occurs due to more height and thin stem	48

Note: The total sum may not be 100 because some farmers (who are nested) have given multiple reasons and the reasons have been grouped for reporting purposes; n=150.

resource-poor and lack access to assured irrigation. Even among households with wells, high groundwater salinity restricts irrigation use, rendering modern varieties unsuitable.

The importance of Kharchia wheat was also highlighted in terms of fodder value and storage characteristics. Nearly 93% farmers stated that, besides grain yield, it provides high and nutritious fodder for livestock. Likewise, 96 percent of the respondents reported that Kharchia wheat has excellent storage capacity and is least affected by storage pests and insects. More than half of the respondents (52%) also considered it resistant to lodging and strong winds, although a comparatively large proportion (48%) held the opposite view, suggesting that lodging resistance may vary with field conditions and crop management practices. In contrast, only a very small percentage of farmers disagreed with the above statements. For example, 4% of farmers felt that Kharchia wheat has become less useful due to disease susceptibility, while only 2% believed that it yields nothing under adverse conditions. Similarly, 8% farmers considered improved varieties to be more productive and 9% felt that improved varieties perform better under reclaimed soils treated with gypsum and organic manure. Collectively, these attributes demonstrate how farmers employ traditional varieties and associated knowledge systems as adaptive strategies to cope with climatic and resource constraints. Similar adaptive responses have been documented elsewhere; for instance, farmers in the Eastern Himalayas have shifted varietal selection across altitudinal gradients in response to rising temperatures (Rao *et al.*, 2018; Reid and Swiderska, 2008). Overall, the findings indicate that farmers' continued cultivation of Kharchia wheat is largely driven by its adaptability, yield stability, seed longevity, fodder value, and superior storage performance under saline agro-ecosystems.

Farmers in the saline belt of Pali district perceive the replacement of Kharchia wheat as both an economic opportunity and a potential loss (Singh *et al*, 2023a). The results presented in Table 2 indicate that only a small proportion of farmers believe that Kharchia wheat is being replaced or lost, whereas an overwhelming majority believe that the landrace continues to be widely cultivated in the saline belt of Pali district. The respondents (12%) stated that improved wheat varieties are high-yielding and provide higher economic returns per unit area; therefore, some farmers have started shifting away from Kharchia wheat. Similarly, farmers (8%) reported that they have already abandoned Kharchia wheat in favour of improved varieties, while 9 % believed that modern varieties are gradually replacing traditional landraces. Only 2 % respondents felt that Kharchia wheat is being lost due to its inability to cope with changing agro-climatic conditions, and it is a low-yielding variety (7%) that cannot compete with improved wheat varieties in terms of productivity. However, the majority of respondents strongly disagreed with the idea of varietal replacement and genetic erosion. Between 12,000 and 14,000 hectares are thought to be under cultivation with Kharchia wheat in the Pali district; annual variations are largely determined by the amount of rainfall received during the previous kharif season (Singh *et al.*, 2023b). The rainfed character of the agricultural system and the reliance of wheat planting choices on soil moisture availability are reflected in this variability.

These findings align with more extensive empirical data from other areas. For instance, field surveys from Guangxi Province in southwest China showed that most farmer-managed landraces and open-pollinated types survived the 2010 severe spring drought, but most hybrid varieties failed (Swiderska *et al.*, 2011). This incident brought to light the resilience that farmers' seed systems provide and the significance of locally adapted germplasm for risk management and climate adaptation. In the current study, farmers' confidence in Kharchia wheat's yield stability, adaptability, and perceived role in preserving soil quality was highly correlated with their perception that varietal replacement and genetic erosion are not happening. Moreover, farmers' intimate knowledge of traditional varieties and their deliberate efforts to avoid indebtedness associated with purchasing external inputs and hybrid seed further reinforce the continued use of Kharchia wheat (Singh *et al.*, 2026). Together, these findings suggest that the persistence of Kharchia wheat is not merely a legacy of tradition but rather reflects rational decision-making by farmers responding to

Table 2. Farmers' thoughts on Kharchia wheat replacement and loss

Reasons of those who think replacement and loss is happening	% of respondents	Reasons of those who do not agree	% of respondents
Improved seeds are high yielding and fetch higher return per unit area and hence we are no longer using Kharchia wheat	12	Kharchia wheat is still in the hands of most farmers and its loss or its replacement is negligible	88
We have abandoned Kharchia wheat while using the new ones	8	We are used to Kharchia wheat; we will still keep on growing them	92
Kharchia wheat is being lost gradually due to its inability to cope with changing agro-climatic scenario	2	Kharchia wheat is still maintained and now expanding in area due to its unique agro-climatic characters under climate change scenario	98
Now most of the farmers grow improved varieties and land races are disappearing	9	Kharchia wheat is grown in the fields of maximum farmers since decades and till date there is no replacement	91
Kharchia wheat is low yielder and can't compete with improved varieties with regard to yield	7	The Kharchia wheat is most adapted and preferred by maximum farmers due to its stable yield under adverse conditions	93

environmental stress, economic constraints, and livelihood security considerations in saline-arid agro-ecosystems.

The findings presented in Table 3 further highlight farmers' strong preference for Kharchia wheat for food and nutritional security. A large proportion of farmers (69%) reported that Kharchia wheat produces good-quality flour that is highly suitable for making *chapatis*, whereas only 31% preferred improved wheat varieties for this purpose. Although farmers (73%) stated that improved wheat varieties produce flour with a better white appearance, most respondents emphasised the superior functional and nutritional qualities of Kharchia wheat. Farmers (86%) reported that Kharchia wheat gives higher flour output per unit volume of grain and is therefore considered more beneficial at the household level. Similarly, farmers (83%) stated that it is highly suitable for preparing a wide range of traditional foods such as *bati, churma, lapsi, dalia* and *halwa*, which are commonly consumed in Rajasthan. Farmers also expressed a strong preference for Kharchia wheat for its dough quality, taste, and nutritional value. About 87% of respondents reported that the dough prepared from Kharchia wheat has a high water absorption capacity and better consistency, while 68% of farmers considered it tastier and more flavourful than improved varieties. Nearly 78 percent respondents believed that Kharchia wheat is more nutritious, more filling, and provides greater physical strength. One of the most important attributes highlighted by farmers was the shelf-life of *chapatis* and *bread*, as 91 % respondents stated that products prepared from Kharchia wheat remain soft and edible for two to three days, compared to only 9% for improved wheat varieties.

Although landraces are preserved and preserved in traditional agricultural systems, farmers' major concerns are economic survival and livelihood security rather than conservation in and of itself (Bellon *et al.,* 2018). Because traditional varieties satisfy several family goals, such as food quality, nutritional security, risk minimisation, and cost reduction, farmers continue to grow them. This view is supported by several studies showing that adopting modern cultivars is not required to increase productivity in marginal environments (Rao *et al*., 2018) and that improved varieties do not always offer a clear economic advantage over local varieties (Rana *et al*., 2021). Overall, the results clearly demonstrate that farmers' continued cultivation of Kharchia wheat is not only due to its agronomic adaptability but also because of its superior food quality, nutritional value, and suitability for traditional diets under the semi-arid conditions of Rajasthan.

Table 4 presents farmers' perception regarding the possible loss of Kharchia wheat and its impact on their future livelihood security in the saline belt of Pali district. The results indicate that a large

Table 3. Farmers' perception on food and nutritional security aspects of Kharchia wheat

Attributes	Description of the traits	Kharchia landrace	Improved wheat varieties
Flour quality	Good quality flour and good for chapatis	69	31
Appearance	Pure white flour with good appearance	27	73
Flour output	High flour output per unit volume of grain; regarded as ''blessed''	86	14
Suitability for different dishes	Multiple uses in preparation of local delicacies (*Bati, churma, lapsi ,dalia, halwa* etc)	83	17
Dough quality	Rated as good, claimed to have high water absorption capacity when made into dough	87	13
Taste	Highly preferred, claimed to be very tasty; highly appreciated for their special flavour	68	32
Nutritional quality	Highly preferred, more filling, lasts longer in the digestive system and gives physical strength	78	22
Shelf-life of bread and chapatis	Keeps better, remains soft for 2–3 days (retains good eating quality)	91	9

Table 4. Farmers' perception on loss of Kharchia wheat on their livelihood security in future

Perception of affected farmers	% of respondents	Perception of non-affected farmers	% of respondents
We don't have any climate friendly seeds like Kharchia wheat having desired traits for arid zone under our condition of soil and climate	62	There is plenty of improved seeds (with good traits) in adequate quantities for our zone hence loosing Kharchia wheat is not a big deal	38
Improved seeds are costly and not easily available unlike Kharchia wheat which is accessible mostly from own sources. Kharchia wheat can be used for sowing again and again for years so there is no need to replace the seed every year	85	Improved varieties are high yielding so additional expanses on procurement of new seeds every year does not matter much	15
Kharchia wheat fetches more income from the market due to its higher price	92	Kharchia wheat is cheaper as compared to improved varieties	8
Preferred by health-conscious consumers and natives due to least use of chemicals in production	88	Preferred by consumers due to its appearance and easy availability	12
The Kharchia wheat is good for food due to its taste, aroma, wide acceptability in villages and emotional attachment with this grain since decades	95	Kharchia wheat does not give white colour to bread and chapatis hence it is not preferred over improved varieties	5
These are traditional seeds conserved by ancestors since decades, it is our heritage and losing them is very pathetic	91	Improved varieties are resistant to biotic and abiotic stresses and there is need to replace old varieties	9
Kharchia wheat gives good yield with minimum inputs and also under conserved moisture	85	Requires high inputs along with good quality irrigation water to produce optimum yield	15

proportion of farmers believe that the disappearance of this traditional landrace would seriously affect their livelihood. About 62% of the respondents stated that they do not have any other climate-resilient seed similar to Kharchia wheat that can perform well under the arid and saline soil conditions of the region. In contrast, only 38 % of the respondents believed that improved varieties with desirable traits are available in sufficient quantity and that the loss of Kharchia wheat would not be a major concern. A very high percentage of farmers (85%) emphasized that improved seeds are costly and not easily available, whereas Kharchia wheat seed is mostly obtained from farmers' own sources and can be used repeatedly for several years without replacement. This makes it highly suitable for small and resource-poor farmers. In addition, the respondents (92%) reported that Kharchia wheat fetches a higher price in the market compared to improved varieties, thereby contributing significantly to farm income. Many respondents (88%) stated that it is preferred by health-conscious consumers because it is grown with minimum use of chemicals. A very large proportion of farmers (95%) expressed that Kharchia wheat is highly valued for its taste, aroma, and wide acceptability in rural areas, and that people have a strong emotional attachment to this grain as it has been cultivated for decades in Rajasthan. Similarly, the respondents (91%) considered Kharchia wheat as a traditional seed conserved by their ancestors and regarded it as part of their agricultural heritage; therefore, losing it would be highly unfortunate. In contrast, only a small proportion of farmers (9%) believed that improved varieties are more resistant to biotic and abiotic stresses and that traditional varieties should be replaced. Farmers also pointed out that Kharchia wheat provides good yield even with minimum inputs and under conserved soil moisture conditions, whereas improved varieties require higher inputs and good-quality irrigation water to achieve optimum yield.

The sustained use of Kharchia wheat further reflects its recognized private value to farmers, a characteristic widely observed for landraces across diverse agro-ecological contexts (Singh *et al.*, 2017). Traditional farming communities worldwide have conserved extensive crop diversity through generations of farmer-led selection and knowledge transmission. Indigenous communities in the Potato Park of Cusco, Peru, maintain nearly

1,500 potato varieties, representing a significant share of global potato diversity (ANDES (Peru) *et al.*, 2012). Such landrace diversity is particularly valuable under climatic and ecological uncertainty, as landraces are typically more genetically heterogeneous than modern cultivars and therefore better able to withstand stresses such as drought, salinity, and nutrient limitations (CBD Secretariat, 2010; Singh *et al.*, 2023b). Overall, the results clearly indicate that farmers strongly believe that the loss of Kharchia wheat would adversely affect their livelihood security, farm economy, food quality, and traditional agricultural heritage, especially under the semi-arid and saline agro-ecological conditions of the region.

Conclusions

The findings of the present study clearly demonstrate that Kharchia wheat continues to play a vital role in sustaining agriculture and rural livelihoods in the saline belt of Pali district. Despite the availability of improved wheat varieties, an overwhelming majority of farmers still prefer this traditional landrace because of its exceptional adaptability to saline soils, saline groundwater, high temperature, and limited irrigation conditions prevalent in Rajasthan. Farmers' perceptions strongly indicate that Kharchia wheat is not only a climate-resilient crop but also a reliable option under adverse agro-ecological conditions where modern varieties often fail.

The study also revealed that Kharchia wheat is valued not merely for yield stability but for multiple agronomic, economic, and socio-cultural benefits. Farmers emphasized its long seed viability, low input requirement, good fodder yield, resistance to storage pests, and ability to provide at least some yield even under extremely unfavourable conditions. In addition, the results clearly show that Kharchia wheat is highly preferred for food and nutritional security due to its superior flour quality, taste, dough characteristics, higher flour yield, and longer shelf life of chapatis. Its suitability for preparing traditional foods such as *baati, churma, dalia*, and other local dishes further strengthens its importance in rural households. The study found very little evidence of varietal replacement or genetic erosion in the study area. On the contrary, most farmers reported that Kharchia wheat is still widely cultivated and, in some cases, even expanding due to increasing soil and water salinity. Farmers also expressed strong concern that the loss of Kharchia wheat would negatively affect their livelihood security, farm income, and food quality. The landrace is considered not only an economically viable crop but also a traditional heritage conserved by farmers.

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