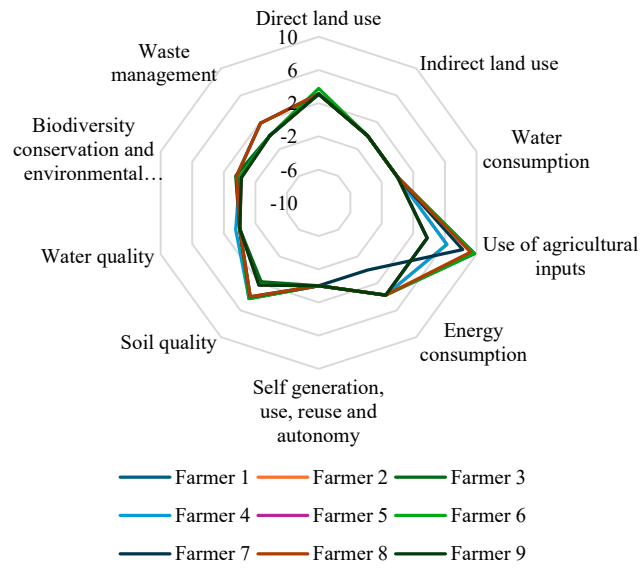
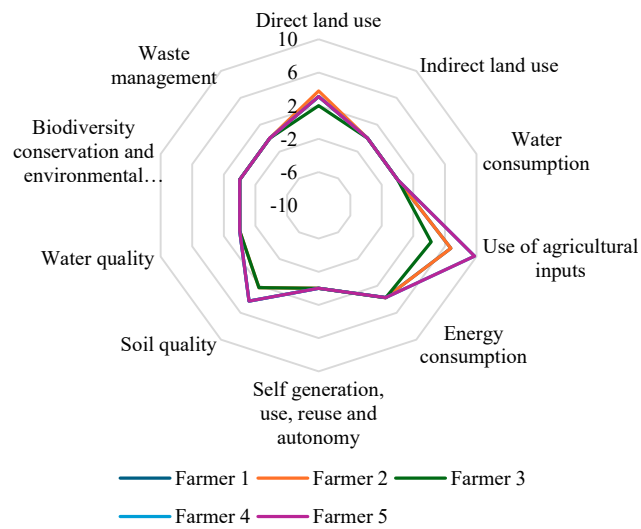


a.



b.



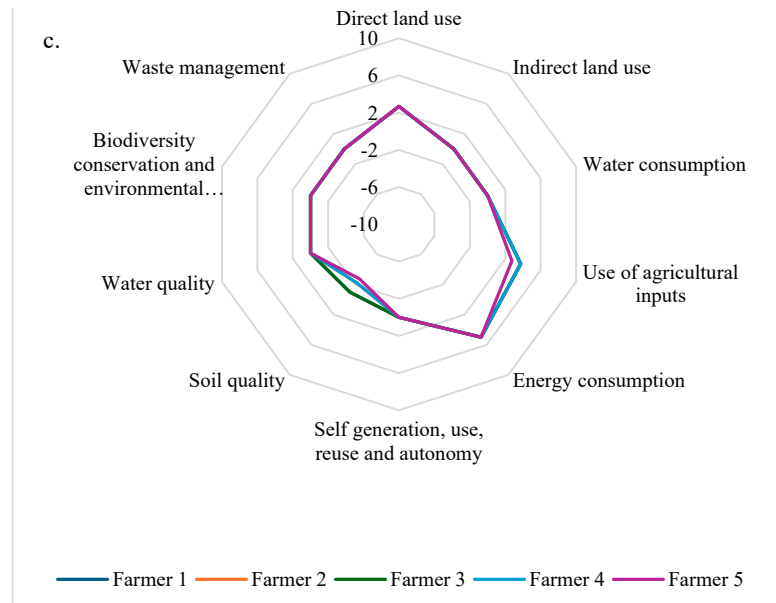


Figure S1. Performance index of the farms for the environmental indicators. a.2021 year ; b. 2022 year; c. 2023 year

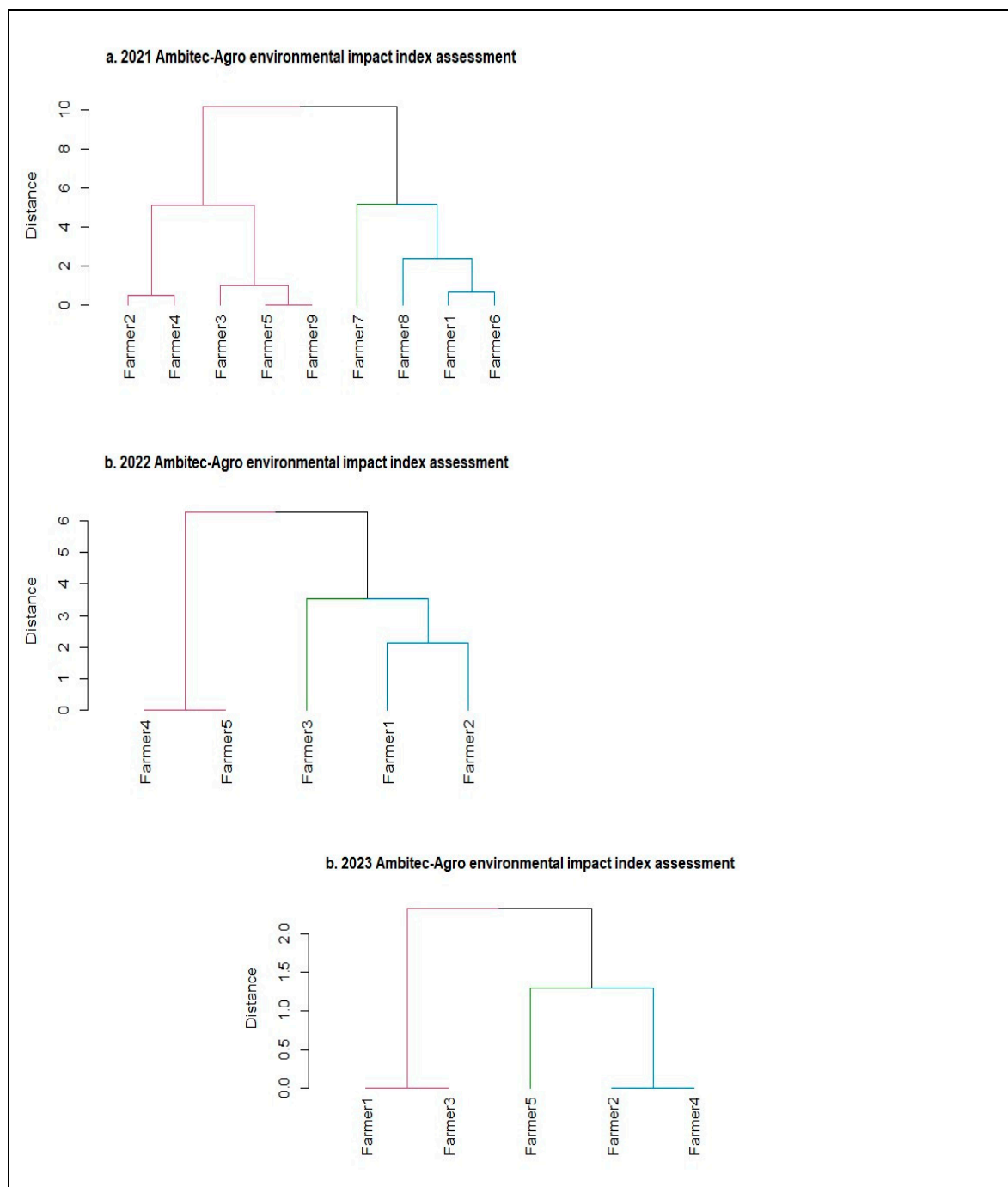
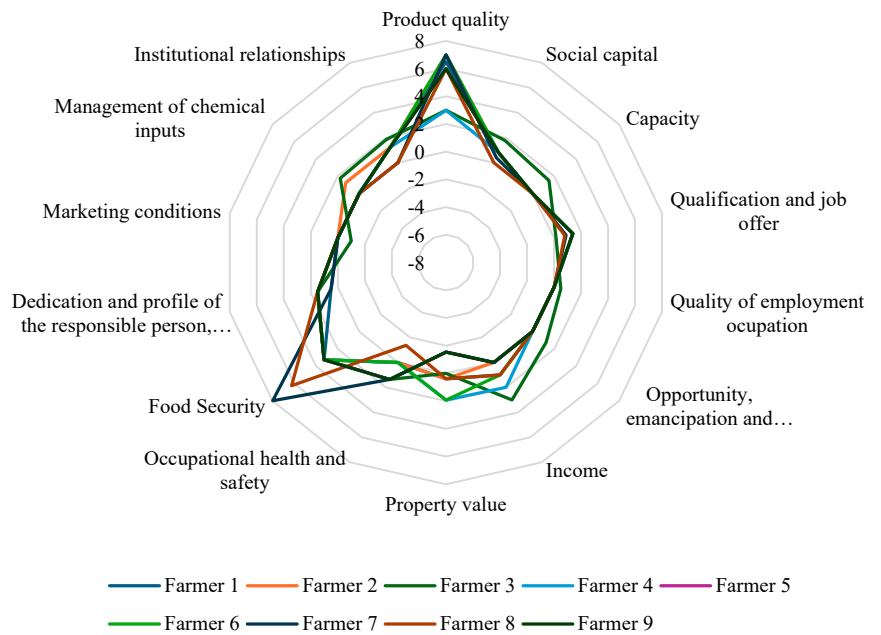
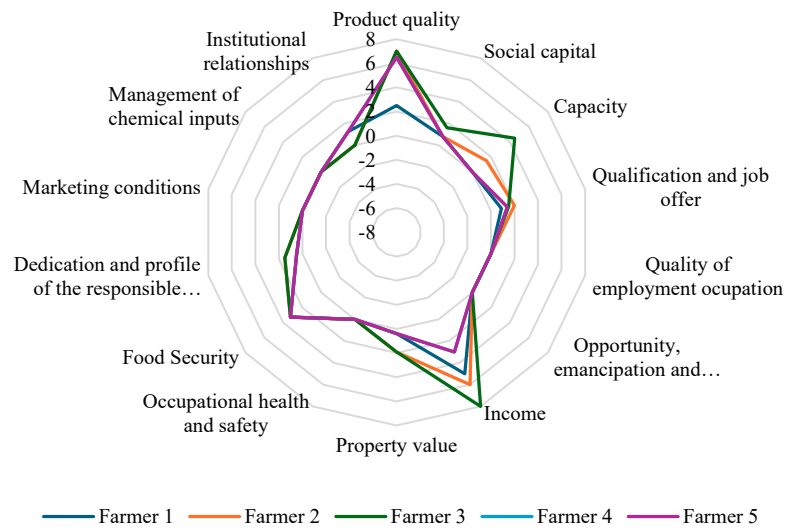


Figure S2. *Similarity index pattern related to the environmental assessment*

a.



b.



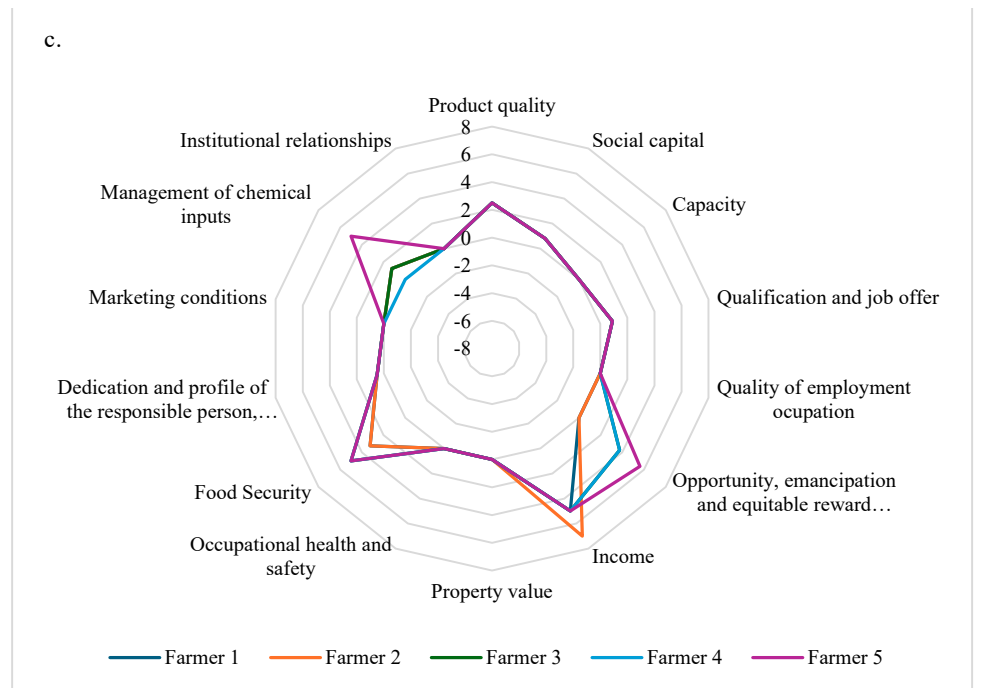


Figure S3. Performance index of the farms for the social indicators. a.2021 year ; b. 2022 year; c. 2023 year

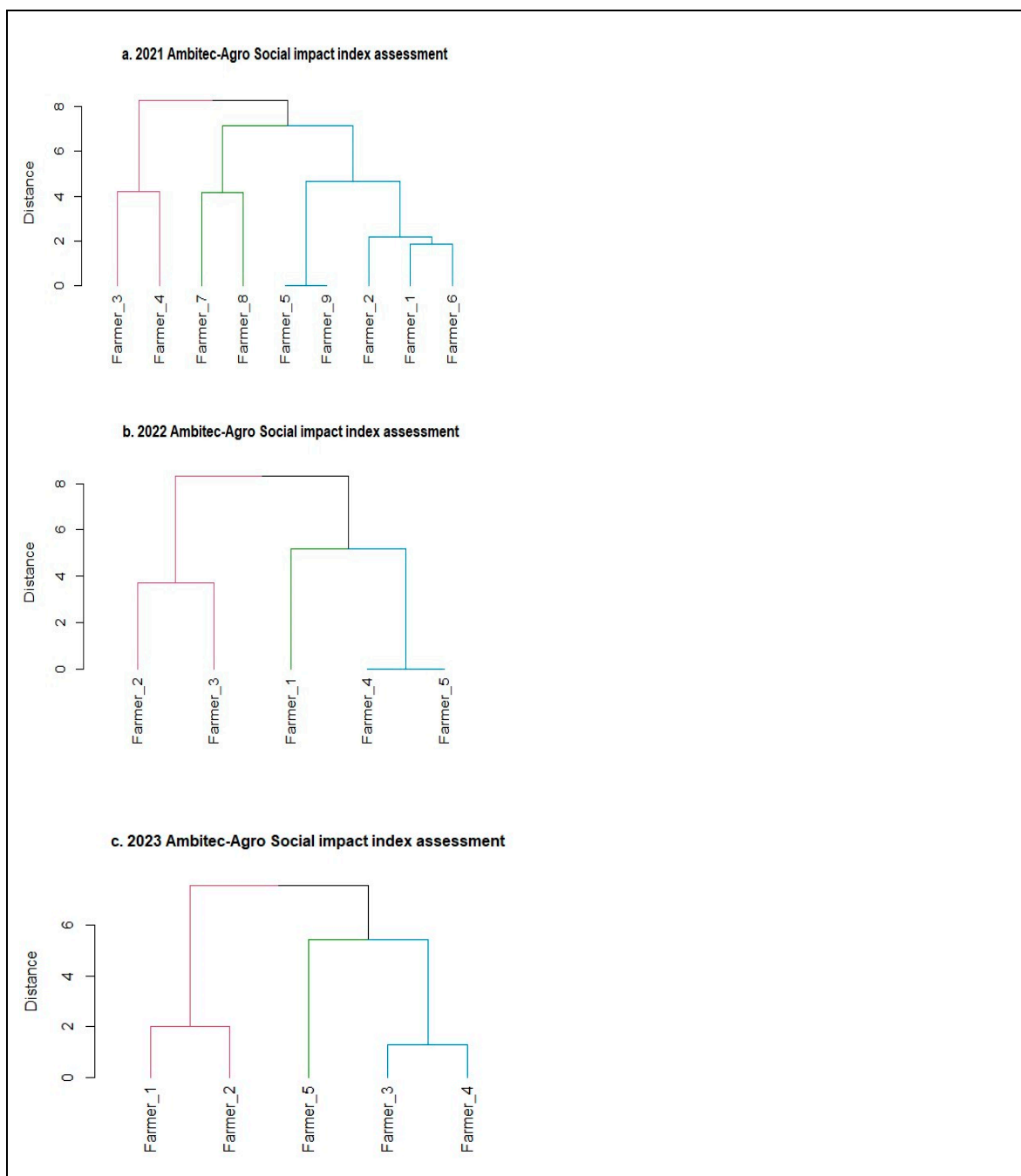





Figure S4. *Similarity index pattern related to the social assessment*

Table S1. Positive aspects of arracacha variety "Agrosavia La 22" adoption process - perceptions from Cajamarca (Tolima) stakeholders.

Stakeholder	Positive aspects adoption process		
	2021	2022	2023
Local Government 	Higher productivity in low-fertility soils, resistance to pests and diseases, resistance to summer. Lower production costs compared to the traditional variety. Possibility of planting the crop in soils with low fertility.	Adaptation to low-quality soils. Maintenance of price throughout the year. Continuous training processes for producers by AGROSAVIA. Reduction in the application of fertilizers.	Reduction in the application of fertilizers. Adaptability to soils less favourable for the new variety. Stimulus in planting due to increased prices in the intermediary market. Continuous training processes for producers.
Farmers 	Productive cycle of the new variety ranging from 10 to 11 months. Lower use of inputs and agrochemicals. The new variety, being 100% yellow, is of interest to traders and consumers. Yield of the new variety between 18.75 to 22.5 t ha ⁻¹ .	Access to technologies and guidance through demonstration plots and field days. Less labour required. Lower production costs due to reduced use of inputs. Local agricultural experience and knowledge that facilitates agronomic management of the new variety in the field.	Adaptability of the new variety to different soil and climate conditions of Cajamarca. Resistance to pests and diseases. Lower production costs.
Agricultural extension services 	Early variety (10 to 12 months to harvest). The new variety is 100% yellow, more attractive to buyers. It is a low and more open variety, which closes rows between crops much faster, favouring less use of herbicides. Fewer applications of agrochemicals, 30% less. The new variety can be planted in areas with lower	Fewer applications of agrochemicals, with 30% less. Improves soil condition.	Can be planted in lands with low fertility. Resistance to summer. Early variety with high yield, as it is harvested about 2 to 3 months earlier compared to the common yellow variety. The new variety has lower production costs.






Stakeholder	Positive aspects adoption process		
	2021	2022	2023
	altitude above sea level, considering that the recommended altitude is between 1800 to 2200 m.a.s.l. It is planted in warmer areas with good development.		
Farmers Association 	Higher productivity, lower use of agrochemicals, resistance to summer. Lower production cost, market potential in restaurants. Technical support from institutions such as AGROSAVIA, promotion of planting by associations.	Similar price to the common yellow variety. Competitive in the national market.	The new variety is more productive than the traditional yellow variety, whose cultivation has declined due to its low productivity and smaller stalks. Both varieties are priced the same, and the new variety is being accepted in the "Corabastos market" without any price fluctuations.

Table S2. Negative aspects of arracacha variety Agrosavia La 22 adoption process - perceptions from Cajamarca (Tolima) stakeholders.

Stakeholder	Negative aspects adoption process		
	2021	2022	2023
Local Government 	<p>Lower selling price than the common variety, displacement of the traditional variety. Increase in prices of agricultural inputs, difficulties in the market and access to inputs, due to factors such as the national strike and closure of main roads. Lack of knowledge about the optimal management of the variety, high labour costs, deficiencies in associativity.</p>	<p>New requirements for harvesting at exact times to avoid loss of quality, which farmers are unaware of. Continuous rains can cause rotting in the arracacha.</p>	<p>Need to strengthen post-harvest management. Possible impact from high rotting due to continuous rains.</p>
Farmers 	<p>Low selling price. Agrosavia La 22 arracacha variety is susceptible to damage during the post-harvest process, especially during handling, due to its tendency to split. Dependency on intermediaries for the commercialization of arracacha, which can affect selling prices. Insufficient infrastructure and difficulties in accessing markets for the sale of products and by-products.</p>	<p>Constant fluctuation in the market prices of arracacha. Challenges in obtaining seeds locally. Lack of specialized technical assistance and rural extension services, including ongoing support at the farm level</p>	<p>Post-harvest quality loss due to splitting and high moisture content in the tuberous root. Similarly, late harvesting causes browning of the tuberous root's skin, affecting its quality and price. Challenges with labour and seed availability. Constant price variation of arracacha in the intermediary market due to the presence of intermediaries, who retain a high percentage of the profit.</p>
Agricultural extension	<p>Higher water content in the turnip. Requires proper nutrient management to prevent splitting.</p>	<p>Susceptibility to diseases and pests. Low availability of</p>	<p>Low availability of seeds in the area. Need to</p>

Stakeholder	Negative aspects adoption process		
	2021	2022	2023
services 	<p>It is a more perishable product, with a shorter post-harvest period. It cannot be left in the field after harvest, as it may affect the quality of the turnip.</p>	<p>seeds in the area. High water content in the turnip.</p>	<p>properly manage nutrient levels in the plant. Shorter post-harvest period cannot be left in the field after harvest. Susceptible to atrazine during the first 4 months.</p>
Farmers Association 	<p>Increased susceptibility to "chirreamiento," a colloquial term used by farmers to refer to the cracking or splitting of the tuberous root of arracacha, refers to a condition that affects the quality of the roots. This condition is characterized by the presence of cracks or splits on the surface of the root, necessitating specific post-harvest management due to the limited harvest time. It influences price reduction and decreases the purchasing power of farmers. Additionally, rising prices of agricultural inputs, impacts from national strikes, and mobility restrictions between Cajamarca and major cities further affect trade.</p>	<p>Loss of quality during transportation to Bogotá and Cali, due to its susceptibility to root splitting. Lack of proper management by some producers due to it being a new variety.</p>	<p>Post-harvest handling of arracacha is particularly delicate due to its high water content, which makes it prone to cracking and splitting. Additionally, the region suffers from a lack of high-quality seed availability.</p>