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कृषि विज्ञान की मासिक पत्रिका

# किसान गज़ट

Summer Care and

## Water Wisdom

Preparing Fields for the Kharif Season

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# Managing Summer Heat Stress in Field Crops: Strategies for the Pre-Monsoon Season

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## Abstract

Rising pre-monsoon temperatures pose a serious threat to crop growth, flowering, and grain filling across large parts of India. Prolonged heat waves during April and May reduce photosynthetic efficiency, accelerate crop maturity, and cause yield losses in standing summer crops. This article discusses the physiological effects of heat stress on field crops and outlines practical management strategies, including irrigation scheduling, mulching, choice of tolerant varieties, and canopy management. Adopting an integrated approach can help farmers protect yields and prepare their fields for the incoming monsoon season.

Across much of the Indian subcontinent, the pre-monsoon months of April, May, and early June bring some of the harshest growing conditions of the year. Daytime temperatures frequently exceed forty degrees Celsius, and the combination of intense radiation, dry winds, and low soil moisture places enormous stress on standing crops. For farmers cultivating summer cereals, pulses, vegetables, and fodder, this period demands careful management to avoid substantial yield losses.

Heat stress is not merely a matter of high temperature. It reflects the interaction of temperature, humidity, wind, and the crop's own developmental stage. Understanding how plants respond to heat, and when they are most vulnerable, allows farmers to plan interventions that protect productivity.

## How Heat Stress Affects Crop Physiology

When temperatures rise above a crop's optimum range, several physiological processes are disrupted. Photosynthesis slows as leaf pores close to conserve water, reducing the plant's ability to produce and store energy. At the same time, respiration increases, meaning the plant consumes more of its reserves. The net result is a decline in the energy available for growth and grain filling.

Reproductive stages are particularly sensitive. High temperatures during flowering can cause pollen sterility, poor fertilisation, and reduced seed set. In cereals such as wheat and maize, even a few days of extreme heat during grain filling can shrink grain size and lower final yield. Pulses and

oilseeds show similar sensitivity, with flower and pod drop being common symptoms of heat injury.

## Irrigation Scheduling During Heat Waves

Water management is the single most important tool for reducing heat stress. Well-timed irrigation cools the crop canopy, maintains transpiration, and prevents the wilting that accompanies soil moisture deficits. During heat waves, lighter and more frequent irrigations are generally more effective than infrequent heavy ones, as they keep the root zone consistently moist without waterlogging.

Irrigating during the early morning or evening reduces evaporation losses and allows water to reach the root zone before the hottest part of the day. Where water is scarce, farmers can prioritise irrigation at the most sensitive crop stages, such as flowering and grain filling, to protect the components that most influence yield.

## Mulching and Soil Moisture Conservation

Mulching the soil surface with crop residues, straw, or other organic materials reduces evaporation, moderates soil temperature, and suppresses weed growth. A mulched field retains moisture longer and provides a cooler root environment, which supports steady crop growth even under high air temperatures.

In addition to organic mulches, practices such as maintaining a healthy crop canopy and avoiding unnecessary soil disturbance help conserve moisture. Together, these measures extend the interval between irrigations and buffer the crop against short spells of extreme heat.





### Choosing Heat-Tolerant Varieties

Variety selection is a long-term strategy for managing heat stress. Many crop breeding programmes have developed varieties that mature early, escaping the peak heat period, or that tolerate high temperatures during critical growth stages. Farmers planning summer cultivation should select varieties recommended for their region and known to perform well under warm conditions.

Early-maturing varieties are especially valuable because they complete their reproductive phase before the most severe heat arrives. This escape strategy, combined with appropriate sowing dates, can significantly reduce the risk of heat-related yield loss.

### Canopy and Nutrient Management

A vigorous, well-nourished crop withstands heat stress better than a weak one. Balanced nutrition, particularly adequate potassium, improves the plant's water relations and stress tolerance. Foliar

sprays of nutrients and certain plant protectants can provide short-term relief during acute heat spells, though they are supplements to, not substitutes for, sound water and soil management.

Maintaining an appropriate plant population also matters. Overly dense stands compete for limited water and can worsen stress, while a well-spaced canopy allows air movement and reduces the risk of humidity-related problems.

### Conclusion

Pre-monsoon heat stress is an unavoidable feature of Indian agriculture, but its impact on yields can be greatly reduced through informed management. By combining careful irrigation scheduling, mulching, the choice of tolerant and early-maturing varieties, and balanced nutrition, farmers can protect their summer crops and enter the monsoon season with healthier fields. As climate variability increases, building heat resilience into cropping systems will become ever more important for stable and sustainable production.

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# Summer Ploughing: A Simple Practice for Better Soil Health and Pest Control

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## Abstract

Summer ploughing is a traditional yet highly effective practice carried out during the hot, dry months before the monsoon. By exposing the soil to intense solar radiation, it helps control soil-borne pests, weeds, and diseases while improving soil structure and moisture retention. This article explains the principles behind summer ploughing, its benefits for soil health and pest management, and practical guidelines for carrying it out. When adopted at the right time, summer ploughing can reduce input costs and improve the productivity of the following kharif crop.

Summer ploughing is one of the oldest and most reliable practices in Indian agriculture. Carried out during the fallow period between the harvest of rabi crops and the onset of the monsoon, it involves deep tillage of the soil while it is dry and exposed to the sun. Though simple, this practice offers a remarkable range of benefits that continue to make it relevant even in modern farming systems.

The peak summer months, when temperatures are at their highest and rainfall is minimal, provide ideal conditions for ploughing. The intense heat and dryness that make crop cultivation difficult are precisely what make summer ploughing effective, as they help destroy pests and weeds that would otherwise trouble the next crop.

## How Summer Ploughing Works

When soil is turned over during the hottest part of the year, the deeper layers are brought to the surface and exposed to direct sunlight. The high temperatures desiccate and kill many soil-dwelling organisms, including insect pests in their resting stages, and destroy weed seeds and the propagules of certain diseases. This natural solarisation reduces pest and disease pressure in the following season without the use of chemicals.

The physical action of ploughing also breaks up compacted soil layers, improves aeration, and creates a rough surface that captures and holds rainwater when the monsoon arrives. These changes improve the soil's capacity to store moisture and support root growth.

## Benefits for Pest and Weed Management

Many insect pests spend the dry season as pupae, larvae, or eggs in the soil, waiting for favourable conditions to emerge. Summer ploughing exposes these resting stages to lethal heat and to predators such as birds, breaking the pest life cycle before the crop is even planted. This reduces the initial pest population and the need for chemical control later in the season.

Weeds are similarly affected. Perennial weeds with underground storage organs are brought to the surface, where they dry out and die. Annual weed seeds near the surface may germinate and then perish in the heat, depleting the weed seed bank in the topsoil. The result is a cleaner field and reduced weed competition for the following crop.

## Improving Soil Structure and Moisture

Beyond pest control, summer ploughing improves the physical condition of the soil. Breaking hardpans and compacted layers allows roots to penetrate deeper and access water and nutrients from lower in the profile. The loosened, cloddy surface created by ploughing acts as a reservoir, catching the first monsoon showers and allowing water to infiltrate rather than run off.

This improved infiltration recharges soil moisture and reduces erosion during heavy rainfall. Over time, regular summer ploughing combined with the addition of organic matter contributes to healthier, more productive soils.

## Practical Guidelines

For best results, summer ploughing should be carried out soon after the harvest of the rabi crop, while some residual moisture remains to make ploughing easier, and repeated once or twice as the





soil dries. A deep plough that turns the soil to a good depth is most effective at exposing pests and breaking compacted layers.

Fields should be ploughed across the slope where possible to conserve moisture and reduce erosion. Incorporating crop residues and organic manures during this period further enriches the soil and supports beneficial microbial activity once the rains begin.

### Conclusion

Summer ploughing is a low-cost, chemical-free practice that delivers multiple benefits: reduced pest and weed pressure, improved soil structure, and better moisture conservation. By making use of the very heat that limits summer cropping, farmers can prepare their fields for a healthier and more productive kharif season. In an era of rising input costs and growing concern over chemical use, this traditional practice remains a valuable component of sustainable soil management.

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# Efficient Water Use in Summer: Drip and Micro-Irrigation for Water-Scarce Regions

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## Abstract

Water scarcity during the summer months is a growing challenge for Indian agriculture. Micro-irrigation technologies such as drip and sprinkler systems offer an effective means of producing crops with far less water than conventional flood irrigation. This article examines the principles and advantages of micro-irrigation, its suitability for different crops, and the practical considerations for adoption. By delivering water directly to the root zone, these systems improve water-use efficiency, reduce energy costs, and enable cultivation even where water is limited.

Water is the most limiting resource for summer agriculture in large parts of India. As groundwater tables decline and surface water becomes scarce during the dry season, farmers face increasing difficulty in irrigating their crops. Conventional flood irrigation, which loses much of the applied water to evaporation, runoff, and deep percolation, is poorly suited to conditions of scarcity. Micro-irrigation offers a compelling alternative.

Micro-irrigation delivers water directly and precisely to the crop, dramatically improving the efficiency with which every litre is used. In water-scarce summer conditions, this efficiency can be the difference between a successful crop and a failed one.

## Understanding Micro-Irrigation Systems

Micro-irrigation encompasses several technologies, the most common being drip and sprinkler systems. In drip irrigation, water is delivered slowly through a network of pipes and emitters placed near the base of each plant, wetting only the root zone. Sprinkler systems spray water over the crop in a manner resembling rainfall and are well suited to closely spaced crops and certain soils.

Both systems share a common advantage over flood irrigation: they apply water in controlled amounts to the area where it is needed, minimising the losses that occur when entire fields are flooded. This precision allows farmers to match water application closely to crop demand.

## Water and Energy Savings

The most significant benefit of micro-irrigation is water saving. By delivering water directly to the root zone and reducing evaporation and runoff, drip systems can produce a crop using a fraction of the water required by flood irrigation. This allows the same quantity of water to irrigate a larger area, or enables cultivation in regions where water would otherwise be insufficient.

Because less water is pumped, energy consumption also falls, reducing the cost of irrigation and the strain on electricity supplies. In regions where farmers depend on pumped groundwater, these savings can substantially improve the economics of summer cultivation.

## Improved Crop Growth and Fertiliser Use

Micro-irrigation maintains consistent soil moisture in the root zone, avoiding the cycles of waterlogging and drought stress that accompany flood irrigation. This steady moisture supply promotes uniform growth and can improve both yield and quality. Crops such as vegetables, fruits, and many field crops respond particularly well to the controlled conditions that drip irrigation provides.

Drip systems also allow fertilisers to be dissolved in the irrigation water and applied directly to the root zone, a practice known as fertigation. This improves fertiliser-use efficiency, reduces nutrient losses, and ensures that plants receive nutrients in the amounts and at the times they need them.

## Considerations for Adoption

Adopting micro-irrigation requires an initial investment in equipment and some technical







knowledge for installation and maintenance. Systems must be designed to suit the crop, soil, and water source, and emitters must be kept clean to prevent clogging. Government schemes and subsidies in many states help reduce the cost of adoption for farmers.

With proper design and maintenance, micro-irrigation systems can serve for many years and pay back their cost through water savings, higher yields, and reduced labour. Training and support from extension services help farmers get the most from these technologies.

### Conclusion

As water scarcity intensifies, micro-irrigation is becoming essential rather than optional for summer agriculture in many parts of India. By using water with far greater efficiency, drip and sprinkler systems enable productive cultivation even under conditions of limited supply, while saving energy and improving fertiliser use. Wider adoption of these technologies, supported by appropriate policy and extension, will be central to sustaining agriculture in a water-constrained future.

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# Summer Moong and Urad: Short-Duration Pulses for Extra Income and Soil Fertility

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## Abstract

Short-duration summer pulses such as green gram (moong) and black gram (urad) offer farmers an opportunity to earn additional income during the otherwise fallow period between rabi and kharif seasons. These crops mature quickly, fix atmospheric nitrogen, and improve soil fertility for the following crop. This article discusses the agronomy of summer moong and urad, their benefits for cropping systems, and the management practices needed for successful cultivation. Integrating these pulses into rotations enhances both farm income and soil health.

In many parts of India, the period between the harvest of rabi crops and the sowing of kharif crops leaves fields idle for several weeks. Where irrigation is available, this short window can be used profitably by growing quick-maturing summer pulses such as green gram, known as moong, and black gram, known as urad. These crops fit neatly into the cropping calendar and offer benefits that extend well beyond their immediate yield.

Summer pulses mature in a short time, require relatively few inputs, and enrich the soil through biological nitrogen fixation. For farmers seeking to make better use of their land and improve the fertility of their fields, these crops represent an attractive option.

## Why Grow Summer Pulses

The most immediate benefit of summer moong and urad is additional income. Because these crops complete their life cycle quickly, they can be grown and harvested before the kharif season begins, generating a bonus harvest from land that would otherwise remain fallow. The grain commands good market prices, and pulses are an important source of protein in the Indian diet.

Beyond income, these legumes improve soil fertility. Their roots host bacteria that fix atmospheric nitrogen, converting it into forms that plants can use. This natural fertilisation benefits the following crop and reduces the need for nitrogen fertiliser, lowering costs and supporting sustainable soil management.

## Land Preparation and Sowing

Summer pulses are best sown soon after the rabi harvest to make full use of the available growing

period before the monsoon. A well-prepared, weed-free seedbed with adequate moisture ensures good germination and early establishment. Treating seed with appropriate microbial inoculants before sowing enhances nitrogen fixation and can improve yields.

Because summer conditions are warm and days are long, these crops grow rapidly. Timely sowing is important to ensure that the crop matures before heavy monsoon rains arrive, which can interfere with harvesting and reduce grain quality.

## Water and Nutrient Management

Although summer pulses are relatively hardy, they require irrigation during the dry season, as there is little natural rainfall. Irrigation at critical stages such as flowering and pod formation is essential for good yields. Light, frequent irrigations suit these shallow-rooted crops and help avoid moisture stress during the hot weather.

Nutrient requirements are modest, particularly for nitrogen, which the crop supplies largely through fixation. A basal application of phosphorus supports root development and nodulation. Maintaining balanced nutrition ensures healthy growth and maximises the fertility benefit passed on to the next crop.

## Pest Management and Harvesting

Summer pulses can be affected by sucking pests and pod borers, which should be monitored regularly. Timely, need-based management keeps these pests in check and protects yield. Because the crop is short in duration, keeping it healthy through its brief life cycle is key to a successful harvest.







The crop is ready for harvest when the pods mature and dry. Harvesting at the right stage preserves grain quality and minimises losses. After harvest, the crop residues can be incorporated into the soil to add organic matter and further improve fertility for the kharif crop.

### Conclusion

Summer moong and urad allow farmers to turn an idle fallow period into a productive and profitable phase of the cropping calendar. By generating extra income, enriching the soil with fixed nitrogen, and contributing organic matter, these short-duration pulses strengthen both farm economics and soil health. Their integration into cropping systems is a practical step toward more diverse, resilient, and sustainable agriculture.

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# Preparing Nurseries for the Kharif Season: Healthy Seedlings for a Strong Start

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## Abstract

The success of many kharif crops, particularly rice and vegetables, depends on the quality of the seedlings raised in nurseries during the pre-monsoon period. Well-managed nurseries produce vigorous, disease-free seedlings that establish quickly after transplanting. This article outlines the principles of nursery management, including site selection, seedbed preparation, seed treatment, and care of young seedlings. Attention to nursery practices during May lays the foundation for a productive kharif season.

Many of the most important kharif crops, including rice and a range of vegetables, are established by first raising seedlings in a nursery and then transplanting them into the main field. The pre-monsoon month of May is the time when farmers prepare these nurseries, and the care taken at this stage has a lasting influence on the crop that follows. Healthy, robust seedlings transplant successfully and grow into productive plants, while weak or diseased seedlings struggle from the outset.

A nursery concentrates the crop in a small, manageable area where conditions can be closely controlled. This makes it possible to protect young plants from pests, disease, and adverse weather during their most vulnerable stage, and to select only the healthiest seedlings for transplanting.

## Selecting and Preparing the Nursery Site

A good nursery site is located near a reliable water source, receives adequate sunlight, and has fertile, well-drained soil. Proximity to the main field reduces the effort of transporting seedlings at transplanting time. The site should be free of the previous crop's residues and away from sources of pest and disease infestation.

Preparing the seedbed involves thorough tillage to create a fine, level surface, followed by the incorporation of well-decomposed organic manure to supply nutrients and improve soil structure. Raised beds are often used to ensure good drainage, particularly important once monsoon showers begin, as waterlogging can damage tender seedlings.

## Seed Selection and Treatment

The quality of the seed determines the quality of the nursery. Farmers should use certified seed of a recommended variety, chosen for its suitability to local conditions and its resistance to prevalent pests and diseases. Using good seed ensures uniform germination and vigorous early growth.

Treating seed before sowing protects it from soil-borne diseases and early pest attack. Seed treatment with appropriate protectants and, for legumes and certain crops, with beneficial microbial inoculants, gives seedlings a healthy start and reduces losses in the nursery.

## Sowing and Early Care

Seed should be sown at the recommended density in the nursery. Overcrowded seedbeds produce thin, weak seedlings that compete for light and nutrients, while properly spaced sowing yields sturdy seedlings with strong roots. Even sowing and light covering of the seed promote uniform germination.

During the early days, the nursery requires careful attention. Regular light watering keeps the seedbed moist without waterlogging, and the young seedlings must be protected from intense heat and from pests. Providing partial shade during extreme heat can prevent scorching of tender plants in the pre-monsoon period.

## Managing Seedling Health

Monitoring the nursery regularly allows problems to be detected and addressed early. Damping-off and other seedling diseases can spread quickly in warm, moist conditions and should be managed through good drainage, appropriate spacing, and timely intervention. Removing weak or diseased seedlings keeps the nursery healthy.





As transplanting approaches, seedlings may be hardened by gradually reducing watering and exposing them to fuller sunlight. Hardened seedlings withstand the shock of transplanting better and establish more quickly in the main field.

### Conclusion

The quality of a kharif crop is often decided in the nursery, weeks before transplanting. By selecting a suitable site, preparing the seedbed well, using good seed, and caring attentively for young seedlings, farmers can raise the vigorous, healthy plants that give the crop a strong start. Investing effort in nursery management during May is one of the surest ways to secure a productive and rewarding kharif season.

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# Rainwater Harvesting and Farm Ponds: Storing the Monsoon for the Dry Months

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## Abstract

Erratic rainfall and declining groundwater make water storage increasingly important for sustainable farming. Rainwater harvesting structures and farm ponds allow farmers to capture monsoon runoff and use it during dry spells and the summer season. This article explains the principles of on-farm water harvesting, the design and benefits of farm ponds, and their role in improving water availability and resilience. Building water storage capacity before the monsoon helps farmers make the most of the rains that follow.

Water availability is the foundation of productive agriculture, yet in many regions the supply is both limited and unpredictable. Rainfall is concentrated in the monsoon months, while the long dry season leaves fields parched and wells depleted. Capturing and storing rainwater when it is abundant, for use when it is scarce, is one of the most effective ways to build resilience into farming systems.

The pre-monsoon period is the ideal time to construct or repair water harvesting structures, so that they are ready to capture the first rains. Among the most valuable of these structures is the farm pond, a simple excavation that stores runoff for later use.

## The Logic of Rainwater Harvesting

During the monsoon, a large portion of rainfall runs off the land and is lost, carrying valuable topsoil with it. Rainwater harvesting captures this runoff before it leaves the farm, storing it in ponds, tanks, or the soil itself. The stored water can then be used to irrigate crops during dry spells within the monsoon or during the subsequent dry season.

By slowing and capturing runoff, harvesting structures also reduce soil erosion and allow more water to infiltrate and recharge groundwater. In this way, they benefit not only the individual farm but the wider landscape and its water resources.

## Farm Ponds and Their Design

A farm pond is an excavated or embanked structure that collects and stores rainwater and runoff. Its size and design depend on the size of the catchment area, the amount of rainfall, the soil type, and the intended use of the water. Ponds located to receive runoff from fields or natural

drainage lines fill during the monsoon and hold water for use afterwards.

To store water effectively, ponds in permeable soils may be lined to reduce seepage losses. Proper design ensures that the pond fills reliably, holds water through the dry period, and does not pose a safety or erosion hazard. Silt traps at the inlet help keep the pond from filling with sediment over time.

## Uses and Benefits

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The water stored in a farm pond has many uses. It can provide life-saving irrigation to crops during dry spells in the monsoon, when even a single supplementary irrigation can prevent yield loss. It can support the cultivation of a second crop after the monsoon, extend the growing season, and provide water for livestock and other farm needs.

Farm ponds also open the possibility of integrated activities such as fish culture, adding another source of income and improving the efficiency with which the stored water is used. By buffering the farm against the uncertainty of rainfall, ponds contribute directly to income stability and food security.

## Maintenance and Community Approaches

Like any structure, farm ponds and harvesting systems require maintenance. Removing accumulated silt, repairing embankments, and clearing inlet channels keep them functioning well. Regular attention before each monsoon ensures that the structure is ready to capture the coming rains.

Water harvesting is often most effective when undertaken at the community or watershed scale,





with multiple structures working together to capture runoff across the landscape. Collective planning and effort, supported by government schemes, can multiply the benefits for all farmers in an area.

### Conclusion

In a climate of uncertain rainfall and stressed groundwater, storing water on the farm is a wise

and increasingly necessary investment. Rainwater harvesting structures and farm ponds allow farmers to capture the abundance of the monsoon and draw on it through the dry months, improving irrigation security, protecting soil, and enhancing resilience. Building this capacity during the pre-monsoon period ensures that when the rains come, not a drop need be wasted.

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# Fodder Management in Summer: Keeping Livestock Healthy Through the Lean Season

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## Abstract

The summer months are a lean period for livestock, when green fodder is scarce and the heat adds to animal stress. Managing fodder supply during this time is essential for maintaining animal health and productivity. This article discusses strategies for summer fodder management, including the cultivation of summer fodder crops, conservation of surplus fodder as hay and silage, and supplementary feeding. Sound fodder planning helps farmers sustain their livestock through the difficult dry season.

For the millions of Indian farmers who keep cattle, buffalo, and other livestock, the summer season presents a serious challenge. As pastures dry up and green fodder becomes scarce, animals face both a shortage of feed and the added burden of heat stress. Milk yields fall, body condition declines, and the health of the herd suffers. Careful fodder management is the key to carrying livestock through this lean period.

Planning for the summer fodder shortage begins well in advance. By cultivating summer fodder crops, conserving surplus fodder from times of plenty, and feeding animals wisely, farmers can maintain their livestock in good condition even when natural forage is limited.

## Cultivating Summer Fodder Crops

Where irrigation is available, growing fodder crops during the summer provides a valuable source of green feed when it is most needed. Fast-growing fodder crops suited to warm conditions can be cultivated to bridge the gap until the monsoon renews natural pasture. These crops supply the green, nutritious feed that supports milk production and animal health.

Selecting fodder varieties adapted to the local climate and water availability ensures a reliable supply. Multi-cut fodder crops, which can be harvested several times, are particularly useful for providing a steady stream of green fodder over the summer months.

## Conserving Fodder as Hay and Silage

One of the most effective strategies for coping with seasonal shortages is to conserve surplus fodder produced during periods of abundance.

Hay, made by drying green fodder, and silage, made by fermenting it under airtight conditions, both allow fodder to be stored for months and fed during the lean season.

Hay is simple to make where conditions allow fodder to dry quickly, and it stores well in a dry place. Silage preserves more of the fodder's nutritional value and is especially useful for maintaining milk production. Preparing these conserved feeds when green fodder is plentiful ensures a reserve for the difficult summer months.

## Supplementary Feeding and Crop Residues

When green fodder is scarce, crop residues such as straws and stovers become important sources of roughage. Although these residues are lower in nutritional value, their quality can be improved through simple treatments, and they can be supplemented with concentrates and mineral mixtures to meet the animals' needs.

Balanced supplementary feeding maintains animal health and productivity during the lean season. Providing adequate energy, protein, and minerals prevents the loss of body condition and supports continued milk production, protecting the farmer's income through the summer.

## Managing Heat Stress

Fodder management in summer cannot be separated from the management of heat stress. Animals suffering from heat eat less and produce less, so keeping them cool and comfortable improves both feed intake and productivity. Providing shade, ensuring a constant supply of clean drinking water, and allowing animals to feed during the cooler parts of the day all help.







Adequate water is especially important, as animals need more of it in hot weather and to digest dry feeds. Attention to comfort and hydration complements good feeding and helps livestock come through the summer in good health.

### Conclusion

The summer lean season need not mean hardship for livestock if farmers plan ahead. By cultivating summer fodder where possible, conserving surplus fodder as hay and silage, using crop residues wisely, and managing heat stress, farmers can maintain the health and productivity of their animals through the most difficult months. Sound fodder management protects both animal welfare and the livelihoods that depend on livestock.

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# Protected Cultivation in Summer: Growing Vegetables Under Shade Nets and Polyhouses

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## Abstract

Protected cultivation using shade nets, polyhouses, and other structures enables farmers to grow high-value vegetables even during the harsh summer months. By moderating temperature, reducing water loss, and protecting crops from pests, these structures allow year-round production and improved quality. This article introduces the principles of protected cultivation, its advantages during summer, and the crops and practices suited to it. For farmers near markets, protected cultivation offers a path to higher and more stable incomes.

Growing vegetables in the open field during the peak summer months is difficult and often unrewarding. Intense heat, scorching sun, drying winds, and heavy pest pressure combine to reduce both yield and quality. Protected cultivation, which involves growing crops inside structures that modify the growing environment, offers a way to overcome these challenges and produce high-quality vegetables when they are scarce and command good prices.

Structures ranging from simple shade nets to more elaborate polyhouses create a controlled environment that shields crops from the extremes of summer weather. This control opens the possibility of profitable, year-round vegetable production for farmers with access to markets.

## Types of Protected Structures

Protected cultivation covers a spectrum of structures. Shade net houses, the simplest and least expensive, use nets to reduce the intensity of sunlight and lower the temperature beneath them, providing relief from summer heat. Polyhouses, covered with transparent plastic, offer greater control over the growing environment and can be equipped with systems to regulate temperature and humidity.

The choice of structure depends on the crop, the climate, the market, and the farmer's investment capacity. Even a modest shade net structure can make a substantial difference to summer vegetable production, while more advanced polyhouses allow the cultivation of demanding, high-value crops.

## Advantages During Summer

The primary benefit of protected cultivation in summer is the moderation of temperature and light. By reducing the intensity of solar radiation, shade structures lower the temperature experienced by the crop, easing heat stress and preventing damage such as sunscald. This allows sensitive vegetables to be grown in conditions that would be too harsh in the open field.

Protected structures also reduce water loss from the crop and soil, improving water-use efficiency at a time when water is scarce. Combined with drip irrigation, they enable productive cultivation with limited water. The enclosed environment further offers protection from certain pests and from the physical damage caused by wind and dust.

## Suitable Crops and Practices

A range of high-value vegetables can be grown under protection in summer, including leafy greens and various fruiting vegetables that fetch good prices when supply from open fields is low. Growing crops out of their normal season, when they are otherwise unavailable, allows farmers to capture premium prices in the market.

Protected cultivation is typically combined with practices such as drip irrigation, fertigation, and careful pest monitoring. The controlled environment makes these precision practices especially effective, and the higher value of the produce justifies the additional attention and investment.

## Economic Considerations

Establishing protected structures requires an initial investment, and successful cultivation demands knowledge and management. However,





the higher yields, better quality, and premium off-season prices that protected cultivation can achieve often make it a profitable venture, particularly for farmers located near urban markets. Government schemes in many states support the establishment of these structures.

Because protected cultivation is intensive, it suits farmers who can devote attention to their crops and who have access to markets that reward quality and off-season supply. For such farmers, it can transform a small area of land into a source of substantial and stable income.

### Conclusion

Protected cultivation turns the challenge of the summer season into an opportunity. By moderating temperature, conserving water, and shielding crops from pests, shade nets and polyhouses enable the production of high-quality vegetables when they are most valuable. For farmers with market access and the willingness to manage an intensive system, protected cultivation offers a promising route to higher and more resilient incomes throughout the year.

कृषि विज्ञान की मासिक पत्रिका

# किसान गज़ट



# Soil Testing Before the Kharif Season: The Foundation of Balanced Fertilisation

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## Abstract

Balanced and efficient use of fertilisers begins with knowing the nutrient status of the soil. Soil testing during the pre-monsoon period allows farmers to plan fertiliser application for the kharif crop based on actual soil needs rather than guesswork. This article explains the importance of soil testing, how samples should be collected, and how test results guide fertiliser decisions. Testing the soil before sowing improves yields, reduces input costs, and protects soil health.

**H**ealthy soil is the basis of productive agriculture, yet the nutrient status of soil cannot be judged by appearance alone. Two fields that look identical may differ greatly in their supply of essential nutrients and in their acidity or alkalinity. Soil testing provides the objective information farmers need to manage their soil wisely, and the pre-monsoon period is an ideal time to test soils in preparation for the kharif crop.

By revealing what the soil actually contains, testing replaces guesswork with knowledge. It allows farmers to apply the right nutrients in the right amounts, avoiding both the waste of applying too much and the yield loss of applying too little.

## Why Soil Testing Matters

Crops draw their nutrients from the soil, and when particular nutrients are deficient, growth and yield suffer. Applying fertilisers without knowing the soil's status can lead to imbalances, where some nutrients are supplied in excess while others remain deficient. This wastes money, can harm the crop, and may damage the soil and environment over time.

Soil testing measures the levels of key nutrients and the soil's acidity or alkalinity, providing a clear picture of what the soil can supply and what must be added. Armed with this information, farmers can apply fertilisers precisely, matching supply to the crop's needs and the soil's condition.

## Collecting a Representative Sample

The value of a soil test depends entirely on the sample being representative of the field. Because soil varies across a field, a proper sample is made

by collecting small portions of soil from several points spread across the area, mixing them together, and drawing a composite sample from the mixture. Sampling to the depth reached by crop roots ensures the test reflects the zone that matters.

Areas that are clearly different, such as low-lying spots, eroded patches, or places where manure has been heaped, should be sampled separately or avoided, so as not to distort the result. Clean tools and containers prevent contamination that could give misleading readings. Careful sampling is the most important step in obtaining a useful test result.

## Interpreting the Results

A soil test report indicates whether the levels of various nutrients are low, medium, or high, and reports the soil's acidity or alkalinity. Low levels signal that the nutrient must be supplied through fertilisers or manures, while high levels indicate that little or no addition is needed. The report may also flag conditions such as excessive acidity or alkalinity that require correction.

Extension services and soil testing laboratories often provide fertiliser recommendations based on the test results and the intended crop. These recommendations translate the raw data into practical guidance on how much of each fertiliser to apply, taking the guesswork out of nutrient management.

## From Testing to Fertiliser Planning

Using soil test results to plan fertilisation ensures that the kharif crop receives a balanced supply of nutrients. This balanced approach improves yields, as the crop is neither starved of essential





nutrients nor harmed by excess, and it reduces costs by avoiding the purchase of fertilisers the soil does not need.

Balanced fertilisation also protects soil health and the environment. Applying only what the soil requires prevents the build-up of excess nutrients and reduces losses that can pollute water. Over time, informed nutrient management, combined with the use of organic manures, builds and maintains the fertility of the soil.

### Conclusion

Soil testing before the kharif season lays the foundation for balanced, efficient, and sustainable fertilisation. By revealing the true nutrient status of the soil, it enables farmers to apply fertilisers precisely, improving yields while saving money and protecting the land. Making soil testing a regular part of pre-monsoon preparation is one of the simplest and most rewarding steps a farmer can take toward better and more sustainable production.

# किसान गज़ट

कृषि विज्ञान की मासिक पत्रिका



# Beat the Heat: Summer Care of Poultry and Backyard Livestock

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## Abstract

Poultry and small backyard livestock are especially vulnerable to the extreme heat of the Indian summer. Heat stress reduces growth, egg production, and overall health, and can cause significant mortality if not managed. This article discusses practical measures to protect poultry and small livestock during summer, including housing and ventilation, water and feed management, and general care. Simple, low-cost interventions can greatly improve the survival and productivity of backyard animals through the hot season.

Backyard poultry and small livestock provide many rural households with a valuable source of nutrition and income. Yet these animals, and poultry in particular, are highly sensitive to heat. During the peak summer months, high temperatures place them under severe stress, reducing their growth and productivity and, in extreme cases, causing death. Protecting them through the hot season requires attention to a few key aspects of their care.

Because poultry cannot sweat and have a high body temperature, they struggle to shed excess heat. As temperatures climb, they eat less, drink more, and become vulnerable. Simple, affordable measures can make a great difference to their comfort, survival, and productivity.

## Housing and Ventilation

The shelter in which poultry and small livestock are kept has a major influence on how they cope with heat. A well-ventilated shelter that allows air to move freely helps carry away heat and keeps the animals cooler. Positioning and constructing the shelter to avoid trapping heat, and providing shade, reduces the temperature the animals experience.

Reducing crowding is equally important, as too many animals in a confined space generate and retain heat and compete for air and water. Roofs that reflect rather than absorb heat, and the provision of shade from trees or other structures, further help to keep the living space cool during the hottest part of the day.

## Water and Feed Management

Access to plentiful, cool, clean drinking water is the single most important factor in helping

animals cope with heat. Water needs rise sharply in hot weather, and a shortage quickly leads to distress. Providing water in shaded locations, and refreshing it frequently so it stays cool, encourages animals to drink and helps them regulate their body temperature.

Feeding practices also matter. Because animals eat less during the heat of the day, offering feed during the cooler morning and evening hours helps maintain intake. Ensuring the feed is nutritious so that smaller quantities still meet the animals' needs supports continued growth and production despite reduced appetite.

## General Care and Health

During heat waves, animals should be observed closely for signs of distress such as panting, drooping, and reduced activity. Prompt attention to affected animals, moving them to cooler areas and ensuring they drink, can prevent losses. Keeping the shelter clean and dry reduces the risk of disease, which can compound the effects of heat stress.

Handling and transporting animals should be minimised during the hottest hours, as the added stress can be harmful. Any necessary movement or handling is best done in the cool of the early morning or evening. General good management, hygiene, and vigilance help animals stay healthy through the demanding summer season.

## Low-Cost Interventions

Protecting backyard animals from heat need not be expensive. Providing shade, improving ventilation, and ensuring a constant supply of cool water are low-cost measures within the reach of most households. Wetting the surroundings and







using simple cooling methods during extreme heat can provide additional relief.

These modest interventions, applied consistently, greatly improve the survival and productivity of poultry and small livestock through the summer. For rural households that depend on these animals, such care protects an important source of food and income.

### Conclusion

The extreme heat of the Indian summer poses a real threat to poultry and backyard livestock, but their suffering and losses can be largely prevented through simple, affordable care. Good housing and ventilation, abundant cool water, sensible feeding, and attentive management enable these animals to come through the hot season in good health. For countless rural families, such summer care safeguards both animal welfare and household livelihoods.

# किसान गज़ट

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