with organic or inorganic suppress weeds, and regulate s, such as straw or wood chips, arove soil fertility, while inorganic provide a barrier to moisture loss. By naintaining consistent soil moisture levels, istand periods of water scarcity and improves

flage

[5].

the and retains crop residues on the eld. is technique helps soil structure, enhance water in ltration, and reduce runo . eserving soil moisture and promoting healthy soil ecosystems, inservation tillage supports crop resilience and reduces the need for excessive irrigation. Additionally, it helps prevent soil erosion and maintains soil fertility, further contributing to sustainable water management.

Alternate wetting and drying (AWD)

Alternate Wetting and Drying (AWD) is a water-saving technique used primarily for rice cultivation. It involves periodically allowing the soil to dry out between irrigation events, rather than maintaining continuous ooding. is approach reduces water usage and promotes healthier root systems. AWD has been shown to increase rice yields and improve crop resilience to water stress, making it a valuable technique for managing water resources in rice paddies [6].

Contour plowing and terracing

Contour plowing and terracing are land management techniques

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s that rigation al water use

on

ing irrigation practices. moisture levels, allowing cessary. By integrating soil arrigation systems, farmers can rigation, both of which can stress addition, both of which can stress addition approach ensures that water orting crop resilience and reducing the nures [3].

esting involves collecting and storing rainwater for rechniques such as constructing rainwater harvesting adding cisterns and ponds, enable farmers to capture runo by periods and store it for use during dry spells. is practice helps mitigate the e ects of drought but also reduces reliance inventional water sources. Rainwater harvesting can be particularly the cial in regions with seasonal rainfall patterns, helping to even out water availability throughout the year [4]. plowing along the contours of the land or constructing terraces, farmers can slow down water runo and increase water in ltration into the soil. ese practices help maintain soil moisture, reduce erosion, and support crop growth, especially in hilly or sloped areas. Implementing contour plowing and terracing can signi cantly enhance crop resilience and soil health.

Integrated water resources management (IWRM)

Integrated Water Resources Management (IWRM) is a comprehensive approach that considers the entire water cycle and aims to balance the needs of di erent water users. By coordinating water management practices at the watershed level, IWRM promotes the

Page 2 of 2