

IRSA - CONGRESSO MUNDIAL DE SOCIOLOGIA RURAL (01/10/2025 A
20/01/2026) - IRSA 32 - AGROECOLOGICAL TRANSITIONS, FOOD
SOVEREIGNTY AND WATER SECURITY: CHALLENGE AND POSSIBILITIES
IN THE CONTEXT OF RURAL DEVELOPMENT

**RESILIENCE OF AGRICULTURAL SYSTEMS IN ARID AND SEMI-ARID
ENVIRONMENTS: EVIDENCE FROM AN INTEGRATIVE REVIEW**

Miriã Ramalho Barbosa (miria.rbarbosa@gmail.com)

Diego Sebastião Landim Silva (diego09landim@gmail.com)

Martin Desvars (martin.desvars@ufv.br)

Climate change intensifies water scarcity, heat stress, and land degradation, creating major challenges for agriculture in arid and semi-arid regions. These areas are highly exposed to climatic variability and often lack the ecological and institutional buffers needed to sustain production. Building agricultural resilience has therefore become essential to secure yields, livelihoods, and food systems. This integrative review synthesizes recent evidence on the strategies that strengthen the capacity of agricultural systems to absorb, adapt to, and recover from climatic shocks in water-limited environments. We followed PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) as a reporting guideline. The search was conducted in Scopus and SciELO scientific

databases and constrains on passage of time or geography had been removed. The search strategy combined terms related to agricultural resilience, climate change, and arid or semi-arid regions. We identified 71 studies. After screening and eligibility assessment, 13 studies met all criteria and were included in the final synthesis. The findings reveal four dominant pathways for building resilience. First, water-management innovations, such as rainwater harvesting, efficient irrigation, and traditional irrigation systems, reduce exposure to drought and stabilize production. Second, conservation and agroecological practices, including agroforestry, organic amendments, and soil-cover strategies, improve soil health and enhance the system's ability to withstand heat and moisture stress. Third, climate-monitoring and modeling tools (e.g., drought indices, remote sensing, AquaCrop) support early warning, guide decision-making, and help anticipate system thresholds. Fourth, socioeconomic and institutional factors, such as adaptive capacity, farmers' perceptions, governance arrangements, and water-policy frameworks, shape how farmers and communities respond to climatic risks. Overall, the review shows that resilience emerges not from isolated actions but from the integration of ecological, technological, and social strategies. Strengthening these connections is crucial for sustaining agricultural production under accelerating climate change in arid and semi-arid environments.

Palavras-chave: agricultural resilience; climate adaptation; semi-arid regions; water-scarce agroecosystems; sustainable farming practices.