

## **Remote sensing based assessment of the dynamics of crop productivity and spatial production pattern across the Fergana Valley, Central Asia**

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### **ABSTRACT:**

Agricultural production systems are a vital lifeline of the rural farming community in Central Asia. However, shrinking natural resource base, increased land degradation and severe irrigation water scarcity render current crop production practices not sustainable as these perform below their potential. Though there is considerable scope for improving productivity through bridging the yield gaps and introducing sustainable land management practices. However crop productivity and production pattern varies across scales, mostly driven by irrigation water availability, markets, and agronomic/cultural practices. Climate change could put additional pressure on production systems in the future by decreasing the major source of irrigation water, namely glaciers. Therefore, there is an urgent need to develop spatial decision systems which provides accurate and timely information on agricultural production that would facilitate the development of target specific and appropriate climate resilient intervention packages. Satellite remote sensing approaches along with climate and in-situ observations will accelerate interventions and decision making by understanding the dynamics of the crop production and pattern at space and time. The overarching goal of this study is to develop image based open access 'digital agriculture' platform by taking the Fergana Valley as a use-case. A systemic quantification of crop productivity and production dynamics has been conducted at the field-level to assess the spatial and temporal variations in crop types, cropping intensity, crop yield gaps and land degradation and to assess the potential factors that explain the observed pattern and decision delivery system. Open access remote sensing based spatial analytical-technology provide a unique perspective with uniform and holistic view of the production systems and inter-intra fields/seasonal dynamics, which enhance the ability to identify opportunities for better farm management practices and for improving system-wide productivity, while reducing negative environmental impacts. Eventually this leads to the development of an interactive digital-agriculture monitoring platform (in progress) that contributes to sustainable and resilient agro-ecosystems.

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The International Center for Agricultural Research in the Dry Areas (ICARDA) is the global agricultural research organization working with countries in the world's dry and marginal areas to deliver sustainable systems solutions that increase productivity, improve rural nutrition, and strengthen national food security. ICARDA's integrated approach includes new crop varieties; agronomy; on-farm water productivity; natural resources management; rangeland and small ruminant production; and socioeconomic; policy research and Geoinformatics (to better target and accelerate adoption). A member of CGIAR Consortium, ICARDA works closely with national agricultural research programs and other partners in more than 40 countries across North and Sub-Saharan Africa, and Central, South, and West Asia.

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