



Esri's ArcGIS enables CRIDA to objectively review watershed projects and assess India's vulnerability to climate change

Client:

ICAR-CRIDA (Indian Council of Agricultural Research-Central Research (Institute for Dryland Agriculture) Website: crida.in **Industry:** Government

Location: Hyderabad

Organization Profile

The Central Research Institute for Dryland Agriculture (CRIDA) is a National Research Institute under the Indian Council of Agricultural Research (ICAR). Established in 1985, it contributes to the development of strategies for sustainable farming systems in rainfed areas.

Solution

ArcGIS Desktop

Highlights

Esri India helped CRIDA by:

- Assessing Sustainability of Treated/ Developed Watersheds in Rainfed Agro-eco-sub-regions of Peninsular India
- Helping it gain insights on relative dependency of one element on another element spatially

Project Summary

CRIDA is an ICAR institute, with 67 scientists and other technical, administrative and supporting staff. Two of its research farms are located at Hayatnagar and Gunegal, that are close to the capital city, Hyderabad. The Institute houses the All India Coordinated Research program on Dryland Agriculture (AICRPDA) which has 25 stations across the country and the All India Coordinated Project on Agro-meteorology (AICRPAM) with 25 stations in India.

CRIDA has rolled out two key projects including the ICAR National Fellow Scheme (2005-2016): Assessment of Sustainability of Treated/Developed Watersheds in Rainfed Agro-eco-sub-regions of Peninsular India as well as the ICAR-NICRA funded project: Spatial Vulnerability Assessment using satellite based NDVI for Rainfed Agriculture in India.

CRIDA required state-of-the-art GIS technology to replace older systems and enhance efficiency and productivity. CRIDA deployed Esri's cutting-edge ArcGIS software to digitize and analyze its geographic data and improve decision making. The implementation of a GIS application with geoprocessing capabilities that runs on the ArcGIS software has enabled CRIDA to conclude that over 47 million hectares of net sown area in India that is spread over 122 districts in 12 states, is vulnerable to climate change!

Dr. Kaushalya Ramachandran Principal Scientist, ICAR-CRIDA

Challenges

Watershed projects were being implemented to support rainfed agriculture in India since the 1980s. Various ministries, departments, public and private agencies were involved in these implementations. Comprehensive monitoring and evaluation tools, however, were not available to ensure the objective Monitoring and Evaluation (M&E) of watershed projects, leading to a loss of funds and poor decision-making.

CRIDA required additional support in its land use projects, to learn how land could be used sustainably, its yields improved, wastage reduced and water use made efficient and ubiquitous.

Solution

CRIDA implemented Esri's ArcGIS Desktop to deal with its vast geographic data for scores of applications in agriculture viz. land use planning, watershed management, agricultural sustainability and vulnerability studies, agrometeorology

Central Research Institute for Dryland Agriculture

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studies, soil and water conservation, etc.

In order to understand the spatial extent agricultural vulnerability to climate change in India, CRIDA, used geospatial and remote sensing technologies (where satellite information was the primary source), for inventory of resources, planning, monitoring and efficient implementation of activities. Remote sensing, GIS and GPS were used for precision agriculture to optimize the application of inputs for plot and crop identification, crop monitoring, etc. to estimate and maximize yield. The solutions were aimed at providing farmers with the best possible outcomes for themselves, their families and investors and indirectly for their customers and the environment. The idea was to provide analysis, optimize practices,





increase productivity and make the best use of available resources.

Benefits

The use of ArcGIS has enabled CRIDA to achieve and showcase results within a short span of time. It can now undertake a rigorous analysis of the GIS data with various changes in parameters. This has enabled it to gain deeper insights into elemental behavior. It helped CRIDA to know about the relative dependency of one element on another element spatially. For instance, it could understand the spread of pest attack and infection in crops and their resistance on the basis of the type of soil, moisture, season, spatial patterns, and the associated surrounding environment.

Using ArcGIS, CRIDA has been able to make a significant contribution in the area of agri science. For the first time in the country, an organization has been able to provide the spatial extent of agricultural vulnerability in India.

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ArcGIS solution will also enable officials in different domains to make better and quicker decisions. It will help them in:

- Managing risks by assessing the nutrition retention capability of soil organic matter
- Bridging yield gaps by determining local natural resource availability and local model development for risk assessment
- Dealing with concerns related to nutritional security such as rise in demand, cereal production and growth in GDP
- Determining environmental footprints of changing demand profiles
- Managing water resources
- Maintaining soil health and productivity
- Evaluating climate change and climate variability



