

Special Issue on
**Agricultural Intensification: Combating Food/Water
Security Challenges Using Remote Sensing and GIS**

CALL FOR PAPERS

With increasing demands to produce at least 50% more food to feed the projected world population of over 9 billion by 2050, there is a tremendous pressure to not only increase and diversify food production but also to produce in a sustainable manner. In conjunction with this, are additional constraints of limited resources of arable lands and related perils of climate change such as drought, flooding, and pest outbreaks that pose significant challenges to increasing crop productivity at local, regional, and global scales. The crop productivity issues are further compounded by alternative and often conflicting issues of land use such as urban and industrial developments, environmental easements, and so on that significantly impact crop production. While increasing crop production by expanding area or technological means such as irrigation, fertilizer, and land management practices that are limited in scope, there is a critical need for agricultural intensification by targeting and implementing innovative approaches under constraints of limited resources. Therefore, there is a critical need for agricultural intensification by targeting and implementing innovative approaches under constraints of limited resources that include multicropping and crop rotation, green manuring, and minimum tillage.

An important element for effective and efficient use of resources for agricultural intensification is the need for inventorying of existing croplands and related resources with intent of targeting and prioritizing additional efforts to combat and mitigate the impacts of complex production-climate change nexus. Geospatial technologies such as Remote Sensing and GIS are valuable tools that provide an integrated platform to not only monitor and analyze spatial dynamics of issues related to crop productivity, but also provide a framework to evaluate impacts of future scenarios of changing climate through coupled environmental models. Improved mapping approaches that leverage historical archives of satellite imagery, crop growth-yield models, environmental data modeling and mining techniques, and cloud computing environments are vital to our understanding of the spatiotemporal dynamics of crop lands and thereby help in combating current and future challenges of sustainable agricultural intensification. Additionally, improvements in precision agriculture and other related technologies such as GPS, weather models, high spatial and spectral resolution data through Unmanned Aerial Systems (UAVs), and apps for mobile and smart phones are emerging developments that are aimed at bringing about the next revolution in agriculture, particularly to the resource-poor farmers in different parts of the world.

This special issue aims to provide a knowledge base that is focused on geospatial mapping approaches for a better understanding of spatiotemporal dynamics of agricultural intensification from food/water security standpoints. This issue is of special importance to researchers engaged in applications of geospatial technologies in various agricultural science and engineering disciplines including agronomy, hydrology, geography, climatology, computer science, and engineering.

Potential topics include but are not limited to the following:

- ▶ Agricultural applications of Remote Sensing data and GIS analysis
- ▶ Enhanced algorithms for image classification
- ▶ Innovative approaches to mapping crop lands
- ▶ Integrated mapping and crop modelling
- ▶ Targeting mapping of vulnerable crop lands—drought-impacted areas, salinity, and so on
- ▶ Characterizing soil moisture dynamics
- ▶ Spatiotemporal crop growth and yield modeling/forecasting

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Manuscript Due

Friday, 28 April 2017

First Round of Reviews

Friday, 21 July 2017

Publication Date

Friday, 15 September 2017