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## Augmenting Agricultural Information through Geospatial Technology: Accurate & Real Time

Globally, there is growing focus on adoption of technology for improvising agriculture farming techniques, planning, decision making, and designing policies which contribute in accelerating agricultural growth and achieve the larger agenda of “Food Security” to ensure food for all. There is also an emerging need for engagement of the private sector in delivering agricultural public goods. Today's need is to prepare plans and policies for agriculture sector improvement in consultation with scientists, technocrats, bureaucrats and policy experts and work towards serious implementation of technologies in the agriculture sector.

**RMSI Private Limited** is a global geospatial solutions and software service provider to governments and private enterprises engaged in the agriculture sector with more than a decade of extensive experience.

RMSI uses geospatial (GIS & Remote Sensing) technology coupled with field-based surveys to deliver agri-planning solutions to its clients. While the use of geospatial technologies helps in covering large areas in a short turnaround time, ground truthing ensures accuracy of the information. Some of our key services include crop acreage estimation, yield modeling, land development planning, agro-ecological zonation on national, regional and local levels, and watershed management.

RMSI help their clients in developmental planning and effective decision making for supply chain management.

### 1. Globally, what are some of the key challenges faced in the agriculture sector?

Climate change and globalization are the major concerns that will drive future agriculture decisions. Countries will have to embrace global issues such as climate change and focus on sustainably increasing agricultural productivity and incomes and adapting and building resilience to climate change.

The key challenge lies in enhancing the technical, policy and investment conditions to implement Climate Smart Agriculture (CSA) as an approach for food security. The effects of climate change on agricultural systems in the developing countries is more pronounced and would become a compelling need to ensure comprehensive integration of these effects into national agricultural planning, investments and programs to arrive at a win-win situation.

Also, educating and increasing awareness amongst farmers on improving farming techniques—what

to grow, when to grow, producing more with less inputs, and water budgeting as part of best practices in agriculture.

Some other core challenges include:

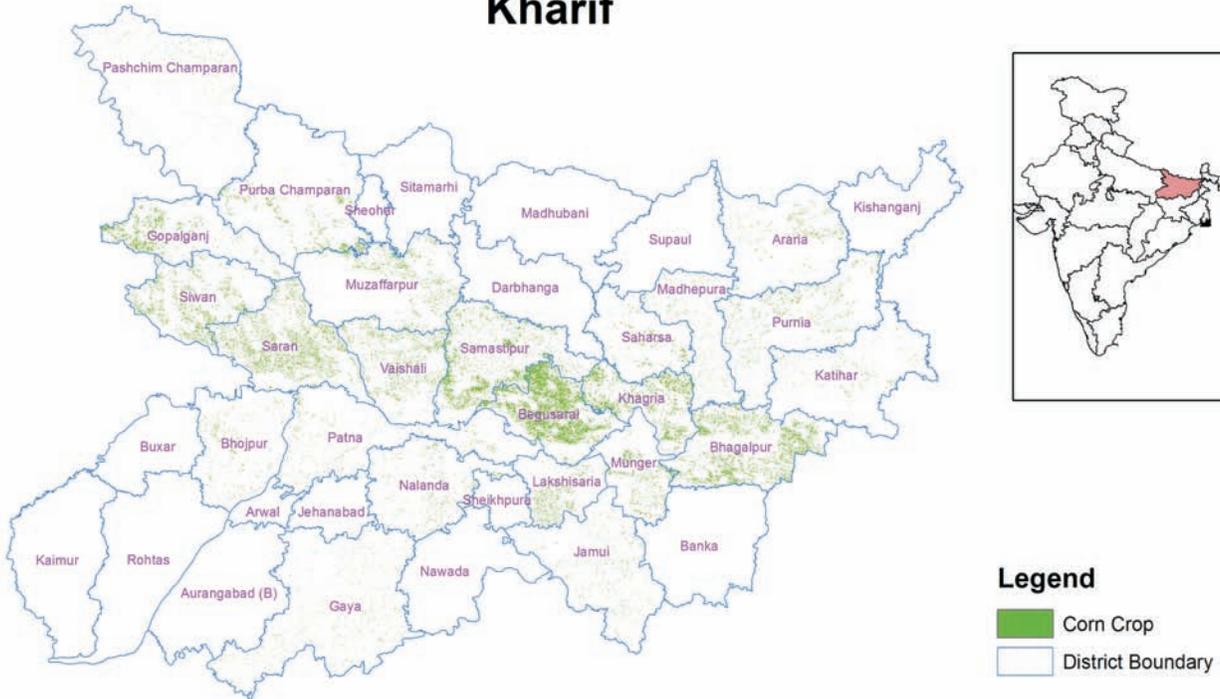
- (i) Improving agriculture farming practices for increasing crop production
- (ii) Agricultural planning and supply chain management
- (iii) Sustainable crop management and land management

### 2. How are technologies like GIS and remote sensing useful for improving agriculture farming practices?

Geospatial technologies greatly assist in land evaluation and monitoring at different scales (national, regional, provincial/district, and village/block level) for proposing suitable land use planning/agricultural development; help in development of Indicators for traditional indigenous crops; and assessment of nutrient demands for promoting efficient regional fertilizer-use management.

GIS-based dashboards share crucial spatial information that forms the basis

## Spatial Distribution of Corn Crop- Bihar Kharif



of decision and policy making. This helps governments in taking important decisions on issues such as regulating import/export prices, benefits to farmers such as subsidies and pricing. Furthermore, input companies (seeds, fertilizers, insecticides and pesticides) use this information for their market planning and expansion.

On the other hand, remote sensing helps in identifying geographic hotspots like land degradation, crop damage, change of land use, etc. and aids in sustainable land management and risk assessment.

While geospatial technology helps extract meaningful information for use across the entire agri value chain, the accuracy of the data and analysis is further enhanced with the use of higher resolution imagery and case specific themes.

### 3. How has GIS & remote sensing changed the course of crop management and improving crop productivity?

GIS and Remote Sensing technology plays a crucial role in collecting country wide or site specific real-time

agriculture information on growing crops (season based), changing crop patterns, crop rotation production and yield estimates. It gives a more accurate understanding and ease in adoption of advanced agricultural practices.

Geospatial techniques also help in planning the distribution of inputs with respect to the kind of soil and climate to benefit the farmer and increase crop productivity.

Developed countries have adopted these technologies to aid their governments/international banks for their planning and decision making to control the food security concerns as well as achieve food security goals.

### 4. How is adoption of technology in agriculture aiding food security concerns?

Majority of the world nations are focusing on food security as a major concern and are preparing Millennium Development Plans (MDPs) along with international funding agencies to achieve food security goals. The four major pillar of food security are availability, access, stability and utilization of food.

The major challenges in achieving food security goals are climate change, growing use of food crops as a source of fuel, soaring food prices, and inefficient food safety systems.

Geospatial technologies can help in augmenting the data and offer probabilistic models to understand climate change impact on food production (increase of temperature, change in crop patterns, availability of water, usage of water, etc.). GIS-based analysis helps in identifying climate suitable pockets for particular crops and preserve agriculture hot spots for implementing improved agriculture practices. Governments can also use GIS to achieve their millennium plans through agri-ecological zonation.

Climate change poses a major challenge for food security. Scientists, developers, engineers, policy makers, and many others have used technologies, such as GIS to better understand complex situations and offer some tangible solutions.

Technology offers a means to better assess, plan, and implement sustainable programmes that can help us to address future challenges.



### 5. What are some of the global agriculture industry practices, wrt technology, and how can they be cloned/adapted in India?

Developed countries are implementing precision farming based on re-zoning agriculture areas to increase the yield with the right choice of the seeds, inputs, land under cultivation, daily weather alerts and right time to sow and harvest.

Developed countries are also using technologies like remote sensing where the satellite imagery, aerial photography and UAV's have become the aid for the real-time pictures. This helps them to choose the areas for agriculture improvement and the type of improvement required and avoid tedious time taking statistical data collection and field surveys.

From our decade long experience, we feel that India needs to adapt to site specific precision farming techniques which is reliant on organized agriculture information.

#### India needs:

- (I) "Re-Zoning" of agriculture land under cultivation and choose and conserve suitable zones for

expansion based on the growing food demand in national and global markets.

- (ii) Monitoring of changing crops and crop patterns, certified seeds.
- (iii) Instituting of "Agriculture Transformation Agencies" for implementing the food security programme and hence, meeting the growing demand for food.
- (iv) Food storage, food conservation and distribution planning.
- (v) Monitoring and evaluation of the entire value chain which helps in market planning and management from 'Farm to Fork'.

### 6. Quote some of your recent work experiences in India, globally.

RMSI has created agri-intelligence data for supply chain management planning for a large Indian corporate that helped the client in their demand/supply analysis and market planning. We have carried out sustainable livelihood projects for the state government in Tripura enabling bamboo-based livelihood planning for local communities. RMSI has also done specific research and development projects for pesticides, insects and

diseases for large Indian corporates that assisted the clients in pesticide production planning, creating pest resistant seed varieties and for their crop productivity improvement.

Some of our international projects include:

- (i) Countrywide agro ecological zonation
- (ii) Range land mapping and preparation of digital herbarium
- (iii) Agriculture information system for input subsidy distribution
- (iv) Mapping and planning of irrigation and watershed based agriculture hotspots
- (v) Creation of agro weather tools
- (vi) Climate change adaption studies for agriculture, irrigation planning for small scale farmers
- (vii) Climate change adaptation for agriculture and livelihood
- (viii) Agri-intelligence data on crop acreage, changing crop patterns, production and yield estimates,
- (ix) Crop health mapping
- (x) Host crop-mapping for disease control



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