IFDC Asia
Regional Capabilities and Core Competencies

Market Systems for Agribusiness ● Resilience, Climate Adaptation, and Mitigation ● Last-Mile Input Delivery ● Scaling Technologies ● Soil Fertility Management ● Seed and Fertilizer Sector Development ● Enabling Environment ● Collaborating, Learning, and Adapting

The International Fertilizer Development Center (IFDC) in Asia serves an area with vast agricultural potential that also faces major infrastructure, climate, and agronomic challenges. Since 1974, IFDC has been working to promote agriculturally led local economic development "from the ground up." IFDC's ***vision*** is to build healthier soils and plants for a food-secure and environmentally sustainable world. Its ***mission*** is to bring together innovative research, market expertise, and strategic public and private sector partners and to scale sustainable solutions for soil and plant nutrition that benefit farmers, entrepreneurs, and the environment.

From the inception of its first project in Bangladesh in 1977, IFDC's agricultural development efforts have spanned the entire continent, reaching a total of 30 Asian nations. IFDC's work in Asia seeks innovative ways to develop sustainable agricultural production systems by adopting a holistic approach throughout the entire value chain involving firms, traders, and farmers. This includes developing and testing efficient nutrient sources and management technologies at the farm level, strengthening agri-entrepreneurship, and influencing policy reforms through evidence-based economic analysis.

In an area of the world where the effects of climate change are already evident, improving fertilizer efficiency and improving soil and environmental health is a major focus of IFDC research in Asia. Climate-smart agricultural technologies, including Fertilizer Deep Placement (FDP), mechanization of fertilizer placement, innovative climate smart fertilizers including slow-and controlled release fertilizers and crop and site-specific balanced fertilizers are helping farmers earn more income and mitigate agriculture's impact on the environment. IFDC is also enhancing the skills and knowledge of national agricultural research and extension system, private sector and other stakeholders in innovative fertilizer molecules, mechanization of fertilizer management, new science of scaling for wider adoption of IFDC technologies, protocols for greenhouse gas (GHG) measurements analysis and linking to carbon farming for improved income to farmers, sustained productivity, better soil, environment and human health.

IFDC's Asia regional intervention strategy addresses constraints to agricultural development through the following areas of expertise:

- Conducting innovative fertilizer and fertilizer technology research in a public-private-producers partnership (4-P), climate smart fertilizers, nano-fertilizers, bio-and organic fertilizers, and integrated soil fertility management (ISFM);
- Improving fertilizer use efficiency to sustain soil health, minimize environmental footprints, reduce national subsidy burden on fertilizers. and link farmers to carbon farming for additional income sources;
- Increasing the mechanization of Asian agriculture with special emphasis on nutrient placement/management machines and equipment;
- Transforming subsidy-based fertilizer policies to incentive-based fertilizer policies through enabling policies and markets;
- Enhancing the energy efficiency of fertilizer production plants and developing a fertilizer innovation center to cater fertilizer sector needs of the region;
- Developing innovative agri-business models, inputs-output markets, science of scaling for wider adoption of technologies and skilled human resource in the region for sustainable agricultural production systems.

Recent Key Work in Asia

Feed the Future Bangladesh Climate-Smart Agriculture Activity (2023-2028), *USAID*

- Implemented in: Bangladesh
- Funding: $35 million

The CSA Activity will result in market improvements in smallholder farmers' access to and use of high-quality CSA technologies and practices as well as CSA inputs, to improve the productivity of target crops. Farmers' incomes will increase, bolstering food and nutrition security. The Activity's goal is to sustainably improve food security and the nutritional status of the rural population, decrease the incidence and severity of poverty among the rural poor, and better adapt agriculture systems to meet the threats and challenges linked to climate change-related events, thus transforming farming systems through CSA.

Accelerating Farm Incomes (AFI): Building Sustainable Soil Health, Markets, and Productivity in Telangana State (2019-2023), *Walmart Foundation*

- Implemented in: India
- Funding: $2.55 million

AFI in India diffuses improved agricultural technologies to farmers in rural and peri-urban areas through good agricultural practices, capacity building, and micro-enterprise development. AFI works with participating farmers, private sector extension agents, agricultural input suppliers, and output buyers to establish partnerships. This project seeks to create awareness and enhance farmers' knowledge on improved technologies and good agricultural practices for increasing crop productivity and accelerating farming incomes. AFI is implementing a new model of science of scaling agricultural technologies through champion farmers to reach 30,000 direct beneficiaries. From 298 villages, 604 champion farmers were trained in good agricultural practices and market linkages. Each champion farmer supports at least 50 fellow farmers on GAPs. As of May 2023, the champion farmers have collected over 20,000 farmers' data, of which 12,638 have been digitized and facilitated in promotion of 122 village level aggregators. The science of scaling model helped in developing 22 new agri-input shops in the project area and incubate 870 new businesses. The champion farmers are also supporting the 30 FPOs for business transactions by aggregating marketable surplus from respective village.

Assessment of State Fertilizer Scenario and Promoting Efficient Nutrient Management (ASPEN-APART-IFDC) (2022-2023), *ARIAS-Government of Assam- World Bank*

- Implemented in: India
- Funding: $675,000

The project is supported by World Bank Group to the Government of Assam through the ARIAS society with a three-pronged vision of improving the efficiency and transparency of fertilizer sector in the Assam state, enhancing the nutrient use efficiency in rice-, vegetable- and mustard- based cropping systems and mechanization of fertilizer deep placement in the state. IFDC conducted the fertilizer sector assessment survey with 231 stakeholders in the state including farmers, fertilizer dealers/retailers, Government officials, APART members, farmer producer organizations and field experts. Based on the findings, IFDC recommended actions to the state government regarding fertilizer methodologies, federal and state level fertilizer policies, fertilizer testing facilities, and state extension services. One of the key achievements of the project is indigenous development of a briquette making machine in India for the fertilizer deep placement. The project has also developed FDP machinery for both upland and lowland crops. The single operation FDP-cum-Paddy transplanter has been successfully demonstrated in 200 rice field demonstrations. The FDP-cum-zero till seed planter has been widely demonstrated in 200 demonstrations in mustard and vegetable crops. The mechanization of fertilizer deep placement is being adopted by farmers on a large scale in different parts of the country now. IFDC has been instrumental in developing new skills and knowledge among the stakeholders through within district, instate, outside state and outside country training programs. Overall, the technology can reduce the amount of fertilizer needed by 25%, increase productivity by 20%, double the nutrient use efficiency, reduce the environmental footprints by 60%, and provide an alternative source of income to farmers through carbon farming.

Sustainable Nutrient Management in Rice-Pulse-Vegetable Cropping Systems for Improved Farm Income, Food, and Environmental Security in Odisha (SNM-Odisha) (2023-2025), *RKVY, Govt. of Odisha*

- Implemented in: India
- Funding: $445,000

The project is supported by the Rastriya Krishi Vikas Yogna (National Agriculture Development Scheme), Government of Odisha State in India. The basic and strategic research project on fertilizer deep placement in different cropping systems of state will be initiated from July 2023. The project envisions to generate new scientific information and technologies by evaluating new and innovative fertilizer products/molecules (FDP and UDP), including multi-nutrient customized fertilizers, application methods, and CPA practices toward improved nutrient use efficiency, soil health, and reduced greenhouse gas (GHG) emissions. Also conduct strategic research on single-operation mechanized seeding-cum-balanced fertilization machine through FDP and UDP for direct-seeded rice-pulses, and rice-vegetables system. The major objective is to generate and share scientific knowledge on ISFM and CPA methods with research, extension, policy makers, and private sector personnel for wider dissemination, adaptation, and use. IFDC will also emphasize on the capacity development of the existing fertilizer value chain and stakeholders including Young Farmers Cooperatives and Farmer Producer Organizations (FPOs) through extensive consultations and advocacy campaigns in new and efficient fertilizer products and their use and delivery mechanisms. Overall aim is to devise technologies and scientific knowledge to double the fertilizer use efficiency in the state.

Feed the Future Nepal Seed and Fertilizer Project (NSAF) (2016-2021), *USAID*

- Implemented in: Nepal
- Funding: $1.1 million

As a sub-grantee to the International Maize and Wheat Improvement Center (CIMMYT), IFDC focused on development of site and crop-specific fertilizer recommendations and scaling Integrated Soil Fertility Management (ISFM) practices through market system approach, private sector engagement to improve fertilizer distribution efficiency, public policy, and extension. The project strengthened productive and profitable agriculture systems, strengthened and expanded access to markets and trade, and increased employment and entrepreneurship. Over 120,000 households applied improved practices to over 66,000 hectares of land. A total of 61 firms received technical assistance for improving business performance, and over $6.6 million of agriculture-related financing was accessed.

Further, IFDC successfully expanded fertilizer deep placement (FDP) operations for various cropping systems in Nepal and assessed the potential of slow-release fertilizers such as polymer coated urea, sulfur coated urea, neem coated urea and tools for real-time N management potent. Also, new and efficient fertilizer product protocols involving major nutrients, such as nitrogen and phosphorus, and secondary and micronutrients were tested for validation and introduction in Nepal with local and international research partnerships. IFDC was also instrumental in the reestablishment of the Fertilizer Association of Nepal, with support from Nepal's Ministry of Agricultural Development.

Dry Zone and Uplands Agro-Input and Farm Services Project (2015-2020), *Livelihoods and Food Security Trust Fund*

- Implemented in: Myanmar
- Funding: $6.1 million

This project supported Myanmar's agro-input sector by strengthening networks of agricultural input and service providers (ISPs) in order to improve smallholder farmer incomes and productivity through quality input use, access to technical advice and information, and reduced vulnerability to crop stress. By working with multiple public and private sector stakeholders, the project promoted an integrated approach. Before this project, 92% of ISPs had limited knowledge of agro-inputs, no business concept, and no confidence to discuss with farmers. After collaboration, 82% of farmers revealed that ISPs offered improved farm advisory and other services. By 2018, over 200 Myanmar Department of Agriculture extension workers had participated in project activities, including over

355 trainings. Crop productivity and profit margins increased for over 25,000 farmers and 55 ISPs through the introduction of new products and services and enhanced network linkages. In 2020 COVID-19 presented a disruption to the project, however ISPs continued to receive remote contact from the project to gather data and prepare business development proposals. Stakeholders gained confidence to give advice on what factors to consider when choosing inputs, and capacity development was gradually built resilient systems that can better face future pressures and shocks from the climate and market. A total of 42,551 stakeholders directly benefited from the project.

Fertilizer Sector Improvement (FSI+) (2014-2019), *USAID*

- Implemented in: Myanmar
- Funding: $9.5 million

IFDC implemented FSI+ in Myanmar to promote balanced fertilization with FDP as well as the use of good-quality seed and better water management practices. In addition, it strengthened the capacity of fertilizer retailers to improve their business management and provide advisory services to farmers. The project contributed to building a strong and resilient food and agriculture system that has had a transformational effect on people's lives. It achieved that by improving incomes equitably and by enhancing food security for small-scale farmers. The FSI+ project: trained over 13,000 farmers; reached another 5,000 farmers through field days and organized visits to model farms; encouraged trained farmers to share information with their neighbors, of whom an estimated 2,500 adopted improved technologies; and trained 346 agro-input retailers, who in turn educated and encouraged over 50,000 farmer customers to adopt improved technologies.

Accelerating Vegetable Productivity Improvement (AVPI) Project and Walmart Foundation Activity (2016-2018 and 2013-2015), *Walmart Foundation*

- Implemented in: Bangladesh
- Funding: $1.1 million

Implemented in 10 Districts in Southwestern Bangladesh, AVPI worked with women vegetable and fruit famers to improve the use of Fertilizer Deep Placement (FDP) and protected seedling cultivation with water-saving irrigation, along with other associated good agricultural practices. As a follow on to the Bangladesh AAPI project's $1.2 million grant to carry forward support to female vegetable farmers, the project collaborated with the Government of Bangladesh's Department of Agricultural Extension and agro-input dealers to promote FDP and seed/crop cultivation, water-saving trickle irrigation, and poly-net houses. The project surveyed market hubs and educated producers on evolving vegetable and fruit market standards. As a result, over 37,800 female farmers directly benefitted from project interventions, with over 40,000 female farmers applying new GAP techniques and 25,000 farmers utilizing FDP. Additionally, a total of 18 fertilizer briquetting machines were sold to female entrepreneurs and vegetable and fruit production had increased by 148% across the project's targeted districts.

Accelerating Agriculture Productivity Improvement (AAPI) Project (2010-2016), *USAID*

- Implemented in: Bangladesh
- Funding: $31.9 million

The AAPI project in Bangladesh emphasized technology diffusion and the development of lasting support systems for rural farmers. Technologies promoted included FDP and alternate wetting and drying (AWD) water management technology. The project met or exceeded all targets assigned for the extensive range and scope of activities, including: more than 28,000 training programs for 1.1 million farmers, field days for 75,000 farmers, training events for 15,600 fertilizer dealers and retailers, and stakeholder workshops for 13,770 participants. As a result of project interventions, over 2 million farmers are now applying FDP, with an adoption rate of 50%. Over 7,800 public and private sector officials were trained on FDP and good agricultural practices, while over 1 million farmers, 33% of whom were women, received training on urea and NPK briquettes for rice and vegetable crops.

Relevant Core Competencies

Market Systems Facilitation and Private Sector Development

IFDC assists smallholder farmers in transitioning from subsistence agriculture to commercial farming by mobilizing farmers to act collectively, empowering them with the knowledge, tools, and networks required to grow more high-quality food that can open profitable access to markets. IFDC brokers partnerships with the private sector to strengthen market systems, from inputs and agricultural marketing to support services, such as extension, credit, and information.

Development and Scaling of Efficient and Climate-Adapted Technologies

Improving fertilizer efficiency is a major focus of IFDC research in Asia. Climate-smart agricultural technologies, such as FDP, are helping farmers earn more income and mitigate agriculture's impact on the environment. FDP is an innovative, proven fertilizer application technology that achieves average yield increases of 18% while reducing fertilizer use by about one-third. IFDC projects combine various approaches to mitigate impacts of climate change: climate-smart agricultural technologies relevant to households' needs and investment capacity; alternative cropping systems to safeguard household food security; and recognition of gender roles in climate adaptation at the household level (e.g., decision making). IFDC promotes technological innovations that increase fertilizer and water use efficiency to improve soil health, combat erosion, and minimize environmental damage.

Inclusive Agribusiness

IFDC works with the private sector to build sustainable agribusiness networks that enable small-scale farmers to connect with markets and services through agribusiness cluster (ABC) development centers. This bottom-up approach facilitates greater trust and enables sustainable and profitable business relationships among ABC actors.

Increasing Farm Productivity, Profitability, and Sustainability

Combining last-mile services with access to improved inputs and farm management practices, such as climate-smart and conservation agriculture, ISFM, and site-specific Soil testing, Mapping, Recommendations development, and Technology transfer (SMaRT), IFDC works with farming households to increase productivity and profitability. IFDC pioneered the balanced nutrition concept for soil fertility management, promoting crop- and soil-specific fertilizer formulas, which has resulted in 30-40% yield increases with minimal cost increases and overall improvements in farmer food security and income. Balanced fertilizer use is part of a suite of good agricultural practices adapted for different crops, market scenarios, and farmer risk profiles to ensure household profitability, food security, and resilience.

Collaborative Learning and Adaptive Management

IFDC projects use a Collaborating, Learning, and Adapting (CLA) model alongside IFDC's global knowledge management and Monitoring and Evaluation policies and procedures to guide evidence-based learning approaches. Key learning approaches include inclusiveness i.e., gender and youth engagement, and through creation on community of practice platforms across partners and participants to enable continuous sharing, learning, and adaptation beyond the program implementing partners and beneficiaries.