



Regional **Policy Brief**
For Agricultural Policy Makers

Scaling out
**Conservation
Agriculture** based
Sustainable Intensification
approaches for smallholder farmers

What are the challenges?

The Eastern Gangetic Plains (EGP) of India, Nepal and Bangladesh remains as a region with one of the world's highest concentrations of poverty and is highly vulnerable to food insecurity and climate risk. Some 300 million people rely on agriculture for their livelihoods, but productivity remains low, and the incidence of households living in poverty is the highest in the world. Population growth, climate change and competition for water and energy resources will further exacerbate these problems in the future without strategic action and widespread transformation of food systems.

Farmers in the EGP need options to address challenges of food insecurity, extreme poverty and climate vulnerability. Policy makers need ways to support improved production to promote agricultural development that does not cause long term damage to the environment.

Intensifying agricultural systems is one way of improving productivity. However, promoting agricultural intensification often leads to unintended and unsustainable environmental consequences such as polluted air, depleted groundwater and degraded soil. Thus, there is a need to promote the adoption of techniques that can improve productivity and profitability sustainably, while reducing inputs and minimizing risks to the environment and human population. These techniques must also be able to cope with the additional pressure of increased climate variability.

What is CASI ?

The Conservation Agriculture based Sustainable Intensification (CASI) approach is a broader form of Conservation Agriculture (CA) that combines with Sustainable Intensification (SI) to create a flexible and adaptive portfolio of techniques, and wider benefits at a range of scales.

CA is an approach to crop production that promotes minimised soil disturbance, maintenance of continuous soil cover, and crop diversification and rotation. It has been implemented around the world for decades, and the area cropped using CA principles is currently around 10% of total cultivated land. Importantly, the spread of CA has been farmer-led, relying on innovation and adaptation to gain momentum.

SI is the overarching principle of improving productivity while reducing resource use and in ways that lessen pressure on the environment. When combined, these approaches increase productivity, improve soil fertility, diversify agricultural systems, make more efficient use of resources and contribute to environmental sustainability.

CASI is a portfolio of technologies that includes improved varieties, crop diversification, crop and soil management strategies (zero and strip till, laser land levelling, relay and intercropping, anchored residue retention), improved water management, better bet agronomy (including efficient weed and nutrient management) and mechanization at scale (e.g. planting techniques).

In addition to these crop production elements, CASI also focuses on building local capacity to solve problems and access information. It does this by working with relevant stakeholders to improve smallholder access to information and equitable input and market systems, which creates opportunities for development of the private sector at the local level.

The long-term benefits of CA technologies have been proven in smallholder situations across South Asia. In a four year project supported by ACIAR and DFAT and implemented by CIMMYT and national partners, more than 2,200 participatory on-farm trials were conducted across eight districts of the EGP in India, Bangladesh and Nepal. This project reached 75,000 farmers and has provided robust evidence of the benefits of CASI approaches for women and men within farming households and local small businesses.



How does CASI contribute to the solution?

CASI has the demonstrated ability to increase farm incomes through diversified cropping systems and more efficient use of resources. Relative to conventional practices, CASI approaches have been proven to improve the productivity and profitability of rice, maize, wheat and lentil farming systems while at the same time reducing the amount of water, fuel and labour needed to produce a crop.

Water productivity is increased by 4 - 16% through lower water demand crops and strategic use of residual soil

moisture. Similarly, energy inputs have been reduced by 10 - 12% by using minimum tillage, reduced pumping for irrigation and improved fertilizer use efficiency. The use of CASI technologies, which includes small scale mechanization, has resulted in labour savings of between 13 - 41%, as well as reduced drudgery, often for women. The application of CASI technologies also results in improved gross margins; economic analysis indicates that the introduction of zero tillage maize/wheat, mung bean and direct seeded rice can create average increases in profitability of between 17 - 95% compared to conventional farming practices. Intercropping maize with leafy vegetables offers even greater returns, especially for women. Women also report positive impacts on household food security, health and children's access to education.

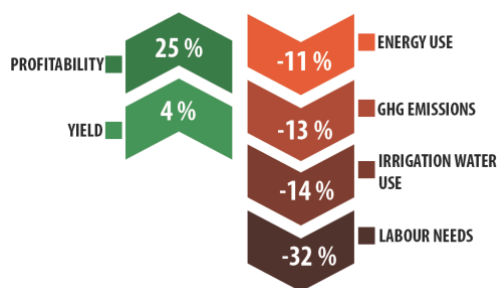


Figure 1 The impacts on crop production using CASI technologies compared to Conventional Tillage. These figures are an average of results from 611 trials across the EGP which measured changes to rice-wheat and rice-maize systems.

CASI increases resilience to climate change and climate variability through improved agricultural practices that improve resource-use efficiency and decrease vulnerability through exposure, sensitivity and adaptive management. For example, CASI approaches incorporate crop management techniques that allow adaptation to climate variability such as changes in rainfall timing and quantity, increased temperature, and associated emergent pest and disease problems.

By using CASI approaches, farmers can increase productivity and reduce production costs, resulting in a marketable surplus at cluster or regional levels. This means **increased opportunities for the local private sector**, who benefit from increased business interactions. Multi-stakeholder groups that link farmers with the public and private sectors can help manage change and solve local issues by developing shared strategies.

CASI approaches improve soil health by increasing levels of soil organic matter and improving soil structure, which means water and nutrients are used more efficiently.

What can policy makers do?

For CASI approaches to be implemented on a wide scale, farmers need access to the right machinery services, good quality inputs, affordable energy and water sources and assured market options, all available to them at critical times of the year. This requires a policy environment that facilitates access to information and the use of technology. Policy makers should consider facilitating the following elements to promote wider scale application of CASI approaches.



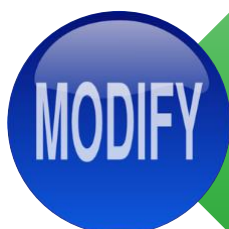
Promote effective extension systems to raise awareness of CASI techniques, which involve members of the public and private sector working together to build capacity and provide services, using a multi-stakeholder approach.



Implement and enforce linked policies to which CASI can directly contribute alternative options, for example banning the burning of rice residues.



Support farmers to organise as groups to increase their bargaining power to access government services, market accessibility and to reduce companies' cost of doing business with them.



Modify policies related to the import and accessibility of agricultural equipment, by reducing or abolishing import tariffs, particularly on cheaper machines (without compromising on quality) that are more likely to be used by smallholders.



Improve subsidies & target mechanization policies to promote CA equipment such as bed planters, zero/strip till drills, Happy Seeders, laser land levelers, mechanical rice transplanters & power tiller operated seeders. Implements that contravene CA based principles (for example, rotavators) should be removed from subsidy schemes.



Australian Government

Australian Centre for
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 **CIMMYT**^{MR}
International Maize and Wheat Improvement Center

Australian Centre for International Agricultural Research

ACIAR is an Australian Government statutory authority within the Foreign Affairs portfolio. It is Australia's specialist agency for international agricultural research for development (R4D). It supports applied research to improve agricultural productivity and sustainability and helps build food system resilience. ACIAR's activities are concentrated primarily in the Indo-Pacific region. ACIAR brokers and funds research partnerships between Australian scientists and their counterparts in developing countries to benefit farmers, the rural poor, researchers and policy makers. For more details, please visit: www.aciar.gov.au

Department of Foreign Affairs

The Department of Foreign Affairs and Trade is the Australian Government department mandated to manage Australia's overseas aid program. The purpose of the aid program is to promote Australia's national interests by contributing to sustainable economic growth and poverty reduction. The aid program focuses on two development outcomes: supporting private sector development and strengthening human development. For more details, please visit: www.dfat.gov.au/aid

International Maize and Wheat Improvement Center

The International Maize and Wheat Improvement Center (known by its Spanish acronym, CIMMYT) is a not-for-profit agriculture research and training organization. The Center works to improve food security and livelihoods by sustainably increasing the productivity of maize and wheat in the developing world. CIMMYT maintains the world's largest maize and wheat seed bank and is best known for initiating the Green Revolution, which saved millions of lives across Asia and for which CIMMYT's Dr. Norman Borlaug was awarded the Nobel Peace Prize. CIMMYT is a member of the CGIAR Consortium and receives support from national governments, foundations, development banks and other public and private agencies. For more information visit: www.cimmyt.org



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