

ACIAR SDIP Program



ANNUAL REPORT 2018-19



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Australian Centre for
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ACIAR SDIP Annual Report 2018-19

Prepared by



**Australian Centre for International Agricultural Research
For the Sustainable Development Investment Portfolio**



Contents

Acronyms	1
EXECUTIVE SUMMARY	3
1. BACKGROUND AND CONTEXT	9
ACIAR SDIP Goals and Objectives	9
Key priorities for 2018-19	10
Overview of political and development context in 2018-19	10
2. RESULTS IN 2018-19	12
Progress against expectations	12
Foresight for food systems	13
Institutional Innovation	17
Field Scale Innovation	18
Analytical Studies – Filling Knowledge Gaps	24
Integration and Synthesis at the Program Level	27
Challenges experienced	29
Lessons learned	29
Evidence of institutional strengthening	30
3. LEVERAGING AUSTRALIA’S DIPLOMATIC PRESENCE	31
4. PORTFOLIO AND PARTNERSHIP APPROACH	32
5. FINANCIAL REPORTING	Error! Bookmark not defined.
SDIP Expenditure in 2018-19	Error! Bookmark not defined.
SDIP Phase 2 (Projected)	Error! Bookmark not defined.
Annexe 1: Overview of priorities for 2019 – 20	34
Annexe 2: Risk Register	36
Annexe 3: Climate change in South Asia: Projected trends and impacts on agriculture in the Eastern Gangetic Plains	37
Annexe 4: Interim report on Developing resource efficient and climate smart production systems in the Eastern Gangetic Plains	38

Acronyms

ACIAR	Australian Centre for International Agricultural Research
AKC	Agricultural Knowledge Centre
APSIM	Agricultural Production Simulator
ASR	Aquifer Storage and Recovery
BARC	Bangladesh Agricultural Research Council
BWS	Best Worst Scaling
CA	Conservation Agriculture
CASI	Conservation Agriculture based Sustainable Intensification
CGED	Centre for Green Economic Development
CGIAR	Consultative Group on International Agricultural Research
CHC	Custom Hiring Centre
CIMMYT	International Centre for Maize and Wheat Improvement
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DBT	Direct Benefit Transfer
DFAT	Department of Foreign Affairs and Trade
DoA	Department of Agriculture
DoA-WB	Department of Agriculture – West Bengal
DSR	Direct Seeded Rice
EGP	Eastern Gangetic Plains
FGD	Focus Group Discussion
GoWB	Government of West Bengal
HC	High Commissioner
ICeWARM	International Centre of Water Resources Management
ICT	Information and Communication Technology
IFPRI	International Food Policy Research Institute
IWMI	International Water Management Institute

LSP	Local Service Provider
MoALD	Ministry of Agriculture and Livestock Development
NABARD	National Bank for Agriculture and Rural Development
NARC	Nepal Agricultural Research Council
NGO	Non-Government Organisation
PEI	Policy Entrepreneurs Incorporated
PMAMP	Prime Minister's Agricultural Modernisation Program
POPI	Producer Organisation Promoting Institution
RDRS	Rangpur District Relief Services
SaciWATERs	South Asia Consortium for Interdisciplinary Water Resources Studies
SC	Steering Committee
SDIP	Sustainable Development Investment Portfolio
SDIP1	Sustainable Development Investment Portfolio Phase 1
SDIP2	Sustainable Development Investment Portfolio Phase 2
SRFSI	Sustainable and Resilient Farming Systems Intensification
SSCOP	Satmile Satish Club 'O' Pathagar
TAF	The Asia Foundation
UBKV	Uttar Banga Krishi Viswavidyalaya
VMP	Versatile Multi-crop Planter
WECS	Water and Energy Commission Secretariat

EXECUTIVE SUMMARY

Statement of Progress

The ACIAR SDIP program goal is to **maximise agriculture's contribution to sustainable food systems in the EGP**, for improved food, energy and water security.

The program has transitioned from understanding and promoting sustainable farming technologies based on conservation agriculture in Phase 1, to include the wider context of the food system and a deeper understanding of the various factors which influence sustainable food systems. We are now working with a wider range of stakeholders - from policy makers and implementers, to food system and gender researchers - to inform strategies for scaling up the adoption of sustainable farming systems. This allows us to develop a deeper understanding of how institutional and social factors, markets and technologies interact to constrain or enable sustainable food systems.

With this wealth of expertise, we are building on our previous work to understand food systems more widely, and to help our partners bring together the 'big picture' related to sustainable food systems. This includes:

- exploring biophysical constraints, such as soil chemistry, weed dynamics, water and energy availability, as barriers to developing more efficient farming systems;
- understanding the significant challenges to agriculture from climate change (changing rainfall patterns and intensity, more frequent droughts, more extreme temperatures); and formulating pathways for adaptation, as well as options for reduction of emissions footprints of food production systems;
- using future-focused processes at the local level as a dialogue tool, to probe deeper into existing situations, and explore future pathways for food systems transformation;
- identifying, measuring and showcasing effective institutions that help farmers access supporting services; and
- creating space for regional engagement.

The growing challenges of **climate change**, and the need to promote **gender equality** by empowering women and girls are themes that are integrated in activities across the program.

Overall, the ACIAR SDIP program has made good progress in 2018-19 and is on track to deliver against the end of phase outcomes. The priority for the program in this year has been to commission the full program, following a delay in finalising the implementation strategy. This has been achieved, with nine projects commissioned, and three completed, and all are in a strong position to deliver key outputs in the final year of Phase 2. The Foresight component has progressed well, moving from scoping and proof of concept to concrete engagement with a range of stakeholders. In the final year of SDIP2 this research will help link broader drivers of food systems into local level understanding. Work on institutional innovation has been slower to start due to longer time needed for the key Delphi survey. However, this project is now on track and the work plan has been modified to capitalise on emerging opportunities that ensure that results are highly relevant within the current systems. The SRFSI project has continued to support scaling approaches, with up to 90,000 farmers using CASI. This project has been extended until the end of Phase 2 to use the opportunity to learn from the wealth of knowledge on development and scaling of sustainable farming systems. The analytical studies have contributed strongly to understanding gender roles in the region and access to mechanisation.

In the coming year a focus on improved water management at local, regional and state levels will be explored to strengthen understanding of the food-energy-water nexus.

Key results achieved in 2018-19

- Continued scaling of conservation agriculture based sustainable intensification (CASI) **farming practices that increase productivity and farm incomes and have emission reduction benefits**. In 2018-19 the project reached a further 78,496 households¹ (22% women) with 43,319 households using the techniques, bringing the total to 219,192 farming households exposed to CASI technique and **up to 90,000 farmers (26% female) now using more productive, profitable and gender inclusive farming systems**. The cumulative impacts of this adoption over the past five years include an additional AUD\$23.8 million in increased farm level profits; 11,0000 t.CO₂-e mitigated, and 11,926 ML water saved.
- **The most significant success with scaling of CASI has been in West Bengal, India**, a priority state for Australia as identified in the India Economic Strategy. The institutional partnerships developed, and convergence with national and state government programs on agricultural development, have ensured sustainability. Adoption of CASI will have significant impact on rural incomes, water savings and reduced carbon emissions. A link to a film on the West Bengal Story can be found [here](#).
- An interim report on *Developing resource efficient and climate smart production systems in the Eastern Gangetic Plains* (Annexe 4) shows that **CASI based systems build resilience to climate change and have reduced the emissions footprint of food production systems in the EGP by 6 - 18%**. Emissions reductions vary by cropping system (i.e. for individual crops, CASI techniques reduce emissions on average by 14% for wheat, 10% for maize, 18% for lentil and 8% for rice), and so any changes to the cropping system can have wider impacts on the carbon intensity of the agricultural sector. There is potential for significant impact if CASI systems are adopted widely; for example, increasing the use of CASI to 20% of the area of rice, wheat and maize systems would increase productivity by almost 2 million tonnes, generate more than \$2 billion (AUD) in additional farm profits, reduce irrigation water use by over 2,000 GL, reduce energy use by over 12 PJ and reduce carbon emissions by over 740,000 tonnes of CO₂-e (Annexe 4). CASI systems also have a positive impact on both the amount and types of carbon present in the upper soil layers.
- **Developing a long-range perspective on key drivers and trends in regional and EGP food systems, and the implications for water and energy use** is ongoing in the Foresight component. Key stakeholders are exploring alternative future scenarios and transformation pathways using a systems-oriented approach to research, policy-making and implementation. Applying Foresight approaches, **we can now say how (and why) the food system is changing and what this might mean for the EGP**. Changes to the agricultural production system (Annexe 4) need to be understood within a wider context of long-term changes in food systems, in particular the changing climate and how this will shape the farming systems of tomorrow, changes in human consumption patterns, trade barriers, as well as issues of nutrition. The Foresight work has progressed well during 2018-19, moving from scoping and proof of concept to concrete engagement with a

¹ This is the number of people who were exposed to CASI through various project activities and convergence with existing programs, for example through attendance at field days, trainings etc.

range of stakeholders. Over four meetings, 140 people have been engaged, with 36% women attending. Importantly, these participants (28 common to more than one meeting) represent a range of sectors, expertise and career stage related to the wider food system. A series of status briefs on food systems and their drivers have been prepared, as well as a centralised data repository hosted on the program website. For example, see Annexe 3 for a summary of climate change and its potential impacts on agriculture.

- **Created new approaches to research and new knowledge which promotes a more nuanced macro and micro understanding of women’s roles in agriculture in the EGP** across Bangladesh, India and Nepal. This research challenges policy makers, academics and donors to ensure they target their interventions based on an appreciation of both macro and micro drivers affecting the success of women farmers. Several reports have been commissioned to better understand the role of women in agriculture, highlighting the heterogeneous situation across the EGP. A chief concern is the low female workforce participation rate in Bihar and West Bengal, which has declined to as little as 10% in some districts. The key value added from the study by Professor Sucharita Sen is the inclusion of micro level case studies that help to explain macro level trends. These have brought new light to the processes occurring, highlighting the need for policies that cater for heterogeneity. This work has been included in the Foresight component workshops to catalyse conversation around the changing role of women in agriculture, and the potential impacts this might have on future food systems.
- **Developed new knowledge on the challenges and opportunities for Nepal’s food systems in the context of federalisation.** In several projects and activities, the challenges and opportunities for Nepal’s food systems in the context of federalisation have been explored. The existing work goes some way to defining the context, and understanding priorities at different levels of government, to reach a consensus on preferred pathways towards sustainable food systems. The work on planning for sustainable agricultural mechanisation offers a linking mechanism for one part of the agricultural system at the provincial level.

Challenges experienced

In implementing SDIP2 to make it flexible and responsive to emerging requirements, a program of 14 projects has been commissioned by processing a series of small contracts. This is a different way of working for ACIAR and has required good communication with the ACIAR Executive. ACIAR will use this phase as a learning experience to evaluate the pros and cons of this approach for ACIAR and implementing partners. It remains to be seen whether this is appealing to partners and efficient in the long run.

A recent directive from the West Bengal State Government reinforces the restrictions on the use of the herbicide Glyphosate on field crops, which is currently the most readily available, cost-effective and widely used herbicide for weed management in CASI systems. Local partners are working closely with major companies and plant protection officers of the Government to access alternative herbicides. CIMMYT researchers are exploring weed management options in a small project within ACIAR SDIP. However, in the future trials will be required to be able to

properly inform the standard protocols and bring them in line with government recommendations.

In Nepal, the move to a federal structure has resulted in lack of coordination of technical manpower between the centre and provinces which has impacted the scaling of CASI technologies there. ACIAR SDIP work in Nepal is orienting towards smaller projects and activities that address ways to improve coordination and training of manpower at the provincial level.

Opportunities and risks for 2019-20

In Nepal, work in food systems in the context of federalisation and in policy dialogue forums has identified the need for supporting mechanisms for collaboration between local government staff. Given their increased power and budgetary availability local staff need to have the skills and confidence to define and implement sustainable food systems and inclusive methods of water management. This will be explored in Foresight activities and from an institutional innovation angle.

Partners participating in the ACIAR SDIP projects in emerging areas like Foresight for Food Systems need mentoring on methodology, design of gender disaggregated surveys, statistical analysis, content planning and editing. We need to ensure that in the last year we continue to adequately resource IFPRI, the main implementing partner, to support them. Managing small projects is time intensive and some South Asian partners need significant support in proposal writing and work-planning. However, the projects also carry smaller risks in delivering results, since they tend to be more focused on short term, discrete pieces of work.

Table 1 Aggregate Results Table

No.	What	Annual Result (2018-2019)			Cumulative results for SDIP2 (2016 - current)			Cumulative results for SDIP (2013 - current)		
		Women	Men	Total	Women	Men	Total	Women	Men	Total
1	Numbers of farmers (women and men) who adopt sustainable agricultural practices that increase resource efficiency and climate resilience (disaggregated)	10,667	32,652	43,319	23,085	67,118	90,203	23,587	67,632	91,219 ²
2	Numbers of farmers (women and men) with increased incomes (disaggregated) ³	10,667	32,652	43,319	23,085	67,118	90,203	23,587	67,632	91,219
5	Numbers of women and men who have undertaken professional development and/or technical training opportunities (short courses, study modules, exchanges, high level study tours etc) (disaggregated)	3,023	9,324	12,347	-	-	-	17,530	41,418	58,948
6	Numbers of women and men who have been supported to undertake specific graduate (Masters etc) programs related to water-energy-food issues (disaggregated)	2	2	4	2	4	6	2	8	10
7	Numbers of women and men that have participated in key knowledge/dialogue/policy forums (disaggregated)	97	258	355	2	123	125	-	-	-
8	Numbers of women and men stakeholders who have participated in stakeholder consultations regarding water-energy-food issues (disaggregated)	1,014	4,092	5,106	2	126	128	4,938	11,437	16,375
9	Numbers of women and men who have been supported to become micro-entrepreneurs (disaggregated)	-	23	23	-	-	-	-	-	23
10	Number of new knowledge products that incorporate a gender lens							350		
11	Number of new knowledge products that directly address knowledge gaps on gender (and include sex disaggregated data)				10			10		
13	Quantum of greenhouse gas emission (CO ₂ equivalent) reductions (disaggregated by type):									
	(ii) agriculture resource efficiency	11,000						18,065		
	TOTAL	11,000						18,065		
14	Cubic metres of water saved through resource efficiency measures (disaggregated by sector):									
	(ii) agriculture	11,926,000						19,017,000		
	TOTAL	11,926,000						19,017,000		
15	MWh of power saved through resource efficiency measures (disaggregated by sector)									
	ii) agriculture	52,500						79,239		
	TOTAL	52,500						79,239		

² The number of households that have been exposed to CASI practices through various project activities and convergence with existing programs, for example through attendance at field days, trainings etc. is higher (219,192) than the number of households who are using the techniques.

³ It is assumed that households using CASI benefit from increased income, based on average increases across on-farm trials.

18	Quantum of finance leveraged from the private sector/government programs (disaggregated by type):			
	i) climate change finance			\$ 194,361
	TOTAL			\$ 194,361

1. BACKGROUND AND CONTEXT

ACIAR SDIP Goals and Objectives

The goal of ACIAR SDIP is to maximise agriculture’s contribution to sustainable food systems for improved food, energy and water management. This work focuses on the Eastern Gangetic Plains (EGP) of Bangladesh, India and Nepal. The program-level objectives focus on collaboration and understanding of longer-term changes to food systems, identifying and promoting effective institutions, filling knowledge gaps at a range of scales for better decision making, and optimising learning from scaling. Table 2 shows how these objectives and end of program targets align with the wider SDIP outcomes.

Table 2 ACIAR SDIP objectives, end of program target and alignment with SDIP outcomes

ACIAR SDIP Objective	End of program target	SDIP Outcome
1. Improve collaboration between key partners (regional, national, state) to strengthen understanding of longer-term food systems changes and the implications for food, water and energy security; particularly in the context of gender and climate change.	Key stakeholders (both women and men) in the EGP (including decision-makers) are engaging in regular dialogue with respect to the drivers and trends for regional food security.	Strengthened practices for regional cooperation; Improved regional enabling environment.
2. Increase capacity within district, state and national agencies in the EGP to promote effective institutions for sustainable food systems.	Key agencies (local, state, national) have improved capacity to identify and support institutions that promote inclusive and sustainable food practices (including CASI).	Strengthened practices for regional cooperation; Improved regional enabling environment.
3. Critical knowledge gaps identified, filled and used to support sustainable food systems, and to allow better decision making at a range of scales.	The technical and socio-economic knowledge base with respect to sustainable food systems and practices, including the role of women and men and the impact of climate change, has been strengthened.	Critical new knowledge generated and used for regional cooperation.
4. Optimise the learning from scaling field level activities and local engagement to promote two-way flow of information for improved field – policy links.	Better links between field level learning and policy levels established	Critical new knowledge generated and used for regional cooperation.

ACIAR SDIP focuses on improving food, energy and water security for more sustainable food systems in the EGP, through resilient and inclusive farming systems supported by robust policies and strategic regional planning. The program is implemented through a centralised scientific leadership and program management team that guides overall program development, ensures in-depth synthesis and adapts work to local contexts and policy opportunities. A Steering Committee (SC) guides the program by informing priorities, responding to higher level research results, and ensuring integration with regional policy and dialogue processes and other research efforts.

The program is based on four complementary components, each with a focus on a different sector or scale of the food system. The Foresight component focuses on dialogue and foresight processes to consider key trends and strategic contributions for the transformation to more sustainable food systems. The Institutional Innovation component is identifying and measuring the most effective institutions for access to information, water and risk management for farmers, with a focus on women and tenant farmers. The Field Scale Innovation component is

working to uncover key constraints to sustainable farming systems, including those related to soil and weed management, as well as likely yield gaps. Finally, the Analytical Studies component fills major knowledge gaps related to mechanisation, the role of women in agriculture, food trade, and water management. An integrated set of activities across local, meso and national scales is helping to drive innovation around the incentives, policies, market mechanisms and extension approaches required to scale-up the adoption of more resilient, sustainable, inclusive and profitable food systems across the EGP.

Key priorities for 2018-19

- **Commission the full program of ACIAR SDIP Phase 2**, given the delayed start in finalising the implementation strategy for this phase (i.e. not finalised and fully staffed until March 2018). Importantly, define achievable outputs for the reduced time period to avoid underspend; keep a balance of investment between the components; and ensure each project is incorporating gender elements and working in the context of climate change.
- **Progress the first phase of the Foresight work** and test whether the approach is accepted regionally and has value, both for building a better understanding of the future of food systems and as a method for integrating different pieces of work in the ACIAR SDIP program.
- **Identify effective institutions** through application of the Delphi technique; and work with local stakeholders in Nepal to plan for sustainable agricultural mechanisation. Together, this work improves capacity to both identify effective institutions, and facilitate change with those institutions through strategic planning in agricultural systems.
- Under SRFESI, **continue scaling efforts** to increase the number of farmers with access to more sustainable and productive farming systems. This will build numbers and wider systemic change to enable learning from scaling impacts.
- Ensure that **individual pieces of work are integrated into the wider program** for synergistic effects. This includes preparation of a synthesis report on the different elements of resource efficiency and climate change mitigation and adaptation.
- **Improve communication** of program activities, results and opportunities for public diplomacy.

Overview of political and development context in 2018-19

The political context for 2018-19 was marked by elections in Bangladesh and India, and the continued implementation of the federal structure in Nepal, all of which impacted on the agricultural sector across the region. In Bangladesh, the focus of the current Five-Year Plan includes strengthening climate and environmental management with the aim to enhance resilience to natural disasters; improving water and natural resource management; and modernizing agriculture. The work under ACIAR SDIP aligns well with the vision of the Government of Bangladesh in promoting sustainable, diversified, climate resilient food systems.

During the period 2016 to 2019, the Government of India initiated the flagship program of *Doubling of Farmers Income by the Year 2022*, which involved an important paradigm shift from a focus on productivity to profitability of farmers. There is now a move to shift from input and

output subsidies to Direct Benefit Transfers (DBT) to farmers which will provide farmers with cash, which provides an opportunity to study the effects on institutions and incomes. There is a focus on promoting mechanisation in agriculture through Custom Hiring Centres which are owned by micro-entrepreneurs and farmer groups. All these developments align well with the scaling of sustainable intensification practices researched and demonstrated by SRFSI.

In Nepal, the adoption of the federal structure as per the Constitution of Nepal in 2015 has brought full autonomy to local governments, who have a range of legislative, judicial and executive powers. Agricultural development is covered by all three tiers of government, and more importantly agricultural extension is now the responsibility of the local municipalities. A key challenge for the new system is the lack of human resources capability, both in terms of the number of staff and their technical capacity. This has an impact on implementation of the agriculture development programs, budget prioritisation and spending. The ACIAR SDIP program is responding to opportunities in this transition phase, to understand the impacts of the federal structure on agriculture, and working with local stakeholders to plan for sustainable mechanisation and resilient food systems.

2. RESULTS IN 2018-19

Progress against expectations

The ACIAR SDIP program goal is to **maximise agriculture's contribution to sustainable food systems in the EGP**, for improved food, energy and water security. **The program has transitioned from understanding and promoting sustainable farming technologies based on conservation agriculture in Phase 1, to include the wider context of the food system and a deeper understanding of the various factors which influence sustainable food systems.**

We are now working with a wider range of stakeholders from policy makers and policy implementers, including food system and gender researchers, to inform strategies for scaling up the adoption of sustainable farming systems. This allows us to develop a deeper understanding of how institutional and social factors, markets and technologies interact to constrain or enable sustainable food systems.

With this wealth of expertise, we are building on our previous work to understand food systems more widely, and to help our partners bring together the 'big picture' related to sustainable food systems. This includes:

- understanding the significant challenges to agriculture from climate change such as changing rainfall patterns and intensity and more frequent droughts, and options for adaptation and reduction of emissions footprints of food production systems;
- exploring biophysical constraints, such as soil chemistry, weed dynamics, water and energy availability, as barriers to developing more efficient farming systems;
- using future-focused processes at the local level as a dialogue tool, to probe deeper into existing situations, and explore future pathways for food systems transformation;
- identifying, measuring and showcasing effective institutions that help farmers access supporting services; and
- creating space for regional engagement.

The growing challenges of **climate change**, and the need to promote **gender equality** by empowering women and girls are themes that are integrated in activities across the program.

Overall, the ACIAR SDIP program has made good progress in 2018-19 and is on track to deliver against the end of phase outcomes. The priority for the program in this year has been to commission the full program, following a delay in finalising the implementation strategy. This has been achieved, with nine projects commissioned, and three completed, and all are in a strong position to deliver key outputs in the final year of Phase 2. The Foresight component has progressed well, moving from scoping and proof of concept to concrete engagement with a range of stakeholders. In the final year of SDIP2 this research will help link broader drivers of food systems into local level understanding. Work on institutional innovation has been slower to start due to longer time needed for the key Delphi survey. However, this project is now on track and the work plan has been modified to capitalise on emerging opportunities that ensure that results are highly relevant to the current systems. The SRFSI project has continued to support scaling approaches, with up to 90,000 farmers using CASI. This project has been extended until the end of Phase 2 to use the opportunity to learn from the wealth of knowledge on development and scaling of sustainable farming systems. The analytical studies have contributed strongly to understanding gender roles in the region and access to mechanisation.

In the coming year a focus on improved water management at local, regional and state levels will be explored to strengthen understanding of the food-energy-water nexus.

Foresight for food systems

Objective 1: Improve collaboration between key partners to strengthen understanding of longer-term food systems changes and the implications for food, water and energy

The Foresight component is developing a long-range perspective on key drivers and trends in regional/EGP food systems, and the implications for water and energy use. It is **engaging key stakeholders and exploring alternative future scenarios and transformation pathways using a systems-oriented approach to research, policy-making and implementation**. Changes in the agricultural production system, such as those demonstrated by the SRFSI project (Annexe 4) need to be understood within a wider context of long-term changes in food systems, in particular a changing climate along with consumption patterns, trade and issues of nutrition. The Foresight work has evolved well during 2018-19, moving from scoping and proof of concept to concrete engagement with a range of stakeholders, and a plan for the final year of SDIP2 that will help link broader drivers of food systems into local level understanding, and communicate these outcomes to a wider audience both in the region and globally. Over four meetings, 140 people have been engaged, with 36% women attending. Importantly, these participants (28 common to more than one meeting) represent a range of sectors, expertise and career stage related to the wider food system. A series of status briefs on food systems and their drivers have been prepared, as well as a centralised data repository hosted on the program website. For an example of a status brief on the current state of climate change projections and likely impacts on agriculture in the region, see Annexe 3.

Process

Scoping: After a scoping meeting in Delhi in June 2018, the major take home messages for developing the program were in suggesting key themes for foresight analysis, including: patterns of rural transformation and implications for demand and production; role of gender issues in food systems; impact of agriculture and climate change on water availability (Annexe 3); impacts of policy on longer term food system transformations; future farming systems that are more diversified and the implications for landholding size; understanding change in consumption patterns and implications for nutrition and health; regional markets and trade; and soil health. Participants noted that foresight work must be linked to the wider food system and include bigger donors, the private sector and the people who are making the decisions. Implementation is critical, and there is a need to focus on elements of the food system that are critically important and for which there is existing technical capacity to ensure that actionable outcomes are achieved, particularly given the limited timeframe remaining in SDIP.

Refining: A second workshop in Kathmandu was held in September 2018, to progress the themes identified earlier. The purpose of this meeting was to generate ideas on how to work together to develop an analytical and policy-relevant understanding of the food systems in the region. The meeting allowed plenty of robust discussion and consideration of the key trends

and emerging themes. To commence, country level presentations were given by local partners to show the current situation for food systems, and to identify key drivers of change. This was followed by a session where mind maps were developed at country or province levels (Nepal), considering the key elements of the food system and the links between them. Interestingly, these drivers of change played out differently when they were prioritized in the different locations. Following this meeting, key deliverables were assigned to Foresight partners, including preparation of food systems mapping for India, Nepal and Bangladesh; a series of status briefs; and the need for a centralised repository for regional data and reports related to understanding food systems in the region.

Training: A participatory learning workshop was held in February 2019, with 47 participants. It was designed as a series of training presentations and participatory exercises in methods for foresight and scenario analysis, using real world examples based on the four focus geographic regions of ACIAR SDIP: Bihar, West Bengal, Nepal (Terai) and Bangladesh. Tools practiced included developing rich pictures, systems diagrams, causal loop diagrams, participatory scenario development and considering the relevance and application of models for foresight analysis. Throughout the workshop, participants worked in regional groups to define a set of foresight activities that could be undertaken at the local level to inform and improve the future of food systems in different parts of the EGP. These plans were summarized and presented to the ACIAR SDIP Steering Committee on the final afternoon. A range of specific activities are proposed. Nepal will use foresight approaches as a policy dialogue tool to understand the implementation of agricultural development at a range of local levels (see Box 1). In West Bengal, foresight will contribute to expanding our understanding of the impacts of CASI for sustainable and equitable rural livelihoods. In Bangladesh, the potential for high value crops for a diversified food system will be explored. Potential pathways to achieve a “healthy plate” based production system will be considered in Bihar. As well as the set of local level activities, key information will be synthesized to support a regional level analysis of the food system.

Engaging: A workshop in July 2019 in Kathmandu was hosted for elected leaders, senior officials from provincial and federal governments and participants from the Nepal Agricultural Research Council (NARC), leading think tanks and international organizations to discuss ways to capitalise on opportunities created by the federalization of Nepal to build sustainable, inclusive and safe food systems for the country. Participants from across sectors focused on the role of credible knowledge and its extension to women and men farmers to build a sustainable food system. Participants called upon researchers to help build a shared understanding of the challenge before Nepal, and facilitate greater coordination across the three levels of government—local, provincial and federal—for sustainable intensification of agriculture.

Outputs

A set of background materials has been developed to support a better understanding of food systems in the EGP. It is recognised that there is a wealth of information related to food systems, but it is scattered and exists at various scales. Key outputs of this project are to synthesise and collate relevant information, hosted on the [website here](#).

- Food systems maps and supporting reports for Bangladesh, India and Nepal
- Status briefs for major drivers on food systems, on the following topics:
 1. Climate Change (Annexe 3)
 2. Electrifying Agriculture in Bihar
 3. Food Trade in South Asia
 4. Comparison of diets in EGP with the recommended diets
 5. Groundwater quality
 6. A Gendered analysis of rural employment in the EGP
 7. Migration and diversification of livelihoods and its implication
 8. Demographic trends in the EGP
 9. An analysis of Food Policy in India
 10. Financing for farmers-labour, credit and insurance
 11. The impacts of federalisation on agriculture in Nepal
- A finalised proposal to progress the next phase of Foresight work, which will focus at two levels:
 - Local level foresight exercises to explore the use of these approaches and the ability to influence change in local food systems.
 - High level dialogue to engage with partners to share information and critically assess the ability of Foresight approaches to influence food systems at different levels.

Box 1: SUPPORTING AGRICULTURE IN THE PROCESS OF FEDERALISATION IN NEPAL

Nepal is in a transition phase as the new federal system is implemented. This period of change means translating the newly enshrined constitutional right to food and food sovereignty into effectively operating systems.

The changed structure gives more power to local governments at the municipal level, adds a provincial level to the government mix, and changes the role of the federal government. This restructuring brings enormous opportunities for services to be prioritised and managed at the local level, bringing the government closer to the people. But there are challenges associated too, in changing roles, responsibilities and funding mechanisms. For agriculture, the new system means that agricultural services are primarily the responsibility of the provincial and local governments, while research remains at the federal level. Stakeholders at all levels recognise the need for coordination mechanisms to ensure that the new system operates effectively. In this context, ACIAR SDIP is working at several levels to support the transition to federalisation to ensure effective agricultural services.

In the Foresight component, the Centre for Green Economic Development (CGED) have led recent work on understanding the wider food system in the Nepal Terai, and exploring the current situation for agriculture in the new system. They found a multitude of policies and plans that relate to agricultural development at all levels, but challenges in coordination and implementation. Discussions with local municipal and provincial staff and community members reveal a lack of staff to fill assigned positions in various government offices, a lack of subject matter specialists, and low budgetary spending despite allocations. These initial constraints can be seen as areas of potential risk that must be managed to allow the implementation to unfold effectively.

A high-level policy dialogue was conducted in Kathmandu that attracted over 40 participants including policy makers from federal and provincial government levels, and other relevant organisations. The objective was to present the evidence and ideas from the initial work, and to get feedback on priority areas for research and support within the new system. Key themes that emerged included the lack of mechanisms that exist for coordination and collaboration, both vertical and horizontal. Policy dialogue was recommended to include local governments to demonstrate promising techniques and ensure informed decision making. Another important

area was the need to link the new Agricultural Knowledge Centres (AKC) with research and other knowledge sources. The importance of building human resource capacity across all parts of the system was highlighted.

In the next phase of Foresight work in Nepal, the team from CGED together with the DoA and IWMI will use foresight approaches as a dialogue tool to identify preferred pathways towards a resilient food system, through identifying synergies between the different levels of government who are responsible for delivery of agricultural services. This project will incorporate recommendations from the peer learning workshop and science policy dialogue, to align with identified priorities.

The activities within the ACIAR SDIP program have highlighted the potential for conservation agriculture based sustainable intensification (CASI) practices to improve the livelihoods of those in rural areas of the Nepal Terai. This has led to the development of substantial recommendations to create enabling environments that facilitate the uptake of CASI in farming communities. Yet there remains a gap in how to 'put into action' such recommendations. CIMMYT are leading a project that focuses on 'Building Provincial Capacity for Sustainable Agricultural Mechanisation in Nepal' to address this gap through the production of participatory roadmaps. Roadmapping is a flexible planning technique to support strategic planning and programming. This process is being developed and applied in Province 1 and 2 in Nepal, where the SRFISI project has been working since 2012. It is exploring the pathways for increased CASI mechanisation through a series of activities that aim to improve linkages and capacity to create and maintain enabling environments. This project responds directly to the need within the new federal structure for cooperative mechanisms at the provincial level.

In several projects and activities we have explored the challenges and opportunities for Nepal's food systems in the context of federalisation. The existing work goes some way to defining the context, and understanding priorities at different levels of government, to reach a consensus on preferred pathways towards sustainable food systems. The work on mechanisation offers a linking mechanism for one part of the agricultural system at the provincial level. As recommended by policy makers, what is missing is testing and supporting mechanisms for coordination and collaboration for local government to define and implement sustainable food systems and inclusive methods of water management, in the context of their increased power and budgetary availability.



Figure 1 A newspaper article with a story about Bubeneshwo Yadav and how he has introduced zero till to his village is passed around a group of farmers and researchers gathered in the Yadav family yard in Chitaha Village, Sunsari District, Terai Region of Nepal.

Institutional Innovation

Objective 2: Increase capacity within district, state and national agencies in the EGP to promote effective institutions for sustainable food systems.

The Institutional Innovation component is identifying effective institutions that work for farmers through inputs from regional experts. Institutional maps for sustainable mechanisation have been compiled at the provincial level in Nepal. In the South Asia region multitudes of policies and programs exist that aim to improve agricultural production and profitability. However the implementation of these policies is often weak, as institutions at various scales vary in their capacity to deliver to farmers, and there are often unintended consequences. The Institutional Innovation component is identifying and measuring the most effective institutions for access to information, water and risk management for farmers, with a focus on women and tenant farmers. Together, these institutions help farmers adapt to and mitigate against climate change. Additionally, the Roadmaps project works with local and provincial government in Nepal to help plan for sustainable agricultural mechanisation (see Box 1).

Institutions for intensification, integration and inclusiveness

The overall aim of this project is to develop capacity within district, state and national agencies in the EGP so that they can identify and consistently promote institutions that foster intensification, integration and inclusiveness. The project hones in on three main areas: the institutions for transferring knowledge to farm households; the institutions and activities related to risk mitigation by rural households; and those institutions and practices related to water property rights. Three main activities have taken place during the reporting period. A project inception meeting in Nepal; a Delphi workshop in Bangladesh accompanied by distribution of a round 1 Delphi survey in Nepal and India; and statistical modelling and analysis of secondary data to better understand specific production risks.

A Delphi study has been activated to extract from experts their knowledge of extant institutions impacting on rural households' well-being and their key characteristics and domains. Phase 1 of the Delphi is near completion and phase 2 has commenced. The second phase generates a testable description of institutions and their design features and is presented back to respondents for ratification. Phase 3 will then use this information to generate empirical weights from experts using best-worst scaling (BWS) methods.

Simultaneously, focus group analyses with farmers has commenced. The purpose of the focus groups is to (1) test some of the observations coming from the expert Delphi and (2) clarify nomenclature so a comparable BWS experiment can be used with farmers. Collectively, the two BWS activities will allow the research team to identify: (a) those institutions/characteristics that are most important in the minds of experts; and (b) those that are most appealing or important to farmers. Given the narrow timeframe, work has also commenced on scrutinising secondary data to inform statistical analysis of production and welfare impacts of different interventions, with a focus on women and tenant farmers.

The Delphi rounds were slower to progress than anticipated. With this in mind, secondary data was used to progress other analysis, especially along the risk issues in the project. The water property right element of the project was initially quite broad. This has subsequently become

more targeted, with a focus on changes to the marketing of groundwater in West Bengal specifically looking at the impacts on tenant and women farmers.

Field Scale Innovation

Objective 3: Optimise the learning from scaling field level activities and local engagement to promote two-way flow of information for improved field – policy links.

The Field Scale Innovation component has helped up to 90,000 farm households adopt more productive, sustainable farming techniques that build climate resilience and reduce the emissions footprint of food production systems in the EGP by 6 – 18% (for more details see Annexe 4), with the potential for significant impact if widely adopted. Alongside this, work is ongoing to understand soil and weed management constraints in these new systems.

Sustainable and Resilient Farming Systems Intensification

The Sustainable and Resilient Farming Systems Intensification (SRFSI) project is a regional six-year multi-partnership arrangement managed by CIMMYT which commenced in SDIP Phase 1 and has been extended to align with the full timeframe of Phase 2. This large project aims to reduce poverty in the EGP by improving the productivity, profitability and sustainability of smallholder farmers while safeguarding the environment and promoting the inclusion of women. The project started with a focus on testing conservation agriculture based sustainable intensification (CASI) techniques with farmers and communities in 40 nodes in eight districts across the EGP in Bangladesh (Rangpur and Rajshahi), India (West Bengal – Cooch Behar and Malda; and Bihar – Purnea and Madhubani) and Nepal (Sunsari and Dhanusha) eight locations of the EGP. Results from more than 400 participatory field trials over three years demonstrated that CASI practices improved productivity and profitability while reducing water, energy use, emissions and labour requirements in rice, wheat, maize and lentil systems in the EGP.

Impacts

The first three objectives of the project were reviewed in 2018, and the overall performance of this phase of the project was rated as very high by experienced external reviewers. In Variation 3 of the original contract (from October 2017), the project oriented towards scaling sustainable, resilient and more profitable farming techniques based on CASI (i.e. Objective 4), using capacity development impact pathways, and aligning with government schemes. The role of the project was to help create an enabling environment for change by building the capacity of partners to execute successful scaling and development of support programs. This capacity development program has focused on three levels of capacity building: with farmers to create demand for CASI services; with agricultural service providers to supply CASI services to smallholder farmers; and with policy makers to create an enabling environment for CASI service provision and implementation to flourish. As a result, up to 91,000 farmers (26% of them female) are now using more productive, profitable, gender-inclusive and lower-risk farming systems. The highest rate of success has been in West Bengal, India due to strong partners and engagement with farmers clubs and high-level government support (see Box 2). The cumulative impact of this adoption to date includes farming systems with improved profit margins and reduced emissions footprints (Annexe 4):

- AU\$23,872,000 in increased farm level profits
- AU\$14,082,000 in reduced production costs
- 60,436 hectares covered by climate resilient techniques
- 11,000 t CO₂-e mitigated
- 11,926 ML irrigation water saved

Additionally, it is estimated that converting 10% of farming systems in the EGP to full CASI use would have significant impacts on system productivity, profitability and emissions intensity, including increased productivity of 958,000 tonnes, an additional one billion dollars (AUD) in farm profits, and reduction of irrigation water use by 1,096 GL, energy use by 6 PJ and carbon emissions by 371,000 tonnes of CO₂-e (for more details see Annexe 4).

Box 2: SCALING SUCCESS IN WEST BENGAL

The SRFSI project is having a tangible impact on rural incomes and livelihoods in West Bengal where more than 65,000 farmers are using CASI techniques, despite the challenges of deep-rooted cultural resistance to new farming practices and the structure of the rural economy. The institutional partnerships and convergence with national and state government programs on agricultural development that has been built with coordinated efforts from CIMMYT, UBKV (State Agricultural University) and importantly with the Department of Agriculture (DoA-WB), will help ensure that the gains that have been made will be sustained beyond the life of Australian financial support. Engagement with government officials and policy makers on issues of CASI, agriculture mechanization and sustainable irrigation is a key aspect of SRFSI being delivered through multiple channels such as workshops, policy dialogues and high-level meetings.

To promote scaling in West Bengal, The SRFSI project team have conducted policy and orientation meetings for DoA-WB extension officials, at the recommendation of high-level officials including the Minister for Agriculture and the Adviser on Agriculture to the Chief Minister. The Adviser is impressed with the success of the project and has highlighted demonstrations in farmers' fields, active involvement of women farmers, and circulated "do and don'ts" for technological implementation among extension agents and farmers for faster dissemination. Policy changes recommended by the project for promotion of CASI technologies and diversification were endorsed by the Director of Agriculture and Ex-Officio Secretary, Agriculture Department, GoWB and distributed to a further six districts in West Bengal to integrate into their regular program.

There is tremendous scope to leverage the work that is being done in the state and link it with Australia's foreign policy, trade and diplomacy agenda in India. West Bengal is a priority state in the India Economic Strategy and agri-business one of the main focus sectors. In particular, ACIAR's significant work with women farmers resonates well within this agenda and provides opportunities for public diplomacy that could be more deeply explored. There are also likely to be opportunities to link ACIAR's work in West Bengal with the broader global Sustainable Food Systems agenda.

One of the outstanding features of the SRFSI program in West Bengal is the promotion and mentoring of Farmer Organisations, in particular the Satmile Satish Club O' Pathagar (SSCOP) in Coochbehar, West Bengal. This organisation has grown rapidly in the last six years and demonstrated exemplary success in providing CASI services, identifying suitable farmers for key activities such as participatory adaptive on-farm trials, and facilitating training and demonstrations. They have been nominated by the Indian National Bank for Agriculture and Rural Development (NABARD) as a Producer Organization Promoting Institution (POPI) which trains other farmer organisations developing as commercial organisations. They have acquired dealership of machinery from the producer company National Agro Industries based in the state of Punjab in North India. About 60 Farmers organisations in North Bengal have filled a critical gap in making the CASI machines and servicing and repair available to a large number of farmers in the northern part of the state

SSCOP has attracted investments from agribusiness companies like Yanmar Coromandel for rice transplanters and combine harvesters. In 2016-17, SSCOP started a rice seedling business with women which has covered 271

hectares and generated revenue of INR 12 Lakhs (equivalent to AU\$24,233). Its current portfolio includes paid trainings; agri-advisory services; input sales (linked to agribusiness company Mahindra Samriddhi); farm equipment rental and sales (with Yanmar Coromandel, Mahindra, Vijay Villiers, National Agro); market linkage and product aggregation and processing for providing better prices to farmers; soil testing; financial services (with strong linkages with financial institutions such as NABARD). SSCOP is also supporting the DoA-WB to promote CASI technologies in other districts of the state. Government agencies have sent their lead farmers for CASI training to SSCOP, which receives visitors not only from India, but also from Nepal and Bangladesh. A link to a film on the West Bengal Story can be found [here](#).



Figure 2 Mooni Bibi a member of the Mukta Self Help Group practices using a rice transplanter machine on a farm in Hawragari village, Cooch Behar District of West Bengal. Mooni Bibi is being taught to use the machine by a staff of the local machinery custom hiring centre

Capacity development

Capacity development activities undertaken in this period concentrated on six focus districts from the three participating countries as platforms (Malda, Coochbehar and Purnea in India; Sunsari in Nepal; Rajshahi and Rangpur in Bangladesh), with spill-over effects starting to radiate to other locations within and neighboring districts. In 2018-19, project activities reached 78,496 people, including 17,504 women (22%). Since inception, the project has succeeded in providing various capacity development activities and exposure to CASI to 219,192 people at all levels from farmers to policy makers and researchers, including 61,373 women (28%).

Since the beginning of the project, gender mainstreaming has remained a key aspect of the project, and SRFISI has employed a multi-pronged approach. As a result, there has been an increase in gender awareness and a profound appreciation of the importance of incorporating gender aspects in all components of the project. Considering the socio-political and cultural settings in the region, the overall level of female participation (22%) is still encouraging,

although it is evident that the rate of female participation is declining as scaling accelerates and project partners have less control over logistics. The rate of participation of women varied depending on which activity was being conducted. For example, Focus Group Discussions (FGD) had a female participation rate of over 60%. It is not only about the number of participation of women, but SRFSI is also working to quantify the benefits that female farmers reap from affirmative action in enhancing their skills thereby empowerment.

Convergence with government programs

Visualizing great opportunities to expand high impact CASI technologies, the project has worked closely with government schemes and plans (e.g. Bringing the Green Revolution to Eastern India, Agricultural Technology Management Agency in West Bengal and Bihar, India; Prime Minister's Agriculture Modernisation Program (PMAMP) in Nepal) through existing partners. Favourable government policy and coordination between national partners is indispensable for scaling through convergence. In West Bengal there is a good coordination between UBKV and DoA WB that has resulted in convergence with government policies for scaling CASI (**see Box 2**).

Acknowledging the importance of formalising support from the highest levels for CASI scaling, UBKV and DoA organized a high-level policy meeting in July 2018. The Minister of Agriculture for West Bengal asked government departments to work on CASI techniques and include them in their extension and dissemination programs. The Director of Agriculture and Ex-Officio Secretary Agriculture Department endorsed the technology package for Conservation Agriculture: for wheat, maize, lentil, mustard, jute and unpuddled transplanted rice, all of which have been validated under SRFSI. Due to lobbying from UBKV, CASI machinery is now compulsory for Custom Hiring Centres (CHCs) who are receiving government subsidies, and demonstrates the commitment of the Government of West Bengal in supporting CA scaling. UBKV had previously made similar efforts to convince government regarding varietal replacement for wheat, lentil and greengram; provision of CA machinery for all blocks and set proportions of machinery subsidy for CASI. As a result of such support, the area under CASI has increased significantly for different crops like rice, maize, wheat, jute, lentil, mustard over the years.

In addition, there has also been refinement of the undergraduate and postgraduate courses offered at UBKV and delivery of conservation agriculture principles and practices under Integrated Farming System and Sustainable Agriculture subjects.

In Bangladesh too, a high-level meeting was organised May 2019 by the Bangladesh Agricultural Research Council (BARC) including policy makers and research and development leaders. The government showed greater commitment to scale high impact CASI technologies, seeing the results at the farm level and given the techniques align with the government priorities.

In Nepal, scaling activities are lagging behind due to the restructuring of the Department of Agriculture within the new federal structure. However, the department has realized the need for CASI in Nepal and is working with SRFSI on outscaling, for example SRFSI and DoA have held

meetings with the PMAMP Director and the Secretary of Ministry of Agriculture and Livestock Development (MoALD) of Province 1, where policy and funding support was agreed.

New scaling partners

In 2018-19, new collaborations were explored with organisations and businesses who had developed plans to support the enabling environment for scaling CASI (RDRS, SSCOP, EcoDev Solutions and DreamWork Solutions). These partners focused on business skills, novel mechanisms for information delivery and understanding market linkages.

EcoDev Solutions developed the mpower-u tool that measures entrepreneurial capabilities and creditworthiness using a combination of behavioral economics, neuroscience and psychometry to identify potential entrepreneurs. In this action research, mpower-u was deployed on the stakeholders such as Farmers' Clubs, Local Service Providers (LSPs), demonstration farmers and extension staff of partner organisations. The theory is that by categorising participants into their inherent level of entrepreneurship (i.e. champion, master, rookie), training can be tailored to boost effectiveness of their scaling efforts. 'Champions' are more likely to scale more successfully. It was found that the majority of the existing stakeholders are masters and rookies, leaving only a small percent as champions – real change agents with great entrepreneurship potential.

iDE conducted a value chain study to create a pathway for the commercialisation of project-supported machinery in Bangladesh. The study found that the key elements for success in scaling machinery are to recognise that one size does not fit all – in that the access to, utilization of and result of utilizing CASI technologies are widely variable in the context of the technology, business model, geographic location, cropping patterns and the awareness and knowledge of service providers and farmers who use the services - and benefit from it. CASI scaling is about more than just the technology itself; there are higher levels of adoption when there is a robust ecosystem of dealers, retailers, mechanics etc. who work collaboratively to create awareness of the technology and provide holistic solutions - from sales to service, and that the business model of the CASI technologies works for everyone involved in the value chain, not just the farmers. Increased levels of awareness have not lead to significant demand at this stage. The recommendations for improved scaling include utilization of a consumer centric process to evolve CASI technologies into solutions; utilizing a market systems development approach and support the strengthening of the market systems around the technology through private sector-led models; and building a strong model that leads to all actors of the market system “desiring” to be in the “CASI business.”

Dreamwork Solutions, a Nepal based NGO working on novel methods of communication and ICT has developed a digital database of CASI technologies and trained NARC, DoA personnel, and university students about CASI technologies and related mobile Apps (Digokrishi).

The way ahead

Challenges continue that includes lack of awareness about CASI benefits among major stakeholders (e.g. extension specialists, development workers); proper weed management and crop establishment in Direct Seeded Rice (DSR); low availability of CASI machines, spare parts,

and maintenance services; and sub-optimal demand for Local Service Providers (LSP) in some areas. Sustainable solutions will continue to be pursued in the final year of the project.

Soil constraints

Key soil health issues were identified in an external review of SRFSI, including soil acidification, trace element deficiencies, and low organic carbon levels, accompanied by soil structural degradation. Additional data will be gathered to determine the extent of the problems. This will enable future research activities to be developed to address the identified major constraint/s to sustainable production and food security in this region. The specific objectives of this project are to: evaluate the extent and rate of soil acidification; evaluate the zinc status of rice crops, and the potential for a yield response to zinc fertilizer application; evaluate the structural benefits for soil under conservation agriculture practices; and calculate preliminary partial nutrient budgets. Trials are being undertaken in two sites each in West Bengal, India; Rangpur-Dinajpur, Bangladesh; and Sunsari, Nepal. All work is underway but there are no results to report yet. At the request of the Nepal Government, additional work will be done on zinc deficiency in citrus crops, which are a priority in the Terai region. This fits with the project scope and with the intention of sustainable intensification, and will provide valuable data for local counterparts.

Yield gaps

The project on 'Quantifying crop yield gaps across the Indo Gangetic Plain (IGP)' aims to quantify current yield gaps for major food crops at sentinel sites across the IGP, and make preliminary assessments on the effects of CASI, future climate scenarios, and economic variables. This project commenced in March 2019, and within limited time the project has selected ten research sites across the IGP, from Punjab in the west through to Bangladesh in the east; developed protocols for data collection and modelling; and commenced initial data collection. The sites in the Nepal Terai, Bihar, West Bengal and Bangladesh are existing sites associated with SRFSI and the APSIM model has been validated under that project. The results from this project will link into the Global Yield Gap Atlas project, managed by Wageningen University and the University of Nebraska, and as such the protocols developed have been done in collaboration with this project. The plans and rationale for this SRA were presented to key stakeholders during the 'Foresight for Food Systems' meeting in Kathmandu (February 2019). This feedback helped clarify what information is desired by different stakeholders (e.g. farmers, extension agronomists, food and water policy makers, water resource planners, research organisations). Essentially the key messages were that physiological yield gaps are still important information for a range of stakeholders, however the optimum economic crop yields and how these vary with price and cost structures was of specific policy importance. The determination of 'sustainable water optimum yields' needs to be considered in the framework of crop areas sown in each district.

Weed dynamics

‘The Implications of Sustainable Intensification on Weed Dynamics in the EGP’ project aims to improve understanding of the response of men and women farmers to changing weed dynamics due to CASI adoption in the EGP. This project focuses work in Sunsari (Province 1, Nepal) and Cooch Behar (West Bengal, India). The objective of the project is to document farmers’ knowledge, attitude and practices around weed management in CASI systems and analyse its gendered implications for equitable and sustainable intensification in the EGP. A literature review on the issues around gender and weed dynamics especially under conservation agriculture has revealed a paucity of information in this space. Not one study has looked the issues from this perspective. Against this setting, this piece of research is important to fill gaps in the knowledge of weed dynamics and its gendered implications.

Analytical Studies – Filling Knowledge Gaps

Objective 4: Critical knowledge gaps identified, filled and used to support sustainable food systems, and to allow better decision making at a range of scales.

The role of women in agriculture in the EGP

Discussions with senior policy makers in India revealed that their thinking based on national data is that women are opting out of agriculture due to rising incomes, and that they are focusing on education and other occupations. However, experience at local scales both through the SRFSI project and other research and development agencies indicated that there is feminization across the EGP. It was important to unpack this anomaly and get a balanced view of the complexity of gender roles.

A study was commissioned to understand women’s role in agriculture in the EGP across Bangladesh, India and Nepal. The primary objective of the study was to understand the magnitude, quality and trend of women’s participation in rural work and agriculture across the three countries of the EGP, Bangladesh, India and Nepal. The study took two approaches a quantitative one, based on household and individual level data published by the governments of the three countries on labour and employment, and a qualitative one, based on an exploratory field surveys in the three countries to triangulate, complement and supplement the findings derived from the quantitative analysis.

The research has mapped the spatial variations in gender vulnerability at sub-regional levels in the EGP as a backdrop to understanding the changing gender roles in agriculture. While in Bangladesh the gender gaps have been bridged successfully from a low base over time, Nepal has achieved some improvements from a higher base, though the changes are not as impressive as that of Bangladesh. In the Indian part of EGP, somewhat unexpectedly, the gender gaps have actually widened over time, which should be of considerable concern for the policy makers and civil society alike.

The workforce participation rates of women in rural EGP demonstrate considerable regional variations, and diverging trends over a period of time, defying its relatively small size and the

shared agricultural and economic characteristics of the basin. In terms of levels of work participation of women, Nepal has a high base, while Bangladesh and India started with a much lower base. Over time, both Nepal and Bangladesh have had a feminizing rural and agricultural workforce, while the Indian EGP, has defeminized steadily over the last thirty years, the trend showing some reversal only in the last three years ending with 2015. Indian EGP also experienced an increasing rate of unemployment among women, far exceeding that of men, which suggests that a lot of the women that are going out of work are still seeking it. At the sub-regional level in Indian EGP, the regional pattern of defeminization is somewhat counter-intuitive since in Bihar it has been particularly sharp, though it has all the potential characteristics that links to feminization like low agricultural income and male outmigration.

Bringing together the findings from the quantitative and qualitative analyses, the study found that the recent increase in participation of women in agriculture in Bangladesh is a response to long-term male migration and it challenges the social norms in the country and this could thus initiate a lasting change in the gender relations observed historically in Bangladesh. The feminization process in Nepal, in contrast, is a continuation of its societal historicity, unlikely to bring about deeper changes in the gender relations in the region from the way it is now. The inability to run the rural economy without women in a region that experienced years of traditional male out-migration, shaped this history of social norms that found women working in the agricultural fields or their presence in public spaces acceptable. The relatively high gender gap in literacy rates in Nepal is a case in point, which indicates that the high participation of women in agriculture in Nepal is probably more functional than part of an all-encompassing pathway towards gender equity.

Box 3: GENERATING A BETTER UNDERSTANDING OF THE ROLE OF WOMEN IN AGRICULTURE

The study conducted by SaciWATERS (South Asia Consortium for Interdisciplinary Water Resources Studies) on the role of women in agriculture in the EGP sought to fill a critical knowledge gap in understanding women's work force participation trends. Earlier studies and public data available for Bangladesh and Nepal tends to define the whole region as a homogenous region where feminization is happening as men out-migrate to pursue alternative livelihood options. Senior policy makers in India believe that defeminisation is taking place as women are opting out of agriculture due to rising incomes and focusing on education and other occupations. It was important for the study to unpack broad terms used to define a whole range of women in similar geographic areas but with varying socioeconomic and cultural conditions, and get a balanced view of the complexity of gender roles.

The study aimed to understand the magnitude, quality and trend of women's participation in rural work and agriculture across the three countries of the EGP. It used a novel methodology combining quantitative and qualitative analysis. In Nepal and Bangladesh, the trend is for feminisation of agriculture. In Nepal, women's workforce participation is almost equal to men's, and continues to increase. The feminization process here is a continuation of its societal history, and therefore unlikely to bring about deeper changes in gender relations. The inability to run the rural economy without women in an area that has experienced high levels of male outmigration for years, has shaped the social norms that allowed women to work in agriculture and other public places. The relatively high gender gap in literacy rates in Nepal indicates that higher participation of women in agriculture is due to unavailability of men rather than increasing gender empowerment and equity.

In Bangladesh, the gender gaps are being bridged successfully but from a low base over time. Recent increases in the participation of women in agriculture in Bangladesh is a response to long-term male migration, which challenges the social norms and could thus initiate a lasting change in gender relations.

In the Indian EGP the situation is reversed, with steady defeminization over the last thirty years, and one of the lowest rates of women's workforce participation in the region. The Indian EGP is experiencing an increasing rate of unemployment among women, far exceeding that of men, which suggests that many of the women who are going out of work are still seeking it. At the sub-regional level this pattern of defeminization is somewhat counter-intuitive, especially in the state of Bihar. The state has all the potential characteristics that links to feminization like high levels of poverty, low agricultural income and male outmigration; despite this, it is defeminizing.

The key outputs from this study include:

1. A message for policy makers and researchers that women in a country or sub-region cannot be treated with a broad brush and labelled as a homogenous group. Detailed studies and data collection are required to inform policies and programs which create employment opportunities for women and promote gender equity.
2. The findings of the study have been used as an input into regional workshops on Foresight for Food Systems to provide directions to make the food systems inclusive and provide researchers and policy makers with an understanding of key patterns and trajectories and the different economic and socio-cultural processes that explain them.
3. Prof Sucharita Sen, the Project leader presented her findings to an international audience at the 'Seeds of Change' conference: Gender Equality through Agricultural Research for Development from 2nd to 4th April 2019 and co-organised by ACIAR and CGIAR centres.
4. A film with highlights of the study is available [here](#).
5. The findings of the study will feed into the Gender Learning project conducted by the DFAT SDIP program.



Figure 3 A woman in Kalingar, Malda, West Bengal, India grinds lentils using a labour intensive grinding stone.

Pilot project on commercialisation of smallholders' CA-based planters in Bangladesh

This project aims to promote small scale mechanization of planting operations using CA practices by engaging with a medium-scale manufacturer of the Versatile Multi-crop Planter (VMP) (Hoque Corporation), the National Bank, and small-scale entrepreneurs (local service providers, LSPs) as partners. Two business models involving the manufacturer, the Bank and users are being tested to create the demand for VMP at a scale where no further specific public funding is needed to ensure that the services continue to be delivered and grow. A total of 20 VMPs and 6 units of 2-wheel tractor (2WT) have been sold under two models. To create demand and raising awareness, VMPs have been demonstrated in agricultural fairs, field days, and farmers' focus group discussions. Meetings were held with farmers' groups, private and public banks and at NGOs events where the project goal, objectives, activities and outcomes were shared with 3,000 people including 600 female participants.

Improving local and regional water management

Access to water and the wider scale implications of its use are critical, including interactions with energy and food security. These interactions are becoming more important as climate change impacts on rainfall timing, quantity and intensity. Several individual projects have been commissioned to look at different elements of water management at a range of scales. At the local level, Nalanda University in Bihar, India will deliver a model of indigenous aquifer storage and recovery (ASR) technology by applying the Bhungroo® model in this new location. This technology helps to store rainfall during extreme rainfall events and floods and makes it available during the dry winter season. Initial work has started with secondary data collection and village selection. The CSIRO will explore the regional hydrological implications of farm-scale water savings such as those associated with CASI technologies. The aim of this project is to better understand field scale water savings, including as a result of conservation agriculture practices, and their likely impacts on the local and regional water balance and groundwater recharge. Groundwater recharge is an effective mechanism to store excess rainwater and flood waters caused by climate change. From this, effective water saving measures and options for enhancing recharge in suitable locations of the EGP will be identified and communicated to policy makers. At a wider scale, IWMI will explore the FEW nexus in West Bengal, India by examining the impacts of two important groundwater policy reforms; universal metering of electric tubewells in 2007, and change in groundwater law in 2011, which removed barriers for electrification of groundwater structures. This project will undertake rigorous evaluation of impacts of groundwater policy reforms on agricultural and groundwater sectors with a special emphasis on sustainability issues and draw lessons for other states and countries in the EGP.

Integration and Synthesis at the Program Level

Communications have been a major focus of the project during 2018-19. The program team have implemented a multi-faceted communications strategy that includes digital (website, social media, bi-monthly e-newsletter), print (reports and briefs) and film platforms for program structure and project outputs. The program [website](#) was launched in June 2018 and is regularly updated. Since June 2018 it has received 7,729 pageviews from 2,855 visitors. The website contains information about SDIP, the ACIAR SDIP program and projects. Two key repositories are also in the process of being developed and hosted on the website to centralise

information related to Food Systems in the EGP and Gender in South Asia. A series of films highlighting elements of the ACIAR SDIP program have been developed and are hosted on the website and shared with partners and wider audiences through social media using ACIAR and partner accounts, and in physical meetings. Films produced in 2018-19 include:

1. Agriculture and the food-energy-water nexus
2. Household level impacts for Sulochana Devi in Bihar
3. High Commissioner Julia Niblett meets farmer Lucky Begum in Bangladesh
4. The role of women in agriculture in the EGP
5. SRFSl: The West Bengal Story

A **Steering Committee** was established in early 2018 to guide the work program by informing priorities, responding to higher level research results, and ensuring its integration with regional policy and dialogue processes and other research efforts. The 12 member SC, of which 7 are women, represent the wider agricultural system, including members of national planning commissions, regional partner organisations, academia and the private sector. The SC met in February 2018 and interacted with the Foresight for Food Systems training workshop. They continue to provide valuable guidance to the shape the program, and feedback suggests they are impressed by the comprehensive program of work under ACIAR SDIP, covering a range of issues relating to agriculture's contribution to the wider food system.

Linking ACIAR SDIP with existing ACIAR projects has been pursued, with a workshop focused on Diversification for Sustainable Food Systems in South Asia held in December 2018 to bring together 30 researchers representing 10 research organisations from Australia and the CGIAR, including ACIAR Research Program Managers (Water and Climate Change, Crops, Horticulture, Livestock and Farming Systems) and regional staff; partners from the SDIP portfolio; and other researchers working in the EGP. The workshop was held to share experience and expertise in promoting diversification of farming systems in the EGP region across a range of disciplines, scales and approaches, to understand the synergies and trade-offs across the work already being undertaken by ACIAR.

Integrating across the program: The ACIAR SDIP program has a diverse program structure, with 14 projects in total of varying sizes and complexity. This is managed by having two full time staff based in the region who are dedicated to program management and regional coordination; frequent communication through newsletters and the website to share information and resources; working with existing partners across different projects at the local and regional level, and selecting new partners who work in a collegiate way.

The Foresight component is being used as one way to integrate different elements of the program. For example, Professor Sucharita Sen has contributed to all of the Foresight meetings, bringing her background in social geography and results from the study into the role of women in agriculture in the EGP. This helps share the findings from this study across different parts of the program. Similarly, several local partners have been engaged in work from farm, institutional and foresight levels, and they help in bringing a ground-check to the wider thinking in terms of influences in food systems.

A standalone report to synthesise the different pieces of work around climate change has been undertaken, with elements of field and farm level impacts on emissions, resource use and soil dynamics considered, as well as modelled performance of CA verses conventional systems under different climate scenarios, and the potential impacts of wider adoption of CA based systems across the EGP (Annexe 4).

Challenges experienced

One of the key challenges in implementing Phase 2 based on a flexible and responsive program of 14 projects is the need to work with ACIAR's (and other organisations') existing processes in commissioning and contracting research. Although this has been managed to date reasonably well by processing a series of smaller contracts, the reality is that many of the projects have been delayed by several months, which has delayed overall progress within 2018-19. This has required good communication with the ACIAR Executive for approval to work within the system in this way, as well as good will and trust from implementing partners who have had to accept often smaller and shorter contracts than they would prefer. ACIAR will use this phase as a learning experience to evaluate whether this system works well enough for ACIAR and implementing partners. For example, much of the partner network and goodwill is building on the bigger, long term engagement of the SRFSI project. It remains to be seen whether this is appealing to partners and efficient in the long run.

A recent directive from the West Bengal State Government bans the use of the herbicide Glyphosate, which is currently the most readily available, cheap and widely used herbicide for weed management in CA based systems. Local partners are working closely with major companies and plant protection officers of the Government to access alternative herbicides, and CIMMYT are exploring weed management options in a separate project within ACIAR SDIP. Trials will be required to be able to properly inform the standard protocols and bring them in line with government recommendations.

In Nepal, the move to a federal structure has resulted in lack of coordination of technical manpower between the centre and provinces which has impacted the scaling of CASI technologies there. ACIAR SDIP work in Nepal is orienting towards smaller projects and activities that address ways to improve coordination and training of manpower at the provincial level.

Lessons learned

- Partners participating in the ACIAR SDIP projects in new areas like Foresight for Food systems need mentoring on methodology, analysis, content planning and editing. We need to ensure that in the last year we adequately resource IFPRI to support them. For example, in West Bengal key partner UBKV are interested in questions around gendered impacts of mechanisation at the community level, but they do not have experience in this discipline. IFPRI will fund gender specialist Professor Sucharita Sen to support the team in this activity.
- Managing small projects is management intensive and some South Asian partners need significant support. However, the projects also carry smaller risks in delivering results, since they tend to be more focused on short term, discrete pieces of work.
- New government guidelines for the use of Glyphosate herbicide in West Bengal will have implications on the out scaling of the CASI technology in the state. In the last year it will be necessary to support partners to look at alternative herbicides to manage this risk.

Evidence of institutional strengthening

- The emphasis on gender is in line with ACIAR's corporate efforts, including implementing ACIAR's Gender Strategy; and working with CGIAR partners on the new CGIAR Gender Platform. The work under SDIP has complemented and help to consolidate ACIAR's directions.
- Similarly, the emphasis in SDIP on explicit reporting of climate change related outcomes from projects is in line with, and has helped to inform, directions for ACIAR's new Climate Program. In addition to commissioning new projects on climate change related topics, the Climate Program has emphasized the importance of recognising and reporting on adaptation and mitigation benefits from ACIAR's existing work and the need to research the food system, not of tomorrow, but of 2050 to 2100.

3. LEVERAGING AUSTRALIA'S DIPLOMATIC PRESENCE

As part of our efforts to improve communication of ACIAR SDIP program activities and results, a range of activities have contributed to raising Australia's public profile through SDIP.

Communications:

- The program website is now live and regularly updated (www.aciarsdip.com). Since June 2018 it has received 7,262 pageviews from 2,630 visitors. The website contains information about SDIP, the ACIAR SDIP program and projects. It also hosts a range of films which have been produced to convey aspects of the ACIAR SDIP program outputs. Two key repositories are also in the process of being developed and hosted on the website to centralise information related to Food Systems in the EGP and Gender in South Asia.
- Eight program newsletters have been sent, with a mailing list of 200 people from different regional, Australian and international audiences.

Public diplomacy efforts:

- Julia Niblett, Australian High Commissioner to Bangladesh celebrated International Women's Day (8th March 2019) with women farmers of Mondolabari and surrounding villages in Rangpur District, a part of the ACIAR SDIP SRFSI project. The women farmers, including Lucky Begum, showed how women are embracing new technology, participating in pre and post-harvest decision making and extending their entrepreneurial skills. ACIAR provided social media content including a short film to cover the visit (<https://aciarsdip.com/high-commissioner-julia-niblett-meets-lucky-begum>). The visit was covered by a large number of national media and newspapers in Bangladesh.
- Peter Budd, Australian Ambassador to Nepal, was a special invitee to the second Steering Committee meeting held in Kathmandu in February 2019. The ACIAR SDIP event was covered by a cable sent by Emma Stone, DFAT South Asia.
- Mandakini Surie, DFAT Program manager, New Delhi visited the ACIAR SDIP SRFSI program in Coochbehar, West Bengal along with the ACIAR team. She developed a cable for the DFAT system on the visit, focussing on women in agribusiness.
- Peter Budd, Ambassador to Nepal attended a high-level Foresight workshop on Federalisation and its impact on agriculture and water on 18th July 2019.

SDIP activities have not resulted in commercial or investment opportunities or follow on activities for Australia in 2018-19.

4. PORTFOLIO AND PARTNERSHIP APPROACH

There are several benefits to SDIP being operated using a partnership approach:

- Being part of SDIP is influencing and reinforcing directions in ACIAR to take a portfolio approach. SDIP has been a way of bringing together all the work in the EGP to get better synergy and a cross-sectoral view; for example, as seen in the Canberra workshop in December 2018, referred to in the results section. The model ACIAR are using in SDIP is influencing ACIAR's Water and Climate Program approach to developing a long term program on salinity in Pakistan, with a flexible structure of program components, built around a network of stakeholders.
- Finalising ROU 047 (SDIP Phase 1) in 2018-19 demonstrates the value of having a flexible partnership approach, which has allowed ACIAR SDIP to adapt our program to take advantage of new opportunities without having to amend a contract. DFAT's flexibility allowed us to continue the engagement through SRSFI in a seamless way for the partners; this has had very significant efficiencies in terms of continuation of and building on SRSFI activities. This is also true of the way that we have built SDIP2 as components. Had we been working to a normal contract, outcomes from both SDIP1 and SDIP2 would have been very different and much, much less successful.
- The workshop on mechanisation is an example of the benefits of long-term engagement which allows time for trust to develop to engage with partners over sensitive and difficult issues.

Opportunities to interact with other SDIP partners throughout the year have been valuable in terms of expanding our understanding of their activities and identifying potential areas for alignment. The primary interactions have been with CSIRO, ICeWARM and TAF.

- From 18 – 23rd November Tamara Jackson joined a field visit to the Kamala Basin in Province 2 in Nepal with CSIRO and ICeWARM. This basin is the site of a joint exercise funded by CSIRO SDIP to develop an example of a Basin Plan for Nepal as part of SDIP Phase 2. The purpose of the field visit was to conduct a series of 'Roaming workshops' to seek inputs and endorsement of the Basin Development Pathways, which were previously developed with significant stakeholder input. The group visited four municipalities in the basin and included members from CSIRO, ICeWARM, The Water and Energy Commission Secretariat (WECS) Nepal, JVS and Policy Entrepreneurs Incorporated (PEI). One of the three development pathways identified is focused on commercial and scientific agriculture for local economic prosperity and livelihood security. The work done previously in Dhanusha district as well as nearby Sunsari by the SRSFI project could offer some inputs into evidence-based strategies. Our local SRSFI colleague from NARC, Mr Prakash Paneru, ably represented the project at the meeting in Janakpur, generating interest from several of the municipalities present. As well as learning more about the local context, it was an excellent opportunity throughout the week to learn more about the work being done by partners in SDIP, to share the ACIAR SDIP approach, and to explore potential areas for collaboration.
- Andrew Johnson contributed to the Foresight meeting in Kathmandu in February 2019, sharing his expertise in scenario planning.
- ACIAR have used TAF's expertise in political economic analysis to conduct an analysis of the regional cross border rice trade.

- Dr Kuhu Chatterjee participated in the planning meeting for the third Regional Power Summit to be held later in 2019, convened by TAF. There was a need expressed to have a FEW nexus session alongside future scenario projections for renewable versus fossil fuel energy sources. ACIAR SDIP could contribute to the summit through two studies illustrating the interactions between access to energy and irrigation.
- Contributed to the Gender Learning project organised by IOD PARC and DFAT, and provided comprehensive examples from the ACIAR SDIP program.

Annexe 1: Overview of priorities for 2019 – 20

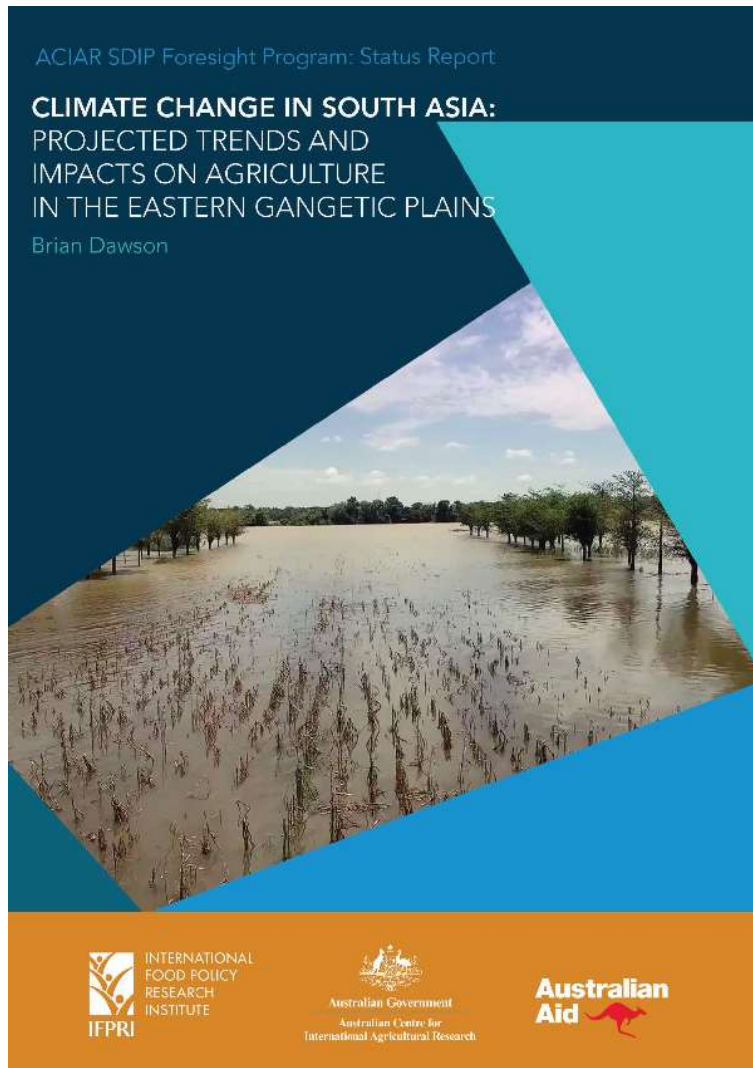
Component	Priorities	Expected results	Targets for 2020
FORESIGHT	<ul style="list-style-type: none"> • Implement local level Foresight projects using a structured methodology • Learn from local level foresight projects • Host local level learning events, including science-policy dialogues • Host regional technical and leadership Foresight event in May 2020 	<ul style="list-style-type: none"> • Strengthened participatory understanding of longer-term changes to food systems and potential impacts at different scales, with a focus on women and climate change • Improved ability to identify interactions and trade-offs associated with food systems changes, and work towards common solutions at local and regional scales that particularly benefit women and girls • Improved capacity to communicate between field and policy levels, including the information itself and inclusive institutional arrangements for knowledge sharing 	Key stakeholders (both women and men) in the EGP (including decision-makers) are engaging in regular dialogue with respect to the drivers and trends for regional food security (including for the EGP)
INSTITUTIONAL INNOVATION	<ul style="list-style-type: none"> • Complete Delphi process and best worst scaling exercise to illicit a relative ranking of importance of different institutions • Conduct and analyse household asset and vulnerability survey • Business case study of machinery service providers • Understand electrification and the functioning of the market that attends groundwater in West Bengal • Analyse secondary data sets with regard to: <ul style="list-style-type: none"> ○ Farm resilience response to intensification ○ Household resilience/dependence on farm and off-farm household assets. • Facilitate the development of provincial multi-stakeholder platforms for mechanisation • Mentor the development of a road map approach that contribute to an enhanced enabling environment for CA mechanisation 	<ul style="list-style-type: none"> • Improved understanding of effective institutional arrangements for access to information, water rights and risk management, particularly for women and tenant farmers • Demonstrated ability to influence and modify institutional architecture, for example in creating an enhanced enabling environment for CA mechanisation at the provincial level in Nepal • Improved understanding and functioning of value chains and markets, with effective engagement of the private sector at the local level • Options for improving sustainable resource use identified and tested (i.e. energy, groundwater) 	Key agencies (local, state, national) have improved capacity to identify and support institutions that promote inclusive and sustainable food practices (including CASI)

FIELD LEVEL INNOVATION	<ul style="list-style-type: none"> Identify potential soil constraints that may hinder the performance of crop production systems, and that will be influenced by wider uptake of intensified systems Understand the weed dynamics associated with CA adoption, and how this influences gender workload Identify lessons for successful business models that work for farmers and local private sector 	<ul style="list-style-type: none"> Deepened technical knowledge related to the barriers to scaling sustainable farming systems in time and space used to adapt recommendations, with a focus on food, energy and water dynamics Better understanding of and demonstrated growth in the service provision of CASI inputs (machinery, seed, fertiliser, agrochemicals, credit, markets) 	<p>Barriers to farmers (both women and men) utilising sustainable agricultural practices (including CASI), such as access to machinery and other inputs, are increasingly understood and addressed</p>
	<ul style="list-style-type: none"> Learning from scaling activities under SRFSI through a series of activities that focus on understanding project impacts related to market actors, outreach, policy, social inclusion and adoption and impact. 	<ul style="list-style-type: none"> Adaptive learning from scaling sustainable farming systems with regard to gender impacts and private sector engagement, in ground truthing the practical realities that farmers, local businesses and government support systems face Institutional and policy innovations for scaling identified and communicated for more effective policy implementation Identified links between field level changes and wider policy processes Extent and scale of adoption of sustainable farming systems (number of farmers utilising CASI techniques), disaggregated by gender 	<ul style="list-style-type: none"> Pathways identified to create sustainable CASI supply and demand in the EGP 125,000 farmers (one third women) utilising sustainable agricultural practices (including CASI) to increase resource efficiency and improve climate resilience
ANALYTICAL STUDIES	<ul style="list-style-type: none"> Understanding water access and management projects at various scales, and links to energy and food Testing managed aquifer recharge to manage both excess and scarcity of water at a local level, for improved household resilience and food security Understanding the regional hydrological implications of on-farm water savings Undertake rigorous evaluation of impacts of groundwater policy reforms on agricultural and groundwater sectors with a special emphasis on sustainability issues and draw lessons for other states and countries in the EGP. 	<p>Deepened technical knowledge related to the impacts of scaling sustainable farming systems in time and space used to adapt recommendations, with a focus on food, energy and water dynamics</p>	<p>The technical and socio-economic knowledge base with respect to sustainable food systems and practices, including the role of women and men and the impact of climate change, has been strengthened</p>
SYNTHESIS & COMMUNICATONS	<ul style="list-style-type: none"> Regular communication of program outputs through publications, website, newsletters Annual meeting for Project Leaders External review of program and projects in July 2020 Link with other ACIAR projects 	<ul style="list-style-type: none"> Integration of ACIAR SDIP program components, with information shared between different projects Program integrated and building on relevant ACIAR projects in the region Activities integrated with other SDIP partners where relevant 	<p>An integrated set of activities across local, meso and national scales that is helping to drive innovation for more resilient, sustainable, inclusive and profitable food systems</p>

Annexe 2: Risk Register

No.	Risk	Likelihood (L-M-H)	Consequence (L-M-H)	Risk Rating (L-M-H)	Treatment / Strategy	Residual Risk	Risk Trend (compared to 12 months ago)
1	ACIAR processes hinder the start date and implementation of projects <ul style="list-style-type: none"> – Delayed start of projects impacts on deliverables – Loss of trust between ACIAR and partners 	H	H	M	<ul style="list-style-type: none"> – Plan processes according to size of project (direct contracts under \$80k, SRA under \$250k, project above \$250k) – ACIAR SDIP management team monitor process closely through the ACIAR system – Engage additional support within ACIAR as required 	M	Decreasing
2	Failure to ensure that individual projects are synthesized into the wider program <ul style="list-style-type: none"> – Loss of synergistic benefits from program level 	M	M	M	<ul style="list-style-type: none"> – Frequent communication between projects through website, newsletter, email connections, face to face meetings – Ensure that partners are selected who will work in a collegiate way 	M	No change
3	Difficulty in accessing key data (i.e. water and climate data from India)	H	M	M	<ul style="list-style-type: none"> – Attempt access as early as possible – Use multiple channels to access key data – Bring key institutions as project partners? 	M	
4	Projects do not share data and research results <ul style="list-style-type: none"> – Loss of synergistic benefits from program level 	M	M	M	<ul style="list-style-type: none"> – Ensure that partners are selected who will work in a collegiate way – Make data and results sharing a key expectation within project proposals 	M	No change
5	Failure to get buy-in from relevant and high-level stakeholders for Foresight work	M	M	M	<ul style="list-style-type: none"> – Ensure work aligns with regional and national priorities – Follow up all interactions as intended – Ensure effective communication of progress 	M	Decreasing
6	Political instability means core partners are removed from projects	H	M	M	<ul style="list-style-type: none"> – Document project processes and outputs to allow handover and induction of new staff 	M	No change

Annexe 3: Climate change in South Asia: Projected trends and impacts on agriculture in the Eastern Gangetic Plains⁴



⁴ Click icon to open Annexe embedded in the report. This is also attached as a separate document.

Annexe 4: Interim report on Developing resource efficient and climate smart production systems in the Eastern Gangetic Plains⁵

Developing resource efficient and climate smart production systems in the Eastern Gangetic Plains

Developing resource efficient and climate
smart production systems in the
Eastern Gangetic Plains

Interim report

Prepared by Tamara Jackson, Mahesh Gathala, TP Tiwari, Rakesh Awale and Kuhu Chatterjee

With input from ACIAR SDIP Partners¹

¹ NARC and DoA, Nepal; BARI, DAE, RDRS and IDE, Bangladesh; UBKV and DoA, West Bengal; ICAR, BAU, JEEVIKA and Green Agrevolution, Bihar; CSIRO, Curtin University, and UQ, Australia; IWMI, IFPRI

⁵ Click icon to open Annexe embedded in the report. This is also attached as a separate document.