The Annual Review of the Sustainable Development Investment Portfolio (SDIP) 2016-17

Regional cooperation in South Asia: Improving water, energy and food security across the three major Himalayan river basins; the Indus, Ganges and Brahmaputra

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Introduction

The Sustainable Development Investment Portfolio (SDIP) aims to improve the integrated management of water, food and energy in South Asia, especially addressing climate risks and the interests of women and girls. The investment focuses on three major transboundary Himalayan river basins – the Indus, Ganges and Brahmaputra – covering parts of India, Pakistan, Nepal, Bangladesh and Bhutan. SDIP Phase 2 (SDIP2) is the second 4-year phase (2016-2020) of a 12-year investment strategy, which recognises that many of the critical interventions required for improving the integrated management of the water, energy and food at the basin level require *sustained engagement* to build regional cooperation and capacity.

The (end-of-investment) objective of SDIP2 is that:

> *'key actors are using and sharing evidence, and facilitating private sector engagement, to improve the integrated management of water, energy and food across two or more countries – addressing gender and climate change impacts*.'

Three end-of-investment outcomes are identified for SDIP2, including:

1. Strengthened practices for regional cooperation
2. Critical new knowledge generated and used for regional cooperation
3. Improved regional enabling environment for private sector engagement.

This '*Annual Review of the Sustainable Development Investment Portfolio 2016-17*' (the 'Annual Review') provides an overview of portfolio-level progress towards delivering the objective and outcomes of the SDIP in 2016-17 (July 2016-June 2017).

Assessment of progress in 2016-17[1]

Performance Assessment Framework (PAF) Milestones – Development outcomes

The PAF outlines six areas of focus ('domains of change') that SDIP partners, DFAT and the M&E Adviser have collectively identified as some of the preconditions to progressing the goal and objectives of SDIP2. A summary of progress against the milestones for the six domains of change is presented below.

Overall performance against this aspect of the PAF is considered to be 'good' and in line with expectations. The broad range of results achieved indicate that SDIP partners are working effectively and making progress against their own intervention logic in complex settings. In three of the domains of change the expected PAF milestones were *largely achieved*, whilst in the other three domains the milestones were *partially achieved*.

[1] The assessments of overall performance throughout this Annual Review for 2016-17 have been made with a view to facilitating the production of key internal DFAT quality reports for the SDIP, including the Annual Program Performance Review (APPR) and the Annual Aid Quality Check (AQC). In particular, the AQC assesses performance across a range of criteria using a 6-point scale including Very Good, Good, Adequate, Less than adequate, Poor and Very Poor. A similar scale has been adopted by IOD PARC to make assessments of performance in this report, particularly with respect to progress towards development outcomes (Effectiveness), Gender and Climate Change. There is evidence to support each of the assessments made in this report.

PAF Domain of Change - progress milestones.	Performance Rating
1. Data and modelling capacity to facilitate IWRM - Indus Basin [Pakistan]	Partially Achieved
2. Integrated practice [proven at scale] for cross-border water resource management - Ganges, Kosi Basin [India & Nepal]	Largely Achieved
3. Collaborative structures for conservation agriculture-based sustainable intensification (CASI) - Ganges Basin [Nepal, India & Bangladesh]	Largely Achieved
4. Institutional capacity to initiate, steer and participate in medium – large scale hydropower] investment (may include PPP), Ganges Basin [Nepal]	Partially Achieved
5. Knowledge base: water needs for agricultural production and energy generation - Indus Basin [Pakistan]	Largely Achieved
6. Enabling policy and regulatory environment for energy investment (production and efficiency), Brahmaputra & Ganges Basin [Bangladesh]	Partially Achieved

PAF Milestones - Gender equality and women's empowerment

Overall, **the performance of the SDIP in 2016-17 towards a stronger consideration of GEWE in practice has been 'adequate',** with partners reporting some solid achievements over the past 12 months against their own set of high expectations. However, there is a need for partners to more effectively integrate gender considerations and expertise into their core activities, and to better demonstrate the value of these impacts to policy and decision makers across the region.

In terms of GEWE specific results in 2016-17**, there is evidence that *all* SDIP partners are enabling women to participate in, or consider women's perspectives in resource management activities, dialogue and/ or policy engagement,** *to some extent***.** Significant challenges remain, including understanding how best to support professional development of women, and enable access to resources and services, and participation in decision-making. **In addition, a gender lens has been applied to new research**, including political economy and policy analyses into food, water and energy security, the HIMAP study of the Hindu Kush Himalayas, and the EIA guidelines for hydropower development.

PAF Milestones - Climate change

The SDIP has made good early progress in embedding a clearer and stronger interpretation of climate change (which has only recently become an explicit focus of the SDIP). Overall performance on climate change in 2016-17 is considered to be 'good' and is in line with expectations at this juncture. The quality of partner reporting on climate change in 2016-17 was good, assisted by climate change reporting guidelines provided by DFAT. A strong platform has been laid from which the SDIP can make significant gains in the year ahead.

In terms of climate-change specific results achieved in 2016-17**, ICEWaRM provided significant input into the development of the Government of Nepal's National Water Policy**. Climate change is now addressed directly within several of the policy's objectives, particularly objective 8 which is '*to address the uncertainty of water availability for various reasons including climate change, and manage situations of water induced disasters and drought*'. Following successful pilots of community-based flood early warning systems and water use management planning in SDIP1, ICIMOD and its partners (both government and civil society) are working towards up-scaling these systems to other communities in Nepal and Pakistan.

In terms of climate change mitigation, IFC reported that 27 textile factories are saving 473,000 MWh of energy and reducing greenhouse gas emissions by 58,000 tonnes each year, under the Partnership for Cleaner Textiles (PaCT) program in Bangladesh. SDIP partners, including SAWI, CSIRO, ICEWARM, TAF and ICIMOD have also drawn on their core expertise towards **improving information flow on climate change**, and making these accessible for decision makers, including through analytical and water modelling tools, such as the water allocation model developed by CSIRO, ICEWARM and partners for the Indus Basin.

Key results in 2016-17 (within and beyond PAF domains of change and related milestones)

SDIP partners provided considerable evidence of progress towards the three end-of-investment outcomes for SDIP2 in 2016-17. These results go beyond the six areas of focus identified in the PAF. From a portfolio perspective, these results have been synthesised and consolidated into a series of **11 higher-order results** that align with one of the three end-of-investment outcomes, including**:**

End-of-investment Outcome 1: Strengthened practices for regional cooperation: operating at a regional, national and/ or sub-national level in the sub-region

- *Result 1: Progress towards centralised hydrological data management in Pakistan and increased capabilities for transboundary river basin management within the Indus Basin*

Significant progress towards enabling national and provincial water management agencies to systematically share data and make transparent water resource management decisions has been achieved through installation of a centralised hydrological data management system (Hydstra) and completion of the Indus common river system model, with the support of CSIRO and ICEWaRM.

- *Result 2: Increased capabilities for river basin management within the Ganges and Brahmaputra Basins*

SDIP partners (including SAWI, CSIRO, ICIMOD and ICEWaRM) enabled multi-stakeholder river basin planning at local, regional (across States) and national scales, through engagement with water management agencies across the Ganges and Brahmaputra Basins. Regional cooperation has been instrumental in the preparation of the comprehensive assessment of the Hindu Kush Himalayas (HIMAP) with critical support by ICIMOD. The Government of Nepal also drafted new water resource management legislation, embedding IWRM practices, with the support of ICEWARM and SAWI**.**

- *Result 3: Transboundary collaboration on flood forecasting and management in the Ganges, Indus and Brahmaputra Basins*

With support from SDIP partners (including ICIMOD and SAWI), community-based flood early warning systems (CBFEWS) have been implemented in Assam (India), Ratu Khola (Nepal) and Gilgit Baltistan (Pakistan) and have been used to provide early warnings to downstream communities of imminent floods, saving lives and reducing the financial impact. For example, on the morning of 3rd August 2017, the CBFEWS in Sherqilla village (Gilgit Baltistan) generated a warning, enabling all 350 residents of vulnerable households to evacuate to safety with their precious belongings and livestock. Similarly, CBFEWS continues to be implemented by communities and government agencies (DHM, Nepal and DMD, Bihar) in Ratu Khola, with transboundary collaboration leading to early warning for downstream communities in India during the 2017 flood season. Local Indian authorities estimated CBFEWS had resulted in avoided losses of US$0.7 million.

- *Result 4: Progress towards scaling out CASI within the Ganges Basin, through improved understanding of barriers and decision-making processes, and targeted support for farmers*

SDIP partners contributed to a greater understanding of the water resource and political economy governing its use in the context of agriculture, and supported farmers and service providers to deliver

conservation agriculture. For example, over the last year ACIAR and partners have engaged with multiple stakeholders to better understand the policy and institutional context for water and food security, as well as how to effectively engage with decision makers on these issues. A political economy analysis conducted by TAF described the power dynamics, including in relation to gender, to which food production and water allocation, are subjected.

- *Result 5: Progress towards medium- and large-scale energy development through PPP investment in Nepal (hydropower) and India (solar)*

In India, the 750 MW Rewa Solar Ultra Mega Power Public-Private Partnership (PPP) in Madhya Pradesh was finalised in April 2017; once commissioned the project will be one of the world's largest solar projects developed with full market-based private financing and is expected to reduce approximately one million tons of CO^2 emissions annually by reducing the power offtake from the grid. In Nepal, IFC, in line with its MoU with the GoN, has identified one of three planned medium-sized (50 – 500 MW) hydropower projects at Phukot Karnali as a prospective PPP, and is providing ongoing support for the Blue Energy development of their Super Trishuli project.

- *Result 6: Improved technical, social and environmental capabilities for hydropower preparation and construction in the region*

IFC developed environmental and social standards to be adopted and applied to new hydropower projects in Nepal (currently with the GoN for approval, and then translation in the Nepali language). Similarly, SAWI supported the development of resilience guidelines for climate change and natural disasters in hydropower and dams with special reference to GLOFs and other natural disasters.

End-of-investment Outcome 2: Critical new knowledge generated and used for regional cooperation: within the priorities acknowledged by regional forums, governments and national bodies and addressing said knowledge gaps through science and/ or well evidenced and reflective practice.

- *Result 7: Multi-stakeholder dialogue, knowledge sharing and collaboration across Indus Basin*

SDIP partners, notably ICIMOD and SAWI, through their support of various Indus Basin forums[2], have facilitated dialogue on regional water resources management in 2016-17 through a series of meetings held with representatives from each of the four countries of the Indus Basin, as well as through enabling collaboration on joint research.

- *Result 8: Strengthened knowledge of water resource and political economy, to support decision-making for agricultural production and energy generation*

SDIP partners (including CSIRO and ICIMOD) have developed a series of modelling and planning tools to support decision-making on food, water and energy security within the Indus and Ganges basins. For example, CSIRO collaborated with a range of partners to develop the Indus river system daily irrigation allocation model for Pakistan. PEA analysis conducted by TAF also seeks to improve effective decision-making around food production and water allocation in the lower Indus.

- *Result 9: Improved knowledge of water quality and socio-economic impacts of water degradation*

CSIRO, in collaboration with ANU and PCRWR conducted a study of the 'gendered and socio-economic impacts of water degradation' in relation to Manchar Lake in Sindh Province. Innovative efforts to improve water quality monitoring were also piloted by SAWI, through the development of a unique citizen-centric framework for crowd-sourced data.

[2] Including the SAWI-supported Indus Forum and Indus Forum Working Group (IF-WG), the Indus Basin Knowledge Forum (supported by ICIMOD, IWMI and the World Bank) and the ICIMOD-supported Upper Indus Basin (UIB) Network.

End-of-investment Outcome 3: Improved regional enabling environment including for private sector engagement: within the policies, regulations, market systems and investment conditions for cross border management of shared water, food and energy resources.

- *Result 10: Increased water and energy efficiency in the Bangladesh textile industry*

During the period July –December 2016 thirteen new factories undertook in-depth resource efficiency assessments under the Partnership for Cleaner Textiles (PaCT) program, and 27 factories that signed up in the previous period were followed up for results monitoring. It was found that these 27 factories had saved over 2.8 million m3 of water, 473,000 MWh of energy, and reduced greenhouse gas emissions by 58,000 tonnes and wastewater discharge by 3.1 million m3 per year.

- *Result 11: Progress in market development and accessibility of quality off-grid solar solutions in India, Nepal and Pakistan*

IFC signed advisory agreements with two manufacturing companies and three distribution companies with the aim of helping companies with their "go to market" strategies. In addition, as part of a strategy to enhance penetration of quality off-grid solar solutions in rural markets, IFC rolled out a business training pilot for 79 women entrepreneurs to support women to market and distribute these solutions in their communities.

Overall assessment of SDIP progress in 2016-17

The results that have emerged over the last year from the entire body of SDIP partner engagement across the three basins in 2016-17 demonstrate three key qualities:

1) **good progress in two of three of the SDIP2 outcome areas** (practice, knowledge) and **some progress in the third outcome area** (enabling environment);
2) a **deepening of the relationships** with key actors both within government structures at different levels of the system and engagement with non-government actors, including the private sector; and
3) a strong theme of **working with other partners** to generate and apply evidence to current challenges.

Overall, performance by SDIP partners in 2016-17 was 'good' and is broadly aligned with expectations. In 2016-17, there were clearly areas where results were particularly strong (eg for SDIP2 Outcome 1, including the contributions to the development of the Government of Nepal's National Water Policy), and others where results were more limited (e.g. Outcome 3, the enabling environment – and specifically in relation to energy investment). This mix of positive and more limited progress across the 3 outcome areas, and within and between SDIP partners is to be expected, given the complex and challenging environment within which SDIP is operating and the deliberate risk profile. Evidence of deepening relationships with key actors in South Asia, which was reported by most partners, is a particularly important result, as it means SDIP partners are increasingly well-placed to respond to opportunities if and when they arise.

Assessment of Portfolio contribution to change

Understanding the SDIP's contribution to change within the *system* and selected *sub-systems* within which it operates is a critical element of the overall portfolio monitoring approach. By monitoring 4 'aspects of change', for each of the 6 domains of change in the SDIP2 PAF, an assessment can be made as to whether change is evident, and a plausible case made for whether SDIP is contributing (if at all) to that change.

A summary of the SDIP's contribution to change for the six domains of change outlined in the PAF is captured in the following table[3]:

ES Table 1: Summary of SDIP's contribution to change in 2016-17

Domain of change	Positive change happening	Indications of SDIP contribution to this change	Prospects of SDIP contributing to a change
Institutional capacity - water modelling data: Indus (Pakistan)	Yes – but limited	Yes	Good
Equitable WRM practice models (at scale): Ganges (India, Bangladesh, Nepal)	No - static	Not applicable	Good
Water needs quantification across the nexus: Indus (Pakistan)	Yes – small steps from a very low base	Yes	Good
Collaborative structures behind out-scaling of conservation agriculture: Ganges (India, Bangladesh, Nepal)	No - static	Not applicable	Good
Institutional capacity for medium-large hydropower investment (Nepal)	Yes – small steps	Yes	Mixed
Enabling policy and regulatory environment for energy investment (Bangladesh)	No - static	Not applicable	Unclear

The key message from this analysis is that while there is limited evidence (to date) of a systemic change occurring across any of the six domains being monitored (perhaps with the exception of water modelling capacity and quantification of water use needs in the Indus, and institutional capacity for hydropower development in Nepal), **the SDIP is well positioned to make significant contributions to wider (incremental) systemic change in a number of places in future years**. Given the complexity of the development challenges that the SDIP is engaged with, and that SDIP is a 12-year investment, this result is in line with expectations.

Institutional strengthening of SDIP partners

Three common areas for institutional strengthening of SDIP partners in SDIP2 were identified including:

1. **improving M&E systems and practices** to reflect a stronger partner orientation to outcomes and an evidence-based engagement; and
2. **improving the integration of gender and social inclusion into programming** in ways that fully allow the partner to deliver effectively and equitably on its mandate.
3. **leveraging of Australian Diplomatic presence in the region,** to progress the overall goals of the SDIP.

[3] Also found on pg. 52 of this report

For the Annual Review of the SDIP 2016-17, a summary assessment has been made on progress against the three common areas of institutional strengthening, based on a detailed review of evidence gathered over the last 12 months. A summary of the results of this assessment is as follows:

With respect to improved monitoring and evaluation systems and practices…

There has been a positive engagement by partners on using the SDIP experience as a way of improving their M&E systems and practice, with partners expectations around strengthening in this area considered to be reasonably high. This is often in step with a broader corporate objective of institutional strengthening, and in several cases the work of the partner on SDIP is spearheading a wider corporate effort. **However, partner progress and improvement, for the most part, is considered to be falling short of their own (high) level of ambition**.

With respect to improved integration of gender and social inclusion into programming…

Partners have set a high level of ambition with respect to their own institutional capacity to integrate gender and social inclusion issues (GESI) into their programming and have been working towards strengthening their practices (and those of their own partners) in this area for several years. There are several examples of positive progress (e.g. ICIMOD). However, **for the most part GESI issues still do not appear to be consistently built in to the design, implementation of programming and associated M&E practices of SDIP partners**. This is largely reflected in the lack of consistent reflection on GESI issues in partner annual reports, with little analysis included as to why certain results were observed (or not), the significance of those results (or otherwise) and what lessons had been learned that might be applicable to future programming.

With respect to leveraging of Australian Diplomatic presence in the region…

With this being the first year that partners have been required to formerly consider how they might leverage Australian Diplomatic presence in the region, SDIP partner reporting was largely anecdotal and often imprecise in this regard. For this reason, and in the absence of any overall related planning and monitoring framework for the leveraging of Australian diplomatic presence, this Annual Review has not made any hard assessment of this aspect of institutional strengthening (in terms of overall partner performance). However, a framework included in the latest CSIRO Annual Report offers a useful breakdown of ways in which Australia's diplomatic presence *can be* leveraged in pursuit of partners investment objectives. It includes maintaining a high level of strategic engagement with senior actors in government, coordinating and synergizing the strategies of partner/ donor countries to ensure alignment with SDIP, and coordinating and managing relationships and interactions between Australian partners.

Through 2016-17 there were several positive examples of Australia's diplomatic presence being aligned with and used to progress the goal and objectives of the SDIP. For example, there was considerable engagement by Kathmandu Post, including the HOM Nepal taking on the role of co-chair for the JAC (Nepal-Australia Joint Advisory Committee on Water Resources Management) and HOM Nepal being elected to a 3-year term as Chair of the ICIMOD Support Group (which includes representation from 8-member countries of the Hindu Kush Himalayas). Similarly, there was also evidence of positive engagement from both Islamabad Post and Delhi Post in 2016-17.

Looking across the evidence of the SDIP on development outcomes and institutional strengthening of partners there is a strong confidence in the way in which the Investment Portfolio is delivering. There is – as anticipated - a gradual ratcheting down of the portfolio to stronger and potentially more impactful points of influence within the systems in which Australian support is engaging. All the signs remain positive and this is continually strengthened by the quality of the dialogue that DFAT is

fostering within and through its partnership working. This includes the Annual Dialogue event which in 2017 included a wider engagement with key informants beyond the SDIP partner group and supported both reflections on the nature and pace of change, and opportunities for continued networking.

Acronyms

ACIAR	Australian Centre for International Agriculture Research, SDIP partner
ANU	Australian National University
BSDMA	Bihar State Disaster Management Authority
CASI	Conservation Agriculture-based Sustainable Intensification
CBFEWS	Community-based Flood Warning Systems
CIMMYT	International Maize and Wheat Improvement Centre (SRFSI partner)
CWC	Central Water Commission, India
CSIRO	Commonwealth Scientific and Industrial Research Organisation, SDIP partner
DFAT	Department of Foreign Affairs and Trade, Australia
DHM	Department of Hydrology and Meteorology, Nepal
DRR	Disaster Risk Reduction
EGP	Eastern Gangetic Plains
GESI	Gender Equality and Social Inclusion
GEWE	Gender Equality and Women's Empowerment
GLOF	Glacial Lake Outburst Flood
GMRC	Division of Glacier Monitoring and Research Centre, WAPDA Pakistan
GoA	Government of Australia
GoB	Government of (the People's Republic of) Bangladesh
GoI	Government of India
GoN	Government of Nepal
HOM	Head of Mission
ICEWaRM	International Centre of Excellence in Water Resource Management, SDIP partner
ICIMOD	International Centre for Integrated Mountain Development, SDIP partner
IFC	International Finance Corporation, SDIP partner
IFPRI	International Food Policy Research Institute (SRFSI partner)
IRSA	Indus River System Authority
IWMI	International Water Management Institute, based in Sri Lanka
IWRM	Integrated Water Resource Management
KPID	Khyber Pakhtunkhwa Irrigation Department, Pakistan
MEW	Ministry of Energy and Water, Afghanistan
MoWP	Ministry of Water and Power, Pakistan
NDRI	Nepal Development Research Institute, Nepal
NEA	Nepal Electricity Authority
NESPAK	National Engineering Services Pakistan
NGO	Non-Government Organisation
PaCT	Partnership for Cleaner Textiles
PID	Punjab Irrigation Department, Pakistan
PMD	Pakistan Meteorological Department
PPP	Public Private Partnership
SAARC	South Asian Association for Regional Cooperation
SAWI	South Asia Water Initiative of the World Bank, SDIP partner
SID	Sindh Irrigation Department, Pakistan
SPIP	Solar Powered Irrigation Pumps
WAPDA	Water and Power Development Authority, Pakistan
WECS	Water and Energy Commission Secretariat, Nepal
WRD	Water Resources Department, Bihar
WUMP	Water Use Management Planning

Introduction

Overview of SDIP

The Sustainable Development Investment Portfolio (SDIP) aims to improve the integrated management of water, food and energy in South Asia, especially addressing climate risks and the interests of women and girls. The investment focuses on three major transboundary Himalayan river basins – the Indus, Ganges and Brahmaputra – covering parts of India, Pakistan, Nepal, Bangladesh and Bhutan. SDIP Phase 2 (SDIP2) is the second 4-year phase (2016-2020) of a 12-year investment strategy, which recognises that many of the critical interventions required for improving the integrated management of the water, energy and food at the basin level will require *sustained engagement* to build regional cooperation and capacity over time. Phase 2 comprises an investment of $42 million.

By investing in the work and capabilities of seven (7) organisations engaged across three inter-related sectors of water resource management, agricultural productivity and energy access and efficiency, and by working with these organisations in a partnership mode, DFAT looks to make a distinctive catalytic contribution to change processes that lead to systemic improvements in regional cooperation. Through this, extending benefits at scale to the poor and vulnerable, impacting beyond the traditional confines and reach of a project setting.

The term 'regional cooperation' relates to both a broad set of regional institutional arrangements (common structures and rules) and/or country level policies, capabilities and practices, reflecting a system wide response to trans-border challenges on water management, access to energy (increased energy generation and efficiency) and food systems. This recognises that the starting point for improvement may be within a country and include the way that a country manages/ utilises internal (sub-national) resources within the frame of one or more of the three river basins.

The (end-of-investment) objective of SDIP2 is that:

> *'key actors are using and sharing evidence, and facilitating private sector engagement, to improve the integrated management of water, energy and food across two or more countries – addressing gender and climate change impacts*.'

Three end-of-investment outcomes are identified for SDIP2, including:

1. Strengthened practices for regional cooperation
2. Critical new knowledge generated and used for regional cooperation
3. Improved regional enabling environment for private sector engagement.

This '*Annual Review of the Sustainable Development Investment Portfolio 2016-17*' (the 'Annual Review') provides an assessment of portfolio-level progress towards delivering the development objective and outcomes of SDIP2 during 2016-17. It is based on evidence generated through the SDIP portfolio M&E system[4], and looks across the full breadth of partner engagement in SDIP2. An overview of the portfolio level monitoring approach used to make this assessment is included at Annex 1.

[4] Data and information sources for the assessments include: Partner Annual Reports (2017), discussions between partners at the Knowledge Forum and Partner Workshop 2017, Change Pathway monitoring 2017, Partnership Health Checks (2017) and SDIP Advisor Interviews (2017).

Purpose of the Annual Review and intended audience

The purpose of the Annual Review is twofold:

1. It enables further reflection within and across partners on the context and change that is happening and what this means for the work that they are engaging in and the outcomes they are working towards.
2. It provides an archive of the position gained at each annual point in the envisaged 12-year period of the Sustainable Development Investment Strategy - thereby facilitating associated evaluation and impact assessment activity.

The narrative on portfolio results and contribution to change in this Annual Review will be an important feed into the processes of reflection and accountability for progress against plans embedded in the DFAT corporate reporting cycle on SDIP. This includes the AQC and the South Asia Regional Annual Program Performance Report (APPR). Selected aspects of this Annual Review may also be drawn on, adapted and used by the SDIP communications strategy.

The pursuit of water, food and energy security in South Asia is a technical, institutional and political challenge. The political economy is a major influence on how government led systems may adapt, reform and change in ways that are able to better meet the needs of its citizens. When looking at the regional dimension this political factor is amplified. Therefore whilst the SDIP, with its focus on water, food and energy and cross-cutting issues of climate change/ resilience and gender, is working in a space that is at the forefront of the development agenda in South Asia it also faces the challenge of being able to 'read' its performance and achievements in ways that reflect the complexity of the reality in which it operates. To do this in a way which informs and supports the continuous improvement of the work of Partners and enables a gradual ratcheting down of a risk based investment portfolio to the points of engagement where DFAT can maximise the effects of its presence/ work in the region, in terms of contributing to improvements in the integrated management of water, energy and food across two or more countries

The Annual Review has been written primarily for the already engaged 'internal' audience of SDIP including designated DFAT staff (both in Canberra and at Post). Its language and presentation is therefore not that of a public document. That said, **the Annual Review may also be of interest to two wider groups of people both in DFAT and DFAT's partners, and in South Asia and beyond**. Firstly, those working on the challenges and opportunities that the nexus of water, food and energy presents to development; and secondly those who have an interest in the feasibility, relative costs and benefits and overall value for money that the innovative investment portfolio and partnering approach of SDIP provides in complex settings relative to more traditional programming approaches.

Section 1: Assessment of Progress and Key Results in 2016-17[5]

Assessment of progress against the SDIP Performance Assessment Framework

PAF Milestones – Development Outcomes

Evidence of progress against the numbered milestones for each of the six domains of change (which, collectively, form the Development Outcomes part of the PAF) is captured below. In three of the domains of change the expected PAF milestones have been *largely achieved*, whilst in the other three domains the milestones have been *partially achieved*.

PAF Domain of Change	PAF Milestone	Summary Assessment[6]
1. Data and modelling capacity to facilitate IWRM - Indus Basin [Pakistan]	Partially Achieved	***Achieved milestones:*** (1) A common river system modelling framework has been populated and applied, facilitating a common understanding of the water resource across federal and provincial agencies, and enabling transparent and effective discussions and decision making (CSIRO); (2) Additional World Bank financing to the Pakistan-based Water Sector Capacity Building and Advisory Services Project (WCAP) is aimed at bringing an increased focus on river basin management for transboundary rivers (SAWI). ***Partially achieved:*** (3) There is evidence of shifts in attitudes to data sharing between key agencies now set up to use the centralised *Hydstra* system, and including the MoWP who are commissioning an evaluation to provide recommendations to guide real-time [telemetry] data sharing (CSIRO); (4) A joint research proposal has been developed, and discussions on future collaboration held between the Indus Forum and Upper Indus Basin Network, comprising academics and government officials from Afghanistan, Pakistan, China and India (ICIMOD, *SAWI*, see result 7). ***Not achieved:*** (5) The Pakistan HLSP2 has not taken place, due to political demands on the high-level participants. Alternative means of engaging with officials in Pakistan are being planned, including through bringing Australian experts to Pakistan (ICEWaRM).
2. Integrated practice [proven at scale] for cross-border water resource management - Ganges, Kosi Basin [India & Nepal]	Largely Achieved	***Achieved milestones:*** (1) The comprehensive assessment of the Hindu Kush Himalayas [HIMAP] report has been drafted; data, in the form of different climate change scenarios, has been made accessible to policy makers and practitioners through the HKH Climate and Hydrology Visualization and Access Portal (ICIMOD). (2) The Government of Nepal has drafted a new Water Policy, with support from SDIP partners, including intensive mentoring in water policy development within WECS and expertise on gender equity considerations (ICEWARM, *SAWI*). (3) The pilot Kamala basin 'multi-stakeholder' planning process, agreed through the JAC Action Plan, was initiated in 2016 with the establishment of a joint planning initiative, a field visit to Kamala Basin to enhance members' understanding of the contextual, complexity of development issues, and pressures in the basin (including climate change and gender equity issues) and training (CSIRO).

[5]The assessments of overall performance throughout this Annual Review for 2016-17 have been made with a view to facilitating the production of key internal DFAT quality reports for the SDIP, including the Annual Program Performance Review (APPR) and the Annual Aid Quality Check (AQC). In particular, the AQC assesses performance across a range of criteria using a 6-point scale including Very Good, Good, Adequate, Less than adequate, Poor and Very Poor. A similar scale has been adopted by IOD PARC to make assessments of performance in this report, particularly with respect to progress towards development outcomes (Effectiveness), Gender and Climate Change. There is evidence to support each of the assessments made in this report.

[6] Organisation in brackets indicates the organisation with whom the milestone in the SDIP PAF is associated.

PAF Domain of Change	PAF Milestone	Summary Assessment[6]
		Partially achieved: (4) The TAF PEA for Kosi Basin has been drafted and includes stakeholder mapping across the politics of embankments and flood control, irrigation, hydropower, forest and biodiversity conservation, water supply and sanitation, and agricultural development – in Nepal and Bihar. (5) Social- and gender-inclusive water use master plans have been piloted with 8 village development committees in three ecological regions in Nepal, in collaboration with local authorities and HELVETAS Swiss Inter-cooperation (ICIMOD).
3. Collaborative structures for conservation agriculture-based sustainable intensification (CASI) - Ganges Basin [Nepal, India & Bangladesh]	Largely Achieved	***Achieved:*** (1) Through partnerships with IFPRI, ANU and CIMMYT, dialogue and working groups was established to generate policy research and advice relating to scaling out CASI (ACIAR); (2) Institutional and capacity barriers to uptake and scaling of CASI technologies by the public and private sector have been identified for Nepal, India & Bangladesh. Gender mainstreaming could have been more systematically integrated to these wider findings (ACIAR). ***Partially achieved:*** (3) Partners have carried forward and sought to consolidate their field-based learning from SRFSI, contributing learning on the importance of appropriate technologies and farm mechanisation. The importance of gender-responsive farm mechanisation services is recognised, but detailed solutions are not proposed (ACIAR).
4. Institutional capacity to initiate, steer and participate in medium – large scale hydropower] investment (may include PPP), Ganges Basin [Nepal]	Partially Achieved	***Achieved:*** (1) One potential site has been identified for a medium sized (200MW) hydropower plant through PPP investment model on Karnali river in Kalikot district (IFC); (2) Capacity building for Government of Nepal agencies was supported through partner activities. For example, SAWI supported NEA staff to attend the '*Process of Social Impact Assessment*' course aiming to help strengthen the capacity for NEA in social impact assessment processes (SAWI, *IFC, ICIMOD*). ***Partially achieved:*** (3) Whilst new EIA guidance was drafted and submitted to the Government of Nepal for approval, it was not finally approved in 2016-17 (IFC); (4) A study on 'local shares as a benefit sharing mechanism for hydropower projects in Nepal' to examine good practices relating to benefit-sharing in hydropower was initiated, and will be completed in February 2018 (IFC). ***Not achieved***: (5) Over the last year, advisory support has been provided to two developers (Chameliya and Blue Energy) towards developing hydropower projects, whilst formal engagement with a third potential client (Yeti World Investment Pvt. Ltd) is in progress of becoming established. Support for the Blue Energy development of their Super Trishuli project is ongoing, however the Chameliya project was too small to require international investment (IFC)
5. Knowledge base: water needs for agricultural production and energy generation - Indus Basin [Pakistan]	Largely Achieved	***Achieved:*** (1) Working groups of the UIB-Network, notably the Adaptation Working Group, are examining local adaptation solutions such as SPIP, GLOF EWS and erosion control (ICIMOD); (2) Indus Forum Working Group initiated joint research activities on climate change (SAWI); (3) A review of the current knowledge and information on climate change issues, impacts and modelling work has been carried out, and a framework for addressing climate change in South Asia's water sector has been prepared and disseminated (SAWI); (4) Rice-wheat cropping analysis for Punjab, has been completed and disseminated to partners (CSIRO); (5) Collaboration with WAPDA-GMRC to build understanding of the dynamics between, and contribution of rainfall, snowmelt and glacier melt to river catchments in the upper Indus Basin and compare seasonal flow forecasting methods for Pakistan. The work is summarised a in a peer reviewed joint publication (CSIRO, see result 2); (6) Through the Manchar Lake study, there is a stronger understanding of water quality and differential impacts on women and livelihoods.

PAF Domain of Change	PAF Milestone	Summary Assessment[6]
		Partially achieved: (7) Dialogue between various Indus Forums to discuss joint research activities although not clear on progress (SAWI, ICIMOD); (8) Political economy analysis of stakeholder interests on agriculture and food security in the lower Indus basin has been drafted (TAF)
6. Enabling policy and regulatory environment for energy investment (production and efficiency), Brahmaputra & Ganges Basin [Bangladesh]	Partially Achieved	***Achieved:*** (1) Resource efficiency assessments were conducted for 27 existing, and 13 new PaCT industry firms, with significant social, environmental and economic benefits (IFC). ***Partially achieved:*** (2) The draft data set for a website to benchmark water and energy efficient equipment for the textile industry was submitted for final review (IFC). (3) PEA of stakeholder interests mapped for energy investment in the Brahmaputra basin was drafted; although gender analysis did not form part of this study (TAF).

PAF Milestones - Cross-cutting issues

Gender equality and women's empowerment and addressing climate change are two issues that are considered core to SDIP delivering on its goal. This importance goes beyond a standard mainstreaming approach and all SDIP partners have made strong commitments in their SDIP2 Investment Strategies in this regard, as well as having – to varying degrees – clear statements of intent in corporate strategies which serve to anchor and guide this SDIP commitment.

Gender equality and women's empowerment

The SDIP2 PAF provides a framework for tracking the extent to which there is evidence of progress on gender equality issues through the partner experience across the three basins and within the different SDIP2 outcome areas of practice, knowledge and enabling environment.

GEWE Result 1: Participation of women (and institutions representing women's issues) in key forums and/or influence of gender on policy discussions

6/7 partners were able to demonstrate that women meaningfully participated, or women's issues were meaningfully represented in resource management activities and/ or policy engagement. However, organisations also reported that significant challenges (related to social discrimination and poverty) remained with enabling women to participate in professional development, access to innovations and decision-making[7].

Awareness of these ongoing and specific challenges is enabling partners to develop local and targeted innovations and strategies to support participation: Targeted activities and innovations resulted in highest levels of participation and benefits for women in agriculture and flood management (CBFEWS). **ACIAR** achieved *up to* 58% participation of women in local, targeted activities (compared with an average of 29%)[8], whereas 77% applications for 65 SPIPs demanded through an **ICIMOD**

[7] ICIMOD (2017) Making Local Water Planning Gender and Socially Inclusive: Towards Gender Inclusive Water Sector Development, Issue Brief July 2017; CSIRO (2017) SDIP Phase 2: CSIRO's First Annual Report; MF Rola-Rubzen, K Chatterjee, S Maharjan and R Murray-Prior (2017) Gender Mainstreaming in SRFSI: Progress and Impacts

[8] Rola-Rubzen, MF *et al.* (2017) Participation of Men and Women in SRFSI Project Activities, May 2016-June 2017, SRFSI Gender Report; Participation in women only groups was 17% in India, 30% in Bangladesh, and 31% in Nepal; participation in joint groups (comprising both men and women) was 3% in Bangladesh, 17% in Nepal

scheme came from women farmers as a result of inclusive financing mechanisms. At policy level, new policy documents, such as the Environmental and Social Systems Assessment (ESSA)[9] for national groundwater management improvement program in India and the *draft* National Water Policy for Nepal, prescribe participation of women in water resource management planning[10]. **SAWI** and **ICEWaRM** provided support in drafting these policy documents.

Gender was also considered in knowledge management. Gender analysis was integral to Political Economy Analyses (PEAs) conducted by **TAF** in the Kosi and lower Indus basins, and participation of women has been explicitly designed into **CSIRO**'s new work in Bangladesh and Kamala Basin – through selection of partners with gender expertise (Bangladesh Agricultural University) and criteria for stakeholder engagement**. IFC**'s study into benefit sharing will also seek to actively consult with both women and men.

GEWE Result 2: Opportunities for civil society voice, including through women's groups, to contribute to/ engage meaningfully in policy dialogue

5/7 partners have, through their activities, provided opportunities for civil society to *contribute to/ engage meaningfully* in policy dialogue. Civil society is actively engaged in multi-stakeholder dialogue and consultation processes, and as partners working with SDIP organisations to deliver their work:

ACIAR works through more than 20 partners, including local and national civil society partners (e.g. Jeevika Trust[11]), to deliver its policy and CASI research, **CSIRO** has established partnerships with the Institute of Water Modelling (IWM), an independent research institute to deliver its work in Bangladesh, and **ICIMOD** collaborates with Helvetas in its Water Use Management Plan work.

Some CSOs (representing issues such as environment, IWRM, gender)[12] participated in Brahmaputra Dialogue forum meetings (such as Royal Society for the Protection of Nature (Bhutan), Centre for North East Studies and Policy Research (India) and the Stockholm International Water Institute) and the 2016 International River Symposium meeting (such as WWF who hosted a Women and Water Forum). These meetings were supported by **SAWI**.

In the preparation of PEA analyses **TAF** consulted WWF, Oxfam and Kosi Victims Society in the Kosi, and the Society for Uplifting Community Human Resource by Education and Technology (SUCHET) in the lower Indus basin. In future, **ICIMOD** intends to *give civil society a platform* during the international conference on resilient the Hindu Kush Himalayas.

GEWE Result 3: Regional DRR strategies and early flood warning systems increasingly accommodate and directly address the differential impacts and needs of women and men

2/7 partners (reflecting those directly involved in DRR and flood warning) have sought to ensure that flood warning systems address the differential needs of women and men.

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and 43% in India. Participation of women was significantly higher in scale-out activities and field trials, compared to capacity building. Source: Rola-Rubzen (2017) *ibid*

[9] http://mowr.gov.in/sites/default/files/ESSA-NGMIP-29Sep2016_0.pdf

[10] Objective 9 of the draft National Water Policy for Nepal is "to maintain gender equality by increasing the involvement of women at each level of the decision-making process related to water resources management, and to enhance the incomes of the rural communities through the development and management of water resources". In addition, it mandates that water user associations comprise minimum of 1/3 women. The ESSA requires that groundwater management plans are drawn up by groups comprising a minimum of 20% women.

[11] The Jeevika Trust support livelihood development in India, focusing on the poorest including women.

[12] Participation and Workshop Reports available on: http://saciwaters.org/brahmaputra-dialogue/workshopreport-ph and http://riversymposium.com/wp-content/uploads/2016/09/RS16-Program_LoRes.pdf

For example, CBFEWS (in the Kosi and Indus basins) and the Regional Flood Outlook system were designed by **ICIMOD** *to address the differential needs of women and men*. Selection of women caretakers in piloting CBFEWS has ensured that women in downstream communities receive early flood warnings even when men are away. In addition, gender-disaggregated data within the **SAWI** developed Flood Risk Assessment (FRA) Atlas aims to enable data analysis. During the 2017 Bihar floods, which affected over 17 million people, the FRA Atlas was used by the Government of India's Central Water Commission, to generate risk reports and estimate losses for areas with severely impacted populations. Gender disaggregated data is expected to help government to prioritize its actions, including for women and the most vulnerable groups, in future years.

GEWE Result 4: Gender lens is applied to knowledge products (institutional and technical) generated by partners/ Progress in addressing gender-related gaps in current knowledge and approaches

7/7 partners applied a gender lens to learning products or processes, including in operational guidelines, policy support and discrete research relating to climate change and wider environmental issues. One partner also set a target to ensure at least 30% female authorship in preparing knowledge products[13].

Gender lens was applied to: PEA analyses conducted by **TAF** in the Kosi and Indus basins, focusing water management in relation to floods and agriculture, respectively; studies on gendered and socio-economic impacts of water degradation on Manchar Lake (**CSIRO**)[14], fisheries and nutrition in the Sundarbans (**SAWI**), and ROAD analyses relating to food shortages (**ACIAR**). The **CSIRO-ICIMOD** report 'Making Gender Count' was published, providing a comprehensive, flexible, multi-scale framework to support incorporation of gender impacts as part of M&E systems in SDIP.

Consideration of gender has also been integral to designing new areas of work, for example **CSIRO**'s work in Bangladesh the Kamala basin and **ACIAR**'s work in understanding and influencing decision-making processes. The CSIRO-ANU gender research fellow is working in consultation with the Indus team and ANU to develop a concept paper on gender, water and modelling - towards better integrating gender into its technical river basin planning and modelling work.

Gender analysis is also integrated in *draft* guidelines for EIA for hydropower (**ICIMOD, IFC**), Environmental and Social Systems Assessment for groundwater management in India[15] and Brahmaputra Strategic Basin Assessment (**SAWI**) and water use management planning (**ICIMOD**). **IFC** is undertaking a study on local equity-sharing or benefit-sharing schemes in hydropower towards supporting the industry to effectively apply 'local shares' as required by the government of Nepal.

There is some evidence of uptake by key stakeholders of knowledge products developed in the previous year – notably the 'Gender and Water Management' course at TERI University and the 'Gender-inclusive Good Practices in Disaster Risk Reduction and Livelihood Improvement in the Koshi Floodplain' (see below).

GEWE Result 5: Collection of sex-disaggregated data, helping to address the paucity of such data in the region

A number of partners indicate that they are routinely collating gender disaggregated data, although only 3/7 (CSIRO, ICIMOD and ACIAR) sought to report and explain the data within their annual

[13] HIMAP has consistently encouraged the participation of women in chapter teams (authors), setting a minimum of 30%, which was achieved.
[14] CSIRO (2017) Analysis of Manchar Lake: Connecting water degradation and gender, Indus Technical Fact Sheet Series, July 2017
[15] http://mowr.gov.in/sites/default/files/ESSA-NGMIP-29Sep2016_0.pdf

reports. Four partners report the *number of participants* that had attended one or more events, such as training or technical workshops within annual reports. **ACIAR,** for example, report that women make up 29.2% of project participants (15,300). Depending on location and activity, women's participation in project activities ranged from 20-55%. **ICIMOD** reports that among a total of 65 SPIPs demanded, about 77% applications came from women farmers.

GEWE Result 6: Improved set of interrelated conditions for resource management capacity from national through to municipal levels, increasingly address women and men's differentiated needs in terms of access to water and energy, especially for agricultural (food) purposes.

5/7 partners supported capacity building – either *of women directly* to support their resource management capabilities, *and/or of both men and women* to support their understanding of how gender should be considered and incorporated into water-food-energy management systems.

Representatives from water management agencies participated in the gender course delivered by TERI University in collaboration with **ICEWaRM**. In November 2016 there were 32 attendees, of whom 8 were women. Of the presenters, 3 were female and 2 were male. Organisations represented included: National Water Development Agency, Delhi Jal Board, Central Soil Material Research Station, Central Ground Water Board, Central Water Commission, Ministry of Water Resources, RD & GR and Municipal Corporation of Gurgaon. **CSIRO** provided basic 'gender training' for partners in their ongoing work in Pakistan (PCRWR) and Bangladesh.

Both **ICIMOD** and **ACIAR** provided capacity building within water management systems (WUMP and CBFEWS) and CASI[16], respectively. **IFC** began working with one distribution company to roll out business training for 79 women to enable marketing and distribution of 'quality solar solutions in rural markets. Work is ongoing to scale out all these systems and technologies. In addition, 38 women have benefitted from formal technical and capacity building training for all **SAWI** activities this year.

Over the last year there have been challenges in providing technical training for professional women in the water sector. However, **CSIRO** has maintained contact with women in Pakistan who have previously benefited from training in order to better understand the barriers and identify opportunities in future; and will actively encourage female students to apply for opportunities in Bangladesh. The team has set a target to have at least 50 percent female BAU Masters students (10 students) as part of the project, however out of 5 students in the first intake, only 1 is female.

GEWE Result 7: Gender is meaningfully considered and increasingly incorporated in the development of water-food systems, and energy policies and regulations, at sub-national, national and regional levels.

Over the last year, important progress has been made towards meaningfully embedding gender in policies and regulations that govern water-food-energy systems, notably in Nepal and India.

Both the draft Nepal Water Policy and the ESSA groundwater guidelines for India (supported by **ICEWARM** and **SAWI**, respectively) make explicit reference to the differentiated needs of women (and other vulnerable groups) and their need to be involved in decision-making. These policy documents are supported by critical evidence-based research and policy recommendations prepared by **ICIMOD**

[16] In 2016-2017, 4104 people participated in training and workshops related to CASI, of which 22% were women. Capacity building would also have been supported through field trial activities (1221 people of which 20% women-only and 38% both men and women), scale-out activities (9809 people of which 4% women only and 83% men and women), farmer field days (5427 people of which 37% women) and exposure visits (2420 people of which 33% women). Source: Rola-Rubzen, MF *et al.* (2017) Participation of Men and Women in SRFSI Project Activities, May 2016-June 2017, SRFSI Gender Report

in 2017[17]. In addition, the EIA guidelines for hydropower has been completed by **IFC** and **ICIMOD** and submitted to the Government of Nepal for approval.

Climate Change

In 2017 DFAT, in consultation with partners, identified five discrete measures on consideration of climate change within partners SDIP work on which they would be expected – where appropriate - to track and report. These measures have been integrated into the PAF in respect to partner experience across the three broad SDIP2 outcome areas.

CC Result 1: Measures that increase resilience to climate change and climate variability

In 2016-17, SDIP partners reported good progress in terms of engagement on climate change adaptation and resilience building in the region, although there was little analysis as to whether this was in line with expectations. The complexities of reporting on resilience, particularly due to a lack of simple quantitative measures, were raised by partners.

Most notably at the outcome level, ICEWaRM provided significant input into the development of the Government of Nepal's National Water Policy. Climate change is now addressed directly within several of the policy's objectives, particularly objective 8 which is '*to address the uncertainty of water availability for various reasons including climate change, and manage situations of water induced disasters and drought*'. Also included in the policy are practical steps to be taken in times of severe climate stress.

In terms of contributions at the activity/output level, ICIMOD conducted a successful pilot of flood early warning systems (FEWS) in three villages. This included organizing several capacity-building trainings for provincial-level officials and lead community members who deal with water-induced disasters. **Similarly, in Nepal, ICIMOD supported the up-scaling of WUMPs**, local climate change adaptation tools that aim to improve the water availability for productive and domestic use, and that allow water governance, water sanitation and health, and gender issues to be incorporated. However, **ICIMOD** reported that WUMP preparation and scaling-up were delayed in 2016-17, with issues related to the long-term impact of the 2015 earthquake (Sindhupalchowk), road blockade and political unrest (Saptari), and budget constraints. **SAWI** also developed and disseminated several analytical tools and approaches to build resilience to climate change and to mitigate flood risks.

Through its SRFSI project, **ACIAR supported research on crop management techniques that allow adaptation to climate variability,** such as changes in rainfall timing and quantity, increased temperature, and associated emergent pest and disease problems. Conservation agriculture-based sustainable intensification (CASI) based approaches are now being implemented by 52,386 farmers (15,300 women) on more than 15,000 ha of agricultural land.

CC Result 2. Measures that mitigate greenhouse gas emissions

SDIP partners reported significant achievements with respect to climate change mitigation, although again there was little analysis as to whether this was in line with expectations. At the Partner Workshop, partners agreed that reporting on climate change mitigation was a more straightforward exercise (compared to reporting on adaptation and resilience), in part because standard quantification measures (i.e. tonnes of greenhouse gases reduced) are available. It was

[17] Goodrich, CG *et al.* (2017) Gender and Social Inclusion in Local Water Planning: Lessons from Water Use Master Plan Practices in Nepal, ICIMOD Working Paper 2017/16; ICIMOD (2017) Making Local Water Planning Gender and Socially Inclusive: Towards Gender Inclusive Water Sector Development, Issue Brief July 2017

noted that for future reports, greenhouse gas reductions need to be above a threshold of 100 tonnes to be considered 'material'.

IFC reported that the Rewa Solar Ultra Mega Power Public-Private Partnership (PPP) in Madhya Pradesh, India, was successfully completed with the selection and award of the project bid to three developers. The Power Purchase Agreements (PPA) were signed in April and form the basis for mobilization of private investment of $550 million for the construction and operation of the 750 MW Rewa Solar project, which is **expected to reduce CO2 emissions by approximately one million tonnes each year. IFC** also reported that 27 factories that had signed up under the Partnership for Cleaner Textiles (PaCT) program in Bangladesh were now saving 473,000 MWh of energy and reducing greenhouse gas emissions by 58,000 tonnes each year.

ICIMOD reported that it had successfully piloted an innovative financing mechanism for SPIPs, **which replace diesel and electric pumps and lower greenhouse gas emissions**. **ICIMOD** reported that through 23 SPIPs approximately 8.6 tonnes of CO2 emissions have been mitigated, though this figure is expected to rise in future years as the approach is scaled up.

ACIAR noted that conservation agriculture contributes to climate mitigation by reducing fuel inputs (including diesel) and tillage and maintaining soil carbon levels. Fuel savings of between 25-50% are reported for CASI approaches, relative to conventional production approaches. No estimates were made with respect to the impact on greenhouse gas emissions to date. ACIAR will work to improve emissions reporting going forward.

CC Result 3. Improved flows of climate change information to decision makers and their use of this information

SDIP partner reports provide evidence of substantial contributions to an improved knowledge base for addressing climate change in South Asia. However, for future reports, partners were requested to focus specifically on the extent to which new information is accessible to and being used by decision-makers in the region.

In 2016-17, SDIP partners made considerable strides in developing new water modelling tools. For example, **CSIRO** developed new tools to understand the surface water dynamics and water allocation in the Indus Basin, and there was evidence of progress towards a common Hydrological Modelling Framework for Pakistan which will facilitate more accurate assessments of the impact of climate change on water resources going forward. Similarly, **ICIMOD** developed a flood outlook system for the Koshi Basin which provides information on the water level condition in the Koshi River from upstream to downstream.

The previous year also saw considerable progress made in terms of collaboration with key players in the region. For example, **CSIRO** invested heavily in collaboration with WAPDA-GMRC to build understanding of the dynamics between, and contribution of rainfall, snowmelt and glacier melt to river catchments in the upper Indus Basin, including the projected impacts of climate change, and strengthen seasonal flow forecasting methods for Pakistan. **ICIMOD** provided technical support to the Government of Bihar to implement to their DRR Roadmap, and piloted community-based flood early warning systems in Bihar. New hydropower Environmental Impact Assessment (EIA) guidelines were developed in partnership between **IFC**, **ICIMOD** and the Ministry of Population and Environment (Government of Nepal), taking into account international good practices that minimize the negative environmental impacts associated with the implementation of new hydropower plants.

CC Result 4: Integrating Climate Change into Partner Institutional Practices and Processes

Partner reflections on institutional strengthening in relation to climate change, including improvements in institutional measures or procedures or improved staff awareness, were limited in 2016-17 reports. Partners commented on the extent to which climate change considerations had been integrated into the operations of their partners, rather than within their own organisation. DFAT will work with partners to better assess internal institutional strengthening in relation to climate change in future.

Examples of progress were provided by ICIMOD, who noted they have established a carbon footprint baseline to enable it to monitor the environmental impact of the organisation, including energy consumption and solid and liquid waste generation. **ICIMOD** also reported the installation of energy efficient LED lamps and occupancy sensor switches, which reduces power load and lowers the energy required to operate the office. **TAF** also reported that research conducted during the previous 12 months has informed TAF's internal thinking on the water-food-energy nexus and will likely influence future programming on environmental governance issues.

CC Result 5: Leveraging Private Sector Finance for Adaptation and Emissions Mitigation

IFC contributed strongly to this element, particularly through its support for the completion of the Rewa Solar Ultra Mega Power PPP in Madhya Pradesh. IFC noted that through this project successfully demonstrated a new approach to 'creating the market'. Importantly, **IFC** reported that the Power Puchase Agreements (PPA), signed in April 2017, form the basis for the mobilization of private investment of $550 million for the construction and operation of the project.

IFC also reported that it had identified a project site for a hydropower plant in Nepal - Phukot Karnali - with strong potential for implementation on a PPP model. Next steps will be for **IFC** to structure and tender a PPP transaction for development of the project as a bankable and sustainable PPP.

Assessment of overall progress against PAF milestones (including gender and climate change)

Overall performance against the milestones included in the PAF is considered to be 'good' and in line with expectations. While not all milestones were achieved (which itself is not unexpected), the broad range of results indicate that SDIP partners are working effectively and making progress against their own intervention logic.

In terms of a stronger consideration of GEWE in practice, overall performance is considered to have been 'adequate', with partners reporting some solid achievements over the past 12 months against their own set of high expectations. However, there is a need for partners to more effectively integrate gender considerations and expertise into their core activities, and to better demonstrate the value of these impacts to policy and decision makers across the region. It will be important to consider gender issues across all activities, and understand how women can be given a voice, in the most appropriate and effective way – drawing on gender expertise to develop strategy and engage in consultation processes where necessary.

The SDIP made good progress in embedding a clearer and stronger interpretation of climate change (which has only recently become an explicit focus of the SDIP). Overall performance on climate change in 2016-17 is considered to be 'good' and is in line with expectations at this juncture. The quality of partner reporting on climate change in 2016-17 was good, assisted by climate change reporting guidelines provided by DFAT, and partner monitoring and reflection against the five

common measures on climate change is expected to deepen for the next reporting cycle. A strong platform has been laid from which the SDIP can make significant gains in the year ahead.

Synthesis of key SDIP results and achievements in 2016-17

SDIP partners provided considerable evidence of progress against their respective objectives/ results frameworks (aligned to the 3 end-of-investment outcomes) in 2016-17. From a portfolio perspective, this progress has been synthesised and consolidated into a series of **11 higher-order results** which, on many occasions, reflect contributions from multiple partners and either demonstrate or point towards convergence of positive influences on key actors who are themselves the drivers of change in the system.

End-of-investment Outcome 1: Strengthened practices for regional cooperation

Result 1: Progress towards centralised hydrological data management in Pakistan and increased capabilities for transboundary river basin management within the Indus Basin

In the Indus, SDIP partners continue to work with the ongoing support of the Government of Pakistan, through the Subsidiary Agreement with the Government of Australia. The increasing engagement including co-investment in SDIP by the DFAT Post in Pakistan significantly strengthens the working relationships with the institutions of the Government of Pakistan.

In 2016-17, CSIRO supported the purchase and installation of the Hydstra system across three provincial irrigation departments of Punjab (PID), Sindh (SID) and Khyber Pakhtunkhwa (KPID), the Indus River System Authority (IRSA) and the Pakistan Water and Power Development Authority (WAPDA)[18], and (in collaboration with **ICEWaRM**) provided technical training within WAPDA, PID and SID. In addition, the Ministry of Water and Power (MoWP) has requested partners to facilitate an evaluation by Australian Industry experts of Pakistan's existing data collection, with recommendations for establishing an automated network to share data in real time with stakeholders. A centralised water resources data management system will enable greater coordination and sharing of data between Provinces and between agencies, helping to address issues of data uncertainty and inequitable decision-making around water allocations.

Several partners, notably CSIRO, ICEWaRM and SAWI have supported capacity building in river basin management and/or modelling in the Indus Basin. CSIRO have progressed, in collaboration with key Government partners[19], the population and application of the common river system model[20], enabling analyses of scenarios on climate change and water availability for irrigation, hydropower and livelihoods, including differential impacts on men and women, in the Upper Indus basin. Its value has been recognised by partners: WAPDA-GMRC has generated time series climate inputs to understand the likely changes in temperature and precipitation in different sub-catchments of the upper Indus basin; the MoWP has requested **CSIRO** to jointly develop a series of planning scenarios to investigate the implications of a new large dam upstream of the existing Tarbela Dam; and IRSA has requested CSIRO to arrange a joint testing and evaluation of the model. **SAWI** has concluded a two-year transboundary water governance capacity strengthening programme in Afghanistan (as well as in Bangladesh and Bhutan) and provided training to strengthen inter-ministerial collaboration and information exchange for the recently established Ministry of Environment and Water (MEW) in

[18] Divisions of Glacier Monitoring and Research Centre (GMRC) and Surface Water Hydrology Project (SWHP)
[19] MoWP, WAPDA, IRSA, NESPAK, PID, and SID
[20] The model is being built using the eWater Source framework, Australia's National Hydrological Modelling Platform. See also joint GMRC publication: https://www.hydrol-earth-syst-sci-discuss.net/hess-2017-428

Afghanistan. SAWI reports that this (well-attended[21]) **intensive training in Afghanistan is leading to strong inter-ministerial collaboration, confidence to engage in riparian dialogue with neighbouring countries**. In addition, the Deputy Minister of Water of Afghanistan has nominated Afghan participants to attend training on glacier monitoring in Pakistan. **SAWI** has also supported **ICIMOD** and IUCN to support scale-out of training through establishing partnerships with research institutes and universities, and the design of short training modules and curricula in water diplomacy and basin governance.

SDIP partner expertise has also helped to leverage further support for capacity strengthening in the region. **SAWI** supported additional WB financing to the Pakistan-based Water Sector Capacity Building and Advisory Services Project (US $35M) and Afghanistan-based Irrigation Rehabilitation and Development Project (US $70M).

Result 2: Increased capabilities for river basin management within the Ganges and Brahmaputra Basins

Over the last year SDIP support has enabled river basin planning at local, regional (across States) and national scales, through engagement with water management agencies across the Ganges and Brahmaputra Basins.

At the local level, water use management plan (WUMP) pilots in Nepal have led to three Districts adopting water use management planning methods to some extent: Saptari and Sindhuli Districts have incorporated WUMPs into their development plans via their the Saptari 5-year Periodic District Development Plan (PDDP 2015/16 – 2019-2020) as reported in 2016-17, and the Sindhuli District Development Plan, in 2016-17. Eight village development committees (VDCs) in these districts have allocated 5-15% of their budgets to implementing the schemes. VDCs in Sindhipal District have also committed to applying WUMPs, however these have necessarily been modified to reflect needs post-earthquake. **ICIMOD** and HELVETAS Swiss Intercooperation, in collaboration with local authorities, have drawn on recent learning[22] to pilot a social- and gender-inclusive WUMP with 8 village development committees in three ecological regions in Nepal. The pilots seek to recognise uncertainty in local water availability and include adaptation projects to increase and sustain water availability for women and disadvantaged groups.

At the basin level, water management agencies in Nepal and India have been provided with technical training in river basin modelling and participatory river basin planning, including scenario model construction and its application in the river basin planning process. With high levels of support within the Governments of India and Nepal[23], these training initiatives aim to support future water

[21] Fifteen Afghan government officials participated in 80% or more of the 18 seminars across FY16-17. The training comprised technical-level staff representatives from the MEW, the Ministry of Finance, the Ministry of Foreign Affairs and the National Environmental Protection Agency.

[22] C.G., Udas, P. B., Gurung, M. B., Shrestha, N. T., Shrestha, S. (2017) Gender and social inclusion in local water planning: Lessons from water use master plan practices in Nepal. ICIMOD Working Paper 2017/16, http://lib.icimod.org/record/32744/files/Issue%20Brief_400.pdf

[23] CSIRO and ICEWaRM support in Nepal continues to be delivered through the JAC mechanism and in line with the JAC action plan. Planned activities under SAWI and the World Bank's Bihar Kosi Development Project (BKDP) were discussed by the joint high-powered committee of the Governments of Nepal and the State Government of Bihar.

basin planning and enable mediation of water conflicts (by federal and state governments) at different scales in the Ganges Basin in both Nepal (through JAC[24]) and India (through the NHP[25] and NGRBA[26]).

Box 1: Technical training in river basin modelling and planning in 2016-17

- In India, SAWI supported basic training on river basin operation software for 62 participants and advanced training on 'Riverware' software for water resources planning and management for 26 participants, training on real time reservoir operation for 24 participants, and *comprehensive* training on 'Waterware', a river basin planning and management software for 27 participants (including five female engineers). The latter comprised representatives from Water Resource Departments of 11 states in the Ganges and Brahmaputra basins.
- CSIRO and ICEWARM provided technical river-modelling training for 4 senior staff (all male) from NESPAK in September 2016, training in integrated water resource management and the role of modelling in policy processes[27] for 16 participants (including 3 women) and training in water balance model development in April 2017. Participants comprised senior Nepali water managers and University water experts; post-training survey results showed an improved understanding of the types of information required to undertake river system modelling and the effect of crop selection and management on water use and availability.
- TERI University (in collaboration with ICEWaRM) provided training on Gender for 32 water management professionals (including 8 women) in November 2016. Organisations represented included: National Water Development Agency, Delhi Jal Board, Central Soil Material Research Station, Central Ground Water Board, Central Water Commission, Ministry of Water Resources, RD & GR and Municipal Corporation of Gurgaon.
- ICEWaRM and IIT Delhi are developing resources for training that will provide local contexts on water modelling and can be built into future water planning courses
- The 'Transboundary Professional Development Programme' for Andhra Pradesh and Telangana was delivered by ICEWaRM in November 2016

ICEWaRM continues to advise on the establishment of the Rajasthan Centre of Excellence in Water Resources Management for the design and delivery of capacity building programmes which will develop the skills of water professionals in the Indian Indus and Ganga basins. With the support of the Australian Water Partnership (AWP), **ICEWaRM** also contributed to the development of a capacity building framework, in collaboration with the NHP, and other key stakeholders[28].

In Nepal and Bangladesh, SDIP partners have established new partnerships and consultation processes towards establishing 'multi-stakeholder' planning processes, including through the Kamala basin planning and the Bangladesh Delta Plan. In Nepal the pilot Kamala basin 'multi-stakeholder' planning process, agreed through the JAC Action Plan, was initiated in 2016 with the

[24] Comprising representatives from WECS, DHM and Department of Irrigation (DoI)
[25] Through which wider uptake by the Government of India and basin state governments is planned.
[26] National Ganga River Basin Project
[27] This formed part of the Kamala Basin joint planning initiative. Training was conducted in cooperation with Nepal Development Research Institute (NDRI) and Nepal Engineering College (NEC).
[28] World Bank, DFAT, Indian and Australian education and training providers, and AWP partners.

establishment of a joint planning initiative[29], a field visit to Kamala Basin to enhance members' understanding of the contextual complexity of development issues and pressures in the basin (including climate change and gender equity issues)[30], and training (see above). These activities have set a solid foundation for the Kamala pilot basin planning process, both in terms of bringing together key agencies and people from across sectors to inform, and have ownership of, basin planning processes, and in establishing a shared understanding of key issues, methods and alternatives. In Bangladesh, **SAWI** supported extensive consultations, stakeholder engagement and training on analytical approaches to basin planning and model design parameters, involving some 100 individuals from over 20 organizations, including government, technical support organizations, academia and NGOs. It also provided technical support to the Government of Bangladesh in the preparation of an investment plan for the Bangladesh Delta Plan (BDP-2100), which aims to adopt a basin-wide approach to addressing water resources management challenges. In parallel, **CSIRO** has established formal partnerships with key agencies including the Water Resources Planning Organisation (WARPO)[31], Barind Multipurpose Development Authority (BMDA), Bangladesh Agricultural Research Institute (BARI), Institute of Water Modelling (IWM) and Bangladesh Agricultural University (BAU). Partners bring together a range of expertise across water modelling and hydrology (IWM), land-use and farming systems modelling (BARI) and socio-economic and gender analysis (BAU), and sit under both the Ministry of Agriculture and the Ministry of Water Resources of the Government of Bangladesh, creating opportunities for cross-institutional and inter-sectoral collaboration.

In October 2016, the first regional dialogue event on the Brahmaputra was held, bringing together senior level delegations from Bangladesh, Bhutan and India, and representatives across government, academia, think tanks and civil society across all four riparian countries. The Brahmaputra dialogue was significant in bringing discussions from track 2 to track 1.5, as well as demonstrating support at the country level (including across the multiple States of India that share the Brahmaputra Basin)[32]. **SAWI** notes important progress toward enhanced working relationships between Bangladesh and India, and indications that the formal Joint Mechanism will come through in FY18 to support planning, management, and collaborative action on measures to reduce poverty and vulnerability to natural disasters in the landscape.

ICEWARM and SAWI supported the drafting of Nepal's new water resource management legislation. ICEWARM has provided intensive mentoring in water policy development by embedding an experienced policy expert in WECS to support the drafting of the National Water Resources policy, including expertise on gender equity considerations. Approval of new water legislation will act as a trigger for World Bank policy lending (P154693, US$150M) for the energy sector in Nepal. The draft policy also includes important principles and directives around IWRM and gender.

[29] Bringing together representatives from the Water and Energy Commission Secretariat (WECS), Department of Hydrology and Meteorology (DHM), Department of Irrigation (DOI), Department of Water Induced Disaster Management (DWIDM), Ministry of Irrigation (MOI), MOPE (Ministry of Population and Environment), Ministry of Water and Sanitation (MOWSS), Department of Electricity Development (DOED), Department of Agriculture (DOA) and Department of Soil Conservation and Watershed Management (DSCWM).

[30] ICIMOD-CSIRO (2017). Workshop proceedings "Water-livelihoods-gender nexus to advance Koshi Basin Management'

[31] WARPO and CSIRO are also in the process of signing a formal MoU.

[32] The dialogue process, led by SaciWaters with the support of SAWI, is supported by a review of existing transboundary protocols and accords and an exercise on institutional mapping. SAWI's strategy of incrementally building trust, and of combining technical knowledge with an advocacy-based approach, is starting to pay off.

SDIP partners have been working to build scientifically rigorous and *accessible* knowledge and expertise towards providing a sound evidence base for river basin management and support decision-making. The comprehensive assessment of the Hindu Kush Himalayas [HIMAP] report – which aims to provide decision makers with critical climate change information - has been drafted[33], through the contributions of more than 300 scientists, including from **ICIMOD**[34]. The data, in the form of different climate change scenarios, has been made accessible to policy makers and practitioners through the HKH Climate and Hydrology Visualization and Access Portal (HI−CHAP)[35]. In Nepal, **CSIRO** has collaborated with Nepalese experts, through a series of workshops and research, to enhance the body of knowledge and modelling expertise in stream-flow and ecology (for the Kamala Basin)[36], and foster a network of academics in ecological flows work – including through support to five masters students (to be managed with Nepalese partners). This work aims to provide a strong evidence base for the Kamala Basin pilot, and enable experts to continue to improve understanding of ecological impacts of changes in stream flow regimes in the context of river basin planning, in future. In India and Bangladesh, **SAWI** is supporting the strategic assessment of the Brahmaputra Basin which aims to improve the understanding of the highly complex system, identify key knowledge gaps and prepare an action plan towards more productive and sustainable use of water resources. The Bangladesh study has concluded with interest from the Government of Bangladesh for follow-on work. **SAWI** has supported the development of series of tools that have been made available to water agencies in India (and to the wider public), including: an online river basin planning and management model that can be used for optimization of reservoirs by managing floods and maximizing storage for irrigation, and an updated hydromet manual[37], and an integrated water resources management tool for the Damodar Basin. This tool is currently being tested, and has already resulted in inter-agency collaboration on data between the West Bengal Irrigation and Waterways Department, Damodar Valley Corporation, and West Bengal State Level Ground Water Resources Development Authority. Modelling and planning tools are also informing the basin-wide (NGRBA, US$1B) by bringing greater attention to environmental flows, water quantity and essential groundwater management.

Through political economy analysis of selected interventions in the Kosi Basin, TAF, in collaboration with partners Institute for Social and Environmental Transition–Nepal (ISET-N) and Gorakhpur Environmental Action Group (GEAG), identified over 60 distinct institutions and groups (such as ministries, foreign donors, NGOs, social movements, and government agencies) embedded in the politics of embankments and flood control, irrigation, hydropower, forest and biodiversity conservation, water supply and sanitation, and agricultural development – in Nepal and Bihar. Through a greater understanding of the political economy of hydrological interventions in the Kosi - **TAF** aims to improve effectiveness of [SDIP] interventions in transboundary water governance and establish a nexus framework 'to expand stakeholder engagement and tradeable benefits in transboundary water negotiations'. Meaningful stakeholder engagement, including for women, was also discussed by prominent Nepali academics and practitioners engaged with the CSIRO-supported Kamala basin planning process. The PEA also provided some important insights into factors affecting differential impacts of water use and management for women in the Kosi Basin – including in relation to access to decision making, markets and support services and risks to health and livelihoods. An important finding that statutory stipulations on female participation is likely to be a driver for

[33] Due to be finalised on September 2017.
[34] Two staff directly involved with SDIP II have been chosen to be coordinating lead author and review editor of new IPPC report on Cryosphere and Oceans.
[35] http://apps.geoportal.icimod.org/climate
[36] CSIRO and NDRI have developed a short synthesis of local biophysical and ecological information.
[37] Both available online at www.indiawrm.org

increased participation of women in community-based development programs and natural resources management committees in recent years, reflects a key approach evident in the work of some SDIP partners. **TAF** is also seeking to develop a methodology that will allow the gender sensitivity of policies to be tested across a spectrum of power, geographies, and communities, providing a more accurate representation of gender trade-offs associated with the transboundary policy.

Result 3: Transboundary collaboration on flood forecasting and management in the Ganges, Indus and Brahmaputra Basins

SDIP partners continue to collaborate with Government partners to pilot and support scale-out of flood forecasting and regional DRR management, across the region, with evidence of real-time data sharing that is contributing to building resilience and saving lives.

In the Ganges, Governments of Nepal (DHM) and India (Bihar DMD and WRD) and (Patna BSDMA and WRD) continue to utilise the flood forecasting data generated by ICIMOD on a daily basis. Data generated by the Koshi Basin and Regional Flood Outlook Information Systems[38] were used to improve flood forecasting during the 2017 monsoon season; and **SAWI** is supporting real-time data sharing between upstream Nepal and downstream Bihar – including through provision of training and study visits for Government of Bihar officials. A high-level delegation (including the Minister, and Principal Secretary Water Resources Department, Government of Bihar) visited Japan in December 2016 to learn about institutional and technological perspectives of real-time flood forecasting and adopt the technology suitable for Bihar. Two Government of Bihar officials attended an operational flood forecasting training organized by RIMES and UNESCAP at the Asian Institute of Technology in Bangkok, in October 2016. There is also ongoing support from SDIP partners to scale-out their flood forecasting systems: DHM Nepal has requested further support from **ICIMOD** to support their monsoon flood forecasting; Bihar's flood forecasting framework (supported by **SAWI**) is being scaled up to other basins under the World Bank NHP and has been replicated for the transboundary Rapti Basin in Uttar Pradesh; and work has started on the Indus Flood Outlook focusing on the Chenab basin, upon *strong request* from the Pakistan PMD.

In the Brahmaputra, SAWI has supported detailed technical analyses and consultation in Bhutan[39] and Bangladesh towards supporting government and World Bank investment in hydro-met systems for improved flood forecasting and early warning. The US$3.3M *Hydro-met Services and Disaster Resilience Regional Project* (co-financed by the Global Facility for Disaster Risk Reduction and Recovery) in Bhutan became effective in October 2016, and the US$113M *Bangladesh Weather and Climate Services Regional Project* started in May 2017.

Following successful piloting of community-based flood early warning systems (CBFEWS) in Assam (India), Ratu Khola (Nepal) and Gilgit Baltistan (Pakistan), and GLOF early warning systems in selected areas on the Nepal-China border in SDIP phase one – there is evidence that these local CBFEWS mechanisms have been, or *are likely to be* extended to other communities**.**

CBFEWS continues to be implemented by communities and government agencies (DHM, Nepal and DMD, Bihar) in Ratu Khola, with *transboundary collaboration* leading to early warning for downstream communities in India during the 2017 flood season. Local Indian authorities estimated CBFEWS had resulted in avoided losses of US$ 0.7 million[40]. Furthermore, on the morning of 3rd

[38] Data is available online and by telephone if needed. The regional flood outlook was visited by over 30,001,535 visitors last year (July-16 and June 17).

[39] The report '*Modernizing Weather, Water and Climate Services: A Road Map for Bhutan*' prepared through extensive consultations with the Royal Government of Bhutan has been published and disseminated.

[40] Correspondence from Gram Panchayat Shri Khandi, Bhitta, Bihar to ICIMOD.

August 2017, the CBFEWS in Sherqilla village (Gilgit Baltistan) generated a warning, enabling all 350 residents of vulnerable households to evacuate to safety with their precious belongings and livestock; the significance of CBFEWS in saving lives was recognised by the National Disaster Management Authority[41].

In Nepal, CFGORRP/DHM scaled out CBFEWS to the Gagan river in Koshi Basin and provided financial support for its implementation, whilst DMD Bihar has committed to supporting the implementation of CBFEWS in Sitamarhi district bordering with Nepal. In Pakistan, GBDMA intends to replicate CBFEWS in Gilgit Baltistan. In Afghanistan, for example, CBFEWS has been incorporated into Focus Afghanistan's risk reduction agenda with government, and the Aga Khan Agency for Habitat (AKAH) has committed to out-scaling CBFEWS in Afghanistan. Uptake of the system has established an improved enabling environment for private early warning system manufacturing company through pilots in India, Nepal and Pakistan in collaboration with the government.

Efforts to establish regional DRR planning is also progressing through ICIMOD engagement with DMD Bihar under the Bihar DRR Roadmap initiative, plans to discuss a DRR knowledge hub (floods, drought, landslides and GLOFs) in the Koshi basin, and collaboration with the National Science Foundation China on a new project considering livelihood adaptation in the Koshi Basin.

To address GLOFs and other flash flood risks, flood early warning systems (FEWS) were successfully piloted in Passu, Damas, and Sherquilla villages in the Upper Indus Basin. Glaciers are regularly monitored through *community hazard watch groups* and geologists, whilst key government and community officials have received training so that they are capable of establishing and maintaining day-to-day operation and communicating flood event messages to affected communities, whilst communities are more prepared for GLOF events. Mitigation and adaptation measures to address threats caused by excessive melting in relation to the Ghulkin, Gulmit, and Passu glaciers was also undertaken, including snout mapping, draining excess water and resilience building activities in affected communities.

In Assam, technical work and dialogue on the Brahmaputra Basin (supported by SAWI) is informing the preparation of the Assam Flood, Erosion and River Management Modernization Project (US$250M), including providing the knowledge base and platform for improved planning and management of the system to reduce the risks of floods, erosion and sedimentation.

Result 4: Progress towards scaling out CASI within the Ganges Basin, through improved understanding of barriers and decision-making processes, and targeted support for farmers

Over the last year ACIAR has focused on the challenge of out-scaling CASI – through consolidating the evidence-base from SRFSI research, understanding barriers to out-scaling at different levels (including institutional, political and socio-economic), and engaging with decision-makers towards successfully scaling out CASI within the Ganges Basin.

Analysis of the *out-scaling potential* for CASI across project districts has been undertaken by ACIAR in collaboration with CIMMYT[42], drawing on field evidence from SRFSI, spatial data and existing knowledge (e.g. district and regional water availability, access to markets, livelihood data, CASI technology). The resulting '*spatial farming systems framework*'[43] includes detailed information on

[41] http://www.ndma.gov.pk/files/Sitrep%20No%20034%20Monsoon%202017%20dated%204%20August%202017.pdf

[42] CIMMYT leads SRFSI project, delivered by 20 plus partners across India, Nepal, Bangladesh and Australia

[43] Tiwari, TP et al (2017) Final Report - Informing policies for removing barriers to scaling conservation agriculture based sustainable intensification in the Eastern Gangetic Plains, ACIAR Final Report, Small research and development activity CSE/2016/112, http://aciar.gov.au/publication/fr2017/24

policy linkages (potential for informing policy), local scaling (which elements of CASI and local organization potential could be used to drive scaling) and basin wide scaling (convergence with national or state schemes, suitability of individual CASI techniques for scaling, and which target farming system in the EGP). **The analysis of the *out-scaling potential* for CASI provides a basis for 'delivering policy-critical knowledge' and includes efforts to understand the impact of the feminisation of agriculture, and understand the factors affecting uptake of CASI for women.** Whilst **ICIMOD** has piloted gender-responsive technologies (solar powered irrigation pumps, SPIPs) with positive results, **ACIAR** has identified a need to focus on appropriate 'labour-saving' technologies for women farmers[44].

Towards addressing barriers to out-scaling CASI, ACIAR has sought to engage the private sector[45], as well as build farmer knowledge, and collective capabilities through support to innovation platforms, micro-entrepreneurs and capacity building. Over the last year, ACIAR (through SRFSI) has formed a partnership with the Australian NGO Business for Development (B4D) to design and test business models that will encourage the private sector in out-scaling CASI technologies in the region. B4D are working with Green AgRevolution, which has established a Farmer Service Company and 5 micro-entrepreneur centres in Purnea District (Bihar) using their DeHaat platform. In addition, 34 Innovation Platforms[46] (taking the form of farmer clubs, self-help groups and cooperatives) continue to operate - working on a range of issues including seed production systems, access to mechanisation and market links – with some evidence of benefits to farmers, local service providers and entrepreneurs. Some government partners, such as the Departments of Agriculture in West Bengal and Nepal, have *internalised* project promoted technologies by including them in their regular programs[47]. The sustainability of these approaches needs further analysis to determine which agribusiness models are likely to be effective on an ongoing basis.

The SFRSI project has also used a range of approaches for capacity building, including on-farm trials; training sessions for farmers, service providers, technical personnel and researcher; exchange visits; focus group discussions; and field days. Altogether 6,445 farmers (22% female) have attended training on various topics (e.g. CASI practices, value chain and market development, entrepreneurial skills development, seed systems); 2,576 farmers (34% female) have participated in exposure/ exchange visits; 1,585 (44% female) farmers attended FGD/ consultation meetings; 5,726 farmers (38% female) attended field days; 33 (12% female) farmers received service providers training and 1,183 farmers (30% female) attended training on the concept of IPs. Participation of women was significantly higher in *on-farm* scale-out activities and field trials, compared to *off-farm* training. Capacity building is an essential element of project activities, to build a skills and knowledge base from which to outscale CASI approaches. **These events have led to enhanced skills and confidence among stakeholders, and also created a huge interest among stakeholders that have helped in wider scale adopting of technologies**. It helps to reduce knowledge gaps, develops community capacity to take ownership of activities and outputs, and leads to the internalisation of project approaches, with tangible outcomes. In addition, the introduction of new crops in certain locations like maize, wheat, legumes with new

[44] Rola-Rubzen, MF *et al.* (2017) Participation of Men and Women in SRFSI Project Activities, May 2016-June 2017, SRFSI Gender Report

[45] IFPRI recommends that efforts to attract private investments should be focused on small and medium enterprises that are already active in the area.

[46] 24 IPs were established in SDIP Phase One

[47] For example, the Department of Agriculture in West Bengal have commissioned a project with UBKV under the Rastriya Krishi Vikash Yojna (RKVY) scheme, which promotes agricultural development in an integrated manner, and commits central funds to state programs.

seeds, intercropping vegetables and legumes with maize and the introduction of mechanization has greatly helped systems intensification.

Over the last year ACIAR, IFPRI, ANU and SaciWaters have engaged with multiple stakeholders towards better understanding the policy context for water and food security, and as well as understanding how to effectively engage with decision makers on these issues. Foresight modelling tools have, for example, been used to define scenarios to present to key decision makers: the ROAD approach was used to identify risks, consequences and solutions for future water and food security; whilst the IMPACT model (linked to IFPRI research) enables analysis of alternative scenarios for water and food security. This work has also contributed to a better understanding of investment pathways and climate change policy development.

National policy and regulatory constraints have been explored within foresight and discussion workshops as well as in detailed reports: A desktop study by SaciWATERS mapped key institutions, support programs, mandates and roles in each country/state, which are relevant to wider development towards sustainable intensification and resilient agriculture; Dialogue workshops (e.g. Delhi Foresight Workshop in September 2016), have also been convened, and have included discussions of foresight scenarios[48]. Foresight workshops identified country specific barriers, drivers and research, and policy focus areas for improved FEW security [scaling CASI approaches]; policy options for sustainable intensification in the EGP (IFPRI). Reports summarising high level outputs have been completed.

Further status and synthesis workshops will take place in the second half of 2017[49]. Proposed solution approaches (identified through foresight workshops) include a focus on increasing agricultural diversification, improving the enabling environment (for example the agricultural service economy), and sustainable energy and water management in the context of agricultural production.

Result 5: Progress towards medium- and large-scale energy development through PPP investment in Nepal (hydropower) and India (solar)

IFC has supported governments in Nepal and India for significant PPP investments in renewable energy, building on agreements established with respective governments in SDIP phase one.

Over the last year IFC has, in line with its MoU with the Government of Nepal[50], carried out preliminary assessments of two potential project sites. One site, *Phukot Karnali*, situated on the on the Karnali river in Kalikot district (Far Western Development Region of Nepal), has an estimated

[48] At the Delhi Foresight Workshop (September 2016), the 'Risks and Options Assessment for Decision-making' (ROAD) approach was used to identify key risk factors within the EGP, assess consequences on food and water systems, and explore possible solutions to overcome threats. This approach follows a step wise process to define the scope of decision-making for assessment, and identification of risks along with triggers and consequences. Possible options for action can then be mapped taking these factors into account. This process deconstructs risk into causal pathways that as a whole show what needs to be done, the effects of action and inaction, and elements that can be managed and those that cannot. The process is undertaken as a group, and can capture the inputs of multiple actors, providing options for effective decision making.

[49] These include regional workshops on mechanization (July, with IFPRI; gender networks (September, with SaciWATERs); conservation agriculture (September, with Trust for the Advancement of Agricultural Science); Innovation Platforms (September, with CSIRO) and sustainable cropping systems and sustainable water yields (March 2018 with CSIRO). This series of workshops raises ACIAR's public profile by bringing together regional decision makers covering a wide range of policy-critical topics.

[50] In April 2016 IFC signed a Memorandum of Understanding (MoU) with the Department of Electricity Development (DoED) and Ministry of Energy to prepare up to three medium-sized (50 – 500 MW) hydropower projects and to provide transaction advisory for the competitive selection of private investors.

capacity greater than 200 MW, and has been identified as having potential for implementation on a PPP model. IFC is now working to sign a mandate with the government to support the DoED to structure and tender a PPP transaction for development of the project as a bankable and sustainable PPP. This demonstrates important progress towards the target of preparing up to three medium-sized (50 – 500 MW) hydropower projects as agreed with the Government of Nepal in April 2016.

Over the last year, IFC has provided advisory support to two hydropower developers in Nepal, Chameliya (Chhetti Gad) and to Blue Energy Private Limited (BEPL) for a sediment management, river hydraulic and cost review of their bulb turbine. Formal engagement with a third potential client (Yeti World Investment Pvt. Ltd) is in progress of becoming established, and advisory support for the Langtang hydro power project is anticipated to include a feasibility study, Environmental Impact Assessment (EIA), development of a financial model, and training of staff on the content of a Project Development Agreement (PDA). Support for the Blue Energy development of their Super Trishuli project is ongoing, however the Chameliya project will not be progressed with support of IFC[51].

Following ongoing support by IFC to the Government of India and Rewa Ultra Mega Solar Limited (RUMSL, the project implementation agency), the 750 MW Rewa Solar Ultra Mega Power PPP in Madhya Pradesh was successfully completed in April 2017, with the selection and award of the project bid to three developers. The Purchase Power Agreements (PPA) forms the basis for mobilization of a US $550 million private investment. **The project is one of the world's largest solar projects developed with full market-based private financing and is expected to reduce approximately one million tons of CO^2 emissions annually by reducing the power offtake from the grid**. It may also represent a potential tipping point for the government to meet its solar energy target and climate change impacts of 100 GW by 2022, if it results in solar being a preferred resource for utilities[52]. The success of the project has since led the Government of India to adopt several aspects of the Rewa project structure in its national guidelines for solar projects: a new approach of 'creating the market' was successfully demonstrated, involving elimination of subsidies to private developers, replaced instead with thorough project preparation and systematic risk mitigation, and adoption of internationally bankable project agreements; and as a result of institutional capacity building supported by IFC, RUMSL[53] now has the capacity to undertake other solar projects after Rewa.

Result 6: Improved technical, social and environmental capabilities for hydropower preparation and construction in the region

SDIP partners have delivered policy guidelines relating to EIA and climate resilience to the GoN for approval, enabled networking between hydro developers in Pakistan and deepened its understanding of the political economy of the energy trade in the BBIN region.

The final draft of new Final EIA guidelines for hydropower projects (prepared in collaboration with ICIMOD and the Ministry of Population and Environment, Government of Nepal) have been submitted to the GoN for approval and translation into the Nepali language, following further consultation with government partners and specialists. The guidelines follow international good practices to minimize negative environmental impacts, including strong mitigation measures to be

[51] Although the Chameliya project was determined too small for international investors after due diligence and is now likely to be developed by Nepalese investors.

[52] It will operate with a record low first-year tariff of INR 2.97 per unit of electricity ($0.044), representing grid parity for solar power (i.e. tariffs that equal conventional tariffs).

[53] RUMSL was created only in July 2015 and yet, with IFC support, was able to undertake an entire gamut of activities, including conceptualization, market consultations, structuring and bid process management (activities normally undertaken by central state-owned enterprises), as well as development of land and associated infrastructure (activities undertaken at the state level by the Solar Power Park Developer).

implemented, an effective environmental management plan, and monitoring. The guidelines discuss all phases (pre-construction, construction, and post construction) of hydropower development with anticipated impacts, and possible measures to consider. Once the guidelines are formally approved by the Ministry, they will facilitate hydropower investment, while ensuring low negative environmental impact of hydropower infrastructure, particularly the freshwater ecosystem, and benefits to local communities. Adoption of these EIA guidelines will promote implementation of good international industry practices (GIIP) and IFC Performance Standards in the hydropower industry in Nepal.

At the sector level, IFC procured the study on 'local shares as a benefit sharing mechanism for hydropower projects in Nepal' to examine good practices relating to benefit-sharing in hydropower. This study focuses primarily on the government of Nepal's local shares policy, which requires project developers to offer the distribution of up to ten percent of equity shares to communities affected by the project. The study, undertaken by PEI, PLA and Kriti, will be finalised in February 2018 and will be followed by a consultative panel. The study will adopt a gender-sensitive approach that includes appropriate engagement and consultation of both women and men. This will allow **IFC** to produce recommendations to reduce women's vulnerability and promote equitable benefit-sharing; and support the industry to effectively apply 'local shares' as required by the government of Nepal[54], thereby increasing the sustainability of hydropower projects.

Following an extensive stakeholder consultation process with major international hydropower and dam industry stakeholders, SAWI supported the development of 'resilience guidelines for climate change and natural disasters in hydropower and dams' with special reference to GLOFs and other natural disasters specific to South Asia. The guidelines set out an integrated framework – that brings together credible climate information, climate impact assessment and decision-making tools – to help governments better account for climate risks in the planning of investments. **SAWI** also supported the upgrading of the Reservoir Conservation Approach (RESCON2) to identify viable approaches for sustainably managing reservoirs, including to address reservoir sedimentation which is currently resulting in more storage being lost annually than added and could be worsened with climate change. The significance of both climate change resilience and sediment strategies to the design and operation of complex projects is becoming increasingly important in South Asia. For example, Nepal has a pipeline of projects to export power to India and Bangladesh that need to account for these factors to be sustainable in the long run.

Hydro-economic modelling has been undertaken by ICIMOD towards understanding the ex-ante impact of seven run of the river type and four storage type dams in Koshi transnational (China, India, and Nepal) River Basin. The model assesses climate resilience of hydro development 'benefits' at present and under future climatic scenarios. Benefits assessed include hydroelectricity production, irrigation, flood damage control benefits of the projects and hence analysed the water-energy-food nexus. The model estimates aggregate annual benefit of around USD 2.27 billion under the baseline (present day) climate scenario and USD 2.4 billion under a future (RCP 4.5[55]) climate scenario, indicating the climate resilience of the benefits.

SAWI also supported five Government of Nepal (GoN) officials to attend the International Hydropower Congress in Ethiopia in May 2017 to enhance their knowledge of and share experiences in hydropower development. **SAWI** activities have informed the US$20M World Bank's Power Sector Reform and Sustainable Hydropower Development Project. In addition, **SAWI** supported NEA staff to

[54] IFC (2017) Operations Report for January to June 2017 and Plan for July to December 2017, Australia South Asia Partnership (SDIP) – IFC Energy Partnership

[55] Representative Concentration Pathway

attend the '*Process of Social Impact Assessment*' Course in April 2017. This course aimed to help strengthen the capacity for NEA in social impact assessment processes.

With SAWI support, Bhutan is developing its first-ever complete national guidelines for preparation and construction of hydropower covering environmental, social and technical aspects. The draft guidelines were developed in consultation with a broad array of stakeholders, and cover sectors such as Gross National Happiness, Health and Cultural Affairs. The draft is currently being improved and tested through a field application for the Dorjilung hydropower project – a potential pipeline project for future hydropower development in Bhutan. Repositories for key variables that could be affected by hydropower development are also being developed – including aquatic and migratory fish species in Bhutan. These activities have led to requests from the Royal Government of Bhutan (RGoB) to support basin studies, including cumulative impact assessments, for the major rivers in Bhutan that all flow into India. Cost-benefit analyses of climate investments in Bangladesh were also conducted by **SAWI**, including through consultation with over 120 private sector experts on their sources, uses, and values for current and potentially improved weather and water information, as well as national public surveys on the value of improved hydro-meteorological information for households.

TAF's PEA on energy trade in the BBIN sub-region revealed that one of the biggest hurdles to creating a regional energy market is the viability of hydropower in the short to medium term, particularly in the context of India's recently attained status as a power surplus country, coupled with rapidly falling solar prices and a domestic policy focus on improving the viability of thermal power, which have left new domestic hydropower generation 'outpriced'. The study also identified geo-politics associated with efforts to establish an inter-connected South Asian grid, with India seeking to act as an intermediary for energy trade across borders.

In Pakistan, IFC brought together 20 hydropower developers and established the Hydropower Developers' Working Group (HDWG). An executive committee has been established and draft ToRs prepared. The HDWG aims to address sector wide issues facing the hydropower sector and to provide a platform for private sector energy firms to raise concerns to the Government of Pakistan. In Nepal, **SAWI** supported the Nepal Power Summit December 2016, organized by the Independent Power Producers Association of Nepal, which brought together investors, developers, policymakers and civil society to realize the government's target of 10,000 MW installed in 10 years.

End-of-investment Outcome 2: Critical new knowledge generated and used for regional cooperation

Result 7: Multi-stakeholder dialogue, knowledge sharing and collaboration across Indus Basin

SDIP partners, notably ICIMOD and SAWI, through their support of various Indus Basin forums[56], have facilitated dialogue on regional water resources management in 2016-17 through a series of meetings held with representatives from each of the four countries of the Indus Basin, as well as through enabling collaboration on joint research. Participants sought to assess the nature of existing knowledge and development challenges of the Indus, consider a joint research proposal, and identify coordination mechanisms that can potentially inform decision making to address those challenges across the four countries within the Indus Basin.

In addition, SAWI facilitated the convening of the International River Symposium (IRS) in New Delhi in September 2016 - one of the most reputed technical conferences in the region. More than 450

[56] Including the SAWI-supported Indus Forum and Indus Forum Working Group (IF-WG), the Indus Basin Knowledge Forum (supported by ICIMOD, IWMI and the World Bank) and the ICIMOD-supported Upper Indus Basin (UIB) Network.

delegates attended, including 249 from India, of which 80 were officials from Indian state and central government water agencies. The World Bank's extended Special Session on the Future Management of the Major Himalayan Rivers was very well attended and culminated in a candid discussion on river basin planning including riparian cooperation by a panel of senior government water officials from Afghanistan, Bangladesh, Bhutan, India and Nepal (Pakistan officials were unable to obtain visas). This panel event broke new ground as multi-lateral discussions on water by government officials in South Asia remain highly sensitive. Following this session, the World Bank-organized closed dialogue on regional water cooperation which resulted in frank discussion on the subject of benefit sharing between the South Asian countries. Feedback from individual government participants indicated the event was highly valued.

Research initiatives are also progressing through respective working groups. For example, the **Adaptation Working Group (of the UIB-Network)** is providing evidence-based adaptation options, such as SPIP, erosion control and GLOF early warning systems) for implementation in the Upper Indus Basin. The **Indus Forum Working Group (IF-WG)** has initiated design of a joint research program on climate change impacts in the Indus Basin, selected this topic as it impacts all four riparians, albeit with different effects. It has also finalized a baseline assessment and a mapping tool on glaciers and climate change in the Indus, which is publicly available on the Indus Basin Knowledge Platform hosted by IWMI[57]. This collaboration between academics and decision makers, is particularly important given the ongoing tensions between Pakistan and India. Following on from its engagement in SDIP phase one, **ICIMOD** is collaborating with the National Science Foundation China on livelihood adaptation project in the Koshi Basin.

Result 8: Strengthened knowledge of water resource and political economy, to support decision-making for agricultural production and energy generation

SDIP partners have developed a series of modelling and planning tools to support decision-making on food, water and energy security within the Indus and Ganges basins.

For example, CSIRO, in collaboration with colleagues from the University of Agriculture in Faisalabad and Sindh Agriculture University, has prepared analyses on future food security and water scenarios in Pakistan[58] and a new report on rice-wheat cropping analysis for Punjab. The report along with a calibrated model was provided to Pakistani partners. PEA analysis conducted by **TAF**, in collaboration with IUCN Pakistan, also seeks to improve effective decision-making around food production and water allocation in the lower Indus. The PEA on food security in the lower Indus revealed that food production and water allocation occurred in the absence of coherent federal or provincial food or water policy, creating conditions ripe for the assertion of power over common pool resources. It found that in the absence of effective central authority, means of equitable water allocation, and feedback mechanisms in local governance, in many cases a state of nature, bears significant implications for building climate resilience and gender equity in the lower Indus. It also identified the divergence between the instrumental role that women have throughout the crop cycle and their lack of decision-making in relation to irrigation infrastructure, and gender-based challenges related to security and power dynamics described above.

In Pakistan, CSIRO have collaborated with IRSA, WAPDA, NESPAK and Provincial Irrigation departments of Punjab and Sindh to develop the Indus river system daily irrigation allocation model

[57] www.indusbasin.org

[58] Mac Kirby, Mobin-ud-Din Ahmad, Mohammed Mainuddin, Tasneem Khaliq, MJM Cheema (2017) Agricultural production, water use and food availability in Pakistan: historical trends, and projections to 2050. Agricultural Water Management, 179, 34-46

for Pakistan; **ICIMOD**, in collaboration with the Pakistan Meteorological Department (PMD) and Nepal Department of Agriculture, have piloted interventions in the Upper Indus Basin and in Nepal to improve access to water during drought, informed by co-developed drought monitoring tools. This work intends to provide farmers with knowledge to improve their climate-related decision-making. A **CSIRO**-Bangladesh team has been established to lead research activities to enhance new knowledge around biophysical aspects of water sustainability, and socio-economic and gender issues in Bangladesh. The team have agreed on the methods and approach required to contribute to knowledge on regional water balance, surface water and groundwater modelling, land use and cropping system modelling, and socio-economic and gender analysis; data scoping and collection has commenced. Field scale modelling and monitoring outputs from the **ACIAR** projects will also be used to inform regional scale modelling and scenario development in Bangladesh.

At a regional level, SAWI has prepared a framework for addressing climate change in South Asia's water sector. The framework focuses on key knowledge gaps, issues and needs, including policy harmonization, institutional coordination, and responses that are adapted to the diverse conditions found across South Asia – from the Himalayan mountains with glaciers and snow to the arid regions of Afghanistan and Pakistan to the tropical coasts of India and Bangladesh. The findings of the study build on a review of the current knowledge and information on climate change issues[59], and has been shared across the region with a wide range of stakeholders, including key policymakers.

Tools developed for the Ganges being utilised by water management agencies[60] include the Koshi Basin Soil and Water Analysis Tool model developed by **ICIMOD** in collaboration with Nepal's Irrigation Master Plan team, support for agro-meteorology advisory services with support from **ICIMOD** and the NASA-SERVIR programme, tools for understanding environmental flows, water quantity and groundwater management developed with the support of **SAWI** for the basin-wide National Ganga River Basin Project, the integrated water resources management tool for the Damodar Basin and the Strategic Basin Planning activity, the latter of which is informing India's National Groundwater Management Improvement Program. The environmental and social systems assessment (ESSA) for the programme focused on gender issues and provided concrete recommendations for a gender-informed groundwater investment program (such as the need for 20 percent women participation in the development of groundwater security plans).

Result 9: Improved knowledge of water quality and socio-economic impacts of water degradation

CSIRO, in collaboration with ANU and PCRWR conducted a study of the 'gendered and socio-economic impacts of water degradation' in relation to Manchar Lake in Sindh Province[61]. The study draws on both water quality data and qualitative data drawn from consultation with local communities (men and women), as well as key informants from academic, civil society organisations (CSOs), and government organisations. The study, which incorporates sex-disaggregated data will be disseminated through PCRWR, **CSIRO** reports, a peer-reviewed journal paper and international forums such as Stockholm International Water Week and the 22nd International Congress on Modelling and Simulation Conference in Tasmania.

Innovative efforts to improve water quality monitoring have been piloted by SAWI, through the development of a unique citizen-centric framework for crowd-sourced data. It combines public

[59] Lacombe, G. et al (2016) Climate Change Science, Knowledge and Impacts on Water Resources in South Asia: A Review, *Draft*

[60] Discussed in detail under 'Result 2' above

[61] CSIRO (2017) Analysis of Manchar Lake: Connecting water degradation and gender, Indus Technical Fact Sheet Series, July 2017.

participation in the scientific process ("citizen science") with modern technologies to collect and disseminate data ("crowdsourcing"). Reports were completed on crowdsourcing water quality. This included a conceptual framework and existing and emerging technologies for continuous water quality measurement and analysis of water quality data from real time water quality monitoring stations on the Ganges.

End-of-investment Outcome 3: Improved regional enabling environment including for private sector engagement

Result 10: Increased water and energy efficiency in the Bangladesh textile industry

During the period July –December 2016 thirteen new factories undertook in-depth resource efficiency assessments under the Partnership for Cleaner Textiles (PaCT) program, and 27 factories that signed up in the previous period were followed up for results monitoring. **It was found that these 27 factories had saved over 2.8 million m^3 of water, 473,000 MWh of energy, and reduced greenhouse gas emissions by 58,000 tonnes and wastewater discharge by 3.1 million m^3 per year.** Work is also progressing towards the development of a website to benchmark water and energy efficient equipment for the textile industry. The draft data set for this website/ database has been submitted for final review. The website will help financial institutions to find efficiency related information for equipment suppliers and facilitate approval of resource efficiency financing proposals.

Result 11: Progress in market development and accessibility of quality off-grid solar solutions in India, Nepal and Pakistan

IFC signed advisory agreements with two manufacturing companies (Greenlight Planet and Omnivoltaic Power) and three distribution companies (Punam Energy (Onergy), Gajam India (Dharma Life), and Frontier Markets) – with the aim of helping companies with their "go to market" strategies. Specifically, **IFC** will support the companies with collecting market research data, creating business-to-business (B2B) linkages, designing training support if required and conducting an awareness campaign, highlighting these companies' brands. **IFC** aims to build upon the successful interventions of Lighting India Phase I to accelerate the development of markets for quality off-grid solar solutions (solar lanterns, larger solar home systems and associated DC solar appliances) and achieve deeper penetration of these solutions among 'last mile' market segments in rural India.

As part of a strategy to enhance penetration of quality off-grid solar solutions in rural markets, IFC in collaboration with Frontier Markets, rolled out a business training pilot for 79 women entrepreneurs to support women to market and distribute these solutions in their communities. In addition, the initiative offers women the opportunity to earn money to support their families, gain new business skills, and gain confidence in their ability to succeed as micro-social-entrepreneurs.

Following a successful innovative financing scheme enabling women to access SPIP technology and rights to the land on which it was installed, ICIMOD is working closely with a private sector bank in Nepal to expand the loan scheme. In SPIP pilots, 77% applications came from women farmers. The pilot showed that it is possible to encourage women farmers to own and operate new technologies like SPIP, whilst reducing inequity in land ownership through innovative financing mechanism. In Pakistan, the Pakistan Council for Water Resources Research (PCRWR) has submitted a proposal to the Government of Pakistan for replication of a solar pump irrigation system in Gilgit Baltistan.

Assessment of overall progress in 2016-17

The results that have emerged over the last year from the entire body of SDIP partner engagement across the three basins in 2016-17 demonstrate three key qualities:

1) **good progress in two of three of the SDIP2 outcome areas** (practice, knowledge) and **some progress in the third outcome area** (enabling environment);
2) a **deepening of the relationships** with key actors both within government structures at different levels of the system and engagement with non-government actors, including the private sector; and
3) a strong theme of **working with other partners** to generate and apply evidence to current challenges.

Overall, performance by SDIP partners in 2016-17 was 'good' and is broadly aligned with expectations. In 2016-17, there were clearly areas where results were particularly strong (eg for SDIP2 Outcome 1, including the contributions to the development of the Government of Nepal's National Water Policy), and others where results were more limited (eg Outcome 3, the enabling environment – and specifically for energy investment). This mix of positive and more limited progress across the 3 outcome areas, and within and between SDIP partners is to be expected, given the complex and challenging environment within which SDIP is operating and the deliberate risk profile. Evidence of deepening relationships with key actors in South Asia, which was reported by most partners, is a particularly important result, as it means SDIP partners are well-placed to respond to opportunities if and when they arise.

Section 2: Assessment of Portfolio Contribution to Change

This section presents a brief assessment of the current dynamic of change within the *system* and selected *sub-systems* within which SDIP2 operates/ is engaging. Based on the outcomes level evidence available, this report offers a judgment on the SDIPs contribution to change (if any) already observed as of 2016-17. The assessment of whether change is evident is made using a simple tracking against 4 'aspects of change', identified for each of the 6 domains of change in the SDIP2 PAF. Each 'aspect' is one possible marker of change within the system (domain). This includes one focused on gender equality and social inclusion. This reading of whether change is evident or not within a particular domain is complemented by a brief overview of some of the characteristics of the wider macro level context[62] on – respectively – water, energy and food security.

The following table explains the overall assessment made for each 'aspect of change' within each domain of change:

	Evidence against several indicators to suggest a reasonably confident assessment of some positive change ('direction of travel') over the last 12 months
	Partial evidence, may be contradictory – against two or more indicators which provides a tentative assessment that there has been some positive change over the last 12 months
	Evidence of stagnation or a deteriorating status indicating a static position (i.e. no movement in terms of positive change)
	Not enough information against indicators for a particular aspect to make a judgement

Portfolio engagement on improving regional cooperation on water security

Macro view 2016-17 on regional cooperation on water security

At a country level, key government agencies across the region, including in India, Nepal, Bangladesh, Pakistan, and Afghanistan continue to strengthen their capabilities for planning at the scale of river basins, with an *intention to collaborate and improve data transparency within country* evident in both Pakistan and India. Bilateral dialogue through government agencies is evident through sharing of hydrological data (and hydro-met data) for the purposes of flood mitigation (for example, between India and its neighbours including Bangladesh, Bhutan, India and Nepal) with positive outcomes during natural disasters (such as the 2017 monsoon), as well as through the BBIN process and cooperation on inland navigation (for example, between India and Bangladesh). A number of *innovations* are also being taken up by government and other agencies, to be shared more widely at various scales – including early flood warning systems (e.g. in Pakistan), and river basin planning (e.g. in India). A series of 'multi-lateral' dialogue forums have also taken place over the last year, bringing together (variously) representatives from academia, government, civil society and think tanks to discuss a range of issues, delivering agreed pathways on aspects such as climate change research (e.g. in the Indus) and river basin planning (e.g. in the Brahmaputra). Tensions between India and Pakistan has risen over the last year, however, linked to military confrontations in Kashmir.

[62] In 2014 a Snapshot exercise was undertaken by the M&E Adviser to provide SDIP with a detailed 'baseline' setting on the status, key statistics, trends and institutional arrangements relating to water, food and energy security across the three basins and the national jurisdictions. It is proposed that this exercise is repeated late 2018/ early 2019 to inform SDIP reflection and steering in 2019 – effectively a mid-point in the 12 year engagement strategy.

Reading the change at the domain level

Domain of change: Institutional capacity within Pakistan to gather, analyse and share data on water modelling and within an IWRM frame

In summary, the Government of Pakistan remains committed to greater transparency and access to real-time hydrological data across water management agencies, and a commitment amongst all governments within the Indus basin, to better capabilities within river basin planning. Despite a series of consultations and increasing awareness of water issues in the public, Pakistan still lacks political will to finalise and approve a National Water Policy.

Table 1: Assessment of change with respect to the '*institutional capacity within Pakistan to gather, analyse and share data on water modelling and within an IWRM frame*'

Aspects of Change	Dynamic of Change within the System and SDIP points of influence
Aspect 1: Routine use by planning departments (sub-national) of improved WR model/shared system generated data and analysis for strategic planning	The Government of Pakistan remains committed to greater transparency and access to real-time hydrological data across water management agencies, as demonstrated by commitment to a 'national water information system' (supported by WCAP), the MoWP-commissioned evaluation to provide recommendations to guide real-time data sharing, and the installation (with the support of CSIRO) of the Hydstra system within key agencies including IRSA, WAPDA and Provincial Irrigation departments of Sindh, Punjab and Khyber Pakhtunkhwa. CSIRO, in collaboration with key government partners, has also populated and applied a common river system model, enabling analyses of scenarios on climate change and water availability for irrigation, hydropower and livelihoods, including differential impacts on men and women in the Upper Indus basin.
Aspect 2: Growing cooperation between India, Pakistan [China & Afghanistan] on shared challenges of climate change and WRM.	Tensions between India and Pakistan have intensified over the last year, including specific threats related to the Indus Water Treaty (related to hostilities in Kashmir). Nonetheless, collaboration between all four riparian countries through various Indus Basin forums (including Indus Forum Working Group and Upper Indus Basin Network, supported by SDIP partners SAWI and ICIMOD), bringing together representatives from government, academia, think tanks and civil society – and enabling collaborative research on climate change. Transboundary (bilateral) collaboration is evident through bilateral mechanisms for sharing hydrological data for flood mitigation between China and India, and power trade agreements on hydropower production and export between Afghanistan and Pakistan.
Aspect 3: WAPDA has agreed common – routine data sharing platforms and protocols operating between provinces leading to greater [shared] confidence in [faster] decisions taken by WAPDA on where to build water infrastructure in Pakistan.	Towards enabling water management agencies in Pakistan to access and use a centralised hydrological time series database, CSIRO has supported the purchase and installation of the Hydstra system within WAPDA as well as other key agencies (see above); technical training (in collaboration with ICEWaRM) has also been provided. A final commitment to a centralised data management system is still forthcoming following the MoWP-commissioned study.
Aspect 4: Recognition of gender and vulnerability within key policy documentation in Pakistan e.g. National Water Plan and related documents/ dialogue.	After considerable consultation among the federal and provincial governments, the draft National Water Policy was sent to the Council of Common Interests in January 2017; and no progress has been made since although there is a strong interest amongst key stakeholders and within the media that Pakistan requires it. A number of prominent actors within the sector are openly considering the role of gender in relation to their work in Pakistan, including SAWI and the World Bank. Gender equality and inclusion in water management and policy was discussed at a high-level workshop in

	Stockholm organised by the Global Water Partnership, whilst the Pakistan Water Partnership contributed their expertise on the environmental and social impact of dams in Baluchistan, in 2016-17. A number of meetings around water and governance and hydro-diplomacy also took place in-country.

On balance the information gathered against the four aspects suggests a dynamic of **positive but limited movement** within the institutional capacity for gathering, sharing and analysis of data for water modelling in Pakistan. Given the strong positioning of SDIP partners in this space, the results that are being achieved – indicating influence on key actors – it is plausible to conclude that SDIP is contributing to a wider change.

Domain of change: Effective (at scale) practice models: cross-border equitable WRM including water-related hazard risk management in and for the Ganges Basin

In summary, whilst there is evidence of increasing activity between government structures within and between countries on forecasting tools for water related disaster risk and flood management there is no evidence of a shift in terms of a change towards the fundamental practices of cross border water resource management. There are a number of initiatives to develop models of improved practice, but these remain small and isolated and with no clear pathway of moving to scale.

Table 2: Assessment of change with respect to '*Effective (at scale) practice models: cross-border equitable WRM including water-related hazard risk management in and for the Ganges Basin'*

Aspects of Change	Dynamic of Change within the System and SDIP points of influence
Aspect 1: Level of country-country cooperation on water-related disaster risk and flood management: increasing sharing and use of cross-border data	There is evidence of ongoing co-operation on flood mitigation, for example between the Governments of Nepal and Bihar, as well as improved technologies to enable cooperation between upstream and downstream communities, within and between countries (Nepal and India). A number of organisations, including USAID, Practical Action – and SDIP partners ICIMOD and SAWI/ World Bank are providing support to communities and government (e.g. DHM, CWC) in improving flood forecasting and early warning systems – with evidence of uptake by government partners. For example, ICIMOD and SAWI reports that the flood forecasting data generated by KBIS/ RFIS and the Flood Risk Assessment Atlas were utilised by the Governments of Nepal/ Bihar and India's CWC, respectively during the 2017 monsoon. SAWI reports that Bihar's flood forecasting framework is being scaled up to other basins and has been replicated for transboundary Rapti Basin in Uttar Pradesh, under NHP. Through its engagement on regional DRR planning with DMD Bihar ICIMOD are also supporting wider flood resilience in the region.
Aspect 2: Content of the transboundary dialogue and agreements detailing water management arrangements integral to the protection of new hydro investments in Nepal (including water sharing, data sharing and management)	The viability of hydropower (within the regional energy market) in the short to medium term has taken a 'knock' over the last year, with India's recently attained status as a power surplus country, rapidly falling solar prices and domestic policy focus on improving the viability of thermal power, - leaving new domestic hydropower generation 'outpriced' and affecting investment. However, in collaboration with GoN, IFC has identified one potential site for a medium sized (200MW) hydropower plant through PPP investment model on Karnali river in Kalikot district; and is providing advisory support for the Blue Energy development of their Super Trishuli project. A number of SDIP partners (IFC, ICIMOD have supported Government of Nepal and private sector in establishing social and environmental standards for hydropower development

	through EIA guidelines (now submitted to GoN for approval), whilst IFC have initiated a benefit-sharing study; SAWI has supported capacity building in NEA.
Aspect 3: Practical use of modelling tools by stakeholders (beyond model development organisations) helping to generate a fresh perspective and agreed course of action on local WRM challenges affected by transboundary flows	High level support within the Governments of India and Nepal for basin level planning is evident through JAC (in Nepal), and uptake through the NHP and NGRBA (in India). SDIP partners (SAWI, CSIRO and ICEWARM) have provided further capacity building to support water management agencies across Ganges and Brahmaputra in river basin management and water resource planning, including through modelling, and in consideration of gender. CSIRO and partners have initiated a pilot multi-stakeholder basin planning process in the Kamala basin, agreed through JAC action plan, will draw on socio-economic analyses as well as knowledge and modelling expertise on stream-flow and ecology, in collaboration with Nepalese experts. A number of tools to support decision-making have been developed by partners, including hydro-economic model that assesses climate resilience of hydro development 'benefits' at present and under future climatic scenarios (ICIMOD), online river basin and planning model for optimisation of reservoirs, an updated hydromet manual in India, and an IWRM tool for Damodar basin which has resulted in inter-agency collaboration in West Bengal (SAWI). Through its PEA, TAF is contributing towards a greater understanding of the political economy of hydrological interventions in the Kosi, which is also intended to support decision-making.
Aspect 4: Extent to which flood management protocols and practice are responsive to gender and social inequity	There is evidence that there is greater awareness, by the Government of Nepal, of the differential needs of women and men in relation to water resource management and water-related natural disasters (e.g. the draft National Water Policy for Nepal prescribes participation of women in water resource management planning); there is some evidence that flood management practices are becoming more responsive to gender and social inequity (as a result), although it is not yet widespread. For example, community based early warning and water use management planning systems have been implemented/ piloted by ICIMOD (and Helvetas) – with particular consideration for the needs of women in these disaster situations (e.g. through building their capabilities in EWS). Both CSIRO and TAF are seeking to understand the gender issues in the Kamala/ Kosi basin, respectively, as a basis for engaging with their multi-stakeholder basin planning and dialogue processes. TAF is developing a methodology that will allow the gender sensitivity of policies to be tested across a spectrum of power, geographies, and communities, providing a more accurate representation of gender trade-offs associated with the transboundary policy – in the context of flood management in the Kosi.

On balance the information gathered against the four aspects suggests a dynamic of **a mostly static situation** in terms of any change in (at scale) practice models becoming a feature of equitable water resource management in the Ganges basin. This signals the intransigence that is inherent within water management systems and which provides a very challenging governance situation to engage in for outside funded interventions. SDIP partners have – and continue to be able to – engage successfully with a number of key actors in this space, covering support to cooperation on flood forecasting and mitigation, and ensuring their responsiveness to women and men's differentiated needs, building national level capabilities on river basin planning, and progressing viable hydropower with requisite social and environmental standards in Nepal. By deepening their work in a number of areas (e.g. the Kosi sub-basin) SDIP is steadily building up a deeper understanding on the nature of the challenge and on prospective points of greater influence. The strong potential for SDIP to contribute to a change remains.

Portfolio engagement on improving regional cooperation on food security

Macro view 2016-17 on regional cooperation on food security

Food security, is well-understood in terms of its complex inter-dependencies on water, energy and climate change (i.e. in the context of the 'nexus'), as well the critical role that women have in agriculture in South Asia and management of resources at a small-scale. Challenges are in shifting political behaviour, so that appropriate policies and support mechanisms can be introduced to incentivise efficient irrigation practices, sustainable agricultural practices and equitable water allocations; and that women farmers are enabled in accessing these. A further political challenge is in achieving prosperity for farmers as well as long-term stewardship of resources.

Reading the change at the domain level

Domain of change: Knowledge base: quantification of water needs across the nexus of food, energy and water security – in the context of climate change, within the Indus Basin

In summary, while large knowledge gaps remain, new information and analysis is improving the evidence base for decision-making on water usage in the Indus Basin. There are important institutions and agencies both on the Pakistan and the India side who – within their own jurisdictions – are getting increasingly involved in this area.

Table 3: Assessment of change with respect to '*Knowledge base: quantification of water needs across the nexus of food, energy and water security – in the context of climate change, within the Indus Basin*'

Aspects of Change	Dynamic of Change within the System and SDIP points of influence
Aspect 1: Institutional mechanisms at national and local level to analyse the interaction between food, energy, water and the environment	A recent study confirms that large knowledge gaps remain regarding the impact of climate change on the Indus basin's hydrological regime, and that understanding of water demand within Pakistan is limited. SDIP partners, in collaboration with Pakistani partner institutions have been working to address this. CSIRO, in collaboration with colleagues from the University of Agriculture in Faisalabad and Sindh Agriculture University, has prepared analyses on future food security and water scenarios in Pakistan and a new report on rice-wheat cropping analysis for Punjab. The report along with a calibrated model was provided to Pakistani partners. In Pakistan, CSIRO have collaborated with IRSA, WAPDA, NESPAK and Provincial Irrigation departments of Punjab and Sindh to develop the Indus river system daily irrigation allocation model for Pakistan; ICIMOD, in collaboration with the Pakistan Meteorological Department (PMD) have piloted small-scale interventions in the Upper Indus Basin to improve access to water during drought. Other initiatives are also ongoing, for example 'water balance and flow data' was made available' through the World Bank WCAP initiative in early 2017.
Aspect 2: Key capabilities at sub-national (provincial) level to respond to the questions that sufficiently granular data on water needs and use for agriculture will pose, including in relation to socio-economic assessments	There is considerable support for the Government of Pakistan at provincial levels towards better understanding water needs for agriculture. The World Bank, for example, has two Irrigation Agricultural Productivity Improvement Programmes, in Punjab and Sindh - seeking to improve community irrigation, efficiency of irrigation technology and productivity of agriculture. SDIP partners have developed a series of tools developed with and for Pakistani agencies (irrigation allocation, drought monitoring, rice-what cropping, food and water security scenarios, water balance and flow data), however the extent to which agencies are utilising these tools in decision-making is not being reported. The TAF analysis on food security in the lower Indus revealed that food production and water allocation occurred in the absence of coherent federal or provincial food or water policy, creating conditions ripe for the assertion of power over common

	pool resources. It found that in the absence of effective central authority, means of equitable water allocation, and feedback mechanisms in local governance, in many cases a state of nature, bears significant implications for building climate resilience and gender equity in the lower Indus. It also identified the divergence between the instrumental role that women have throughout the crop cycle and their lack of decision-making in relation to irrigation infrastructure, and gender-based challenges related to security and power dynamics described above.
Aspect 3: Key decision-makers have an evidence-based understanding of climate change impacts in the Indus Basin	The Government of Pakistan approved its Climate Change Act in March 2017, maintaining its strong commitment towards addressing climate change and its impacts. A recent climate change report/ stocktake for Pakistan identified a number of priority areas for action including: accelerated uptake of sustainable irrigation practices by smallholder farmers; strengthen post-secondary education in the area of climate change; establishing a central repository of water data and analysis; and modernizing Pakistan's streamflow monitoring network; aspects of work to which SDIP is contributing. The Indus Forum Working Group (IF-WG) has initiated design of a joint research program on climate change impacts in the Indus Basin, a topic selected due its relevance for all four riparians, albeit with different effects. It has also finalized a baseline assessment and a mapping tool on glaciers and climate change in the Indus, which is publicly available on the Indus Basin Knowledge Platform hosted by IWMI. A joint research proposal has also been tabled by the UIB-Network.
Aspect 4: Factoring gender considerations into the enquiry and analysis on the quantification of water use and resources in agriculture	The importance of women to agriculture in Pakistan is understood to some extent, and some of the tools that have been developed to improve understanding of water resources for agriculture (e.g. food and water security scenario analyses), the extent to which these have been applied has not been reported in detail. CSIRO conducted Manchar Lake study that particularly looks like gender and social inclusion in the context of water pollution; some gender training has been provided to PCRWR.

On balance the information gathered against the four aspects suggests **a dynamic of some positive steps – moving from a very low base** – in terms of the intent and strengthened efforts by key actors at senior levels in government towards the improved quantification of water needs across the nexus of food, energy and water security in Pakistan, in the context of climate change. SDIP is well positioned to be influential in this space and the results achieved by partners to date suggests that SDIP is both already contributing to this change and has the potential to be a more significant contributor.

Domain of change: Collaborative structures between farmer organisations and service providers, agro-business, researchers and relevant public agencies in the Ganges region

In summary, the rationale for effective collaborative approaches between the public sector, private sector and farmers groups to catalyse the uptake of and sustain service provision behind CASI remains very strong. Whilst there seems to be widespread recognition of this, the extent to which key actors are demonstrating a willingness to engage and invest in these forms of business model remains limited.

Table 4: Assessment of change with respect to '*Collaborative structures between farmer organisations and service providers, agro-business, researchers and relevant public agencies in the Ganges region*'

Aspects of Change	Dynamic of Change within the System and SDIP points of influence
Aspect 1: Intensity of the policy discourse [Eastern Gangetic Plains] towards encouraging higher private sector participation to support collaborative structures in agricultural marketing	The most striking feature of the sustainable intensification of agricultural production in the EGP through conservation agriculture techniques is the challenge of failures of policy implementation. The system of policy, institutional and regulatory arrangements provide an imperfect space for the out-scaling of CASI approaches and one in which private sector engagement is currently limited. Whilst at a macro level there is an increasing focus on the agriculture service economy there is limited discourse on the design and testing of business models that can attract and retain private sector involvement in the out-scaling of CASI technologies in the region. Nor is there much enquiry and reflection within the system on how the conditions for out-scaling work may be better or worse in certain geography (in particular driven by the evident leveraging of government and other resources already happening). The wider shifts in areas of the EGP from (water demanding) dry season rice to other dry season crops using the CASI technologies, is potentially a game changer in terms of less water use for agricultural production.
Aspect 2: Convergence of externally funded CASI initiatives with Government schemes	There are various national and sub-national programs within the respective countries of the EGP that have a livelihood focus, specialise in community engagement and have existing farmer group networks. These could be the entry point for Governments to domestically resource the scaling out of CASI and through this for governments to reflect and learn from this experience. To date such experience has been very limited. Some government partners, such as the Departments of Agriculture in West Bengal and Nepal, have internalised project promoted technologies by including them in their regular programs. For example, the Department of Agriculture in West Bengal have commissioned a project with UBKV under the Rastriya Krishi Vikash Yojna (RKVY) scheme, which promotes agricultural development in an integrated manner, and commits central funds to state programs. Whilst it is recognised that conservation based sustainable intensification practices requires effective farmer and business advisory and support services and inclusive (pro-poor) and efficient input and output market systems the level of activity by the public sector to engage with the private sector in this endeavour has been limited. The have yet to match intent with actions particularly in the poorer districts. Here it is the largely informal growth of the micro-enterprises that is the key development happening.
Aspect 3: Policies (regional/ bilateral) and enhanced operations at existing border trade points for increased formal cross-border agricultural input-output trade and through this wider market stimulus	Not enough information against the indicators for this aspect of change to make a judgement. (Although, it is worthy to note it is recognised that the wide scale adoption of CASI practices in the EGP requires the right machines to be accessible to the right groups of farmers, and to link them with service providers in an environment which encourages the private sector for technology access, marketing and investment).
Aspect 4: Emergence of collaborative structures involving the private sector, informed by the specific needs of women farmers	Not enough information against the indicators for this aspect of change to make a judgement.

On balance, the information gathered against the four aspects suggests a dynamic of **a predominantly static situation** in respect to any change evident within the institutional arrangements that enable and equip the out-scaling of CASI at a district, sub-national or national level within the EGP. The evidence base to read across the different contexts within the border districts and sub-national jurisdiction of specific interest to SDIP within the EGP (the poorer border districts of Nepal, Bangladesh & India) is thin and there may – in practice – be some pockets where positive steps are being taken either by government structures or by the private sector (in isolation of each other) which directly or indirectly are supportive of an out-scaling of CASI. That said, the overriding impression is of a context where there is a weak dynamic to change. Within this context SDIP through SRFSI is well positioned to be a point of influence and a contributor to any emerging change provided it can quickly and effectively bring together the different strands (technical & institutional) of its continuing adaptive research on collaborative structures that enable and support the out-scaling of CASI in ways that are inclusive and responsive to the particular needs of women.

Portfolio engagement on improving regional cooperation on energy security

Macro view 2016-17 on regional cooperation on energy security

Recent shifts in South Asia have seen renewables become increasingly more competitive from a price perspective. For example, since early 2016, solar tariffs in India have dropped by 40 per cent, making solar energy the cheapest source of electricity in the country[63]. Innovations in solar technology have also been improving the competitiveness of solar energy, through lower prices for the units themselves and an improved capacity to store energy that has been generated. As solar energy becomes increasingly competitive there are implications for the viability of alternative forms of renewable energy, including large-scale hydropower. In India, new hydropower installations cost anywhere between two and four times the price of thermal power depending on the projects, and solar is even cheaper.

Energy trade in the BBIN ((Bangladesh, Bhutan, India, Nepal) countries has the potential to connect large reserves of hydropower potential in the Himalayas to a potential South Asian grid, reducing regional dependence on fossil fuels and rationalizing energy investment decisions[64]. However, while noting that there are niches (especially for peak load) where hydropower can be very cost competitive (relative to the cost of peaking plant alternatives) the overall cost competitiveness of hydropower in the short to medium term is a key constraint to the size of the potential market. At its core, the energy trade agenda in BBIN is built on the idea of selling hydropower produced by Nepal and Bhutan to Bangladesh and India. However, the high up-front construction costs of hydropower, long gestation periods, and opposition to new large-scale projects have driven up prices and risk, deterring private capital and has led to several government projects being put on hold[65].

While much of the debate is focused on how to increase the supply of energy, significant potential exists to improve the energy intensity of South Asian economies through the adoption of large scale energy efficient products and processes. For example, there is scope for a significant improvement in coal-fired power plant efficiency and a reduction of losses through transmission and distribution systems, which could be harnessed through a program of refurbishments and/or the replacement of existing coal power plants with more efficient technologies[66]. On the demand-side, direct load control through smart metering can play an important role, with increasing attention now being paid to the employment of smart grids in the region[67].

Reading the change at the domain level

Domain of change: Institutional capacity to initiate, steer and participate in medium – large scale hydropower investment (may include PPP) (Basin: Ganges, Countries: Nepal)

In summary, there continues to be considerable interest and activity around the Nepal hydro space. However, key actors in government in Nepal engaged in hydropower have continued to experience uncertainty regarding the roll out of a federal government structure. This may have been a factor in moves away from investments using a PPP modality.

[63] https://asiafoundation.org/2017/06/14/promise-flux-south-asian-electricity-trade/
[64] TAF Annual Report
[65] https://asiafoundation.org/2017/06/14/promise-flux-south-asian-electricity-trade/
[66] https://www.adb.org/sites/default/files/publication/200651/sawp-047.pdf
[67] https://www.adb.org/sites/default/files/publication/200651/sawp-047.pdf

Table 5: Assessment of change with respect to '*Institutional capacity to initiate, steer and participate in medium – large scale hydropower investment (may include PPP) (Basin: Ganges, Countries: Nepal)*'

Aspects of Change	Dynamic of Change within the System and SDIP points of influence
Aspect 1: Improved government capacity to manage medium - large hydropower project submissions and reach agreement with investors (including PPP)	There are some signs emerging of improved capacity within the Government of Nepal to manage the approvals process by hydropower projects, particularly within the Ministry of Energy and the Ministry of Environment. SDIP partners have made strong contributions to capacity development, including the work of IFC who have been developing environmental and social standards to be adopted and applied to new hydropower projects in Nepal. Similarly, SAWI supported the development of resilience guidelines for climate change and natural disasters in hydropower and dams with special reference to GLOFs and other natural disasters.
Aspect 2: Investment community / private sector has greater clarity on government requirements for hydropower projects in Nepal (reflected in higher quality project designs being submitted for approval)	A range of small, medium and large-scale hydropower projects are currently under consideration in Nepal, but project guidelines and the approval process need to be strengthened further to give confidence to investors that they will get a return on investment. SDIP partners have been working directly in this space. For example, new approaches for climate risk screening developed under SAWI have provided a stronger technical basis for the design of hydropower investments in Nepal, such as the application of the Decision Tree framework, developed in part by SAWI, which led to prefeasibility design changes to climate proof the proposed Upper Arun Hydropower Project in eastern Nepal. Similarly, IFC has provided technical assistance to ten companies (developers and contractors) to manage the development of proposed hydropower projects in line with international technical, commercial and E&S standards.
Aspect 3: Reduction in the time for medium-large scale hydropower projects (including PPP) to be approved in Nepal.	The process for obtaining approvals and reaching agreement with the Government of Nepal for new hydropower projects remains difficult to navigate and leads to considerable delays. IFC provides technical support to the Government of Nepal to overcome this, particularly through the Ministry of Energy. In 2016-17 this included conducting a preliminary assessment for a 200MW project in the Karnali river. Further work is required before this project is developed as a fully-fledged PPP.
Aspect 4: Gender equality issues are addressed within the (ex ante) social and environmental impact assessments for large renewable energy investments (including PPP) in Nepal.	In the hydropower sector in Nepal, women are often excluded from consultations on issues such as benefits-sharing and community development activities. However, IFC has engaged closely with the private sector to encourage the participation of women in hydropower, including involving women in technical trainings, and ensuring female representation and participation in workshops. IFC have also designed a study that will look at best-practice examples of local benefit-sharing schemes in hydropower, and that will include recommendations to reduce women's vulnerability and promote equitable benefit-sharing between men and women.

On balance the information gathered against the four aspects suggests a dynamic of **a small positive change** in the institutional capacity in Nepal to initiate, steer and participate in medium-large scale hydropower investment. Given the positioning and the results achieved to date SDIP partners can make a strong claim of contribution to the improvements in the capacity of key ministries with respect to hydropower. There is also evidence of some incremental improvements in the guidelines and approvals process for new hydropower plants, a space in which SDIP partners are also focusing their efforts. On this basis it is plausible to conclude that SDIP is contributing to a wider change.

Domain of change: Enabling policy and regulatory environment for energy investment (production and efficiency) (Basin: Ganges, Brahmaputra, Countries: Bangladesh)

In summary, whilst the Government of Bangladesh remain committed to expansion and diversification of its energy base as a means to increase access to electricity, there has been little progress on taking these plans forward. In terms of moves by the private sector to promote energy efficiency, progress continues to be constrained by limited access to finance.

Table 6: Assessment of SDIP contribution to change in '*Enabling policy and regulatory environment for energy investment (production and efficiency) (Basin: Ganges, Brahmaputra, Countries: Bangladesh)*'

Aspects of Change	Dynamic of Change within the System and SDIP points of influence
Aspect 1: Shift in the regulatory framework in Bangladesh to support improved access to electricity (including through increased domestic production and/or imports).	Bangladesh has plans to expand its electricity sector and improve energy access, but to date has found it difficult to do so because of a shortage of primary energy sources, particularly natural gas. In recent years the Government of Bangladesh has promised new solutions including nuclear power, LNG and imported coal, however traction on these to date has been limited. Cross-border energy trade is seen to be critical to secure Bangladesh's future energy needs. Efforts from SDIP partners to date have focused more on the demand-side in Bangladesh, reflecting the significant potential that exists to reduce the energy intensity of the Bangladesh economy through the adoption of energy efficient products and processes. For example, in late 2016 it was identified that 27 factories that had signed up under IFC's Partnership for Cleaner Textiles (PaCT) program had saved over 473,000 MWh of energy and reduced emissions by 58,000 tonnes.
Aspect 2: Greater clarity on the standards and guidelines that underpin energy efficiency programs in Bangladesh.	Not enough information against the indicators for this aspect of change to make a judgement.
Aspect 3: Improved access to finance to fund infrastructure that would support energy production and improved energy efficiency in Bangladesh.	Limited access to finance for new energy efficient infrastructure continues to be a major constraint in Bangladesh. SDIP, through IFC, are working directly in this space through the rollout of PACT2. IFC has designed a new initiative to overcome limited access to finance and promote energy efficiency in the textile industry. This includes implementation of a business model that supports the scale-up of rooftop solar by supporting factories to overcome the initial cost of investment.
Aspect 4: Energy access reforms take account of the specific needs of vulnerable groups including women and girls	There is limited evidence of the extent to which energy access reforms in Bangladesh take account of gender equality considerations. To some extent SDIP, through IFC's PACT program, can be said to have had a positive impact on women given that 85 per cent of ready-made garment factory workers are female. However, there is limited information available on this in the context of the challenges in Bangladesh more broadly. Going forward, IFC will be seeking ways to ensure that women are empowered through its PACT program.

On balance the information gathered against the four aspects suggests a dynamic of **a mostly static situation** in terms of any change in the enabling environment for energy investment (production and efficiency) in Bangladesh. Significant barriers remain, particularly with respect to access to finance to fund new energy efficiency infrastructure. SDIP has continued to engage with the private sector on an initiative on energy efficiency in the textile industry, to overcome limited access to finance. The extent to which this provides strong entry points for influencing regulatory change and other institutional conditions is not clear. This will need to be addressed before a clearer position on the potential of SDIP to contribute to a wider change in this area can be established.

Overall assessment of SDIP contribution to change in 2016-17

Looking across the SDIP, there are a number of different situations (as of 2016-17) regarding SDIP's contribution to a systemic change for the six domains of change outlined in the PAF. This is summarised in Table 7 below.

Table 7: Overall assessment of SDIP contribution to change in 2016-17

Domain of change	Positive change happening	Indications of SDIP contribution to this change	Prospects of SDIP contributing to a change
Institutional capacity - water modelling data: Indus (Pakistan)	Yes – but limited	Yes	Good
Equitable WRM practice models (at scale): Ganges (India, Bgl, Nepal)	No - static	Not applicable	Good
Water needs quantification across the nexus: Indus (Pakistan)	Yes – small steps from a very low base	Yes	Good
Collaborative structures behind out-scaling of conservation agriculture: Ganges (India, Bgl, Nepal)	No - static	Not applicable	Good
Institutional capacity for medium-large hydropower investment (Nepal)	Yes – small steps	Yes	Mixed
Enabling policy and regulatory environment for energy investment (Bgl)	No - static	Not applicable	Unclear

The key message from this analysis is that while there is limited evidence of a systemic change occurring across any of the six domains of change being monitored (perhaps with the exception of water modelling capacity and quantification of water use needs in the Indus, and institutional capacity for hydropower development in Nepal), **the SDIP is well positioned to make significant contributions to wider (incremental) systemic change in a number of places in future years**. Given the complexity of the development challenges that the SDIP is engaged with, and that SDIP is a 12-year investment, this result is in line with expectations.

Section 3: Institutional Strengthening of SDIP Partners

Within their respective (2016) Investment Strategies for SDIP2, all partners set out where they saw the SDIP experience (core funding and being a partner) providing the means to strengthen one or more areas of their organisational practice in the period through to 2020. With the prospective benefits from such improvements being realised, both across the workstreams/ activities they currently associate with SDIP and more widely across the organisations programming, in turn leading to stronger organisational performance and overall impact of their work.

With the exception of TAF (new partner) and SAWI (no partnering agreement with DFAT), the institutional strengthening commitments of ACIAR, CSIRO, ICEWaRM, ICIMOD and IFC have largely been built on the intent set out within the Grant and/or Partnering agreements of SDIP1.

Two common areas for institutional strengthening are based from the SDIP1 experience:

1. **improving M&E systems and practice** to reflect a stronger partner orientation to outcomes and an evidence-based engagement; and
2. **improving the integration of gender and social inclusion into programming** in ways that fully allow the partner to deliver effectively and equitably on its mandate.

Both areas are considered central to the ability of SDIP partners to work strategically.

As well as being the administrator of the SDIP, DFAT is also an active partner, an agent of change in the context of the SDIP seeking to make a difference in the three targeted river basins of South Asia to addressing water, food and energy security through improved regional cooperation. This involves both DFAT in Canberra and, in particular, the Posts in Pakistan, India, Nepal & Bangladesh. Therefore, **within SDIP2 there is a third common area of institutional strengthening**:

3. **leveraging of Australian Diplomatic presence in the region,** to progress the overall goals of the SDIP.

There are also a number of other (partner specific) areas of institutional strengthening within SDIP2. These are summarised in Table 8 below.

Table 8: Institutional strengthening priorities identified by partners (beyond the 3 common areas)

More effective partnering (SDIP partner with its partners)	***Broadening the thinking / related analytical capacity practice of the SDIP Partner to strengthen delivery on its core mandate in the region***
CSIRO	ACIAR – beyond food security
ICIMOD	TAF – beyond water security

The approach to portfolio monitoring on institutional strengthening progress for SDIP 2 at the portfolio level is based on recognition of the following:

- **Some partners will have more opportunity, willingness and ability to use the experience of being an SDIP partner to effect organisational improvement than others**. This will be affected by organisational size, context and the relative investment or importance that SDIP holds within the organisation. For newer SDIP partners, the opportunities for understanding the potential for SDIP to influence organisational progress may not yet be evident.

- **For some SDIP partners, relevant organisational improvements clearly sit within a longer standing, wider and inter-connected process of organisational improvement that they are already moving on and tracking**. Others are less well set up to report on organisational shifts in a structured way. SDIP2 offers the opportunity to support partners to develop a monitoring approach that enables a more reflective practice around both expected and unexpected progress.

For the purposes of this Annual Review, the following sources of evidence have been used to assess progress on partner institutional strengthening: Partner Annual report/cover briefs, discussions at the Annual Dialogue and the Partnership Health checks, coupled with bilateral exchanges with partners during the year on M&E practice and gender and social inclusion.

It should also be noted that the PAF tracks the progress in terms of the three common areas (identified above) of institutional strengthening. In each case it provides a statement on a '2020 change state' and uses a constant year-on-year marker of progress (see Table 9 below).

Table 9: Milestones for institutional strengthening as outlined in the PAF

Area of change	***2016-17 Progress Milestone***	***2020 Change state***
Partner tracking and sharing experiences against own M&E system/ practice improvement agendas	Partner monitoring provides – where relevant - a robust annual assessment of progress against the three SDIP2 outcomes	M&E practice delivers a strengthening outcomes focused approach to partners delivering on their respective mandates.
Partner tracking and sharing experiences against own integrating gender and social inclusion into programming improvement agendas	Partner monitoring provides - where relevant - a robust annual assessment (including use of gender disaggregated data) of the contribution of their work in SDIP2 to gender equality and women's economic empowerment	Advancing gender equality fully integrated into the implementation of partner SDIP programs and activities
Leveraging Australian diplomatic presence in the region (Partner shared PED agenda with DFAT)	Opportunities identified and taken for Australia diplomatic presence in the region to contribute to progress towards SDIP outcomes and the wider aims of improved regional cooperation	Significant leveraging of Australia diplomatic support to support achievement of partner initiatives

The following sections provide a summary assessment (by IOD PARC) of progress by SDIP partners against the three common areas of institutional strengthening. This assessment is based on a detailed review of evidence gathered over the last 12 months. Each assessment is unique to the partner, reflecting the nature of the ambition that the partner has set itself. In some cases, this ambition/ aim for improvement is clearly stated with well-defined focus areas and (in some cases) specific markers/ indicators against which the organisation can judge its own progress. In other cases, the ambition or the intent to improve is less clearly set out and there is limited specification of what this improvement process will entail. Moreover, the strength of evidence on which our assessment is drawn also varies given variability in how partners have reported/ shared information on institutional strengthening. This includes the Annual Partner reports, the narratives of which provide a reference point in terms of a demonstration of outcomes reporting.

Partner progress improving monitoring and evaluation systems and practice

The progress of each partner in improving the monitoring system and practice over the last 12 months, set against their own individual expectations and guided by the way in which their partner report reflected an evidenced outcomes orientation, is summarised in Table 10 below. For all partners the system and practice of evaluation (outcomes & impact), which inevitably builds on the monitoring evidence base, is yet to be discussed or explored in detail.

Table 10: Partner progress improving monitoring and evaluation systems and practice

Partner[68]	**Progress against own ambition on improvement**	**Strength of the evidence on which IOD PARC judgement made**	**Assessment of progress against PAF marker**	**Notes: Snapshot view August 2017**
	4 point scale: Exceeding own expectation Meeting own expectation Falling short of expectation Falling significantly short	3 point scale: High confidence Medium confidence Low confidence	4 point scale: outcomes reporting 'fit for purpose' for the Partner √√√√ > √	
CSIRO	Falling short of own expectation	High	√√√	Clear strategic intent. High ambition and clarity on steps to be taken
ICIMOD	Falling short of own expectation	Medium	√√	Strategic intent. Very high ambition. Some steps still to be set out
IFC	Falling short of own expectation	Medium	√√	Clear orientation and (bounded) ambition. Some steps still to be set out
ACIAR	Falling short of own expectation	Medium	√√	Low and/ or unclear ambition. Direction of assessing 'contribution' but first steps yet to be set out.
ICEWaRM	Ambition still to be defined	N/A	√√√	Orientation clear but ambition and associated improvement steps (if any) yet to be set.
TAF	Too early to judge	Medium	√√	Clear direction/ challenging ambition and clarity on steps to be taken

Overall, the summary shows a positive engagement by partners on using the SDIP experience as a way of improving their M&E systems and practice, with partners expectations around strengthening in this area considered to be reasonably high. This is often in step with a broader corporate objective of institutional strengthening, and in several cases the work of the partner on SDIP is spearheading a

[68] To date there has been no structured engagement of IOD PARC with SAWI (the World Bank) on their internal commitment to strengthen their M&E practice.

wider corporate effort. **However, partner progress, for the most part, is considered to be falling short of partners own (high) level of ambition**.

Partner progress improving the integration of gender and social inclusion into programming

Partners have set a high level of ambition with respect to their own institutional capacity to integrate gender and social inclusion issues (GESI) into their programming and have been working towards strengthening their practices (and those of their own partners) in this area for several years. However, despite some examples of positive progress, **for the most part GESI issues still do not appear to be consistently built in to the design, implementation of programmes and associated M&E practices of SDIP partners, across the breadth of their programming**. This is largely reflected in the lack of consistent reflection on GESI issues in partner annual reports, with little analysis included as to why certain results were observed (or not), the significance of those results (or otherwise) and what lessons had been learned that might be applicable to future programming.

In 2016-17, partner efforts to strengthen integration of GESI into programming included **making gender expertise available within/ to the team (e.g. ACIAR, CSIRO and SAWI) and strengthening staff capabilities (e.g. ICIMOD, CSIRO). All partners also sought to strengthen gender sensitivity or responsiveness within particular activities and strengthen M&E** to some extent (for example through gender disaggregated monitoring). An overview of partner effort is summarised below.

Table 11: Efforts to strengthen GESI integration across programming (2016-17)[69]

Mechanism for integrating GESI	ACIAR	CSIRO	ICEWARM	ICIMOD	IFC	SAWI	TAF
Staff training/ capacity building	√√	√		√√√			
Strengthening M&E practice	√√	√√	√	√√	√	√	√
Resourcing of gender expertise	√√√	√√√		√√√	√	√√	
Gender analysis informs design	√√	√√	√	√√	√	√	√√
Gender mainstreamed into programming	√√	√√	√	√√√	√	√	√
Analysis and learning, reflected in robust reporting on GEWE results	√√	√√	√	√√	√	√	√√

There were a number of isolated examples where institutional capacity of SDIP partners is likely to have been strengthened in 2016-17. For example, **CSIRO** reported that all SDIP staff had completed gender training in the previous year. This provided a forum for a conversation on gender and social inclusion issues and an opportunity to share experiences and challenges from different projects. Similarly, **ICIMOD** reported it had included a gender specific strategic result in its strategic planning for the next five years to ensure gender transformative outcomes in the HKH region. It also reported that a gender audit of its programmes had been completed and that a comprehensive gender action plan is being prepared to help identify gender specific objectives, targets and milestones for each of

[69] Overview based on a 3-point scale (√√√ > √), reflecting scales at which the organisation has implemented and institutionalised GESI into programming through a mechanism (in 2016-17, on the basis of annual reporting).

its programmes. More broadly, discussions with partners indicated there is, and likely has been, more progress with respect to integrating GESI in programming than has been included in formal reporting mechanisms to date, such as in partner annual reports.

Given the common challenges SDIP partners face in strengthening the integration of GESI into programming, **there would be considerable benefit to establishing a mechanism to facilitate the sharing lessons learned between partners, and to enable partners to work collaboratively to generate new approaches and build their institutional capacity**. To that end, a Gender Technical Working Group (with voluntary representation from each SDIP partner) is envisaged, to be established in 2018, with a view to building a stronger evidence base and an improved understanding of gender related results and their significance with respect to the SDIP.

Partner progress on leveraging Australian diplomatic presence

In the first year of SDIP2, the partner experience on leveraging Australian Diplomatic presence in the region has been largely anecdotal and often imprecise in this regard. For this reason and in the absence of any overall related planning and monitoring framework for the leveraging of Australian diplomatic presence, this Annual Review does not seek to make any assessment of this aspect of institutional strengthening (ie in terms of performance). However, the latest CSIRO Annual Report offers a useful breakdown of the ways in which Australia's diplomatic presence *can be leveraged* in pursuit of partners investment objectives. Three of these relate to the type of things that we would expect to see – anticipated/ planned for – on an annual rolling basis (specific leveraging opportunities by partner/ by country). This would in turn provide the basis against which partners could monitor the engagement and capture any signs of this contributing, directly or indirectly, to progress towards partner objective(s). Table 12 below draws selectively from the commentary in this year's partner reports and in the SDIP2 Investment strategies to illustrate how such a framework could work.

Table 12: Partner progress on leveraging Australian diplomatic presence

DFAT Post can…	***Pakistan***	***India***	***Nepal***	***Bangladesh***
Support the enabling environment – maintain high level strategic engagement with senior actors in government	CSIRO's success will be strongly linked to Post's role with GoP (complex arrangement and interplay of Ministries and agencies involved in food/ water in Pakistan).		HOM key to cultivating and strengthening [CSIRO] relationships with the GoN HOM now joint chair of the Nepal Australia Joint Advisory Committee	HOM will be key to reinvigorating the previously good relationship of CSIRO with GoB
Coordinate and synergize the strategies of partner/ donor countries to ensure	USAID & DFID have significant interests, and these need careful oversight		Assist with the development of important relationships between CSIRO	

alignment with SDIP			and Nepal based areas of World Bank Group and ICIMOD HOM now Chair of the ICIMOD International Support Group	
Coordinate and manage relationships and interactions between Australian partners	HOM sees Post as having a role in coordinating water activities associated with National water planning between various agencies in Pakistan	Workshop with AWP in India, June 2017 (ICEWaRM engaged] – framework for capacity building in collaboration with the (under development) World Bank funded NHP (fit with DFATs India strategy in general and the MoU between Australia and India in particular)		Linking SDIP work and outcomes to the broader Australian work in the water, food and energy sectors

Through 2016-17 there were several positive examples of Australia's diplomatic presence being aligned with and used to progress the goal and objectives of the SDIP. For example, there was considerable engagement by Kathmandu Post, including the HOM Nepal taking on the role of co-chair for the JAC (Nepal-Australia Joint Advisory Committee on Water Resources Management) and HOM Nepal being elected to a 3-year term as Chair of the ICIMOD Support Group (which includes representation from 8-member countries of the Hindu Kush Himalayas). Similarly, there was also evidence of positive engagement from both Islamabad Post and Delhi Post in 2016-17.

Annex 1: Overview of the Portfolio Level Monitoring Approach

The SDIP2 portfolio monitoring system tracks progress and performance towards the long-term goal of SDIP, and the objectives and expected outcomes of SDIP2, including the cross-cutting issues of gender and climate change. It does this at two interacting levels, the *partner* level and the *portfolio (whole-of-investment)* level.

- **At the partner level**, SDIP partners monitor their work programs, with an emphasis on results at the outcome level. Partners report annually on progress against their four-year investment strategies, in reference to their own intervention logic/ targeted outcomes, which align to at least one of the three SDIP2 outcomes.
- **At the portfolio level**, the focus of the monitoring approach is on assessing change at the SDIP objective (and goal) level, and importantly, to make an assessment as to whether SDIP2 as a portfolio can reasonably attest contribution to that change. It also assesses the value-add of the delivery modalities that are unique to the SDIP, including the portfolio approach and the focus on partnerships.

There are several elements to *portfolio level* monitoring and reporting, including:

1. ***An assessment of performance against the milestones outlined in the Performance Assessment Framework (PAF) (see Section 1 of this report)***

The PAF outlines a set of specific areas of change ('domains of change') that partners, DFAT and the M&E Adviser have collectively identified as preconditions to progressing the goal, objective and outcomes of SDIP2. This reflects the broad focus of the SDIP goal and objective and recognises that the funding provided under SDIP2 is limited when considered against the scale and complexity of the development challenges it seeks to address.

The six (6) domains of change, reflecting (in part) areas where there is a natural concentration of partner activity and engagement, provide the focus of portfolio monitoring in SDIP2 and form the basis of the PAF. Tracking against the year-on-year milestones/ indicators developed for each domain at the start of SDIP2 towards an anticipated (2020) change state provides a basis for assessing the performance of the portfolio (where 'reached' against where 'aimed to be').

The 6 domains of change can be grouped under the three SDIP2 outcomes as follows:

Strengthened practice for regional cooperation

1. Data and modelling capacity to facilitate Integrated water resource management (IWRM) (Basin: Indus, Countries: Pakistan)
2. Integrated Practice [proven at scale] for cross-border water resource management (Basin: Ganges (Kosi sub-basin), Countries: India, Nepal)
3. Collaborative structures for conservation agriculture-based sustainable intensification (CASI) (Basin: Ganges, Countries: Nepal, India, Bangladesh)
4. Institutional capacity to initiate, steer and participate in medium – large scale hydropower investment (may include PPP) (Basin: Ganges, Countries: Nepal)

Critical new knowledge generated and used for regional cooperation

5. Knowledge base: water needs for agricultural production and energy generation (Basin: Indus, Countries: Pakistan)

Improved regional enabling environment for private sector engagement

6. Enabling policy and regulatory environment for energy investment (production and efficiency) (Basin: Ganges, Brahmaputra, Countries: Bangladesh)

Key results relating to cross-cutting issues including gender equality and women's empowerment, and climate change, are also assessed, noting that both these issues are core to SDIP delivering on its goal.

2. A review and synthesis of partner achievements and key results at the outcome level (see Section 1 of this report)

This includes an evidence-based assessment of key results achieved in the previous year framed against the three 'end-of-investment' outcomes for SDIP2. This provides a good sense of what the portfolio has achieved within a given year, including but not limited to the results captured under the six domains of change.

3. An assessment of portfolio contribution to change made by SDIP2 within the broader system and sub-systems in which it operates (see Section 2 of this report)

This includes an assessment of the current dynamic of change within a sub-set of the *systems/ sub-systems* within which SDIP2 operates, drawing on evidence collated across 4 tracked 'aspects of change' for each of the 6 domains of change in the SDIP2 PAF. This 'picture on system change' is then juxtaposed against the evidence base on the results of partner engagement within the different domains (Section 1) providing the basis for a judgment of if, where, and how SDIP has contributed (e.g. has been influential) to that change process in the previous year. This assessment of contribution specific to each domain of change is situated within a brief broader macro level view for the region on some key features of the last 12 months, in respect to regional cooperation on water security, food security and energy security.

4. An assessment of progress on the institutional strengthening undertaken by partner agencies (see Section 3 of this report)

This includes some initial indications of areas of added value of the 'portfolio and partnering approach' in terms of the effect of the SDIP experience on the wider thinking and practice of SDIP partners. The SDIP2 PAF includes three common areas of institutional strengthening which all partners are committed to, including:

1. improving M&E systems and practices to reflect a stronger partner orientation to outcomes and an evidence-based engagement; and
2. improving the integration of gender and social inclusion into programming in ways that fully allow the partner to deliver effectively and equitably on its mandate.
3. leveraging of Australian Diplomatic presence in the region, to progress the overall goals of the SDIP.

In addition to this, some partners have made commitments within their partnering agreements to other areas of institutional strengthening, such as strengthening the way in which the SDIP partner organises itself to partner more effectively with the partners that are key to delivery on its own mandate.