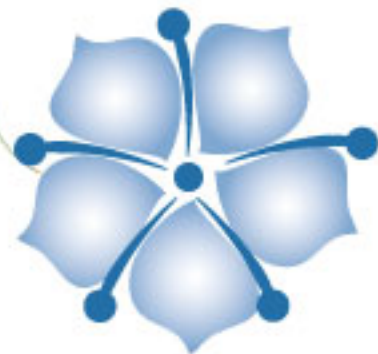
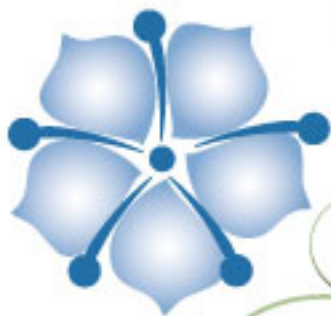


AIT

**Research Strategy
(2012 – 2016)**



AIT

Asian Institute of Technology

ACRONYMS

AIT	Asian Institute of Technology
CoE	Center of Excellence
CSR	Corporate Social Responsibility
DEng	Doctor of Engineering
DPRC	Doctoral Progress Review Committee
DTechSc	Doctor of Technical Science
FoS	Field of Study
Head RES	Head of Research and Education Support
INGO	International Non-Governmental Organization
MBA	Master of Business Administration
MEng	Master of Engineering
MSc	Master of Science
NGO	Non Governmental Organization
PAC	President's Advisory Council
PhD	Doctor of Philosophy
RBM	Results Based Management
RS	Research Strategy
SCPU	Sponsored and Contracted Projects Unit
SDCC	Sustainable Development in the context of Climate Change
SERD	School of Environment, Resources and Development
SET	School of Engineering and Technology
Sida	Swedish International Development Cooperation Agency
SOM	School of Management
TOR	Terms of Reference
VP	Vice President
VPAA	Vice President for Academic Affairs
VPR	Vice President for Research
VPRD	Vice President for Resources and Development

PREFACE

The Asian Institute of Technology (AIT) has provided graduate-level education as per the development needs of countries in the Asian region for more than 50 years. Today, with the emergence of some economies in Asia and the creation of institutions possessing strong research infrastructure, AIT intends to create a niche for itself by building rapidly on its existing strengths. This research strategy document, the first of its kind in the history of our august institution, has been developed with this in mind.

AIT Research Strategy 2012-2016 has been created with the understanding that research in today's world requires a critical mass of scientists and researchers in order to have true, lasting impact. It is premised on the institute's core research focus areas, and is guided by the overarching need for inter and trans-disciplinary colleagues to work in partnership with fellow scientists in the region and beyond, and with the required financial support. Benefiting from the strong support of governments, non-governmental organizations, alumni networks, and research and developmental partners, AIT is now in a very good position to achieve its goals, as has been outlined in this strategy document.

AIT wishes to thank the Swedish Developmental Agency (Sida) for all its support to develop AIT Research Strategy 2012-2016 and for its guidance in using the Results Based Management (RBM) methodology. The framework of the document includes the overall objective of the strategy, the various outcomes that will help achieve the overall objective, the inputs that will be required to achieve the outcomes, the monitoring mechanisms that will indicate the progress being made, and the responsibilities and accountability centers of departments and people concerned. It is a dynamic document which will serve as a blueprint for the entire research planning and implementation process, and is to be revised depending on new demands as they arise.

The formalization of AIT's status as an International Intergovernmental Organization from 30 January 2012 also provides an opportunity for AIT and its partners to venture beyond the "business as usual" approach that worked in the first few decades of the institute's existence.

Based on the strength of AIT's research and all experience gained, the theme of Sustainable Development in the context of Climate Change (SDCC) is at the heart of AIT Research Strategy 2012-2016. It is hoped that the five thematic groups under the Centre of Excellence (CoE) of SDCC will be responsible for the implementation of the work plans included in the research strategy document. We

are confident that AIT will receive the required support from different development agencies, donors, and the public and private sectors in this endeavor.

It is a historical fact that the greatest scientific developments witnessed by the world have occurred during and after periods of great duress, such as both human-made (world wars) and natural calamities (famine, epidemics). The 2011 flood in Thailand which inundated the campus of the Asian Institute of Technology for over 6 weeks, forcing the evacuation and relocation of the campus and scholars for around 4 months, has not only provided an opportunity for AIT to plan restoration and upgrade of its research and academic infrastructure, it has also reaffirmed our brand and our commitment to forge ahead with greater research impact.

I would like to thank all faculty, staff, students and partners who have participated in the development of this document which is focused on tackling the near and middle term needs of the region. Moreover, throughout this endeavor, AIT President Prof. Said Irandoust's active participation and encouragement clearly demonstrated his vision for the future of research at the institute.

Finally, I take this opportunity to thank Mr. Ashish OM Sitoula for his contributions in compiling and drafting the document, and also to Dr. Pritam K. Shrestha, who facilitated the RBM workshops and extended his professional guidance throughout the development of AIT Research Strategy 2012-2016.

**With regards,
Professor Sudip K. Rakshit
Vice President, Research
Asian Institute of Technology**



EXECUTIVE SUMMARY

The Asian Institute of Technology (AIT), an autonomous international institute of higher learning, has been helping meet the region's growing needs for advanced learning in engineering, science, technology and management, research and capacity building over the last five decades. As a trendsetter of quality education in Asia through its innovative academic offerings at the graduate level and research undertakings, AIT continues to fulfill its mission, which is to develop highly qualified and committed professionals who will play a leading role in the sustainable development of the region and its integration into the global economy. From January 2012, the new AIT charter will come into effect, and this will completely elevate and transform the Institute's legal status, from being an international organization vis-à-vis its host country Thailand under the current Charter, to a full-fledged international intergovernmental organization, under an international (multilateral) agreement. AIT will therefore be in a much stronger position to leverage its role as a regional and global platform for partnerships and development.

AIT is a member of several academic and research networks in Asia and Europe, and seeks to expand its role throughout the region. One of the four strategic themes identified by AIT in its strategy document (AIT Strategy 2013) is: Excellence and Relevance in Education, Research and Outreach. Accordingly, AIT embarked upon development of a research strategy. Equipped with half-a-century long research and academic experience in various fields, AIT pursues excellence in research intended for developing sustainable solutions to address real-life challenges. In order to consolidate AIT's leadership and experience in the region, bring more focus into sustainable development, develop new partnerships and bring together interdisciplinary teams that form a critical mass of scientists who can jointly work on the new challenges faced, AIT has been positioning itself under the umbrella research area of "Sustainable Development in the context of Climate Change". In this line, AIT has developed an institute-wide research strategy using Results Based Management (RBM) as a tool, which is emphasized in the AIT Strategy 2013 document. The thematic areas have been broadly divided into 5 categories in which AIT has demonstrated expertise.

This document outlines the roadmap for research at AIT for the next 5 years (2012-2016). The strategy has been developed through extensive discussions amongst the researchers and administrators of AIT focusing on the following principles:

- **Research Focus:** The AIT Research Strategy (2012-2016) will focus on select thematic areas under the broad umbrella of Sustainable Development in the Context of Climate Change

(SDCC) involving relevant stakeholders.

- **Research Quality:** AIT will continue to focus on continuous quality assurance and systemic quality improvement of its research processes and research outputs.
- **Quality Collaboration in Research:** AIT will continue to promote and sustain quality collaborations with relevant stakeholders, existing and new ones, for research, and implementation of research applications to address real-life challenges. While supporting research institutions in the region to build their capacity, AIT will also continue to seek engagement with leading research institutions to develop its own capacity and assist in creation of linkages between institutions.
- **Research Resource Mobilization:** AIT will seek to diversify its resource portfolio through the implementation of this strategy. AIT will seek to increase its research resources by 10% every year and pursue active engagement of public-private partnerships for resource mobilization.

Other AIT research not falling under the umbrella of SDCC but contributing towards AIT's mission of sustainable development will continue and the three principles mentioned above (Research Quality, Quality Collaboration and Research Resource Mobilization) will apply to them as well.

With the overall objective: "To significantly increase, by 2016, AIT's contribution towards sustainable development of Asia and beyond through participatory research in relation to climate change, and, implementation of applications to address real life challenges and fill knowledge gaps", AIT will focus on the following five thematic areas for research in the next five years:

1. **Disaster Risk Management**
2. **Sustainable Land and Water Resources Management**
3. **Business and Innovation Models for a Green Economy**
4. **Urban and Rural Quality of Life and Sustainability**
5. **Lower Carbon, and, Sustainable Production & Consumption Technologies & Management**

The specific objectives and the outcomes related for the thematic areas, which AIT seeks to achieve by December 2016 are presented hereunder.

Specific Objectives and outcomes:

1. Disaster Risk Management

Specific Objective: To increase, by 2016, capacities of Asian countries in conducting disaster risk assessments and management

Outcomes:

- 1.1 Increased capacity of countries to carry out Probabilistic Risk Assessment for multi-hazards (using CAPRA tool and Cumulative Impacts/effects Assessment, etc.)
- 1.2 Increased capacity of countries to make informed decisions based on scientific and economic analysis of disaster risks and develop different risk mitigation options
- 1.3 Increased awareness in ecosystem-based disaster risk management, ecological health, and climate change adaptation

- 1.4 Increased adoption of improved early warning systems and ICT applications for disaster responses, including increased use of satellite data for post-disaster management
- 1.5 Decreased water-borne diseases in disaster zones through improved ability to recover and reduce damage to ecosystems
- 1.6 Increased capacity of countries in drought modeling, risk assessment and monitoring

2. Sustainable Land and Water Resources Management

Specific Objective: To increase, by 2016, co-generation and adoption of technological solutions that can address climate induced bio-physical and socio-economic challenges in Asia

Outcomes:

- 2.1 Increased availability of better tools and techniques for modeling of hydrological and land use changes due to climate change
- 2.2 Increased availability of downscaled climate data required for impact and adaptation assessment
- 2.3 Improved policy actions based on improved understanding of the economic and social value of water
- 2.4 Increased cogeneration and adoption of locally relevant agriculture/aquaculture technologies and sustainable intensification options by smallholders
- 2.5 Reduced land degradation
- 2.6 Improved integrated coastal zone management
- 2.7 Reduced GHG emissions and environmental impacts from paddy rice fields, and higher resource-use efficiency

3. Business and Innovation Models for a Green Economy

Specific Objective: To improve, by 2016, the efficacy of Asian businesses in their contributions towards climate change adaptation

Outcomes:

- 3.1 Increased application of models of CSR and sustainability by businesses
- 3.2 Increased adoption and sophistication of social, environmental, economic and governance performance criteria
- 3.3 Increased changes in values and behaviors of policy-makers, business managers and consumers towards green products and services
- 3.4 Improved knowledge of the cultural context to adaptation of CSR and management mechanisms to implementing CSR
- 3.5 Improved understanding of the technological contributions towards a green economy

4. Urban and Rural Quality of Life and Sustainability

Specific Objective: To increase, by 2016, use of technological and social applications by governments and industry, to improve the quality of life of the urban and rural populations of Asia

Outcomes:

- 4.1 Improved policy actions that mitigates the negative impact of migration and mobility on gender, livelihood, food security and ecosystem vulnerability in the Mekong region
- 4.2 Increased adoption of urban and peri-urban agricultural models to improve food security
- 4.3 Increased knowledge of the impacts of changing land use patterns from food to feed and fuel
- 4.4 Increased recognition and integration of vulnerability and resilience as attributes in urban plans and designs by policy planners
- 4.5 Increased use of applications to reduce risk of microbial and chemical contamination of food resulting from climate change
- 4.6 Increased adoption of alternative livelihoods and livelihood diversification strategies by smallholders

5. Lower Carbon, and, Sustainable Production & Consumption Technologies & Management

Specific Objective: To increase adoption of policies and technologies towards a cleaner environment and sustainable energy access in Asia by 2016

Outcomes:

- 5.1 Increased awareness about integrating resource efficient concepts into cleaner production technologies amongst policy makers and industry
- 5.2 Improved knowledge (of industries, academia, general public) on efficient and environmentally sustainable technologies and processes
- 5.3 Increased adoption of sustainable consumption practices by industry and general public (reduced energy, reduced/reused/recycled materials usage, minimized waste)
- 5.4 Increased policy actions for adoption of technologies for improved energy access
- 5.5 Improved hydropower system operations for environmental flow and reduced GHG emissions
- 5.6 Improved knowledge of carbon sequestration technologies

Implementation Framework:

The AIT Research Strategy will be implemented and managed by the team led by Vice President Research. Annual action plans for achievement of the objectives will be coordinated by the Center of Excellence on Sustainable Development in the Context of Climate Change (CoE SDCC). The Center will be supported by the Head of Research and Education Support and Coordinator of Sponsored and Contracted Projects Unit for collection of data to report on the performance indicators. The Peer Review Committees that will be constituted as part of the implementation of the research strategy and the institutional quality assurance bodies will be responsible for quality assurance. Management outputs like annual plans, annual budgets, periodic monitoring/progress reports, evaluation reports, and, publications and conference presentations will also contribute towards the achievement of the expected outcomes.

TABLE OF CONTENTS

Content	Page
Acronyms	ii
Preface	iii
Executive Summary	iv
Table of Contents	viii
I. Introduction	2
1.1 AIT Profile	2
1.2 Research at AIT	3
1.3 Results Based Management and Research Strategy Development Process	4
II. Strategic Principles	5
2.1 Research Focus	5
2.2 Research Quality	13
2.3 Quality Collaboration in Research	14
2.4 Research Resource Mobilization	15
III. Results	16
3.1 Overall objective	16
3.2 Specific objectives and outcomes	16
3.3 Logframes	20
IV. Implementation Framework	33

I. INTRODUCTION

1.1 AIT Profile

The Asian Institute of Technology (AIT) is an autonomous international institute of higher learning. It is Asia's pioneer educational institution established in 1959 as a graduate school to help meet the region's growing needs for advanced learning in engineering, science, technology and management, research and capacity building. AIT enjoys an international reputation based on the proven value of its work and its dedication to applying academic knowledge and skills to address the emergent challenges of the region. It exists to elevate our partners' understanding of global changes and their impact in Asia, and to influence and enable sustainable development. From January 2012, the new AIT charter will come into effect, and this will completely elevate and transform the Institute's legal status, from being an international organization vis-à-vis its host country Thailand under the current Charter, to a full-fledged international intergovernmental organization, under an international (multilateral) agreement. AIT will therefore be in a much stronger position to leverage its role as a regional and global platform for partnerships and development.

Through its three graduate schools – namely, the School of Engineering and Technology (SET); the School of Environment, Resources and Development (SERD); and the School of Management (SOM) – and the AIT Extension, the institute offers Master degrees (MBA, MEng, MSc, Executive Master), Doctoral degrees (DEng, DTechSc, PhD), diplomas, certificates, an intensive English language and academic Bridging Program, as well as continuing education courses for practicing professionals. All academic programs at AIT are taught in English. As a trendsetter of quality education in Asia through its innovative academic offerings and research undertakings, AIT positions itself as one of the leading Asian institutions dedicated to the excellence in engineering, advanced technologies, environment, natural resources planning, management and development, and business management and public administration. AIT's mission is to develop highly qualified and committed professionals who will play a leading role in the sustainable development of the region and its integration into the global economy.

The Institute is home to approximately 2300 students from more than 50 countries, over 120 academics from 30 countries, and, around 500 research and support staff, with centers in Vietnam and Indonesia, and about 400 research and outreach projects. The AIT community extends far beyond its campus, including an extensive network of partners, alumni, and, former faculty and staff working in a wide range of sectors within the region and around

the world. As a multicultural and multinational educational hub for a global network of development partners, AIT is dedicated to the generation and transfer of knowledge and, strengthening of capacity across borders.

As a member of several academic and research networks, AIT is actively involved with international networks of leading universities in Europe and Asia. The Institute is energetically exploring options for expanding its role in that capacity in a manner that takes full advantage of its extensive 50+ year experience and established relationships in working with public and private sector partners throughout the Asia-Pacific region and beyond. This includes a new financial model and undergraduate studies in some specific fields that will bring sustainability and financial support to the graduate program and research. Accordingly, AIT also embarked upon a new strategy as enunciated in its strategy document 2009-2013 (Strategy 2013)¹. The four strategic themes identified by AIT in its strategy document are: Internationality as a Regional Network Institute; Excellence and Relevance in Education, Research and Outreach; Positioning and Branding; and Development and Resources Management. The implementations of these strategies complement each other and contribute towards the institute's mission.

1.2 Research at AIT

Research at AIT is premised on the application of highly complex fields of technological inquiry towards achieving sustainable development solutions for the region. AIT aims to lead the region as a center for knowledge development, research and development activity, and is creating specific niche areas for itself. AIT's research agenda is oriented towards the sustainable development of the region, strengthening the knowledge, development and business capacity of the region, and supporting communities and their economic development and integration into the global economy.

Maintaining a societal perspective on science, researchers at AIT produce knowledge for practical application with high relevance, utility and economic impacts. Research and education are managed to satisfy the needs of societal stakeholders. Research is intentional, purposive and manageable. Crucially, the agenda of the Institute and its staff is integrated with the agenda and desires of the stakeholders. In this model, researchers are both individualists (free, critical and creative thinkers) and team players.

Through the Research Strategy, AIT seeks to fulfill its mission of excellence in conducting applied research to achieve a deeper understanding of the complex interaction and interdependence of social and economic systems with natural ecosystems, to develop unconventional solutions that cut across disciplines to achieve prosperity that is socially responsible and environmentally sustainable; and to bring that knowledge into the classroom. In its five decade long history, AIT has garnered research experience in various fields, but in the pursuit of excellence in relevant research, it has been positioning itself under the umbrella research area of "Sustainable Development in the context of Climate Change". This has been done to consolidate AIT's experience in the region in this area, bring more focus, develop new partnerships and bring together interdisciplinary teams that form a critical mass of scientists who can jointly work on the new challenges we face. As outlined in the AIT Strategy 2013, AIT is positioning itself under the SDCC umbrella by focusing on the following:

¹ <http://www.ait.asia/publications>

- Exploring applications of technology that will drive poverty reduction, reduce risk, reduce consumption of resources, and create job opportunities and building sustainable livelihoods.
- Technologies, policies and systems for mitigation and adaptation taking into account the adverse impacts of an increasingly unstable natural environment, and enable urban and rural communities, and, coastal cities, etc.
- Technologies and policies that contribute toward enabling countries and communities to attain energy, food and water security to meet basic needs.
- How urban and rural communities can reduce their impact on the environment, while at the same time, increasing quality of life through better environmental management, more efficient transportation systems, greener construction practices, better management of all kinds of waste, sustainable consumption and engagement of the private sector.
- Understanding and enabling the emergence of sustainable business practices, learning from traditions and recognized best practices, engagement with all stakeholders, and exploring how businesses, especially small and medium-sized enterprises, can be created and built in order to contribute towards socially and environmentally responsible societies.
- Integrate and support the process of innovation management from ideation to commercialization

1.3 Results Based Management and Research Strategy Development Process

As noted in the Institute Strategy 2013 document, under the Development and Resources Management strategic theme, it is noted that AIT will apply Results Based Management (RBM) as a tool for administrative effectiveness – for planning, implementing, monitoring and evaluating its activities, and for program management of substantive areas. In the last decade AIT has carried out projects sponsored by the Canadian International Development Agency (CIDA) and Swedish International Development Cooperation Agency (Sida) where RBM was applied as a management tool in project preparation, monitoring and reporting.

For the development of the Research Strategy, AIT has used the RBM process. To start with, it used RBM in planning the process for research strategy development. Two RBM workshops were conducted on 30-31 March 2010, and 14-15 May 2010. The objective of these workshops were (1) to familiarize participants with the form of RBM concepts that the institute plans to use in the future; and (2) to apply RBM in mapping out the research strategy development process in an RBM logframe. Subsequently, two further trainings on Results Based Management were organized for AIT faculty and staff to familiarize them in RBM and to enable them to use RBM in their future work. Based on these capacity building initiatives, an RBM workshop for development of the draft logframe of the research strategy was organized during 11-14 November 2010. Following this, there were multiple sub-committee meetings and small workshops between December 2010 and July 2011, which has shaped the strategy document in the current form.

This research strategy is presented using the RBM framework.

II. STRATEGIC PRINCIPLES

The AIT research strategy follows four strategic principles, the application of which is expected to achieve the objectives mentioned in the strategy. This research strategy aims to consolidate AIT's leadership in generating solutions to address real-life challenges in order to support AIT's mission of sustainable development in the Asian region and its integration into the global economy. For this, the AIT Research Strategy focuses on Sustainable Development in the Context of Climate Change (SDCC). The following are the four strategic principles of the research strategy:

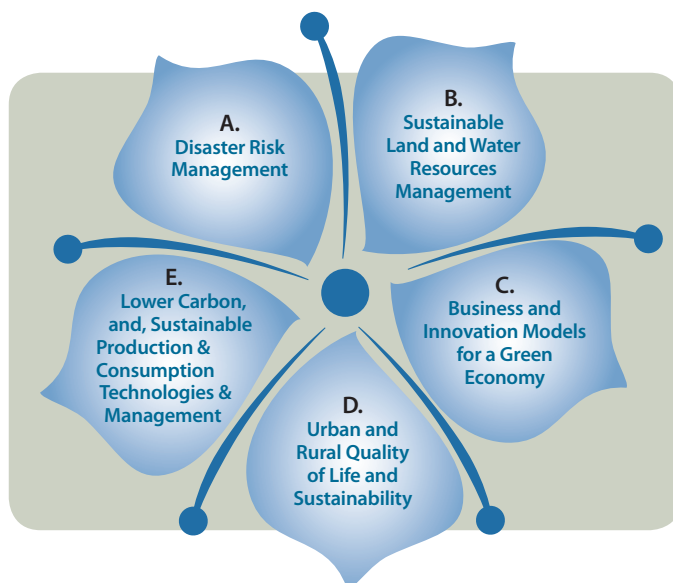


2.1 Research Focus:

The AIT Research Strategy (2012-2016) will focus on select thematic areas under the broad umbrella of Sustainable Development in the Context of Climate Change (SDCC), which were arrived at through extensive institute-wide consultations. In 2009, a Center of Excellence on SDCC was established at AIT to contribute and focus on development of sustainable strategies and solutions in the areas of climate change. It is expected that with focus of all research activities under the SDCC umbrella, AIT will produce better results to cater to the development needs in addressing real-life challenges in Asia and beyond, while creating a niche for itself in the areas of sustainable development and climate change. The results generated through AIT research will be disseminated through policy briefs, international seminars, conferences and high-impact journals for wider audiences to ensure that development planners, policy-makers and implementers are aware of the new knowledge and solutions. It is also expected that AIT will have instituted a system for harnessing intellectual property rights and patents for select research results. Based on the implementation of the strategy, it is expected that AIT will continue to maintain internationally recognized critical mass of research expertise at the institute, and, new recruitment for research faculty/staff and students will seek to build on the capacity of the candidates to

further contribute in the SDCC thematic areas. Research in advanced technologies, including Information and Communication Technology (ICT), innovative research in existing and emerging areas, and, research in social sciences conducted at AIT would apply across the above mentioned thematic areas. Owing to AIT's capacity building and development agenda transcending the SDCC thematic areas, other research not falling under the umbrella of SDCC but contributing towards AIT's mission of sustainable development will continue and the three principles of Research Quality, Quality Collaboration and Research Resource Mobilization will apply to them as well.

During the period 2012-2016, AIT will seek to consolidate its leadership in the following five thematic areas of sustainable development in the context of climate change, their description and the sub-thematic areas:



A. Disaster Risk Management

Disasters exact an enormous toll not only on lives, but also on livelihoods, infrastructures and basic social services. These losses materially affect the prospects of disaster-prone countries for achieving the Millennium Development Goals (MDGs). Globally, people farthest down on the economic ladder live disproportionately in the most disaster prone areas. Global Assessment Report (UN-ISDR, 2009) highlights that poverty is both a cause and consequence of disaster risks. With 903 million people living below the poverty threshold (ADB, 2009), Asia is more vulnerable than ever to disasters and climate change impacts.

Globally, disaster risk is increasing for most hazards and the risk of economic loss is increasing faster than the risk of mortality. The main driver of this trend is the rapidly increasing exposure. As countries develop, and economic conditions and governance improve, vulnerability decreases but not sufficiently to rapidly compensate for the increase in exposure. Disaster risk is determined by prevalent hazard, exposure and vulnerability conditions. Nothing much can be done regarding hazard occurrences and their severities, while the exposure of people and assets is largely fixed by the location of historical investments in infrastructure, urban and economic development, as well as by social and cultural attachment to a place, or by geographical constraints. Thus, if hazard occurrence, severity and exposure cannot be lessened much, the main opportunities for reducing risk lie in reducing the vulnerability.

Reducing disaster risk is critical to the achievement of the Millennium Development Goals, and addressing underlying risk drivers is also vital to climate change adaptation. Disaster risk reduction efforts not only minimize losses but also encourage development and promote poverty reduction

by protecting economic activities and assets. Disaster risks, therefore, need to be effectively managed as an integral part of development. This entails understanding and identifying the risk factors that cause disasters. In addition, numerous environmental impacts (effects) cumulate and interact, significantly complicate disaster risk assessment. To obtain a true picture of the multi-hazards, there is a need to understand disasters in the context of a cumulative whole of dynamic environmental impacts. Further, ecosystem-based disaster risk management is becoming an increasingly attractive option for addressing problems as varied as river basin and urban flooding, drought and wildfires. Additionally, health risks (avian and swine influenza, water-borne diseases such as malaria, diarrhea, etc.) also lead to situations considered disastrous. Chronic in Asia, these risks are not usually dealt with in conjunction with other risks (droughts, floods, cyclones) and, particularly, those to ecological health of the environment (GAR, 2011).

Through its research and academic programs, AIT has been engaged in this thematic research area on 'Disaster Risk Reduction'. Research projects include, among others, designing and applying innovative technologies during post-tsunami reconstruction, monitoring glacier lake outburst flooding in the Himalayas and installing Early Warning Systems (EWS), developing country capacity in multi-hazard risk assessments (incl. health and ecosystem risk), applying community centered approaches in disaster management, and identifying knowledge gaps and research issues in climate change mitigation and adaptation. AIT currently runs an interdisciplinary program on disaster preparedness, mitigation and management with regional and international partners, and also has disaster and vulnerability issues interlinked in its different technical and social courses. AIT has been active in disaster risk assessment and risk reduction efforts for last couple of years and AIT is working on the following priority areas of the Hyogo Framework for Action (HFA):

- Identifying, assessing and monitoring disaster risks and enhancing early warning and action
- Using knowledge, innovation and education to build a culture of safety and resilience
- Reducing underlying risk factors

Under disaster risk reduction, AIT will focus on research in the following sub-thematic areas:

Sub-thematic areas:

1. Disaster Risk Assessment

- Probabilistic risk assessment
- Multi-hazard risk assessment in the context of cumulative environmental impacts
- Environmental and Health Risks
- Drought Risk Assessment

2. Disaster Management

- Preparedness, (Prospective/corrective/compensatory risk management)
- Response (Scenario analysis, Applications of Information and Communications Technology for emergency response)
- Recovery (Damage and need assessment, etc.)
- Ecosystem-based risk management

B. Sustainable Land and Water Resources Management

Rising energy demands, growing population, changing food consumption patterns, shrinking resources, and energy impact of climate change coupled with increased natural hazard events are posing serious threats towards meeting food, livelihood and income security of billions of poor people in Asia and beyond. The growing trends of rapid urbanization and peri-urbanization are also proving cataclysmic to the livelihoods of the people while exhausting the existing resources at a level that will challenge the sustainability of human, animal and plant life.

In this context, this thematic area seeks to address the bio-physical and socio-economic challenges in sustainable land and water management for technological adaptation and further adoption, which can lead to wise use and management of land and water resources, and maintenance of the hydrological cycle in balance, which are prerequisites to protect the ecosystem health and enhance food security and livelihoods. AIT has demonstrated expertise in sustainable water and land resources management research areas through its inter-disciplinary research and academic programs in water and land resources management and it has significantly contributed in human resources development and research services provision in Asia, in many applied sectors of water, agriculture and agri-business, food engineering and bio-process technology, aquaculture, coastal zone management, integrated natural resources management, etc.

From the perspective of water resources, this thematic area will deal with creating better understanding of the climatic impacts and forecasting of climate patterns in relation to water, vis-à-vis, Temperature, Precipitation; Sea level rise; Water cycle and its components; Floods and droughts; Water use sectors (agri./aqua., domestic etc.); and, Coastal environment and ecosystems, including marine biodiversity. In relation to land resources management, this thematic area will concentrate on co-generation of innovative technological solutions for sustainable intensification, and, innovation in climate change adaptive technologies to enhance factor productivity. With an overall objective to address real-life challenges faced by the Asian population in sustainable production and consumption, AIT will engage in further research through examination of the cause-effect relationship in the following sub-thematic areas:

Sub-thematic areas:

1. Future climate and water resources
2. Forestry and land management
3. Integrated Water Resources Management (IWRM)
4. Sustainable agriculture and aquaculture intensification
5. Integrated coastal management

C. Business and innovation models for a Green Economy

Business can be a powerful force in bringing sustainability from theory into reality. As such this research theme focuses on exploring and contributing to improving the implementation of the strategic and operational business case with respect to organizational and technological innovation and business model development towards sustainability. There is a clear need for encouraging, under-

standing and enabling more profound responsible business practices that will have positive impact on the environment; locally, nationally and globally.

Through their operations and supply of goods and services businesses across various industries are creating what is believed to be unsustainable pressures on the environment and society. As such there is a widely-acknowledged need for developing a Green Economy that fully embraces sustainable natural resource use and reduced waste and pollution, including climate-friendly practices and low carbon approaches. A green economy if mainstreamed would significantly reduce environmental risk to the point where the future generations of both humanity and the natural environment can be more assured. As this requires significant transitions in organizations and technologies, academic institutions, alongside civil society and governments need to apply their knowledge, expertise and resources with respect to their technical, social and managerial science backgrounds towards supporting businesses in making the transition. In this context AIT, with management, technology and social science schools is extremely well placed to deliver on the academic and scholarly contributions.

There is immense scope for technical and organizational innovation whereby green products and services can replace the more orthodox and traditional business offerings that have been known to prove harmful to the environment. There are numerous pockets of best practices emerging, where individual businesses are pioneering green innovation both as internal process-driven developments, as well as more external, market-driven approaches. This demonstrates the capability and potential for the business to contribute towards a green economy, and towards a considerably more sustainable society and planet. The scale of this success however is still extremely small, when one takes on board the scale of the transition required. The success stories we are familiar with are predominantly of Western origins, with what appears as little to no significant contributions emerging indigenously from South and South East Asia. Considering the much heralded climate change issues and emerging water crises, to name a few, progress to date appears too small and insignificant to stave off massive environmental problems; of which arguably South and South East Asian countries will bear an economically disproportional burden to the amount they have arguably contributed to the human dimensions of the problem.

Businesses obviously face a number of internal and external challenges in making this transition, or it would have been much more developed already. Research aimed at understanding the issues, challenges and barriers, along with being pro-active about providing solutions and knowledge that is based on robust, objective and informative research towards the practical issues business faces is still needed as a contribution. Innovative climate-friendly practices and behaviors of business need to be developed across various industries. Innovative sustainable technologies need to be encouraged to enter the marketplace both for public consumers as well as for organizations. These needs serve both as challenges and opportunities which through this research theme will be identified, explored, evaluated, tested, refined and disseminated within businesses and public organizations, as well as in public and community arenas.

The impetus opportunities and barriers for going green sometimes come from outside businesses, and sometimes from inside. This theme covers both approaches, by engaging with relevant key stakeholders. It will attempt to help spread sustainable business ideas and practices from where they have been developed in the private/public/civil society sector to new organizations and to new places where they can be useful and relevant by providing appropriate advice, knowledge, evaluations and objective critique to the private sector, to governments, to civil society institutions and for the general public.

The Business and Innovation for the Green Economy research theme has five key areas of research, which encompasses the multi-disciplinary nature of the issue; namely general organization change and business responsibility management, integration and management of green technology and product service innovation, macro economics and social policy instruments, and individual change and societal behavior impact. There are clear inter-relationships between the sub-themes, and some research initiatives will touch on its relationship with other themes and sub-themes. This neatly employs the specialization aspects of AIT's management, technology and social science schools.

Sub-thematic areas:

1. Sustainability and Corporate Social Responsibility in Business
2. Climate Change Policy and Corporate Compliance
3. Social responsibility, Behavioral Change and Social Impact
4. Innovation in Green Products and Services
5. Technology needs assessment and transfer

D. Urban and Rural Quality of Life and Sustainability

This thematic area is multi-sectoral and focuses on reducing poverty and improving the quality of life of urban and rural populations through applications of technological and social solutions that can improve development sustainability and climate resilience.

Persistence of high poverty rates in both rural and urban areas underpins social vulnerability and undermines these areas' adaptive capacity and resilience to climate-induced extreme events. Sound adaptation strategy therefore requires effective poverty alleviation measures, which are focused especially on the poorest members of population in disaster-prone places. Existing food security and sustainable livelihoods of rural and semi-rural households, which are often based on local farming and fisheries and in-part engagement with non-farming and urban-based economic activities, have become rapidly eroded by changes in land and water uses and demands brought about by urbanization and broader economic transformations. Moreover, limited access to financial and economic resources by the urban poor compromises their food security. These problems affect vulnerability and adaptive capacity of rural and urban households to climate-induced extreme events. General poverty and lack of sustainable livelihoods in many localities have forced people into internal migration as a livelihood coping strategy. These internal migrants settle where ever job opportunity and making a living exist nearby, oftentimes compromising or totally ignoring considerations of basic safety of their destination habitats vis-à-vis natural disaster threats.

Protective social policies, particularly relevant to internal migrants, should be put in place for this burgeoning segment of the population to be able to cope better vis-à-vis disaster threats. Currently, none of this type of people-centered social policies are in place. Existing legal entitlements to disaster victims are based on politico-administrative units and limited citizenship or permanent resident status in a given locality, where people on-the-move remain in cognito.

Reducing GHG emission should involve the social equity and environment justice principle of 'emitter pays', not only in terms of potential harm done to the atmosphere, but in also terms of shouldering rehabilitation costs of climate-induced extreme events. Currently, mitigation and adaptation national plans and policies being adopted do not reflect these principles. Program and policy design of certain adaptations measures at the national and local levels have to be looked into to ensure that the costs and benefits are not distorted or skewed based on socio-economic, ethnic and gender differences and inequalities. Adaptive capacities and strategies within households and grassroots communities differ often between men and women, a matter that has to be considered for a gender-responsive government intervention and assistance for community-based adaptation measures. Effective mitigation and adaptation strategies and policies vis-à-vis climate change require a paradigm shift, which put security of individuals and people at the center vis-à-vis global threat of climate change and threat of disasters and natural hazards. In almost all countries in Asia at present, the nation-state and threats to its own security is the current be-all and end-all goal framing development and environmental planning. This traditional paradigm of national security distorts and obscures what ought to be at the heart of climate change issues and debates: the fundamental human security goal. Obsession to preserving national GDP growth rates and protecting national interests in trans-boundary and global issues related to GHG emissions are some manifestations of this development ethics myopia.

Developing countries in Asia are experiencing very rapid urbanization – that is, the growth of cities and higher concentration of its population in urban centers. Urban tipping point would be reached in the region on or before 2025, while in SEA and East Asia sub-regions it would be reached in 2013. This means that unplanned and ecologically unsound rapid urban growth, which is the common trend now in many countries in the region, will increasingly become the main engine generating social vulnerability to climate change as well as destruction of the planet's atmosphere due to increased GHG emission. Planning and creating eco-cities offers a way of avoiding these negative impacts of current urbanization characteristic.

Existing basic infrastructures of cities in the region (e.g. bridges, highways, drainage systems, embankments etc.), including their maintenance and further developments, need to be reevaluated and abandoned, or retrofitted based on likely scenarios of flooding and sea-level rise. Hence, the likelihood of increasing climate change-related extreme events has introduced another essential dimension for consideration, in addition to the factors that go in conventional cost-benefit analysis of the feasibility and life span of a city's infrastructures.

Transportation system of cities in the region, whose travel time and fuel efficiency is already commonly very low and has to be remedied, would have to be re-evaluated and planned from an essential criterion too of minimizing carbon emission. This is important especially in mega-cities of developing Asia-Pacific region where urban transport sector is one of the major sources of total carbon emission.

The importance of information and communication technologies and its impact in development has been well established and documented. AIT recognizes the importance of addressing the multi-faceted challenges of climate change and environmental sustainability through informed use of information and communication technology applications. The role of ICT in climate change through energy efficiency in sectors such as smart buildings, intelligent transportation systems, smart homes, etc.; community engagement for climate monitoring and climate forecasting; eco-design; measurement of GHG emissions; disaster management; dissemination of timely information for climate-resil-

ient agricultural systems, etc., are critically important aspects that need to be integrated into climate adaptation and mitigation strategies and local populations need to develop localized mitigation and adaptation strategies to combat climate change.

Since the close of the last century, ecological inter-dependencies, migration and demographic dynamics, and economic and trade linkages between rural, semi-rural, peri-urban and urban core areas have all intensified, making the notion of rigid rural and urban divide in developing countries in Asia largely a myth. This is a fundamental societal condition upon which governance modality of climate change-related programs and initiatives should be built. Hence, traditionally existing organization, mandate, and functioning of government institutions, which are based either on rigid sectoral or territorial jurisdictions, have proven to be unresponsive to these intensive inter-linkages and have become an anachronism in planning and implementation of climate change mitigation and adaptation strategies. The latter require, among others, flexible, and intensive cross-sector and thick and coherent horizontal coordination and harmonization between separate agencies.

Traditional top-down and state-centric orientation of leadership and administration of governments at various levels dominant in the region go against the grain of effective governance of climate change programs, which requires meaningful public participation and community-based planning and decision-making. The seemingly insurmountable and huge costs of adaptation, especially those requiring retrofitting or developing new physical infrastructures anticipatory of climate-induced extreme events, require innovative forms public-private partnership in investments and management. Currently dominant exclusive reliance on government and multi-lateral agencies' resources is unsustainable and grossly inadequate to cover and manage a wide range of necessary adaptation and mitigation measures. Thus, new modalities of partnerships have to be explored between private business, state, and civil society organizations for the purpose.

Sub-thematic areas:

1. Poverty, food security and sustainable livelihoods
2. Eco-cities, Infrastructure and transport
3. Human security, social equity and gender
4. Information and communication technologies for sustainable development (ICT4D)
5. Governance vis-à-vis urban and rural changes

E. Low Carbon and Sustainable Production and Consumption Technologies and Management

Greenhouse gas (GHG) mitigation options (both technological and policy) and their implications for the energy resource mix, technology-mix, environmental and developmental co-benefits in terms of reduction of other pollutant emissions, is a major focus of research at AIT. AIT has assisted in national energy system and policy modeling in Thailand, Vietnam and Indonesia. These models are designed to capture the energy demand and technology characteristics of different economic sectors as well

as the possible technology and energy resource options. Similar modeling activities in the case of Cambodia, Lao PDR and Myanmar are ongoing. For several years now, AIT has developed strong collaboration with the Asia-Pacific Integrated Assessment Modeling (AIM) team in Japan to develop both the bottom-up and top-down models of selected countries in South-East Asia for integrated assessment of climate change policies.

AIT has been engaged in substantial research on low carbon and renewable energy technologies. The Asian Regional Research Program in Energy, Environment and Climate (ARRPEEC) was a regional networking project involving 22 National Research Institutes (NRIs) from seven countries of Asia. The project produced policy outputs in the areas of energy, environment and climate research; mobilized and enhanced capacity of the NRIs; disseminated results among policy personnel; and created linkages of project activities with national, regional and global initiatives to reduce GHG and other hazardous emissions.

The Renewable Energy Technologies (RETs) in Asia was a regional research and dissemination program to promote renewable energy technologies in six Asian countries involving thirteen institutions in South and South-East Asia. Project activities focused on adaptive research and demonstration of the appropriate renewable technologies suitable to the local conditions as well as dissemination. Three renewable energy technologies were selected for adaptive research and dissemination: Solar photovoltaics, Solar and biomass-based drying, and Biomass briquetting and briquette-fired stoves. Technology packages, demonstration, case studies and lessons learnt have been documented under this program. The Institute also facilitated a project that transfers European wind energy technology called "Transfer of EU Knowledge and Technology for Development of Wind Energy Technology in Thailand". The objective of the project was to promote wind energy sector in Thailand with the transfer of knowledge and technology from the EU. Other recent undertakings include cooperation and technology transfer projects to promote low carbon societies and renewable energy technology. The Energy group at AIT has been recognized as one of the eight centers of excellence in the Global Network on Energy for Sustainable Development (GNESD), a Type II alliance formed after the Johannesburg Summit (2002) coordinated by the UNEP Risoe Centre. Thematic studies have been carried out in the area of energy access, renewable energy technologies, urban and peri urban energy access. Research and capacity building activities have been implemented on Clean Development Mechanism, specifically with Cambodia, the Philippines, Vietnam and Thailand.

Current trends in population growth, industrialization and natural resources consumption have seen wastes and pollutants released faster than the earth can absorb them and be restored. Urban and industrial areas are affected by water pollution and by high levels of air pollution. It is imperative that measures to minimize and control pollution need to be undertaken urgently through the prevention of pollution and waste generation at the source of production. Sustainable Production is the continuous application of an integration of preventative environmental and business strategies for procuring resources, producing and processing products, and/or providing services at higher efficiency, increased profitability, and at reduced risks to the environment. AIT's offerings and expertise in Sustainable Production and Consumption focus on capacity building and research. Past experience in the region reveals that capacity building in sustainable production and consumption was designed and implemented either in an ad-hoc basis or was focused on training the specialists. Such training activities should not only be limited to the training of specialists, but also reach out to the various cross sections of future technicians and planners. Sustainable production and consumption concept in traditional academic programs are limited to few institutions in this region.

In January 2000, AIT introduced an interdisciplinary postgraduate program in “Cleaner Production” with support from UNEP. This program helped professionals in the fields of energy, environment, management, planning, process integration fields towards sustainable development and climate change mitigation activities. A large number of activities have been carried out on CP by faculty, staff and students at AIT through student and sponsored research on activities involving treatment of wastes, improving energy efficiency through energy and environmental audits. The ARRPEEC Project involved studies of cleaner production options in industries like Tea, Desiccated Coconut, Foundry, Textile, Brick Manufacturing, Cement, Pulp and Paper, etc. These have contributed to new climate change interaction knowledge and understanding both to the industry and the research teams. Energy efficiency improvement, material efficiency improvement and reduced material consumption resulting in greenhouse gas reductions are notable benefits from the cleaner production research. Extensive research on waste management has been carried out at AIT through the Asian Regional Research Program on Environmental Technology (ARRPET) involving 18 National Research Institutions from 8 Asian countries. Wastewater, Solid Waste, Hazardous Waste and Air Quality are the focus areas where ARRPET conducted climate change research as an integral component among other issues. The solid waste group of ARRPET was involved in technology development for Anaerobic Digestion of municipal solid waste, a potential area for trapping greenhouse gases. Other groups had climate change and GHG mitigation as key component in the research. The recent project, 3R Knowledge Hub, implemented by the Asian Development Bank and jointly hosted by AIT and UNEP Regional Resource Center for Asia and the Pacific (RRC.AP), has been promoting waste reduction, reuse and recycle in Asian countries. Working on the upstream production and consumption sectors, 3R Knowledge Hub has generated knowledge and information on GHG reduction potential by promoting a reduce, reuse and recycle culture among the global citizens. Research on the downstream waste disposal side, and upstream waste reduction, reuse and recycle in tandem form a waste refinery (Integrated Solid Waste Management).

The following are the sub-thematic areas under this thematic area:

Sub-thematic areas:

1. Green house gas mitigation
2. Energy access and security
3. Sustainable energy sources and access to energy
4. Urban Solid Waste Management
5. Non-hazardous Industrial Waste Management for energy intensive industries and processes

2.2 Research Quality:

Ensuring quality of research is foremost in all research that AIT undertakes. AIT has in place different quality assurance mechanisms that seek to ensure that all research conducted at AIT are of high standards following state-of-the-art codes of scientific research. The existing research policies and procedures of AIT include criteria and mechanisms that ensure scientific quality of research from

initiation of research proposals to research process monitoring to research reporting, dissemination and publication. These criteria adhere to internationally recognized criteria for scientific research. The Policy and Procedure statement on Academic Integrity in Publication and Research is the guiding document for assessment of scientific quality. AIT will update this guideline to incorporate peer review processes for its research activities, which includes networking and collaboration with partners, and other criteria for evaluation of quality assurance.

Over the years, AIT has been systematically improving the quality of its research process and also its research results through employment of various means of quality assurance. As opposed to 10 years ago, when submission of publication manuscripts was sufficient to earn a doctoral degree, today one publication in an international peer-reviewed journal is mandatory. There has also been significant improvement in the quality of journal publications of AIT research results in the past 5 years and the average impact factor for the period 2005- 2010 for all AIT publications stood around 1.32. Such improvements will continue and AIT will seek to publish research results in high impact journals and other publications.

Certain quality assurance systems that are yet to be institutionalized will be founded through the implementation of this strategy, which will further strengthen AIT's quality resources and systems that ensure high quality research by all faculty, staff and students. Key amongst these are the improvement in the mechanisms for raising the standards of research conducted at AIT, vis. a vis., institution of peer review committees with participation of external partners, regular assessment of research processes and results, further investment in research facilities and resources that aid high quality research, increased involvement in interdisciplinary research, and, wider dissemination of research results through better quality publications. The quality of research education and research capacity of students will be improved through introduction of doctoral level courses and other courses in research methodology, language enhancement, communication capacity, statistics, experimental planning and design, mathematical modeling, etc., and ensuring that all research results are of publishable standard.

2.3 Quality Collaboration in Research:

This strategic principle emphasizes on the quality of collaboration with relevant stakeholders for conducting research, dissemination of research results and optimum utilization of resources including sharing of resources between partners. AIT has been undertaking research projects in collaboration with various types of partners – donors, governmental and non-governmental organizations, universities and research institutions in the region and beyond, and has maintained strategic partnerships with other research and education institutions, governmental and non-governmental organizations, including the private sector in promoting participatory research, the results of which are relevant in addressing issues of sustainability and real-life problems. The directions and goals set for themselves by these stakeholders will need to be taken into account to determine areas in which there is overlap of interests. It is pertinent that high quality of collaboration is sought in research projects – starting with the initiation of joint research proposals, implementation, research result dissemination and research results utilization.

AIT categorizes its partners at three levels, namely, partners who support to enhance AIT's capacity, partners of equal capacity for mutual sharing and learning, and, partners that AIT supports in capacity development. AIT continuously seeks to strengthen existing partnerships and developing new ones. Periodic evaluations of each partnership will be conducted through developed criteria

to ensure that the objectives of the partnerships are being achieved. AIT will develop and maintain a high-standard knowledge repository that will store all research results conducted by AIT, the information of collaborative research and details of partners, and, evaluation results of collaborations and partnerships.

2.4 Research Resource Mobilization:

Mobilization of resources for conducting research and facilitating application of research results is an inherent component in consolidating AIT's leadership as an institution of higher learning. Traditionally, sources of funding for conducting research at AIT, both student thesis/dissertation research and sponsored research projects have been from donors, governments or development agencies. There is a strong potential for engagement of businesses, industry and private sector in research and this proportion can be increased. For conducting a critical volume of research, and facilitating the application of research results, it is necessary for AIT to garner enough resources – in cash as well as in kind (seconded researchers, donated equipment, strategic partnerships, etc.). Regular investment in research infrastructure will also be required for AIT to continue current research activities. In new and emerging areas this will require additional investment in order to attract energetic new scientists and researchers. Hence, the above principle is set for including mechanisms in the research strategy to mobilize resources from diverse sources. While continuing to mobilize resources from its existing and established partnerships, AIT seeks to optimize its current resources; and expand its network and collaboration initiatives to generate longer term resources, while upgrading the current infrastructure for research. AIT will seek to increase its research resources by 10% every year and pursue active engagement of public-private partnerships for resource mobilization.

AIT will seek to diversify the resource base and include more partners from the private sector for funding research. AIT's knowledge base through its research is rich and AIT will scale up and disseminate these research results in a better manner to attract more resources from diverse sources. Investment in research infrastructure will be a priority and thus AIT will seek to optimize the available resources in order to develop its research infrastructure.

Through the implementation of this research strategy, AIT will also seek to diversify itself into a research network hub. AIT, in the past, has been involved in management of research grants, from small to large scale, for multiple research projects in Asia, implemented by different government and research institutions.² AIT will seek to strengthen this role of mediating between research donors and research implementers. This will provide three distinct benefits to the donors, to the participating research institutions and to AIT. Firstly, outsourcing of research management services by donors to AIT will enable donors to be involved more closely in evaluation of the research projects and focusing on realizing palpable research impacts, while freeing up their management responsibilities and arduous tasks of managing and monitoring multiple research grants. Secondly, research institutions will be able to utilize AIT's academic and research base which will provide them with a robust regional network, while also enables regional capacity building, in transferring research implementation and management knowledge to national and local levels. Thirdly, AIT will have better opportunity of scaling up sustainable technological and social solutions to address real-life challenges of the Asian population through intimate involvement in the research project implementation by virtue of being the research grants manager.

² Some examples are: *Bio-Innovation for Poverty Reduction Project*; *Energy and Environment Partnership Project*; *Wetlands Alliance Program*; *the South East Asia – Urban Environmental Management Application Project*; *Asia Project Management Support Program*; *AARPEC*; *AARPET*, etc.

III. RESULTS

3.1 Overall Objective

The overall objective of the AIT Research Strategy (2012-2016) is in line with the mission of the AIT to support sustainable development in the Asian region and its integration into the global economy. Building upon over 50 years of AIT's experience and leadership in creating sustainable solutions to address real-life challenges faced by the Asian Region, the following is the overall objective of the AIT Research Strategy (2012-2016) under the broad umbrella of Sustainable Development in the Context of Climate Change:

- *To significantly increase, by 2016, AIT's contribution towards sustainable development of Asia and beyond through collaborative research in relation to climate change, and, implementation of applications to address real life challenges and fill knowledge gaps*

It is expected that the realization of the overall objective will only be possible through transfer of the realized research knowledge through the academic curricula of AIT, through creative collaborations with partners and active linkages with communities whose lives that AIT seeks to transform, and through optimum mobilization of resources. All research will follow a rigorous quality assurance system that will encompass criteria for research implementation and management as well as peer review mechanisms to evaluate the research process and the results.

3.2 Specific Objectives and Outcomes

Being an academic research institute, the outputs from each theme will be scholarly, and thus center on producing articles, journals, policy briefs and conference papers, for academic, scholarly and intellectual audiences. Being an educational facility also, the outputs will also be incorporated into the schools teachings for its students and faculty development as well as pedagogical contributions for other educational institutions around knowledge content and teaching cases. Considering the interest, influence, impact and involvement of governmental and civil society, the outputs will also center around reports, presentations and events for policy-making institution reflections, NGO dissemination and consumer group assimilation. Generally, therefore, there would be measures around original publication outputs and further academic/practitioner/policy-maker use citations of the outputs, as well as conference and networking event presentations with different stakeholders.

The intended outcomes are to support the enablement of increased applications, incubations and adoption of technologies and research applications at the national and local levels so as to address real-life challenges. Alongside some measurable behavior change, skill sets and organizational processes, there would be some measurable outcomes in terms of changes or evolutions to policy mechanisms and compliance structures, as well as a more informed and supportive consumer and community acceptance rates. These would be monitored as both micro-level and macro-level outcome measures.

Based on the strategic principles, the specific objectives and the related outcomes of the AIT Research Strategy (2012-2016), based on the focus research thematic areas are presented below.

1. Disaster Risk Management

Specific Objective: To increase, by 2016, capacities of Asian countries in conducting disaster risk assessments and management

Outcomes:

- 1.1 Increased capacity of countries to carry out Probabilistic Risk Assessment for multi-hazards (using CAPRA³ tool and Cumulative Impacts/effects Assessment, etc.)
- 1.2 Increased capacity of countries to make informed decisions based on scientific and economic analysis of disaster risks and develop different risk mitigation options
- 1.3 Increased awareness in ecosystem-based disaster risk management, ecological health, and climate change adaptation
- 1.4 Increased adoption of improved early warning systems and ICT applications for disaster responses, including increased use of satellite data for post-disaster management
- 1.5 Decreased water-borne diseases in disaster zones through improved ability to recover and reduce damage to ecosystems
- 1.6 Increased capacity of countries in drought modeling, risk assessment and monitoring

2. Sustainable Land and Water Resources Management

Specific Objective: To increase, by 2016, co-generation and adoption of technological solutions that can address climate induced bio-physical and socio-economic challenges in Asia

Outcomes:

- 2.1 Increased availability of downscaled climate data required for impact and adaptation assessment
- 2.2 Improved policy actions based on improved understanding of the economic and social value of water
- 2.3 Increased cogeneration and adoption of locally relevant agriculture/aquaculture technologies and sustainable intensification options by smallholders⁴

³ CAPRA (Comprehensive Approach for Probabilistic Risk Assessment) is a tool developed by the World Bank

⁴ 75% of Asian farmers are smallholders

- 2.4 Reduced land degradation
- 2.5 Reduced impediments for integrated coastal management
- 2.6 Reduced GHG emissions and environmental impacts from paddy rice fields, and higher resource-use efficiency

3. Business and Innovation Models for a Green Economy

Specific Objective: To improve, by 2016, the efficacy of Asian businesses in their contributions towards climate change adaptation

Outcomes:

- 3.1 Increased application of models of CSR and sustainability by businesses
- 3.2 Increased adoption and sophistication of social, environmental, economic and governance performance criteria
- 3.3 Increased changes in values and behaviors of policy-makers, business managers and consumers towards green products and services
- 3.4 Improved knowledge of the cultural context to adaptation of CSR and management mechanisms to implementing CSR
- 3.5 Improved understanding of the technological contributions towards a green economy

4. Urban and Rural Quality of Life and Sustainability

Specific Objective: To increase, by 2016, use of technological and social applications by governments and industry, to improve the quality of life of the urban and rural populations of Asia

Outcomes:

- 4.1 Improved policy actions that mitigates the negative impact of migration and mobility on gender, livelihood, food security and ecosystem vulnerability in the Mekong region
- 4.2 Increased adoption of urban and peri-urban agricultural models to improve food security
- 4.3 Increased knowledge of the impacts of changing land use patterns from food to feed and fuel
- 4.4 Increased recognition and integration of vulnerability and resilience as attributes in urban plans and designs by policy planners
- 4.5 Increased use of applications to reduce risk of microbial and chemical contamination of food resulting from climate change
- 4.6 Increased adoption of alternative livelihoods and livelihood diversification strategies by smallholders

5. Lower Carbon, and, Sustainable Production & Consumption Technologies & Management

Specific Objective: To increase adoption of policies and technologies towards a cleaner environment and sustainable energy access in Asia by 2016

Outcomes:

- 5.1 Increased awareness about integrating resource efficient concepts into cleaner production technologies amongst policy makers and industry
- 5.2 Improved knowledge (of industries, academia, general public) on efficient and environmentally sustainable technologies and processes
- 5.3 Increased adoption of sustainable consumption practices by industry and general public (reduced energy, reduced/reused/recycled materials usage, minimized waste)
- 5.4 Increased policy actions for adoption of technologies for improved energy access
- 5.5 Improved hydropower system operations for environmental flow and reduced GHG emissions
- 5.6 Improved knowledge of carbon sequestration technologies

Common Outputs for all outcomes of all thematic areas, based on the principles of the research strategy:

- Internationally recognized critical mass of research expertise maintained in thematic areas
- Regular assessment of quality of AIT research through peer review and other evaluation mechanisms
- Regular assessment of research (proposal, process, results) institutionalized
- Quality research facilities, software, journals, books, and other library materials procured and maintained
- Research collaborators selected and collaborations coordinated based on mechanism developed
- Agreements for sharing partner human resources and research facilities signed with collaborators
- SDCC Research collaborations assessed (for expanding and maintaining collaboration quality) based on assessment criteria
- Knowledge repository developed
- Research resource requirements assessed and potential & existing resource sources⁵ identified annually

Management outputs contributing to all outcomes:

1. Annual Plans
2. Annual Budgets
3. Monitoring / Progress Reports (based on data collected against the performance indicators)
4. Semi-annual and Annual Financial Reports
5. Final Evaluation Reports

The logframe presented in Table 3.2.1 below displays the objectives, outcomes, performance indicators, outputs, and the data collection strategy of the AIT Research Strategy:

⁵ Including sources that second researchers

Table 3.2.1 Logframes for AIT Research Strategy (2012 – 2016)

A. Disaster Risk Reduction

Types of Outputs	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy	Assumptions
Specific Objective: To increase, by 2016, capacities of Asian countries in conducting disaster risk assessments and management					
<ul style="list-style-type: none"> Participatory research projects on the application of Probabilistic Risk Assessment and cumulative impacts assessment for disasters in context of climate change and human development implemented Capacity building initiatives conducted on probabilistic risk assessment and cumulative impacts assessment for personnel of 10 countries through use of the research data 	<p>1.1 Increased capacity of countries to carry out Probabilistic Risk Assessment (using CAPRA⁶ tool and Cumulative Impacts /effects Assessment for multi-hazards, etc.)</p>	<ul style="list-style-type: none"> Number of participatory research projects Number of risk maps produced by countries Number of countries conducting contingency and emergency planning based on risk maps Number of contingency and emergency plans Number of people trained•Number of publications Number of citations 	<ul style="list-style-type: none"> Training database Historical records Meteorological data Hydrological data Topographic data 	<ul style="list-style-type: none"> Review of database, country records, reports and database; RMU and project staff; Annual 	
<ul style="list-style-type: none"> Research projects and trainings conducted on prospective/corrective/ compensatory risk management•Scenario analysis developed based on research projects Training and capacity building conducted on scientific and economic analysis of disaster risks 	<p>1.2 Increased capacity of countries to make informed decisions based on scientific and economic analysis of disaster risks and develop different risk mitigation options</p>	<ul style="list-style-type: none"> Number of projects implemented in countries based on scientific and economic analysis Number of countries having scenario analysis tools Number of risk mitigation options implemented Number of people trained Number of ICT tools adopted for disaster response 	<ul style="list-style-type: none"> Training database Data in lifelines, infrastructure, critical facilities etc. Urban planning and development maps 	<ul style="list-style-type: none"> Review of database, country records and reports; RMU and project staff; Annual 	

⁶ CAPRA (Comprehensive Approach for Probabilistic Risk Assessment) is a tool developed by the World Bank

Types of Outputs	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy	Assumptions
<ul style="list-style-type: none"> Research projects conducted on ecological health and ecosystem-based disaster risk management including climate change adaptation Dissemination of research findings 	1.3 Increased awareness in ecosystem-based disaster risk management, ecological health, and climate change adaptation	<ul style="list-style-type: none"> Number of ecosystem-based and eco-health related projects implemented in Asian countries taking climate change into account Number of publications and citations 	<ul style="list-style-type: none"> Survey reports Action research or pilot project reports Publication database 	<ul style="list-style-type: none"> Review of reports and database; RMU and Project staff; Annual 	
<ul style="list-style-type: none"> Research conducted on improved and cost-effective design of early warning systems, disaster responses and rapid damage assessment using satellite data Research results disseminated ICT applications developed through research for effective response to potential disasters 	1.4 Increased adoption of improved early warning systems and ICT applications for disaster responses, including increased use of satellite data for post-disaster management	<ul style="list-style-type: none"> Number of improved early warning system adopted in countries-Number of ICT applications applied Number of people trained Number of people covered by the Early Warning system Number of casualties reduced 	<ul style="list-style-type: none"> National disaster management agencies Project documents Satellite data providers Training database Country reports Disaster reports 	<ul style="list-style-type: none"> Review of country records; reports and database; RMU and project staff; Annual 	
<ul style="list-style-type: none"> Research projects and demonstration projects undertaken in disaster zones on decreasing water-borne diseases through improved ecosystem resilience 	1.5 Decreased water-borne diseases in disaster zones through improved ability to recover and reduce damage to ecosystems	<ul style="list-style-type: none"> Number of deaths in disaster zones due to water-borne diseases Levels of water contamination Levels of soil contamination Levels of reforestation/ deforestation 	<ul style="list-style-type: none"> Research reports and country reports 	<ul style="list-style-type: none"> Review of reports; RMU and project staff; Annual 	

Types of Outputs	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy	Assumptions
<ul style="list-style-type: none"> Participatory research projects conducted on drought modeling, risk assessment and monitoring Trainings conducted on drought modeling and risk assessment and monitoring 	1.6 Increased capacity of countries in drought modeling, risk assessment and monitoring	<ul style="list-style-type: none"> Number of people trained Number of countries produces drought risk maps Number of drought monitoring systems Food security parameters in drought hit areas 	<ul style="list-style-type: none"> Meteorological data Satellite data Agricultural data Training database 	<ul style="list-style-type: none"> Review of country records, reports and database; RMU and Project staff; Annual 	

B. Sustainable Land and Water Resources Management

Types of Outputs	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy	Assumptions
<p>Specific Objective: To increase, by 2016, co-generation and adoption of technological solutions that can address climate induced bio-physical and socio-economic challenges in Asia to improve sustainable production and consumption</p>					
<ul style="list-style-type: none"> Increased availability of better tools and techniques for modeling of hydrological and land use changes due to climate change Research conducted to produce downscaled data required for impact and adaptation assessment Research data disseminated 	<p>2.1 Increased availability of downscaled climate data required for impact and adaptation assessment</p>	<ul style="list-style-type: none"> Downscaled climate data at regional or local level of particular site List of tools available for modeling of hydrological and land use change List of techniques available for modeling of hydrological and land use change Number of inquiries received about the tools and techniques Number of inquiries 	<ul style="list-style-type: none"> Regional reports Project and research database 	<ul style="list-style-type: none"> Review of reports and database; RMU and project staff; Annual 	
<ul style="list-style-type: none"> Research projects conducted to calculate the impact of climate change on water resources and its economic and social valuation Research results on the impact of climate change on water resources disseminated Publications prepared on the impact of climate change on water resources 	<p>2.2 Improved policy actions based on improved understanding of the economic and social value of water</p>	<ul style="list-style-type: none"> No. of laws, policies and regulations which defines water as economical and social goods List of members (stakeholders in) in international, regional, national water resources councils Number of research projects Number of publications Number of citations 	<ul style="list-style-type: none"> Project reports Policy briefs Publication databases 	<ul style="list-style-type: none"> Review of reports and databases; RMU; Annual 	

Types of Outputs	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy	Assumptions
<ul style="list-style-type: none"> Relevant agriculture/ aquaculture technologies generated through research (4-5 each year) Best practices towards technological and environmental efficiency in cropping systems identified and promoted for adoption Rhizosphere research conducted to understand root plasticity to develop matching management practices for climate proofing of agricultural production Research conducted to develop novel approaches for optimized relationships and ecological balances for reduced herbivory Participatory action research conducted for community preparedness for climate proofing of agricultural value chains 	<p>2.3 Increased cogeneration and adoption of locally relevant agriculture/aquaculture technologies and sustainable intensification options by smallholders⁷</p>	<ul style="list-style-type: none"> Number of technologies produced Number of technologies adopted Number of publications Water footprint of rice and main crop productions Water stress index as per production basins Carbon footprint of rice and main crop productions Number of caged fish products in target area Level of usage of fishmeal in aqua feeds (reduced by at least 10% by 2016 in Asia) Level of resource use (improved efficiency by at least 20% by 2016 in Asia) Efficiency in level of water usage Level of negative impact on environment by famers/feed mills 	<ul style="list-style-type: none"> Survey reports Research reports 	<ul style="list-style-type: none"> Review of reports; RMU and project staff; Annual 	
<ul style="list-style-type: none"> Research conducted to understand causes and severity of land degradation in forest and agricultural ecosystem 	<p>2.4 Reduced land degradation</p>	<ul style="list-style-type: none"> % increase in forest area % increase in water yield % increase in crop yield 	<ul style="list-style-type: none"> Country reports Research project reports 	<ul style="list-style-type: none"> Review of reports; RMU and project staff; Annual 	

⁷ 75% of Asian farmers are smallholders

Types of Outputs	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy	Assumptions
<ul style="list-style-type: none"> Research conducted to understand/Identify barriers in sustainable forestry and land management in selected countries (3 countries in the region) and selected ecological zones (3 ecological zones) Research conducted to understand/identify good practices or technologies for reducing land degradation Research results disseminated to various audiences for adoption of technologies and applications 		<ul style="list-style-type: none"> % decrease in chemicals use Number of sustainable land management techniques adopted 			
<ul style="list-style-type: none"> Applied research projects implemented to reduce impediments for integrated coastal management 	2.5 Reduced impediments for integrated coastal management	<ul style="list-style-type: none"> Number of impediments to integrated coastal management 	<ul style="list-style-type: none"> Country reports 	<ul style="list-style-type: none"> Review of reports; RMU and project staff; Annual 	
<ul style="list-style-type: none"> Research projects conducted to generate results of models of paddy rice fields with reduced GHG emissions and environmental impacts Research projects conducted to generate results on higher resource-use efficiency 	2.6 Reduced GHG emissions and environmental impacts from paddy rice fields, and higher resource-use efficiency	<ul style="list-style-type: none"> Number of GAP-certified rice producers Reputation index for Thai export rice Irrigation water quality indicators 	<ul style="list-style-type: none"> Primary data from field surveys Secondary data from local sources International databases 	<ul style="list-style-type: none"> Review of survey data, secondary data and databases; RMU and project staff; Annual and Bi-annual 	

C. Business and Innovation Models for a Green Economy

Types of Outputs	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy	Assumptions
Specific Objective # 1: To improve, by 2016, efficacy of Asian businesses in climate change adaptation					
<ul style="list-style-type: none"> Research projects conducted to develop and test models of CSR and sustainability Commitments from industries generated to apply models of CSR 	<p>3.1 Increased application of models of CSR and sustainability by businesses</p>	<ul style="list-style-type: none"> Number of models applied - survey Number of businesses that apply CSR and sustainability models – survey 	<ul style="list-style-type: none"> Survey reports 	<ul style="list-style-type: none"> Review of survey reports; RMU; Annual 	
<ul style="list-style-type: none"> Research conducted on social, environmental, economic and governance performance criteria implementation in industries 	<p>3.2 Increased adoption and sophistication of social, environmental, economic and governance performance criteria</p>	<ul style="list-style-type: none"> Number of social performance criteria adopted – Annual Reports on CSR – R&D reports of businesses Number of environmental performance criteria adopted Number of economic performance criteria adopted Number of governance performance criteria adopted 	<ul style="list-style-type: none"> Annual CSR reports R&D reports 	<ul style="list-style-type: none"> Review of reports; RMU; Annual 	
<ul style="list-style-type: none"> Motivational driver for adoption of green processes, products and services identified and disseminated 	<p>3.3 Increased Changes in values and behaviors of policymakers, business managers and consumers towards green processes, products and services</p>	<ul style="list-style-type: none"> Number of rules, regulations and market mechanisms developed to promote green products and services % of business managers with a positive attitude towards green products and services 	<ul style="list-style-type: none"> Government policy documents Survey Business survey General public survey 	<ul style="list-style-type: none"> Review of reports and survey data; RMU; Annual 	

Types of Outputs	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy	Assumptions
		<ul style="list-style-type: none"> • % of businesses producing green products and services • % of consumers willing to use green products and services • % of consumers using green products and services • Number of green processes, products and services in the market 	<ul style="list-style-type: none"> • General public survey; trade association survey reports • Patent records 		
<ul style="list-style-type: none"> • Research conducted on local adaptation models of CSR and management mechanisms to implementing CSR in Asia • Research results disseminated through high impact journals, other publications, conferences/seminars and other vehicles, including joint training⁸ and dissemination activities undertaken with research partners 	3.4 Improved knowledge of the cultural context to adaptation of CSR and management mechanisms to implementing CSR	<ul style="list-style-type: none"> • Number of publications • Number of citations • Number of conference papers presented • Number of other publications 	<ul style="list-style-type: none"> • Scopus, Google Scholar; and other database 	<ul style="list-style-type: none"> • Review of reports and survey data; RMU; Annual 	
<ul style="list-style-type: none"> • Technological contributions towards green economy identified and disseminated 	3.5 Improved understanding of the technological contributions towards a green economy	<ul style="list-style-type: none"> • Number of technologies applied in green processes producing green products and providing green services • Number of publications • Number of citations 	<ul style="list-style-type: none"> • Scopus, Google Scholar; and other database 	<ul style="list-style-type: none"> • Review of reports and survey data; RMU; Annual 	

⁸ Training to include skill development for coordination and management of collaborations apart from research skill development.

D. Urban and Rural Quality of Life and Sustainability

Types of Outputs	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy	Assumptions
<p>Specific Objective : To increase, by 2016, application of research results by governments and industry, to improve the quality of life of the urban and rural populations of Asia</p>					
<ul style="list-style-type: none"> Research conducted to understand the impacts of migration and mobility on gender Research conducted to understand the impacts of migration and mobility on livelihood and food security 	<p>4.1 Improved policy actions that mitigates the negative impact of migration and mobility on gender, livelihood, food security and ecosystem vulnerability in the Mekong region</p>	<ul style="list-style-type: none"> Number of policy actions Number of publications Number of policy briefs produced Number of citations 	<ul style="list-style-type: none"> Country reports; Publication database 	<ul style="list-style-type: none"> Review of reports and database; RMU and Project Staff Annual 	
<ul style="list-style-type: none"> Research projects conducted to develop peri-urban agricultural models Agricultural models tested in select sites in Asia 	<p>4.2 Increased adoption of urban and peri-urban agricultural models to improve food security</p>	<ul style="list-style-type: none"> Number of applications adopted Number of areas where application models are adopted % of people benefitting from the use of agricultural models % reduction in food insecurity in SEA and SA 	<ul style="list-style-type: none"> Country reports; Publication database 	<ul style="list-style-type: none"> Review of reports and database; RMU and Project Staff Annual 	
<ul style="list-style-type: none"> Research projects conducted to develop peri-urban agricultural models Agricultural models tested in select sites in Asia 	<p>4.3 Increased knowledge of the impacts of changing land use patterns from food to feed and fuel</p>	<ul style="list-style-type: none"> Number of applications adopted Number of areas where application models are adopted 	<ul style="list-style-type: none"> Country reports; Research survey reports; Publication database 	<ul style="list-style-type: none"> Review of reports and database; RMU and Project Staff Annual 	

Types of Outputs	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy	Assumptions
<ul style="list-style-type: none"> Research conducted to understand current policies vulnerability and resilience in urban plans Commercial joint ventures implemented to produce and test models for integration of vulnerability and resilience attributes in urban plans Technical assistance provided to countries 	<p>4.4 Increased recognition and integration of vulnerability and resilience as attributes in urban plans and designs by policy planners</p>	<ul style="list-style-type: none"> % of people benefitting from the use of agricultural models % reduction in food insecurity in SEA and SA Number of policies adopted Number of countries adopting policies Number of models produced and tested Number of models applied 	<ul style="list-style-type: none"> Country reports; Publication database 	<ul style="list-style-type: none"> Review of reports and database; RMU and Project Staff Annual 	
<ul style="list-style-type: none"> Research conducted on development of applications to minimize risk of microbial contamination of food and water sources Research conducted on the extent of use of mycotoxins in agricultural products and development of possible alternatives Research results disseminated 	<p>4.5 Increased use of applications to reduce risk of microbial and chemical contamination of food resulting from climate change</p>	<ul style="list-style-type: none"> Number of industries using the applications Number of publications and citations 	<ul style="list-style-type: none"> Industry reports Publication database 	<ul style="list-style-type: none"> Review of reports and database; RMU and Project Staff Annual 	

Types of Outputs	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy	Assumptions
<ul style="list-style-type: none"> Research conducted to develop alternative livelihood and livelihood diversification strategies in South and South East Asia 	4.6 Increased adoption of alternative livelihoods and livelihood diversification strategies by smallholders	<ul style="list-style-type: none"> % reduction in poverty level Number of alternative livelihood strategies adopted Number of livelihood diversification strategies adopted 	<ul style="list-style-type: none"> Country and regional reports 	<ul style="list-style-type: none"> Review of reports and database; RMU and Project Staff Annual 	

E. Low Carbon and Sustainability Consumption and Production Technologies and Management

Types of Outputs	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy	Assumptions
Specific Objective : Increased adoption of policies and technologies towards a cleaner environment and sustainable energy access in Asia by 2016					
<ul style="list-style-type: none"> Research conducted on integrating resource efficiency concepts in cleaner production technologies Research conducted to review and analyze cleaner production recycling technologies in view of adaptation to local conditions Policy and technology briefs produced and disseminated Responses sent to governments and industries on inquiries on resource efficient cleaner production technology systems 	<p>5.1 Increased awareness about integrating resource efficient concepts into cleaner production technologies amongst policy makers and industry</p>	<ul style="list-style-type: none"> Number of enquiries about cleaner technologies Number of policies adopted by governments and industry on waste management and valorization Number of cleaner technologies adopted by industry 	<ul style="list-style-type: none"> Survey report Country reports Project reports Internal database 	<ul style="list-style-type: none"> Review of reports and databases; RMU/Project Staff; Annual 	
<ul style="list-style-type: none"> Research conducted through Life Cycle Analysis of efficient and environmentally sustainable production technologies and process Research results disseminated 	<p>5.2 Improved knowledge (of industries, academia, general public) on efficient and environmentally sustainable technologies and processes</p>	<ul style="list-style-type: none"> Number of policy papers produced Number of journal papers produced Number of articles in industrial journals Number of articles/queries/interviews in general media 	<ul style="list-style-type: none"> Survey report Internal database 	<ul style="list-style-type: none"> Review of reports and databases; RMU/Project Staff; Annual 	

Types of Outputs	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy	Assumptions
<ul style="list-style-type: none"> • Research conducted on understanding consumption patterns that can lead to reduced energy use, reduced/ reused/recycled materials usage and minimized waste • Research results disseminated 	5.3 Increased adoption of sustainable consumption practices by industry and general public (reduced energy, reduced/reused/recycled materials usage, minimized waste)	<ul style="list-style-type: none"> • Number of major consumers (industries & organizations) adopting sustainable consumption practices • Number of enquiries • Number of industries applying sustainable consumption practices • Amount of GHG emissions reduced as a result of improved sustainable consumption patterns 	<ul style="list-style-type: none"> • Country reports • Industry reports • Project reports and database 	<ul style="list-style-type: none"> • Review of reports and databases; RMU/Project Staff; Annual 	
<ul style="list-style-type: none"> • Research conducted on development of technological applications that can increase energy access • Policy briefs produced and disseminated • Research results disseminated 	5.4 Increased policy actions for adoption of technologies for improved energy access	<ul style="list-style-type: none"> • Number of policies adopted • Number of policies and technologies on energy access actually implemented • Number of publications and citations 	<ul style="list-style-type: none"> • Survey report • Internal database 	<ul style="list-style-type: none"> • Review of reports and databases; RMU/Project Staff; Annual 	
<ul style="list-style-type: none"> • Research projects conducted to study the impact of hydropower system operations • Research results disseminated through publication and other fora 	5.5 Improved hydropower system operations for environmental flow and reduced GHG emissions	<ul style="list-style-type: none"> • Amount of GHG emissions reduced as a result of hydropower construction and operation • Number of people and infrastructures benefiting in both upstream and downstream 	<ul style="list-style-type: none"> • Report from water resources departments 	<ul style="list-style-type: none"> • Review of reports and databases; RMU/Project Staff; Annual 	

Types of Outputs	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy	Assumptions
<ul style="list-style-type: none"> Research conducted on development of technological models for carbon sequestration Technical assistance provided to countries on implementing carbon sequestration models Research results disseminated 	5.6 Improved knowledge of carbon sequestration technologies	<ul style="list-style-type: none"> No. of aquatic animals and plants benefitted in downstream as a result of maintaining environmental flow Quantity of outflow from reservoirs (downstream discharge) % of forested land area Area coverage of new forests % reduction in fossil fuel usage % increase in use of renewable energy technologies Number of publications and citations 	<ul style="list-style-type: none"> Country reports Project reports 	<ul style="list-style-type: none"> Review of reports and databases; RMU/Project Staff; Annual 	

IV. IMPLEMENTATION FRAMEWORK

The AIT Research Strategy (2012-2016) will be implemented by all units and departments of AIT and will be coordinated by the Vice President Research. The Center of Excellence for Sustainable Development in the Context of Climate Change will be the coordinating body for research activities' implementation under the thematic areas identified by the Research Strategy. The SDCC CoE will coordinate the different thematic research groups (TRG) for preparation and submission of research proposals with inputs from relevant departments/units of AIT. The SDCC CoE will continue to monitor country needs for research and advise the TRGs about the country situations and the available partnership and funding opportunities.

Quality assurance mechanisms will continue to function as per their prescribed responsibilities laid down by AIT's Policy and Procedures Manual and a Peer-Review Committee will be set up for institute-wide quality assurance for research.

For implementation of the research strategy, annual action plans will be developed for implementation based on the logframe. The responsibilities of each unit will be clearly identified in the action plans with analysis of the resources required for implementation. This action plan will be developed in consultation with existing collaborators in order to ensure their inputs are incorporated and also to familiarize them with their roles in developing the partnership to enhance mutual benefit.

Research resource mobilization will be coordinated through the Research Management unit under the leadership of VPR. The SDCC CoE, the Head of Research and Education Support and the Coordinator for Sponsored and Contracted Projects Unit will be responsible bodies for collection of information relating to the performance indicators and coordination between the various units of AIT.

Through the implementation of this research strategy, AIT will also seek to diversify itself into a research network hub. AIT, in the past, has been involved in management of research grants, from small to large scale, for multiple research projects in Asia, implemented by different government and research institutions. This role has been increasing for AIT, with multiple requests from donors to manage regional research grants, and it is expected to increase further from January 2012 onwards, once AIT's legal status will change to that of a full-fledged international inter-governmental organization. AIT will seek to strengthen this role of mediating between research donors and research implementers. AIT has in place a grants management system that takes into account the

issues of quality and transparency which are vital to the grants management process.

The implementation framework of the research strategy is demonstrated in Table 4.1 below.

Table 4.1 – Research Implementation and Management

Activity	Responsibility	Frequency
Action plan development and implementation	VPR – Research Management Unit, SDCC CoE and Dean’s Offices of the schools/Divisions	Annual
Resource mobilization, Budget and management plan, and implementation	VPR - Research Management Unit, SDCC Thematic Groups, Finance Department, SCPU	Annual
Coordination of teams for preparation and submission of research proposals	Research Management Unit, SDCC CoE, AIT Consulting, SCPU	Periodic
Quality assurance	VPR, VPAA, Academic Senate, DPRC, Dean’s offices, FoS Coordinators, Supervisors, SDCC CoE	As scheduled and through regular assessments
Data collection and presentation from FoS and other bodies as per the logframe; Management of research project funding	SDCC CoE, Head Research and Administration, Alumni Affairs Office, Library, SCPU	Semi-annual, Annual or as scheduled
Dissemination of research results	VPR – Research Management Unit, SDCC CoE	Annual and as required
Grants Management	VPR – Research Management Unit, Grant Management Team, Finance Department and External Resource Persons	As required
Implementation of activities for realization of outputs common to all outcomes and management outcomes	VPR, School Deans, FoS Coordinators, SDCC CoE	Annual

