



Gender, the Environment and Sustainable Development in Asia and the Pacific

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Foreword



THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT IS A VISIONARY COVENANT FOR HUMAN PROGRESS.

This aspirational agenda is built on the idea of “leaving no one behind” in the journey towards inclusive and sustainable development. Achieving gender equality and empowering all women and girls are decisive factors in transforming this vision into a reality, particularly in Asia and the Pacific where only 5 of 53 ESCAP member States have achieved a low level of gender equality according to the Gender Inequality Index

The lives of a significant portion of the women are inextricably tied to the use of the environment for daily support and livelihood in our region. Nearly 58 per cent of the economically active women work in the agriculture sector. Women constitute 54 per cent of the labour force in small-scale inland fisheries. And more than 80 per cent of rural households rely on biomass for fuel, which affects a preponderance of women. Environmental depletion and climate induced changes add increased pressures on women’s time, income, health, nutrition and social support systems. For sustainable development to become a reality, it is incumbent on policymakers to envision growth strategies that recognise and respond to the gender-based realities in the sphere of managing the environment and natural resources.

Gender, the Environment and Sustainable Development in Asia and the Pacific is the first Asia-Pacific report that comprehensively maps out the intersections between gender and environment at the levels of household, work, community and policy. This publication examines gender in the spheres of food security, agriculture, energy, water, fisheries and forestry. It identifies the strategic points for policy interventions. Based on a grounded study of the reality in the Asia-Pacific region, this report assembles good practices and policy lessons that could be capitalized on to advance the 2030 Agenda for Sustainable Development in our region.

The report draws five policy-relevant conclusions on the relationship between gender and the environment:

- First, persistent gender inequalities threaten to exacerbate maintaining food security in our region. Women play a pivotal role in all three dimensions of food security—availability, accessibility and utilization of food. Their role in these dimensions also intersects with the responsibilities, opportunities and constraints they face in their households, at work and within their communities. Climate-induced weather variations coupled with deforestation require women and girls to travel greater distances to collect food and water and thereby divert time that could otherwise be used for income-generating activity. Worsening constraints will not only increase women’s time burdens, but also threaten to reduce nutrition for women and impact the educational attainment of girl children.
- Second, structural biases must be eliminated to enable women to thrive in agriculture. The majority of the economically active women in the Asia-Pacific region work in the agriculture sector, and rural outmigration of men has led to the feminization of agricultural labour force. However, structural factors have restricted women farmers’ access to credit, irrigation and extension services and thereby negatively affected productivity. If women had access to and control of the same resources as men, their contributions would increase food production by 2.5–4 per cent, which would be enough to move 150 million people out of hunger and poverty across the developing world. With more than 60 per cent of the undernourished or chronically hungry people in the world living in Asia and the Pacific, it is therefore imperative that we redress access barriers to enable women to thrive in agriculture.

- Third, clean energy has transformative potential to enhance productivity, health outcomes, and relieve the burden of housework. The Asia-Pacific region today has at least 455 million people who lack access to electricity and more than 2 billion people still relying on biomass, or solid fuel, for cooking. Women, especially in rural areas, bear the brunt of energy poverty and are heavily impacted by the reliance on biomass, which is the single most important feature of the energy mix in the region. The lack of access to clean, reliable energy exacerbates the many challenges women face on a daily basis.
- Fourth, integrating gender concerns into policy making in agriculture, energy, water, fisheries and forestry sectors is critical to addressing gender disparity and enhancing women's access to resources and economic empowerment. Actions to advance gender mainstreaming at the policy and programme levels include gender analysis and establishing gender targets and indicators within specific sectors, along with gender-responsive budgeting to support the equitable distribution of resources.
- Finally, empowering women and creating enabling environments to foster women's effective participation and leadership in the management of environmental resources will positively influence conservation and resource efficiency. Women's participation and leadership are outcome-changing factors for the sustainable management of resources. Country-specific evidence in this report reinforces how empowering women in local decision-making over the conservation of forests and fisheries leads to better resource efficiency and conservation. Women's leadership will make a difference in the sustainable management of resources, which is why the sociocultural factors that impede their ability to lead must be recognized.

In our collective quest for a more balanced development strategy that propels economic growth, protects the environment and advances social development, we must ensure half of the population is not left behind. I hope that this report will be read with interest and help stimulate further action to address critical gender concerns in the advancement of the Sustainable Development Agenda.



Shamshad Akhtar

Under-Secretary-General of the United Nations and
Executive Secretary of ESCAP

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Executive summary

The lives of a significant portion of the population in the Asia-Pacific region are inextricably tied to the use of environment for daily support and livelihood, especially women's lives. For instance, more than 80 per cent of rural households in the region use biomass for fuel, compared with only 25 per cent of urban households, which affects a preponderance of women more than men. Around 58 per cent of the economically active women in the region are in the agriculture sector. Women constitute 54 per cent of the labour force in small-scale inland fisheries in the region. If the agenda of sustainable development is to advance in this region, countries need to understand—and then respond to—the gender-based realities (including inequalities and disparities) in the sphere of managing the environment and natural resources.

This report looks at gender inequalities as they relate to food and nutrition security and to the agriculture, energy, water, fisheries and forestry sectors in the Asia-Pacific region. The following captures the key messages and policy lessons that could guide policymakers, private sector leaders and other actors involved in the gender and environmental arenas.

The gender-environment intersection is key to promote the advancement of the 2030 Agenda for Sustainable Development. The 2030 Agenda and the associated Sustainable Development Goals (SDGs) set the foundation for comprehensive and integrated action on environmental sustainability. With the focus of these goals to leave no one behind, addressing environmental concerns must consider inequality and exclusion between men and women—the social dimensions of sustainable development. The socially constructed differences between men and women are an important dimension of inequality and exclusion and must be tackled to achieve the SDGs.

The constraints faced by households in maintaining food security will be exacerbated if gender inequalities are allowed to persist. More than 60 per cent of undernourished or chronically hungry people in the world live in the Asia-Pacific region. In rural and urban areas, seasonal variability, which pushes up the price of staples, forces households to spend more of their income on food. Coping strategies that reduce the amount of food consumed

have direct impacts on lowering the nutritional status, thus making children and women vulnerable to nutritional deficits. Climate change-induced weather variations, coupled with deforestation, require greater distance to be travelled to collect food and water from safe sources, thus diverting time that would otherwise be used for income-generating activities, community activities or simply for leisure. Women and girls who travel farther from home to find food and water are also at risk of sexual harassment. In households that reduce non-food expenditures in response to rising food costs, young and adolescent girls are likely to be pulled out of school, while available funds are likely to be redirected to educate boys. Policies in the region must address the three dimensions of food security—availability, accessibility and utilization, while also acknowledging the gendered aspects of these dimensions, which impact the health and nutritional status of children and women.

Alleviate structural biases so that women can thrive in agriculture. Although the majority of the economically active women in the Asia-Pacific region engage in agriculture, less than 20 per cent of women hold secure tenure to the lands they farm. Structural factors impede women's access to credit, mechanical equipment, irrigation facilities and extension services, in turn having a negative effect on agricultural productivity. Waged employment in commercial agriculture and export-based agriculture is beset with low remuneration and insecure conditions of work, which push women further into vulnerable positions. It is widely acknowledged that if women had access to and control of the same opportunities and resources as men, their contributions would increase food production by as little as 2.5 per cent and by as much as 4 per cent—enough to move 150 million people out of hunger and poverty across the developing world. It is imperative to take note of the gender-differentiated concerns in agriculture in the region, especially in light of the large-scale rural outmigration of men that leaves women to foray into wage work under stringent pay conditions.

Clean energy has the transformative potential to enhance productivity and health outcomes. Energy access is a critical enabler to development, having a transformative role in enhancing productivity and effectiveness at home and at work. When women gain access to quality energy services, households experience multiple positive impacts related to

health, income generation and family well-being. The implications for economically empowering women can reach far beyond the individual; especially considering that women tend to reinvest up to 90 per cent of their income in their families and communities, while men tend to reinvest only 30–40 per cent.

In contrast, the absence of clean energies has detrimental effects. The Asia-Pacific region has at least 455 million people who lack access to electricity and more than 2 billion people who rely on solid fuels for cooking, which creates attendant health problems. Of the 4.3 million deaths worldwide attributed to household air pollution in 2012, 80 per cent were in Asia and the Pacific. Globally, household air pollution is the second-most important health risk factor for women and girls. Sixty per cent of all premature deaths attributed to household air pollution occur in women and children. Policy interventions should urgently address the need to transition to clean energies while acknowledging the gendered dimensions of control over the allocation of resources within households.

It is crucial to integrate gender concerns into the energy sector. The thrust of national energy policies in the Asia-Pacific region has largely been on electrification, but with almost no mention of gender-based realities, particularly gender inequalities. The energy sector employs considerably fewer women than men and mostly in administrative jobs. There are, however, several cases of women in the delivery of energy services, mainly decentralized renewable energy technologies, including the dissemination of solar home systems and lanterns, improved cookstoves and the management of community-based off-grid systems. This is a good practice that should be replicated as much as possible across the region. National energy policies or programmes seldom use sex-disaggregated information. Yet, the sector stands to gain immensely by using data that provide information on women's and men's energy use, access to resources and participation in decision-making.

Address the “missing women” scenario in water sector policies. Water is a resource that is fundamental to achieving sustainable development. Everyone's right to safe drinking water and sanitation is pivotal for realizing other human rights. In Asia, girls and boys walk approximately 6 kilometres a day just to fetch water. Time burdens such as these are known to affect

educational outcomes. Women are consistently absent in decision-making structures and policymaking in the water sector. There is a need to give space to women, their knowledge and capacities as well as their priorities in this sector, especially in sustainable water resource management, water-related disaster management and the design of sanitation policies. Huge data gaps remain in Asia and the Pacific for measuring the status quo as well as progress in improving access to drinking water and sanitation, thereby seriously impeding evidence-based policymaking.

Recognize the vital economic contribution of women in the fisheries sector. The Asia-Pacific region accounts for 84 per cent of people working in fisheries and aquaculture and 94 per cent of people engaged in fish farming. Of them, 66 per cent of the workers in large-scale marine fisheries and 54 per cent in small-scale inland fisheries are women. Despite the seemingly valuable contribution that women make to this sector, the nature of their work is treated as inconsequential. Women often work as low-skilled, low-paid labourers and have irregular seasonal employment in processing, packaging and marketing. Although they participate in a range of activities throughout the value chain, it does not translate to decision-making power primarily because the work undertaken by women in this sector lacks official recognition. Official data tend to focus on open-ocean and river fishing, which are male bastions, ignoring the rest of the fishing cycle, where women work. It is imperative for policymakers to track the fishing cycle from start to finish, thereby making visible the “invisible work” done by women within the fisheries sector of the region.

Enhance women's effective participation in the forestry sector. An alarming rate of deforestation is taking place across the region due to land-use change in agriculture, urbanization, mining and infrastructure development. Development that rides on the back of depletion of forest resources is unsustainable and measures must be taken to use, manage and protect forests in a sustainable manner. It was found in India and Nepal that empowering women in local decision-making with respect to the conservation of forests and fisheries leads to better resource efficiency and conservation. Pathways to the sustainable management of forest resources could benefit from the knowledge and capacities that women have honed through their interactions with forests.

Empower women's leadership for the sustainable management of environmental resources. While women's leadership remains key for the sustainable management of resources, it is important to recognize the sociocultural factors that impede their ability to lead. Policymakers need to design strategies that enable women leaders to navigate their social milieu successfully to further the sustainable management of resources as well as drive towards gender empowerment and equality. For this to happen, a shift is needed from a narrow focus on the "participation" of women to the "recognition" of women's knowledge and capacities to manage environmental resources. Although participation remains important as ever, it is equally important to dissect the type of participation available to women.

Policy lessons

1 Adopt gender mainstreaming as a mechanism to enact gender-responsive policies and interventions

- Develop well-articulated commitment to gender equality and women's empowerment through specific gender policy declarations within the food, energy, water, fisheries and forestry sectors.
- Create and enable gender focal points within sectors to catalyse government commitments.
- Conduct gender analysis during the planning stage of programmes and policies.
- Design gender-responsive strategies and programmes across sectors to include goals relevant to each sector, such as targets for the extent and type of women's participation, carrying out research to evaluate interventions and the impact of gender-responsive design elements.
- Devise strategies to close the gender wage differentials in these sectors.

2 Conduct systems mapping within and across sectors to address gender concerns

- Undertake systems mapping to understand the actors and organizations within sectors that are critical to address gender concerns.
- Identify prospective organizations, actors and points of entry that could address gender concerns within the sector as well as collaborate with other sectors to capitalize on synergies.

3 Adopt gender budgeting to establish gender-responsive financing goals, processes and mechanisms

- Adopt gender budgeting to facilitate the access of women entrepreneurs, leaders of civil society organizations and small-scale providers to financial resources by utilizing an integrated approach.
- Capitalize on the cooperative work between different government ministries to synergize the provision of grants, credit lines or alternative financing mechanisms on easy terms.

4 Develop instruments, processes and gender-responsive measurements to capture sex-disaggregated data

- Examine current data collection instruments and processes to devise ways to report sex disaggregation, especially for Tier 1 and Tier 2 indicators that are already being reported by member States within the Economic and Social Commission for Asia and the Pacific (ESCAP) region.
- Set up gender-responsive measuring criterion from the start for Tier 3 indicators, especially in the Pacific subregion, where data coverage is the lowest of all ESCAP subregions.

5 Foster women's participation, leadership and involvement in decision-making at all levels

- Strengthen the policy processes and decision-making at the national, subnational and local levels to ensure that the participation of women is effective.
- Establish mandatory quotas to ensure women's representation in environmental associations, community organizations and in local and national government decision-making structures, including ministries (or their equivalent) managing the environment and natural resources.
- Launch initiatives to encourage and foster women's leadership that recognize and address the social milieu within which women take up leadership and decision-making roles.
- Analyse the extent and the type of participation women have access to, and design policies that enhance the effective participation of women.
- Create profiles of successful women's participation and leadership and disseminate their stories widely.

6 Recognize women's unpaid care work

- Recognize women's contributions to the economy by funding and improving the capacity of statistical bureaus for data collection, particularly for time-use surveys, and invest in finding ways to tabulate the value of women's unpaid work contributions to the economy in terms of gross domestic product.
- Reduce the time spent on collecting resources for household use by improving access to clean and efficient technologies.
- Redistribute work through the promotion of long-term normative change; adopt measures to redistribute the burdens of unpaid work, like the provision of parental leave (both for fathers and mothers) and affordable child care services. Co-opt men to tackle underlying social norms to affect behavioural change.

7 Promote clean cooking fuels and technologies

- Enhance political and financial commitment to ensure that all households across the region switch to clean fuels.
- Invest in education and awareness spreading, particularly among men, on the health benefits of transitioning to clean energy technologies.

8 Support women as "green entrepreneurs"

- Promote a green economy, which provides opportunity to foster women's entrepreneurship that is environmentally sustainable, especially with cleaner energy technologies.
- Enhance policy commitment at the national level to create and support an enabling environment for women entrepreneurs to thrive in.
- Create a level playing field for women as green entrepreneurs by putting in place systems and mechanisms that support women's concerns and priorities.
- Extend assistance to organizations that are willing and capable of supporting women green entrepreneurs.

9 Strengthen women's leadership and entrepreneurial skills

- Develop gender-responsive capacity-building programmes that recognize and engage with women's knowledge for sustainable resource management.
- Develop capacity-building programmes that enrich women's capacities to navigate their leadership roles in decision-making and the management of natural resources.
- Develop capacity-building programmes that foster women as green entrepreneurs.



10 Prioritize development, funding, dissemination and the adoption of new gender-responsive technologies

- Promote technologies that enable time and energy savings within households.
- Leverage information and communications technologies to facilitate and strengthen the opportunities for women entrepreneurs to access information, exchange information and promote their businesses and most importantly, to give voice to their concerns.
- Promote the development of mobile platform technologies for data collection.

11 Integrate gender analyses into policymaking and strategies for climate change adaptation and mitigation

- Integrate gender analysis into climate change policies and programmes at all levels.

- Require analysis of the gender dimensions of development programmes as a qualifying criterion for environmental-funding initiatives to ensure that all interventions benefit women as well as men.

12 Recognize women's land and property rights through appropriate legislation

- Promote changes to customary laws and structures to ensure that women have rights to land and property equal with men.
- Develop progressive legislation that recognizes women's rights to land and property.
- Emphasize comprehensive examination of the realities of the impact of such laws.

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Abbreviations and acronyms

ADB	Asian Development Bank	IRENA	International Renewable Energy Agency
AES	agricultural extension services	IUCN	International Union for Conservation of Nature
AIPP	Asia Indigenous Peoples Pact	IWA	International Water Association
AIT	Asia Institute of Technology	IWMI	International Water Management Institute
APO	Asia Productivity Organization	LPG	liquefied petroleum gas
ASDP	Agricultural Sector Strategic Development Plan	MARD	Ministry of Agriculture and Rural Development, Viet Nam
ASEAN	Association of Southeast Asian Nations	MDGs	Millennium Development Goals
ASTAE	Asia Alternative Energy	MPI	Multidimensional Poverty Index
CBOs	community-based organizations	NORAD	North American Aerospace Defense Command
CGIAR	Consultative Group on International Agricultural Research	OECD	Organisation for Economic Co-operation and Development
DESA	United Nations, Department of Economic and Social Affairs	P2P	Power to the Poor
ESCAP	United Nations, Economic and Social Commission for Asia and the Pacific	REDD	Reducing emissions from deforestation and forest degradation
ESMAP	Energy Sector Management Assistance Program	REDD+	Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries
FAO	Food and Agriculture Organization of the United Nations	RECOFTC	Regional Community Forestry Training Center (Asia and the Pacific)
GACC	Global Alliance for Clean Cookstoves	REDP	Rural Energy Development Project
GERES	Group for the Environment, Renewable Energy and Solidarity	SDGs	Sustainable Development Goals
GII	Gender Inequality Index	SEWA	Self-Employed Women's Association, India
GDP	gross domestic product	SMEs	small and medium-sized enterprises
GMAG	Gender Mainstreaming Action Group	SPC	Secretariat of the Pacific Community
GWA	Gender and Water Alliance	SSP	Swayam Shikshan Prayog, India
HKI	Helen Keller International	TVET	technical and vocational education and training
IEA	International Energy Agency	UNCCD	United Nations Convention to Combat Desertification
IEG	Independent Evaluation Group	UNDP	United Nations Development Programme
IFAD	International Fund for Agricultural Development	UNE	University of New England
IGES	Institute for Global Environmental Strategies		
ILO	International Labour Organization		
IOM	International Organization for Migration		

UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
UNIDO	United Nations Industrial Development Organization
UNISDR	United Nations Office for Disaster Risk Reduction
UNU	United Nations University
UNW-DPC	UN-Water Decade Programme on Capacity Development
USAID	United States Agency for International Development
WASH	water, sanitation and hygiene
WEDO	Women's Environment and Development Organization
WHO	World Health Organization
wPOWER	Women's Entrepreneurship in Clean Energy
WSP	Water and Sanitation Program
WWAP	World Water Assessment Programme

Introduction

GENDER INEQUALITY IS A CROSS-CUTTING issue that impacts the social, economic and environmental dimensions of sustainable development. Existing structural inequalities and social norms create different conditions for women and men. Juxtapose this with the fact that we live in the Anthropocene era, wherein human activities contribute towards ecological changes (Steffen, and others, 2004). Therefore, “environment” goes beyond its physical form to encompass social dynamics, such as gender-based dynamics, within which human lives are implicated. The social dynamics, on the other hand, affect how environmental resources are used, accessed and made part of human existence.

This publication looks at the intersections between gender inequalities and the environment as a critical link for achieving sustainable development. This intersection is key because the lives and livelihoods of a good majority of the population in Asia and the Pacific depend on the resources discussed in this report. Through those discussions on food, energy, water, fisheries and forestry, the report contributes towards our understanding of the gendered dynamics in the interactions between human beings and environmental resources.

Integrating the environmental, economic and social dimensions of sustainable development—for people, prosperity and planet—is the basis of the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs). This report speaks to the complex and interlinked nature of the dynamics between gender inequalities and environmental concerns. While emphasis is on the junctures in which gender issues and environmental concerns could come together for achieving sustainable development, the report also sheds light on the economic aspects of these junctures through the detailed attention to livelihoods and the interactions women experience in the economic sphere. Throughout the report, attention is given to other cross-cutting themes, like climate change, health and disaster management.

Building on this foundation, the report uses its gendered analysis of environmental issues to illustrate the different conditions that women and men face and the corresponding effects of policies and programmes related to the environment.

i International frameworks for action

The 2030 Agenda has created renewed momentum for the advancement of gender equality and women’s empowerment (SDG 5) and for concerted action on environmental issues (SDGs 6, 13, 14 and 15). There is increased emphasis on environmental sustainability, galvanized through the Paris Agreement and the Sendai Framework for Disaster Risk Reduction.

Adopted by United Nations Member States in 2015, the 2030 Agenda is a plan of action for the next 15 years. Composed of 17 goals and 169 targets, it builds on the Millennium Development Goals (MDGs) by expanding the scope and seeking to complete what they did not achieve.

The Paris Agreement, which came into force in November 2016, is a ground-breaking, legally binding and ambitious effort to tackle climate change and adapt to its effects on the global scale. With 148 States ratifying the accord as of June 2017, the agreement seeks to establish a global warming objective of below 2 degrees Celsius on pre-industrial averages and, for the first time, establishes a process for countries to develop plans detailing contributions to climate change mitigation, which are to be monitored periodically (UNFCCC, n.d.).

The Sendai Framework for Disaster Risk Reduction is the first major agreement of the post-2015 development agenda and is an important international instrument for Asia and the Pacific, which is considered the most disaster-prone region in the world. Unlike the Paris Agreement, however, the Sendai Framework is non-binding and voluntary. It consists of seven global targets and four priorities for action to substantially reduce disaster risks and “losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries”.¹

1 See www.unisdr.org/we/coordinate/sendai-framework.

The 2030 Agenda and the two international frameworks represent a collective call for environmental sustainability that integrates the importance of livelihoods, well-being and sustainable economic development.

ii Features of the 2030 Agenda and the prominence of gender equality and environmental sustainability

The 2030 Agenda is a blueprint for progress that provides specific goals as well as three key underpinnings that are to be considered while undertaking developmental work: (a) the goals are integrated and indivisible, balancing the three dimensions of sustainable development; (b) the 2030 Agenda pledges to leave no one behind; and (c) the 2030 Agenda affirms the importance of human rights and the achievement of gender equality.² These features are woven throughout the SDGs and their targets, which cover a range of issues critical for sustainable development. Of note is the prominence of gender equality, which has a dedicated goal (SDG 5) and has been mainstreamed throughout the other goals. Another important change is the prominence of environmental sustainability with several goals dedicated to specific environmental challenges. Table 1 delineates the connections between the environmental and social dimensions to illustrate the integrated and indivisible underpinning.

iii Purpose of this gender analysis

The post-2015 development architecture, particularly the 2030 Agenda, together with the Paris Agreement and the Sendai Framework, sets the foundation for comprehensive and integrated action on environmental sustainability. The different goals in the 2030 Agenda are a blueprint for the thematic areas that the international community must address, with an overarching objective to leave no one behind. This means that in addressing environmental concerns, we must consider who has access to, uses and benefits from what, to what degree and at what environmental cost, who has knowledge on environmental resource management and who gets to make decisions on access to and use of the environmental resources.

Thus, inequality and exclusion—the social dimensions of sustainable development—are a critical concern. The differences between social groups of men and women and the complex and overlapping inequalities related to gender, ethnic, class, race, age and nationality within each group are important determinants of exclusion and therefore must be tackled if we truly want to achieve the SDGs.

To advance this understanding in the Asia-Pacific region, this publication takes on analysis of the intersections between gender inequalities and environmental concerns to answer how gender interacts with and impacts the environment and vice versa. It includes some good practices and advocacy points that can support the integration of gender analyses in environmental policymaking initiatives.

iv The analytical approach

A gendered analysis of the environment moves away from the ecofeminism approach and the women, environment and development approach, both of which posit an intrinsic, close relationship between women and nature. A gendered analysis of the environment instead theorizes that both men's and women's relationship with nature should be seen through the lens of material reality—in their specific interactions with the environment (Agarwal, 1992, p. 126). In this report, the material reality that mediates the relationship between humans and the environment refers to food, water, energy, fisheries and forest resources.

This report also moves away from a simplistic understanding of gender as women and analyses gender relations through the power relations between men and women in different arenas: household, work, community and policy. Often, these power relations intersect with class, ethnicity, geographic location, disability and age to aggravate inequalities and social exclusion. Thus, gender is understood in this report through contextual and intersectional signifiers, with a focus on addressing the structural factors that contribute towards gender inequalities.

² See General Assembly Resolution 70/1, www.un.org/ga/search/viewm_doc.asp?symbol=A/RES/70/1.

Table 1**Selected Sustainable Development Goals and the links between the environmental and social dimensions**

SDGS	ENVIRONMENTAL AND SOCIAL LINKS
Goal 1 End poverty in all its forms everywhere	This goal and its targets recognize the multiple determinants of poverty, emphasizing the need to ensure that all social groups of men and women have access to and control over the land and natural resources necessary to support life and livelihoods. It underscores the importance of building resilience among poor and vulnerable populations to reduce their exposure to climate-related extreme events and other environmental shocks and disasters.
Goal 2 End hunger, achieve food security and improved nutrition and promote sustainable agriculture	This goal's targets acknowledge the critical role that women have in agricultural production and recognizes their nutritional needs. This goal also mainstreams sustainability aspects of food production, such as the need for resilient agricultural practices and increasing adaptation capacities to climate change.
Goal 5 Achieve gender equality and empower all women and girls	This goal recognizes the multidimensional challenge of gender equality and women's empowerment. Going beyond education, maternal health and political participation, this goal includes key issues that are holding women and girls back. They include all forms of discrimination and violence against women in the private and public spheres, eliminating harmful practices, recognizing and valuing unpaid care and domestic work, universal access to sexual and reproductive health care, equal rights to economic resources, land and other natural resources, enhancing the use of enabling technology and strengthening legislation.
Goal 6 Ensure the availability and sustainable management of water and sanitation for all	This goal aims for the achievement of universal and equitable access to safe and affordable drinking water. Its targets call for strengthening the participation of local communities in water and sanitation management.
Goal 7 Ensure access to affordable, reliable, sustainable and modern energy for all	This goal seeks universal access to affordable, reliable and modern energy services and to expand infrastructure and technology for supplying modern and sustainable energy services for all.
Goal 11 Make cities and human settlements inclusive, safe, resilient and sustainable	This goal aims to ensure access for all to adequate, safe and affordable housing and basic services; access to safe and affordable transportation with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons; the protection and safeguarding of the world's natural heritage; reduction of the impact of disaster-related risks, with a particular focus on the poor and people in vulnerable situations; attention to air quality and municipal and other waste management.
Goal 13 Take urgent action to combat climate change and its impacts	This goal aims to improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning; promote mechanisms for improving capacity for effective climate change-related planning and management in least developed countries and small island developing States, including a focus on women, youth and local and marginalized communities.
Goal 14 Conserve and sustainably use the oceans, seas and marine resources for sustainable development	This goal promotes the sustainable use of oceans, seas and marine resources and recognizes the importance of artisanal fishing in community livelihoods.
Goal 15 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	This goal promotes the implementation of sustainable management of all types of forests and promotes the fair and equitable sharing of the benefits arising from the utilization of genetic resources.

Within the sphere of the household, a key concept that most chapters grapple with is that of time poverty. This concept stems from an understanding of time as a resource that could be converted into material things, such as goods, money and services via work (Abdourahman, 2010). Time is also a resource for consumption, leisure and community activities. When time poverty is used as an optic to examine the gender and environment intersections, the nature and extent of demands that resources make on women's time come to light. New technologies can ameliorate the time that has to be spent gathering fuelwood, water and food, thereby freeing up time to be used elsewhere.

Within the sphere of work, the report flags concerns regarding visibility, the need to give official status to women workers in certain sectors and to generate sex-disaggregated employment data. Policy emphasis on gender mainstreaming, gender budgeting and concerted measures to review and revise data instruments to lend visibility to gender inequalities would address the concerns.

Within the sphere of community, the report also grapples with the issues of participation, leadership and decision-making capacities of women in the use and management of environmental resources. While the discussion argues for greater participation of women, it also looks at the structural factors that limit women's active participation. The analysis emphasizes the need for future analysis to look at the extent and type of participation that women have access to and the knowledge and capacities of women regarding environmental conservation as a pathway to the sustainable management of resources.

Within the sphere of policy, the report is interested in heralding new forms of interventions that take into account the structural factors that limit women's voice in policy interventions, both as decision makers as well as beneficiaries. By understanding the structural limitations better, policymakers could design interventions that advance women's capacities to use, access and manage environmental resources.

The report looks at how differently men and women access, use and make a living out of environmental resources. It also recognizes that "women" do not form a homogenous category and that such factors as class, ethnicity, nationality, age, geographical location

and disability complicate access, use and reliance on environmental resources. While the report ultimately recommends measures to make women's voices heard, it is based on a cross-section of women in the Asia-Pacific region who are dependent upon natural resources for daily life and livelihood. While particularities emerge in the evidence used for the analysis, there is much to be gained for policymaking by understanding the nature of constraints that inhibit women's use, access to and management of natural resources.

v Organization of the report

This report is organized into five chapters. Chapter 1 examines the different facets of gender inequality in Asia and the Pacific. Chapter 2 discusses the intersections between gender inequalities and food security, with a view to create pathways to sustainable agriculture. The chapter traces the intersections within the household, work and community spheres, while also recommending policy measures that could strengthen the position of women and thus ensure food security. Chapter 3 discusses extensively the links between gender and energy as they relate to the realms of household, work and community. It features national policies and strategies that have succeeded in advancing gender equality and empowerment. Chapter 4 turns to the intersections of gender and water as they relate to the household, livelihoods and paid work, as well as governance and leadership. Chapter 5 discusses the fisheries and forestry sectors as they intersect with gender-based realities.



Chapter 1: **Dimensions of gender inequality in Asia and the Pacific**

GENDER NORMS AND SOCIAL STRUCTURES, which shape a particular understanding of women's place in society—at home, work and in the community—obstruct equality of opportunity between men and women. This chapter draws out dimensions of gender inequality in the Asia-Pacific region to set the scene for the subsequent chapters.

1.1

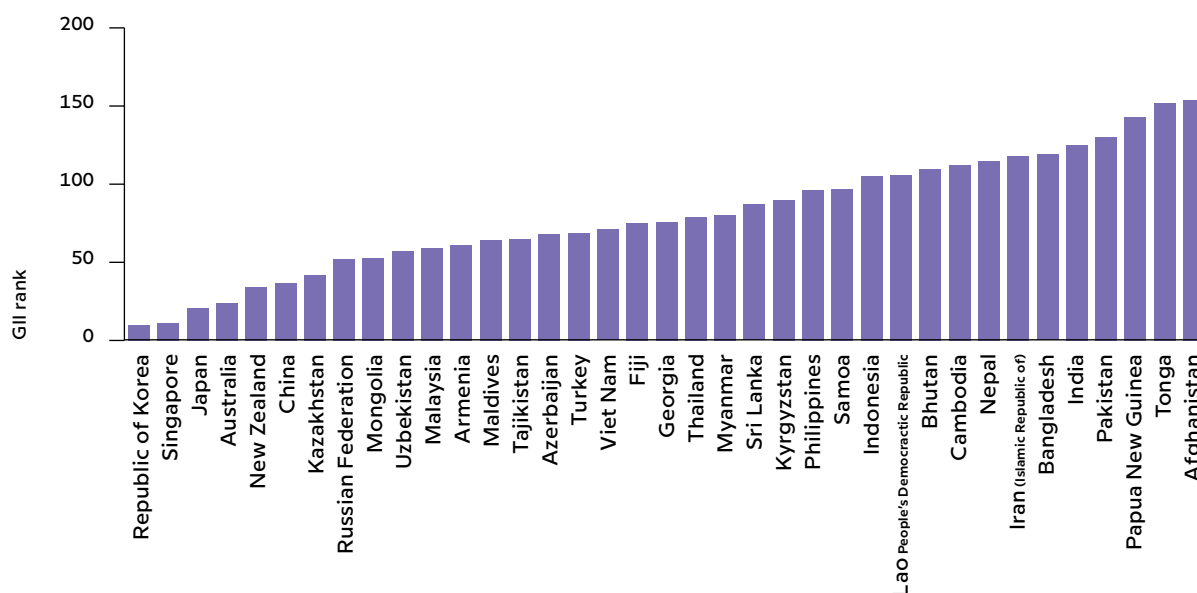
Examining gender inequality in Asia and the Pacific

Gender inequality is one of the most pervasive challenges throughout the region and the world. Trends in the Asia-Pacific region reflect a mixed picture on different aspects of gender inequality, with substantial variations across countries and territories. The United Nations Development Programme's (UNDP) Gender Inequality Index (GII), which combines maternal mortality ratios, adolescent birth rates,

share of women holding seats in parliament, levels of secondary education and the labour force participation rate, indicates that countries classified in the “very high human development” category also rank high in the GII, which means they have a low level of gender inequality. Within the region, these countries number only five: Australia, Japan, New Zealand, Republic of Korea, Russian Federation and Singapore.³ The majority of member States in the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) for which GII scores are available rank between 37th and 154th place, with the poorest five performers in terms of gender inequality being Afghanistan (154th of 157 countries), Tonga (152nd), Papua New Guinea (143rd), Pakistan (130th), India (125th) and Bangladesh (119th).

When looking at indicators of human development and gender equality for the region, progress has been made in education enrolment. According to the Gender Parity Index, several countries have achieved primary enrolment parity or exceeded it. In 2013, most countries in the region have attained female-to-male enrolment ratios in the range of 0.9 or higher, with exceptions being Pakistan, at 0.87, and Afghanistan, at

Figure 1
Gender Inequality Index rank of ESCAP member States, 2015



Source: ESCAP, based on UNDP Human Development Database; see <http://hdr.undp.org/en/data> (accessed 3 August 2017).

³ Brunei Darussalam and Hong Kong, China (associate member) are also classified as having “very high human development”, but their GII rank and value were not available due to missing data. The HDI ranks for the “very high human development” categories from the Asia-Pacific region are: Australia (2nd), Singapore (5th), Hong Kong, China (associate member, 12th), New Zealand (13th), Japan (17th), Brunei Darussalam (30th) and Russian Federation (49th).

0.7.^{4,5} A similar picture is evident for gender parity in secondary enrolment, where the female-to-male ratios are, for the most part, between 0.9 and 1.16, with the exception of Afghanistan (at 0.56), Pakistan (at 0.73), and the Lao People's Democratic Republic (at 0.89).⁶

However, there are other dimensions for which progress has been uneven or stagnating and which provide a critical context in analysing the gender-environment intersections: (a) time poverty due to unequal burdens of unpaid care and domestic work, (b) economic empowerment and (c) leadership and political participation.

1.1.1

Time poverty

An important dimension of gender inequality is the differences in the household allocation of time resources. The ways in which households allocate these time resources form a complex set of dynamics, influenced by a variety of factors that respond to the demands and configuration of the family unit as well as more widely held social norms and cultural beliefs. How households divide tasks and time is often due to: (a) the demographic composition of the household, including adults, children and older persons and whether they are male or female or able to participate in the labour market; (b) social norms and their influence on the gendered division of labour; (c) the balancing of economic constraints with resources, such as the need for subsistence production and remunerated or unremunerated work (ADB, 2015a).

Differences in the household allocation of time are measured with specialized time-use surveys. This data have repeatedly shown that, compared with men, women carry a disproportionate burden for unpaid household and care work in most countries, leading to increased time poverty. In developing economies, for example, women spend 4 hours and 30 minutes per day on unpaid care work. In comparison, men spend 1 hour and 2 minutes in the same activities. In regards to paid work, women spend 2 hours less per day than men on

average in developing countries and 1.5 hours less than men in industrialized countries. This situation is not substantially different in the industrialized economies, where that data show that women spend on average 4 hours and 20 minutes on unpaid care work, but men spend 2 hours and 16 minutes per day (ILO, 2016b).

Time-use data from ESCAP member States are not widely available; only a few countries have conducted such a survey (see table 2). Although there are methodological limitations and debates on the comparability of these surveys, a comparison for illustrative purposes indicates that in those countries that have conducted time-use surveys, women perform the vast majority of unpaid work. By extension, women undertake fewer hours of paid work than men. In a few countries, however, such as Bhutan, the Lao People's Democratic Republic and Thailand, the findings show that time spent is similar for women's and men's paid work. Yet, in all those cases, women perform more unpaid work than men. This means that women work longer hours overall when paid and unpaid work are added together, further exacerbating their time poverty. This unpaid work includes the day-to-day management of the household, which entails obtaining clean water for household use, finding or procuring energy sources for cooking and heating, obtaining and preparing food as well as foraging for forest products for household use and income generation.

At the root of these inequalities are patriarchal social norms and the social construction of the male-female binary in which men are considered the breadwinners and women the caregivers. Within this constructed context, monetary earnings by women are seen as "supplementary", without recognizing the critical contributions unpaid work brings to the household, economies and societies. The critical contribution being that unpaid work, specifically care and reproductive work, subsidizes paid work. Costs for care work would be much higher if paid work had to cover the cost of care. Therefore, it is imperative to address the economic value of unpaid care work. This report advocates the three-R framework: recognize, reduce and redistribute household and care work (Elson, 2017). To do so, it is

4 While Afghanistan is still the lowest performer compared with other countries, it has made substantial progress since 1999, when Gender Parity Index ratio stood at 0.08.

5 ESCAP, based on UNESCO Institute for Statistics (UIS) Data Centre; see www.data.unescap.org/escap_stat/ (accessed 11 August 2017).

6 See www.data.unescap.org/escap_stat/ (accessed 11 August 2017).

important to first strengthen the funding and capacity of statistical bureaus for data collection, particularly for time-use surveys, and to invest in researching and costing women's unpaid work contributions to the economy in terms of gross domestic product (GDP) to fully capture the value that women's unpaid work contributes to the economy. Second, improve access to basic infrastructure to reduce women's time burdens for retrieving resources for household daily needs. Improving access to clean sources of water, for example, reduces the time spent by women and girls in collecting it (improving access to safe sanitation decreases burdens related to waterborne diseases). Similarly, improving access to electricity and cooking technologies, such as fuel-efficient cookstoves, reduces the burden of biomass collection for household use. Investing in alternative energy sources, such as solar, biogas and wind energy, is an important opportunity to reduce time burdens while at the same time promoting more sustainable energy consumption.

Finally, at the core of the unpaid care work inequality are social norms that prescribe the gendered divisions of labour. Policymakers need to address these norms when designing policies. In the meantime, measures that can redistribute the burdens of unpaid care work, such as the provision of parental leave (both for fathers and mothers) and affordable child care services, should be pursued.

1.1.2 Women's economic empowerment

Women's economic empowerment traverses such issues as equal opportunities for economic leadership, equal access to economic resources, ownership and control over land and other forms of property, financial services, inheritance and natural resources. Where and how women work and which resources they are able to access and control are important factors that determine

Table 2
Time-use survey per country, showing paid and unpaid care work, by sex and ESCAP member State, as of May 2016

COUNTRY	YEAR	AGE	AVERAGE TIME SPENT (IN HOURS) ON PAID AND UNPAID WORK IN A 24-HOUR PERIOD			
			PAID WORK		UNPAID WORK	
			MEN	WOMEN	MEN	WOMEN
Armenia	2008	15–80	4.85	1.68	1.05	5.22
Australia	2006	15+	4.55	2.35	2.73	5
Azerbaijan	2008	15+	4.67	1.73	2.13	6.1
Bhutan	2006–2007	-	5.65	5	1.48	3.42
Cambodia	2003–2004	15–64	6.3	4.5	0.3	3
China	2008	15–74	6.0	4.38	1.52	3.9
India	1998–1999	6+	6.82	3.02	0.45	4.35
Islamic Republic of Iran	2008–2009	15+	4.68	0.68	1.3	5.08
Japan	2011	10+	5.43	2.77	0.77	3.65
Kazakhstan	2012	10+	3.4	2.23	1.85	4.1
Republic of Korea	2014	10+	4.13	2.88	0.78	3.47
Kyrgyzstan	2015	12+	3.6	2.02	2.43	4.12
Lao People's Democratic Republic	2007–2008	10+	4.7	4	0.5	2.4
Malaysia	2003	15–64	-	-	1.43	4.58
Mongolia	2011	12+	5.8	3.97	2.32	4.83
New Zealand	2009–2010	12+	4.22	2.38	2.53	4.33
Pakistan	2007	10+	5.35	1.3	0.47	4.78
Thailand	2009	10+	5.9	4.5	0.9	3.17
Turkey	2014–2015	15+	4.4	1.27	0.88	4.58

Source: ESCAP, based on UNDESA Time Use Data portal; see <https://unstats.un.org/unsd/gender/timeuse/> (accessed 4 August 2017).

how women use environmental resources and how they are impacted by environmental degradation. When looking at indicators of economic empowerment, worrisome trends in Asia and the Pacific emerge. For instance, the gender gap in labour force participation in the region has actually worsened, with a female-to-male ratio of 0.61 in 2016, down from 0.67 in 1990.^{7,8} In contrast, gender gaps have been decreasing over the past 10 years in other regions of the world (see figure 2a).

The general trend of an increasing gender gap of labour force participation in the ESCAP region is reflected in the subregions as well. Barring agriculture in East and North-East Asia and services in North and Central Asia as well as the Pacific, the rest of the economic activities in the subregion were estimated to employ more men than women in 2016 (see figure 2b).

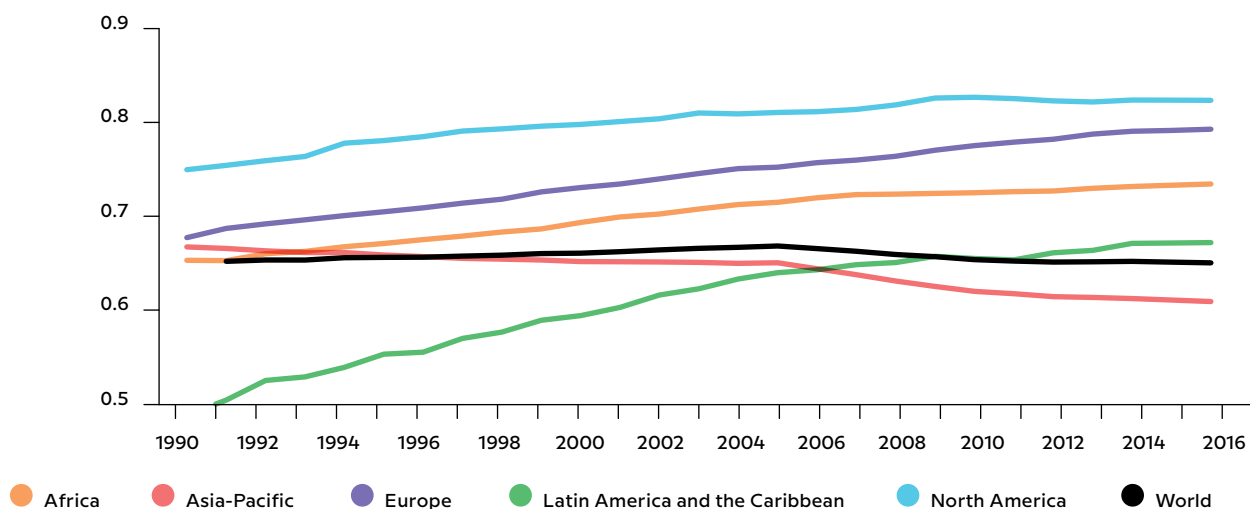
Figures 2c, 2d and 2e show the female to male ratio in agriculture, industry and services between 1995 and 2016. A value of 1 indicates that the same number of women as men work in the sector. In 2016, the

agriculture sector in East and North-East Asia is estimated to have employed more women than men (see figure 2c). All regions, except the Pacific, show an increasing trend in the female to male ratio in agriculture. Feminization of agriculture in the region has been linked to male outmigration from agriculture to industry (Vepa, 2005; Kelkar, 2009). However, this process is not uniform throughout the region. For instance, in Cambodia between 1998 to 2011, female share in agricultural employment fell from 83 per cent to 57 per cent, while there was a simultaneous jump in female participation in services from 16 per cent to 26 per cent (OECD, 2014).

Globally, services have overtaken agriculture as the sector that employs the largest number of men and women (ILO, 2016b). *Women at Work Trends 2016* reported that the greatest increment in women's employment in the services sector was in East and North-East Asia, where women's share in employment increased from 32.7 in 1995 to 77 per cent in 2015.⁹ Figure 2d shows that in East and North-East Asia and in the Pacific, more women were employed in services

Figure 2a

Female-to-male ratio in labour force participation, by world region, 1990–2016



Source: ESCAP, based on ILO Labour Statistics Database; see www.ilo.org/ilostat/faces/ilostat-home/home?_adf.ctrl-state=eafa6zhmt_86&_afLoop=2147343543978612#! (accessed 3 August 2017).

7 This is driven in large part by declining female participation rates in South and South-West Asia—the subregion with the lowest participation ratio, at 0.36 in 2015.

8 ESCAP, based on ILO Labour Statistics Database; see www.ilo.org/ilostat/faces/ilostat-home/home?_adf.ctrl-state=eafa6zhmt_86&_afLoop=2147343543978612#! (accessed 3 August 2017).

9 The ILO report refers to East and North-East Asia region of the ESCAP region as East Asia.

than men. Except the subregions of South and South-West Asia and North and Central Asia, there has been an increasing trend in women's participation in the services sector since 2005. While female-to-male ratios in agriculture and services show positive trends, industry shows a declining trend across the region. Considering the importance of industry sector in the region's growth story, this could be an important driver of the declining female-to-male participation rate in the Asia-Pacific region (see figure 2a).

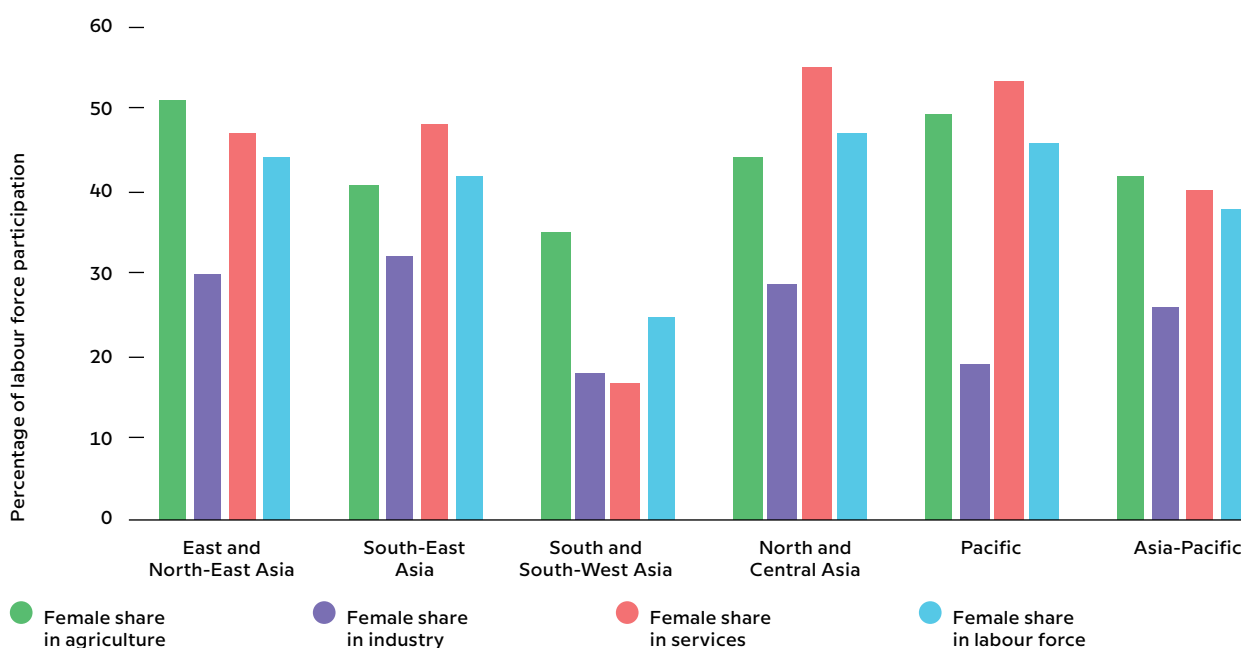
In the industry sector across subregions, more men were employed than women (see figure 2e). One key factor for this decline is technological change, particularly in East and North-East Asia. Changes in technology have shifted production from labour-intensive to more capital intensive activities, resulting in the defeminization of this sector (Kucera and Tejani, 2014; Caraway, 2007 cited in ILO, 2016b). This is in line with the global trend since 1995, when women's share in industry fell by 5.6 percentage points simultaneously with an increase in men's share by 5.3 percentage points (ILO, 2016b).

To advance women's economic empowerment, greater attention needs to be given to their access to productive resources. Land is a critical means through which women and men generate their livelihoods. Strengthening women's access to and control of land assets not only improves their status in the household and community but also impacts farm productivity (FAO, 2011b). This is particularly pertinent in the Asia-Pacific region, where 58 per cent of economically active women are in the agriculture sector. In a number of countries, less than 10 per cent of agricultural landholders are women. These include Bangladesh (at 4.6 per cent in 2008), Fiji (at 3.6 per cent in 2009), the Islamic Republic of Iran (at 5.9 per cent in 2002) and Nepal (at 8.1 per cent in 2002). Countries with a larger proportion of women agricultural landholders, which ranges from 23 per cent to 30 per cent of total agricultural landholders, include Armenia, Georgia, Niue, Samoa and Thailand (ESCAP, 2016a).

Another dimension that concerns women's economic empowerment in the Asia-Pacific region is its high degree of informality. For women, informal

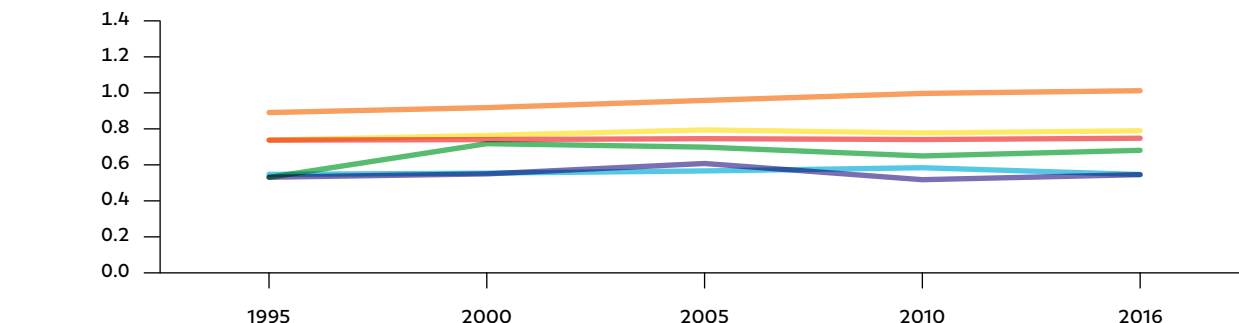
Figure 2b

Female labour force participation, by sector and ESCAP subregion, 2016



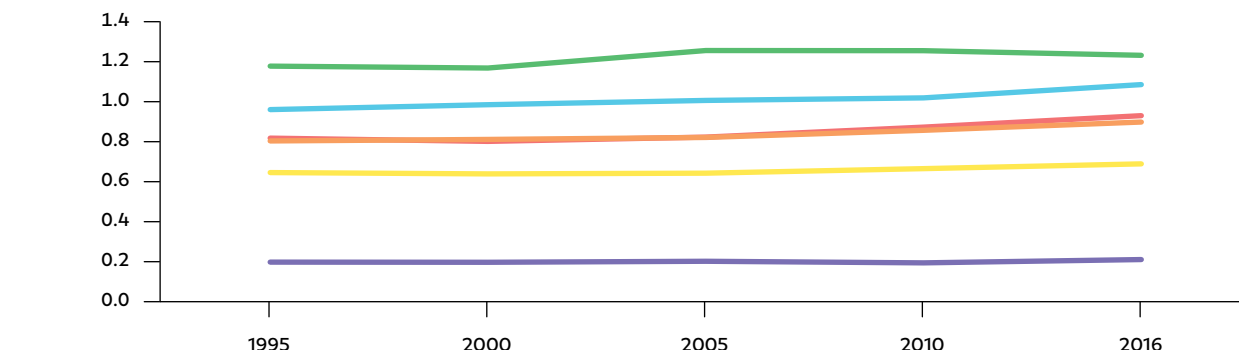
Source: ESCAP, based on ILO Labour Statistics Database; see www.ilo.org/ilostat/faces/ilostat-home/home?_adf.ctrl-state=eafa6zhmt_86&_afzLoop=2147343543978612#! (accessed 3 August 2017).

Figure 2c
Female-to-male ratio in agriculture, by ESCAP subregion, 1995–2016



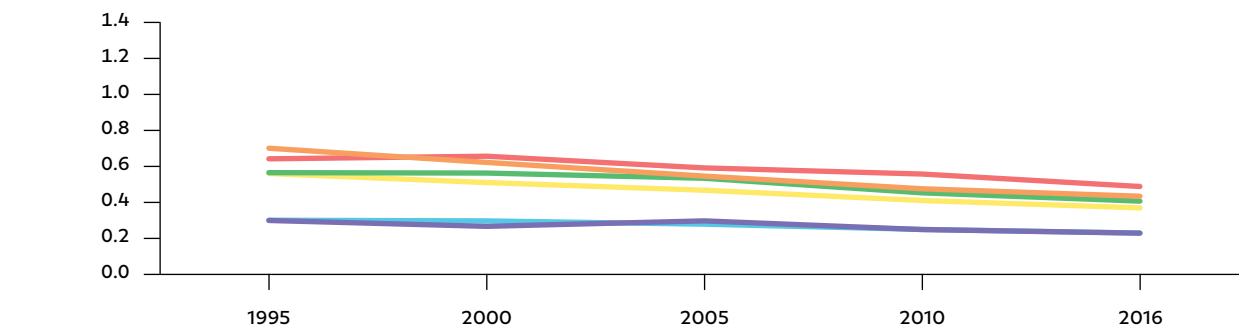
Source: ESCAP, based on ILO Labour Statistics Database; see www.ilo.org/ilostat/faces/ilostat-home/home?_adf.ctrl-state=eafa6zhmt_86&_afzLoop=2147343543978612#! (accessed 3 August 2017).

Figure 2d
Female-to-male ratio in services, by ESCAP subregion, 1995–2016



Source: ESCAP, based on ILO Labour Statistics Database; see www.ilo.org/ilostat/faces/ilostat-home/home?_adf.ctrl-state=eafa6zhmt_86&_afzLoop=2147343543978612#! (accessed 3 August 2017).

Figure 2e
Female-to-male ratio in industry, by ESCAP subregion, 1995–2016



Source: ESCAP, based on ILO Labour Statistics Database; see www.ilo.org/ilostat/faces/ilostat-home/home?_adf.ctrl-state=eafa6zhmt_86&_afzLoop=2147343543978612#! (accessed 3 August 2017).

Legend

- East and North-East Asia
- North and Central Asia
- Pacific
- South-East Asia
- South and South-West Asia

employment is a greater source of non-agricultural employment than for men in South Asia (at 83 per cent for women versus 82 per cent for men) and to a lesser extent in East and South-East Asia, excluding China (at 64 per cent for women versus 65 per cent for men) (Vanek, 2014).

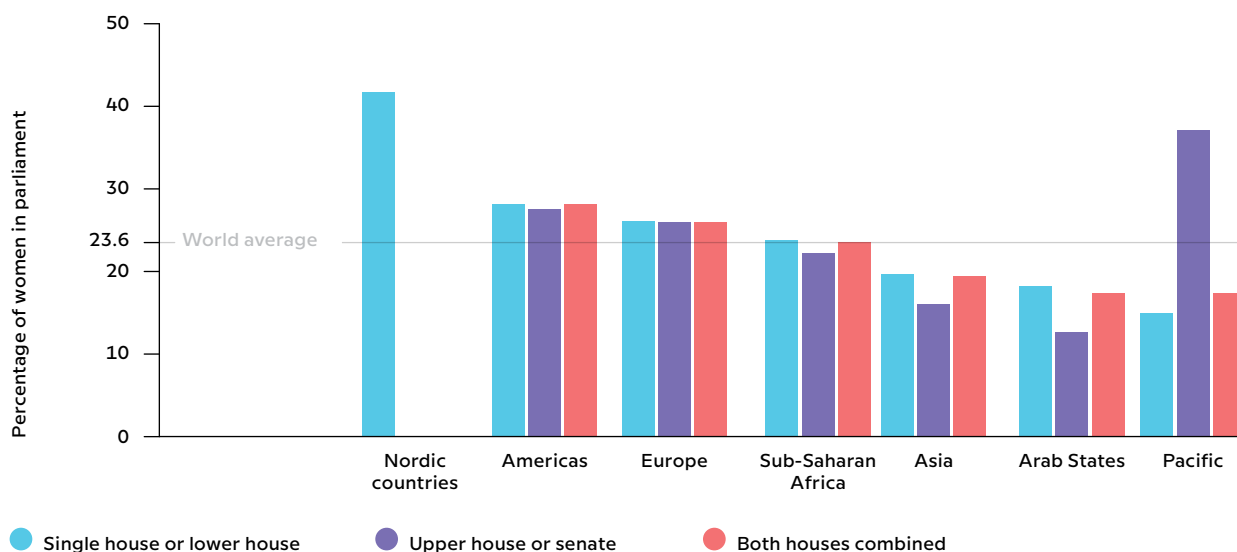
As examined throughout the following chapters, the sectoral composition of women workers has consequences on women's access to productive resources, safe working conditions and security of tenure has multiple repercussions, particularly in the gender and environment linkages.

1.1.3 Leadership and political participation

Gender equality and women's empowerment requires women's full and effective participation and equal opportunities for leadership at all levels to influence the various social, economic and political decisions that affect their daily lives.

The levels of female political representation in the Asia-Pacific region are low in comparison with other regions of the world (see figure 3). As of July 2017, 23.6 per cent of all national parliamentarians (or equivalent) globally were women, although the proportion in the Asia-Pacific region was 18 per cent.^{10, 11} It is noteworthy that globally, the Pacific subregion has the highest proportion of women representatives in the upper house or senate. However, this result is driven by the fact that only two member States from the subregion, namely Australia (31 women out of a total of 89 members in the upper houses of the subregion) and Palau (2/89) have bicameral legislatures. Except in Timor-Leste and New Zealand, women parliamentarians in the rest of the Asian-Pacific countries were fewer than the critical mass of 30 per cent, which by international consensus is what it takes to bring about meaningful change. Analysis of the ESCAP subregions found that, as of 2017, on average, East and North-East Asia had the highest level of female parliamentary representation (at 21 per cent), followed by South and South-East Asia (19 per cent), North and Central Asia (at 18 per cent), South and South-West Asia (at 17 per cent) and the Pacific (at

Figure 3
Women in parliament, by world region, 2017



Source: ESCAP, based on data from the Inter-Parliamentary Union's Dataset on Women in National Parliaments; see www.ipu.org/wmn-e/arc/classif010717.htm (accessed 1 July 2017).

¹⁰ Unless otherwise noted, data on national parliaments refers to representation in single or lower houses of parliaments as tracked by the Inter-Parliamentary Union database.

¹¹ ESCAP, based on data from Inter-Parliamentary Union; see www.ipu.org/wmn-e/arc/classif010717.htm (accessed 8 August 2017).

15 per cent). In deconstructing these averages, a few countries stand out for their substantial improvements in their share of female parliamentary representation between 2001 and 2017: Nepal (from 6 per cent to 29.5 per cent), the Philippines (from 8.8 per cent to 29.5 per cent) and Singapore (from 6.5 per cent to 23.8 per cent).¹²

In recent elections in the region, greater female representation was promoted through special measures, such as reserved seats and gender quotas (True and others, 2012). Notable successes are Timor-Leste, where women won 38 per cent of seats in the national parliament in 2012, and Nepal, which UNDP (2014) reported to have achieved the quota target of 30 per cent female representation in 2013.

The trend towards greater decentralization and local governance increases the importance of strong participation of women at the subnational levels. Throughout the region, women only account for 21 per cent of elected officials at those levels (UNDP, 2014). At the local level, where communities elect councils, affirmative action, such as quotas, has led to increased participation of women (UNDP, 2010b). In Bangladesh, India and Pakistan, women accounted for 23 per cent, 37 per cent and 19 per cent, respectively, of rural council members as of October 2010, while 10–20 per cent of council members were women in Cambodia, Cook Islands, Thailand and Viet Nam. Even without quotas, China achieved a level of women's participation that exceeded 20 per cent. However, in these instances, the proportion of women chosen as chairs or heads of their council remained below 10 per cent (UNDP, 2010b, pp. 10, 20–21).

Despite widening recognition of the gender-specific impacts of climate change, women have been underrepresented in environment-related negotiations at the international level. For instance, women's representation in bodies and boards of the United Nations Framework Convention on Climate Change (UNFCCC) ranges from 36 per cent to 41 per cent; women account for one quarter to one third of the heads of national delegations (Ivanova, 2015). A review of National Adaptation Programmes of Action (NAPAs) found that most recognize women as among the most vulnerable to climate change and mention gender

¹² See www.ipu.org/wmn-e/arc/classif010717.htm (accessed 8 August 2017).

Table 3
Women in parliament in Asia and the Pacific, 2017

RANK	COUNTRY	SINGLE HOUSE OR LOWER HOUSE (%)	UPPER HOUSE OR SENATE (%)
1	Timor-Leste	38.50	---
2	New Zealand	34.20	---
3	Nepal	29.60	---
4	Philippines	29.50	25.00
5	Australia	28.70	40.80
6	Afghanistan	27.70	26.50
7	Lao People's Democratic Republic	27.50	---
8	Kazakhstan	27.10	10.60
9	Viet Nam	26.70	---
10	Turkmenistan	25.80	---
11	China	24.20	---
12	Singapore	23.80	---
13	Pakistan	20.60	18.30
14	Bangladesh	20.30	---
15	Cambodia	20.30	14.80
16	Indonesia	19.80	---
17	Kyrgyzstan	19.20	---
18	Tajikistan	19.00	21.90
19	Armenia	18.10	---
20	Mongolia	17.10	---
21	Republic of Korea	17.00	---
22	Azerbaijan	16.80	---
23	Democratic People's Republic of Korea	16.30	---
24	Fiji	16.00	---
25	Georgia	16.00	---
26	Uzbekistan	16.00	17.00
27	Russian Federation	15.80	17.10
28	Turkey	14.60	---
29	Palau	12.50	15.40
30	India	11.80	11.10
31	Nauru	10.50	---
32	Malaysia	10.40	22.10
33	Myanmar	10.20	10.40
34	Samoa	10.00	---
35	Japan	9.30	20.70
36	Brunei Darussalam	9.10	---
37	Marshall Islands	9.10	---
38	Bhutan	8.50	8.00
39	Tuvalu	6.70	---
40	Kiribati	6.50	---
41	Islamic Republic of Iran	5.90	---
42	Maldives	5.90	---
43	Sri Lanka	5.80	---
44	Thailand	4.80	---
45	Tonga	3.80	---
46	Papua New Guinea	2.70	---
47	Solomon Islands	2.00	---
48	Federated States of Micronesia	0.00	---
49	Vanuatu	0.00	---

Source: ESCAP, based on data from the Inter-Parliamentary Union's dataset on Women in National Parliaments; see www.ipu.org/wmn-e/arc/classif010717.htm (accessed 7 July 2017).

Note: ESCAP member States are ranked on the basis of women in lower or single house in descending order.

Table 4
Women's representation in environmental bodies globally, as of August 2015

ORGANIZATION OR INSTITUTION	FEMALE REPRESENTATION (%)
Nationally elected Green Party leaders	48
Rio Convention NGO representatives	47
Rio Convention government delegates	33
Convention on Biological Diversity (government delegates, bureau members, NGO representatives)	43
United Nations Convention to Combat Desertification (government delegates, bureau members, NGO representatives)	30
United Nations Framework Convention on Climate Change (government delegates, bureau members, NGO representatives)	36
National focal points with the Global Environmental Facility	29
Focal points for the United Nations Forum on Forests	24
Focal points for Rio Conventions and the Global Environmental Facility	18
Heads of national environmental-sector ministries or departments	12
World Energy Council Secretaries	18
World Energy Council chairs	4

Source: ESCAP, based on IUCN Environment Gender Index Factsheet, 2015; see www.portals.iucn.org/union/sites/union/files/doc/egi_factsheet_desicion_making_web_sept2015.pdf (accessed 29 July 2017).

equality as a principle, but they do not demonstrate a commitment to mainstreaming gender or to incorporating women as stakeholders or beneficiaries of NAPA activities (UNFPA and WEDO, 2009).

As table 4 implies, the only strength in women's representation in environmental bodies globally appears to be in national Green Parties, in which participation was 48 per cent as of August 2015.

The Philippines is one of the key champions of gender mainstreaming in the region and figures as the highest-ranking country (7th rank out of 114 countries) from the Asia-Pacific region in World Economic Forum's Global Gender Gap Index, 2016 (WEF, 2016). Data from the Philippines shows that the country appears to far surpass the norm, demonstrating a large participation of women in international processes and at professional

Table 5
Women's representation in environmental bodies in the Philippines

ORGANIZATION OR INSTITUTION	FEMALE REPRESENTATION (%)
Secretary of environment-related sectors	20
Under-secretary of environment-related sectors	36
Environmental NGO president or executive director	33
Environmental NGO board membership	47
Government delegate to the United Nations Framework Convention on Climate Change Conference of the Parties 19 (2013)	67
Government delegate to the United Nations Convention to Combat Desertification Conference of the Parties 11 (2013)	0
Government delegate to the Convention on Biological Diversity COP11 (2013)	71
Average representation to the 3 Rio Conventions	46
National focal point to 3 Rio Conventions	16
National focal point to the Global Environmental Facility	50

Source: IUCN, 2015; Luna, and others, 2015.

levels, particularly in the environmental NGO sector (see table 5).

In contrast, a recent study of REDD+ in Viet Nam illustrates how women are limited in their ability to influence decision-making, despite progressive promotion of inclusion. The Ministry of Agriculture and Rural Development (MARD), the lead agency for REDD+ in Viet Nam, has a gender strategy that defines roles for female leadership and includes measures to ensure gender equality. And the national REDD+ action plan endorses gender equality. Nonetheless, the opportunities for women to influence decision-making are limited: Women only account for 20 per cent of staff at MARD and 14 per cent of director general positions. Of the 17 members of the national REDD+ Steering Committee, only six (35 per cent) are women (Pham and others, 2016).

According to informants for the study in Viet Nam, women feel unable to raise concerns or influence decisions because their numbers are so small. They attribute their underrepresentation to discriminatory policies. For instance, women seeking employment at MARD are required to graduate with distinction while men only need to pass their university courses. All employees seeking promotions must complete management training, although the maximum entry age for this training is five years lower for women than for men. The constraints to women's influence on decision-making at the national level are replicated at other levels. For instance, the implementation of REDD+ involves numerous subnational government agencies and civil society organizations. Yet, two-thirds of these organizations have expressed moderate to low interest in gender issues (Pham and others, 2016).

Policy debates in Viet Nam hardly include gender issues. Gender equality and gender mainstreaming are considered secondary priorities and/or administrative matters; and the capacity of personnel to address gender concerns is limited. Women's involvement tends to be as "consultative partners"—they are generally asked their opinions on specific issues but with no guarantee of influencing decisions.

The REDD+ study in Viet Nam highlighted critical concerns surrounding initiatives that support women's effective participation, leadership and decision-making and concluded with the following policy lessons:

- Move away from an “add-women-and-stir” approach to progressively promote women's leadership and participation in decision-making bodies.
- Recognize the web of power relations within which women's leadership and participation are embedded.
- Recognize the sociocultural factors that impede or limit women's leadership.
- Analyse the extent and type of participation in decision-making bodies that women have access to.
- Design appropriate policy interventions that enable women to be effective leaders and participants.

There is need to not only promote women's presence in decision-making bodies and leadership positions but to ensure an enabling environment in which women's perspectives, knowledge and capacities are recognized and taken on board.

1.2 Intersecting inequalities: Geographic location and social groups

While an overall picture of social performance indicators enables data aggregation and intercountry comparisons, the unequal outcomes seen between men and women are a symptom of deeper, structural inequalities within countries that not only manifest themselves along the male-female heteronormative binary but also through intersections with other layers of inequality. Within countries, economic inequality, geographic-based inequalities (such as the rural-urban divide), membership in social groups (such as indigenous ethnic minorities, young or old age, disability or migratory status) intersect with each other and with gender inequalities to compound social vulnerabilities.

1.2.1 Geographic location

One of the most enduring divides is inequality according to rural or urban location. Where people are born and where they live determine lifelong opportunities, including issues of vulnerability and poverty. People in rural areas are often more likely to be among those left behind in terms of their rights, opportunities and services.

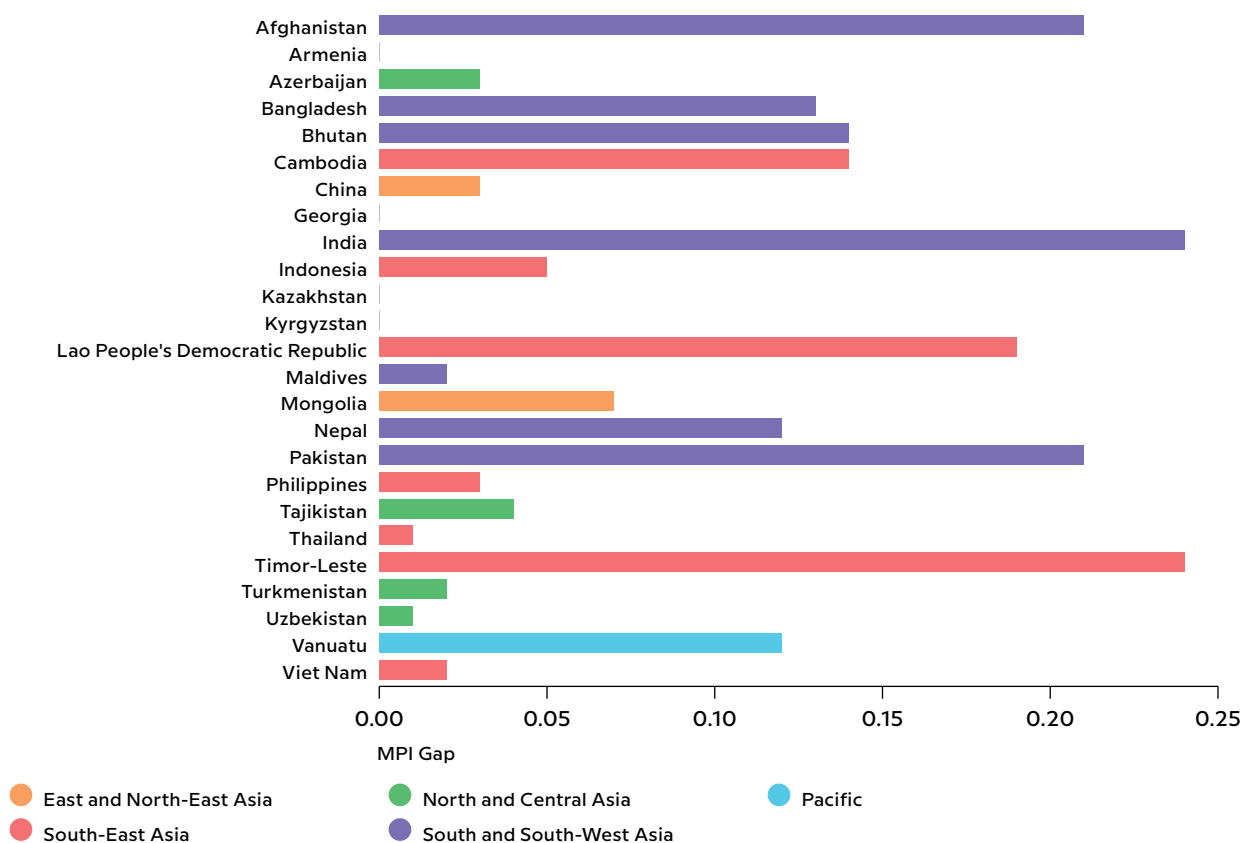
In many countries, rural poverty is significantly more pervasive and more pronounced than urban poverty. An examination of the Multidimensional Poverty Index (MPI), for example, revealed the vast difference in poverty dimensions between rural and urban households. The MPI uses three categories of indicators to illustrate the many facets of poverty and deprivation: education, health and standard of living

(access to services). Within these categories, the MPI weighs 10 indicators¹³ to calculate an index score from 0 (no multidimensional deprivations) to 1 (high multidimensional deprivations). Figure 4 shows the disparity in the MPI between rural and urban areas for countries in the ESCAP region where scores are available. Score 0 shows no disparity in the MPI between rural and urban areas, while higher positive values indicate increasing levels of disparity between rural and urban areas. For most countries for which MPI score values are available, disparity exists between rural and urban poverty. The widest MPI gap between rural and urban scores can be found in Afghanistan, India, the Lao People's Democratic Republic, Pakistan and Timor-Leste, pointing to higher levels of multidimensional deprivation in rural areas than in urban areas.

Agriculture is an important arena in which geographic inequalities intersect with gender inequalities to create layers of disparities and exclusion. As seen from Figure 2b, women constitute around 42 per cent of the total labour force in the agricultural sector of the region. The feminization of agriculture in Asia has been linked to male rural outmigration that leaves women behind to venture into areas of farming previously undertaken by their husbands, though at lower remuneration (Kelkar, 2009). The lack of access to productive resources and limited bargaining power puts women at a disadvantage when it comes to improving farm-based income in the absence of their husbands.

This report argues for the design of policies that take into account the vulnerabilities of women employed in both subsistence and commercial agriculture.

Figure 4
Multidimensional Poverty Index score gap between urban and rural areas, by ESCAP member State, 2016



Source: ESCAP, based on Alkire and others, 2016.

¹³ The indicators are: (a) education: years of schooling and school attendance; (b) health: child mortality and nutrition; and (c) living standards: electricity, improved sanitation, safe drinking water, flooring, cooking fuel and assets.

1.2.2 Social group-based inequalities

The rural versus urban divide gives us a sense of geographic-based inequalities, but it is not enough. Rather, it is also necessary to identify specific social groups within these areas facing higher incidence of poverty or deprivation and, by extension, potentially added vulnerability to changing environmental conditions. For example, in Viet Nam, there are significant disparities within rural areas when looking at membership in ethnic minority groups. Poverty is highest in the northern midland and mountain regions, where many ethnic minorities live, but low in the South-East (Bhatkal and Mariotti, 2016). Overall, indigenous people are among the poorest social groups, accounting for 10 per cent of the global population living below the poverty line (World Bank, 2011). Further evidence of their increased marginalization in Asia can be seen in higher poverty rates among indigenous groups, ranging from 1.5 times higher in China, 1.9 times in India, 2 times in the Lao People's Democratic Republic and 5.1 times higher in Viet Nam (DESA, 2013).

Beyond looking at poverty, the situation of indigenous or ethnic minorities is of high importance in the environmental and social context. Indigenous peoples face environmental challenges on multiple fronts that can further their social marginalization and disadvantage. In many parts of the world, indigenous people rely on the resources provided by their ancestral lands for physical but also for spiritual and cultural survival. Reliance on land, water, timber, wildlife and biodiversity often combine with indigenous traditional knowledge and expertise to manage their territories sustainably and efficiently. However, multiple pressures have already compromised this relationship, fuelling instability and displacement and exacerbating indigenous groups' marginalization. These pressures include dispossession of traditional lands and territories, impacts from large-scale development projects (such as dams) and, increasingly, impacts from climate change (DESA, 2009). The latter is of particular concern in this report due to indigenous people's dependence on their environment and its resources for survival.

Within this context, indigenous women have critical roles in their households as well as in their communities. In Cambodia, for example, Kui women are responsible for gathering food from forests as well as for collecting non-timber forest products, such as rattan, wild vegetables and foliage, that are critical to their families' food security and also for revenue generation. This strong relationship with forests includes a spiritual role in women's lives. They visit sacred sites in the forests for worship, which has been linked to supporting their psychological health. Therefore, destruction in the means of subsistence and traditional occupations through decay of the resource base directly impacts the well-being and status of women in those areas (AIPP, 2013).

Existing gender inequalities in the region, such as time poverty due to unequal burdens of unpaid care and domestic work and low levels of economic empowerment and political representation are key issues that intersect with environmental resources, which the subsequent chapters elaborate on.

1.3 The challenge of sex-disaggregated data in the context of the Sustainable Development Goals

Sex-disaggregated data to measure the intersection between gender inequalities and environmental concerns is vital to put the Asia-Pacific region on the path of sustainable development. Yet, sex-disaggregated data are uneven across many environmental dimensions.

To illustrate the availability of data for the ESCAP region, this section reflects the findings of a mapping exercise of select SDG indicators to determine whether available data provide sex-disaggregated information, based on the three tiers of indicator classification.¹⁴

Of the available Tier 1 indicators (conceptually clear, established methodology and data collected regularly) that capture elements of the environmental and social

14 As of this publication, the three tiers are a provisional classification that may change in the future. In regards to coverage measurements, this exercise counted data availability if at least one year of data from the baseline year was available. Thus, it is not to be taken as an indicator of how extensive the data coverage is.

Table 6

Proposed SDG environmental-social indicators classified as Tier 1, by Asia-Pacific coverage and sex-disaggregation

SDG	SDG TARGET PROPOSED INDICATOR	ASIA-PACIFIC COVERAGE (%)	SEX DISAGGREGATED
Goal 2 Zero hunger	2.1.1 Prevalence of undernourishment	62	No
	2.1.2 Prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale (FIES)	-	-
	2.2.1 Prevalence of stunting (% of children younger than 5 years)	74	No
	2.2.2 Prevalence of overweight (% of children younger than 5 years)	72	No
	2.2.2 Prevalence of wasting (% of children younger than 5 years)	76	No
Goal 3 Good health and well-being	3.9.1 Mortality rate attributed to household and ambient air pollution	88	Yes
Goal 6 Clean water and sanitation	6.1.1 Proportion of population using safely managed drinking water services	95	No
	6.2.1 Proportion of population using safely managed sanitation services	93	No
Goal 7 Affordable and clean energy	7.1.1 Proportion of population with access to electricity	93	No
Goal 11 Sustainable cities and communities	11.1.1 Proportion of urban population living in slums, informal settlements or inadequate housing (% of urban population)	28	No

Source: ESCAP, based on the ESCAP Statistical Database; see http://data.unescap.org/escap_stat/ (accessed 19 July August 2017).

Table 7

Proposed SDG environmental-social indicators classified as Tier 2, by Asia-Pacific coverage and sex-disaggregation

SDG	SDG TARGET PROPOSED INDICATOR	ASIA-PACIFIC COVERAGE (%)	SEX DISAGGREGATED
Goal 1 No poverty	1.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population (number per annum)	83	No
Goal 3 Good health and well-being	3.9.2 Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene.	69	No
Goal 11 Sustainable cities and communities	11.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population (number per annum)	88	No

Source: ESCAP, based on the ESCAP Statistical Database; see http://data.unescap.org/escap_stat/ (accessed 19 July August 2017).

intersection, only one, “Mortality rate attributed to household and ambient air pollution” already provides sex-disaggregated data (see table 6). Coverage of data for the region ranges from a low of 28 per cent for data regarding urban slum populations to a high of 95 per cent for measuring the percentage of population using safely managed drinking water services. Food security indicators, such as prevalence of undernourishment, stunting and wasting, have important coverage gaps.

As shown in table 7, the indicators currently classified as Tier 2 (conceptually clear with established methods and data not regularly collected) have a relatively higher level of coverage in the region, but none of them are sex disaggregated in the international databases maintained by United Nations custodian agencies. For Tier 1 and Tier 2 indicators that are already reported on by ESCAP member States, a high priority should be placed on examining how current data collection instruments and processes could better capture and report sex disaggregation.

Indicators classified as Tier 3 (no established methods) are the least developed and, as such, the least reported on (see table 8). Because data collection frameworks and methods are currently being developed for the indicators, they present an opportunity to build in gender-responsive measurements from the beginning

instead of retrofitting into existing data collection instruments. It is important to advocate for designing these metrics as sex disaggregated from the start.

As shown in table 9, data coverage within ESCAP subregions is highest in South and South-West Asia and South-East Asia, with the Pacific having the least data available to assess the social-environment interactions within the currently proposed SDG targets framework.

As the mapping exercise revealed, sex-disaggregated data are largely missing from internationally homogenized databases. Although this does not reflect internal national data collection, ongoing efforts to monitor and report on the SDGs will require that the data are made widely available. Countries where sex disaggregation has not been conducted, should place a high priority on examining how current data collection instruments and processes could better capture and report sex disaggregation, especially for Tier 1 and Tier 2 indicators, which are already being reported by ESCAP member States. While Tier 3 indicators are being developed, countries should also use the opportunity to build gender-responsive measurements while setting up their systems and instruments. This is of particular importance for the Pacific subregion, where data coverage is the lowest of all ESCAP subregions.

Table 8

Proposed SDG environmental-social indicators classified as Tier 3, by Asia-Pacific coverage and sex-disaggregation

SDG	SDG TARGET PROPOSED INDICATOR	ASIA-PACIFIC COVERAGE (%)	SEX DISAGGREGATED
Goal 1 No poverty	1.4.1. Proportion of population living in households with access to basic services	-	-
	1.4.2. Proportion of total adult population with secure tenure rights to land, with legally recognized documentation and who perceive their rights to land as secure, by sex and type of tenure	-	-
Goal 2 Zero hunger	2.3.1. Volume of production per labour unit by classes of farming, pastoral or forestry enterprise size	-	-
	2.3.2. Average income of small-scale food producers by sex and indigenous status	-	-
Goal 5 Gender equality	5.a. 1. (a) Proportion of total agricultural population with agricultural land ownership or secure rights over agricultural land, by sex ; (b) share of women owners or right-bearers of agricultural land , by type of tenure	-	-

Source: ESCAP, based on the ESCAP Statistical Database; see http://data.unescap.org/escap_stat/ (accessed 19 July August 2017).

Note: The indicators are still being developed, hence there is no coverage as yet.

Table 9
Coverage of SDG environmental-social indicators, by ESCAP subregion

SDG TARGET INDICATOR	INDICATOR NAME	SUBREGIONAL COVERAGE (%)				
		ENE A	SEA	SSWA	NCA	PAC
1.5.1	Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population (number per annum)	86	91	100	89	67
2.1.1	Prevalence of undernourishment	57	91	90	89	24
2.2.1	Children under-5 years stunting (% of children younger than 5 years)	71	100	100	89	43
2.2.2	Children under-5 years wasting (% of children younger than 5 years)	71	100	100	89	48
2.2.2	Children under-5 years overweight (% of children younger than 5 years)	71	100	100	78	43
3.9.1	Deaths attributed to household air pollution (female, male)	71	100	100	100	76
3.9.2	Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene	71	100	100	100	24
6.1.1	Proportion of population using safely managed drinking water services	71	91	100	100	100
6.2.1	Proportion of population using safely managed sanitation services	71	91	100	100	95
7.1.1	Proportion of population with access to electricity	100	100	100	100	81
11.1.1	Proportion of urban population living in slums, informal settlements or inadequate housing (% of urban population)	29	64	60	11	0
11.5.1	Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population (number per annum)	86	91	100	100	76

Source: ESCAP, based on the ESCAP Statistical Database; see http://data.unescap.org/escap_stat/ (accessed 19 July August 2017).

Note: ENEA=East and North-East Asia; SEA=South-East Asia; SSWA=South and South-West Asia; NCA=North and Central Asia; and PAC=Pacific countries.



Chapter 2: **Gender inequality, food security and sustainable agriculture**

WOMEN HAVE A PIVOTAL ROLE IN ALL dimensions of food security. These dimensions—the availability, accessibility and utilization of food—intersect and interact with the responsibilities, opportunities and constraints that women face in their households, at work, within their communities and in their influence on decision-making. Women, especially poor women, are burdened with responsibilities that stem from their biological and reproductive capacities, such as expectations they will take care of and provide nourishment to household members and contribute to household income.

2.1

At the household level



For women who experience high levels of time poverty due to their productive and reproductive tasks, a decline in agricultural productivity and rise in food prices exacerbate their struggle to sustain food security.

The projected declines in long-term agricultural yields due to degraded soil, water scarcity and climate variability in the region are significant. In tropical and

Box 1

Snapshot of food security in the Asia-Pacific region

- More than 60 per cent of undernourished or chronically hungry people in the world live in the Asia-Pacific region, with the largest concentration in South Asia (ADB, 2013).
- While production of staple crops has increased in several countries (India, Kazakhstan, the Lao People's Democratic Republic, Pakistan, the Russian Federation, Thailand and Viet Nam), countries in all subregions and particularly in the Pacific islands continue to rely on imports to meet some or all of the domestic demand for staple crops (FAO, 2014b).
- The majority of households in the Asia-Pacific region are net purchasers of food; for many poor households, food purchases account for 60 per cent to more than 80 per cent of their expenditures (ESCAP Statistical Database; ADB, 2013).
- Throughout the Asia-Pacific region, the level of dietary diversity has traditionally been low. Staple foods, such as rice, wheat and maize, constitute the basis of household diets. While the share of staple foods has declined in recent decades, they still represent half to three-quarters of daily energy consumption (Weinberger and others, 2009).
- Strong economic growth and urbanization throughout the Asia-Pacific region and particularly in East Asia have led to changing dietary patterns and increasing demand for protein-rich and resource-demanding foods (ADB, 2013). In the Pacific islands, increasing reliance on and preference for imported, high-calorie and processed foods has resulted in changing dietary patterns. The combination of changed dietary patterns and increasingly sedentary lifestyles has led to significant increases in obesity, diabetes and other non-communicable diseases associated with changing diets (FAO, 2015; SPC, 2011).
- There is a serious and persistent problem of malnutrition throughout the Asia-Pacific region that is closely linked to low dietary diversity and micronutrient deficiencies as well as inadequate safe water and improved sanitation. In 2013, 20 per cent of children in the region younger than 5 years were stunted (ESCAP, 2016a).

arid or semi-arid areas, crop yields are projected to decline as much as 30 per cent by 2050 (UNCCD and IFAD, 2009). More immediately, droughts and flooding that occur with greater frequency and intensity each year are damaging or destroying entire crops. Increased sea temperatures are decimating the coastal and inshore fisheries and shellfish resources that are a major part of the diet in the Pacific islands and other coastal areas.

The immediate effect will be the increased time and energy that will be required to obtain the resources needed to be food secure. There are several feedback loops that will place greater stress on women, particularly when pregnant:

- Greater exertion and higher temperature increase the need for greater intake of liquids. Water shortages in rural and urban areas will require women to spend more time to travel greater distances to collect water from safe sources and, if that is not possible, more time to treat water.
- In the face of shortages in the household production of crops and livestock, wild foods will become more important to many households to provide calories and nutrients in their diets. Women in areas affected by land clearance, deforestation and desertification will need to travel farther to locate their food sources. A similar situation already exists for women in areas where fuelwood is a primary source of energy for cooking and heating.
- In the Pacific islands and other coastal areas, women do subsistence fishing and collect shellfish and seaweed in mangroves, seagrass beds, lagoons and intertidal flats to provide food for household consumption and income. Projected declines in the productivity of these ecosystems due to climate change will increase competition for the limited resources. Commercial aquaculture has already depleted many coastal resources (UN Women, 2012). As these resources become scarce, women will expend more time and energy to secure the protein-rich foods or to acquire alternative sources of protein.
- High temperatures and humidity reduce the safe shelf life of food and increase the risks of pathogens contaminating grains, other foods and water. Work that needs to be done to ensure food safety add to the time and energy burden. Strategies to ensure food

safety will become even more important in women's work to feed their families, increasing the time and energy required.

- Droughts as well as patterns of increased rainfall may make it more difficult to grow traditional and preferred foods in some areas. While this will be offset by some areas becoming more conducive to crops and therefore productive, in general, the situation will require putting in more time to learn to cook new foods and to encourage children and other family members to eat them.

In rural and urban areas, seasonal patterns that reduce food availability increase prices and their volatility, reducing access to non-staple foods by requiring households to spend more of their income on staple food and water. For women in households that spend 50 per cent or more of their income on food (see table 10), this will increase the difficulties and stress of feeding their family. Households facing food shortages often must rely on gifts from family and

Table 10
Share of food expenditure among poor households, by select countries in the Asia-Pacific subregions

SHARE OF FOOD EXPENDITURE, POOR HOUSEHOLDS (%)		
South-East Asia	Cambodia	84
	Indonesia	22
	Lao People's Democratic Republic	84
	Philippines	61
	Viet Nam	65
South and South-West Asia	Afghanistan	49
	Bangladesh	68
	Bhutan	54
	India	65
	Nepal	72
	Pakistan	75
	Sri Lanka	67
Central Asia	Azerbaijan	62
	Kazakhstan	52
	Tajikistan	74

Source: ESCAP, based on FAO food security indicators; see www.data.unescap.org/escap_stat/ (accessed 4 August 2017).

Note: Data are the most recent available, ranging from 2004 to 2012. No data were available for East Asia or the Pacific.

other people in their social networks. Coping strategies that reduce the amount of food consumed have direct impact on lowering nutritional status. Intrahousehold food distribution patterns make children and women particularly vulnerable to nutrition deficits (Haddad, and others, 1996; Quisumbing and Smith, 2007).

In households in which access to water, fuelwood and wild foods require greater time and energy as well as in households that reduce non-food expenditure in response to rising food costs, it is often young and adolescent girls who are affected, as well as their mothers. Girls are likely to be pulled out of school, and available funds are likely to be used to educate boys (UNESCO, 2012). Girls are then expected to do unpaid jobs at home and in family fields or contribute to household income through low-paid work in the informal sector or by migrating to work in cities.

Rural households are increasingly migrating out of fear that environmental degradation will result in farming becoming unsustainable. Relocation is occurring in the aftermath of major storms, floods or landslides. As families resettle, they often lack adequate food and water and experience high levels of physical and emotional stress.

Women are far more likely than men to die because of natural disasters: Women in Indonesia and Sri Lanka accounted for 70 per cent of fatalities during the 2004 tsunami; 61 per cent of fatalities in Myanmar during Cyclone Nargis in 2008 were women (UN Women, 2016). Women who survive shoulder the burden of caring for others.

The demands on women's time and energy are compounded by other constraints and risks. The increased time to ensure food security means that women have less time for other activities, like income-generating activities or involvement in community activities. Women generally have more limited mobility than men, whether that is having no means of transportation or social norms that curtail their movements. Women who travel farther from home to find food, water and fuelwood are frequently at risk of sexual harassment. But at home, domestic and gender-based violence increases when households are under stress.

2.2

At the income-earning level



Smallholder livelihoods in the Asia-Pacific region are complex, combining subsistence farming with emerging economic activities in export-oriented agriculture, urban services and industrial sectors and work-related migration.

2.2.1

Women in the agriculture sector

Women throughout the region make crucial contributions at all levels of agricultural value chains. They work as own-account farmers, as unpaid labourers on household land, as paid and unpaid workers on other people's land, raising crops and animals, fishing and collecting forest products; as owners, operators and employees in processing, trading and other agri-enterprises; and in off-farm enterprises and employment.

Globally, women account for 42 per cent of the agricultural labour force and two-thirds of livestock keepers (FAO, 2011b). In the Asia-Pacific region, 58 per cent of economically active women are employed in agriculture, with subregional average rates varying from 18 per cent in Central Asia to 67 per cent in the Pacific (see table 11).

Table 11

Share of female population employed in agriculture, by ESCAP subregion, 2010

REGION	ECONOMICALLY ACTIVE FEMALE POPULATION (%)	AGRICULTURE SECTOR'S SHARE OF ECONOMICALLY ACTIVE FEMALE POPULATION PARTICIPATION (%)
Asia-Pacific	38.4	57.6
Central Asia	47.0	17.8
East Asia	45.5	61.8
South-East Asia	41.6	47.8
South Asia	29.6	60.4
Pacific	45.8	67.0

Source: ESCAP, based on FAO, 2011b.

Note: Data for East Asia did not include Japan.



Women rely heavily on agriculture for their primary source of income. With the exception of Central Asia and some countries in the Pacific islands, the agriculture sector's share of economically active women exceeds their level of participation in the labour force. In South-East Asia, 70–88 per cent of economically active women in Cambodia, the Lao People's Democratic Republic, Myanmar and Timor-Leste engaged in agriculture as of 2011. In South Asia, 82–97 per cent of economically active women in Afghanistan, Nepal and Bhutan work in agriculture. In the Pacific islands, 80 per cent of economically active women in Papua New Guinea and the Solomon Islands were in agriculture (FAO, 2011b).

Women's work in agricultural value chains vary widely across the region, depending on the social, cultural, religious and economic contexts in which they live. Overall, women's subsistence farming activities are essential to ensure household food security. In rural areas, women are primary producers of staple crops, vegetables and livestock for household consumption. Small plots in urban and peri-urban areas enable the women who cultivate them to offset the costs of buying food (IFAD, 2011). Through sales of surplus production and their processing and marketing activities, women generate income that strengthens household access to food.

Beyond subsistence farming activities, women's work in agricultural value chains include:

Labour: While the exact nature of work varies by crop and country, women provide most of the labour for and make decisions on a range of post-harvest operations, including handling, storage and marketing. In Cambodia, India, Indonesia, Nepal and most other countries in the Asia-Pacific region, women-owned home-based microenterprises and local small enterprises account for much of the processing of fruits, vegetables and fish (APO, 2001), and women are employed in large processing plants.

Livestock: Women throughout the region raise livestock, particularly smaller animals, such as poultry, pigs and goats, that are maintained primarily to meet household needs and generate income. For many women, raising livestock acts as a form of savings as well as insurance against accidents, illness, death and natural disasters, such as floods and droughts.

Aquaculture: Women are active in aquaculture throughout East, South and South-East Asia, with brackish and freshwater fishponds, cages and pens providing important sources of animal protein and income. Women are not often involved in capture fisheries, but they dominate fish processing and, in many countries, the marketing of fresh and processed fish products.

Agroforestry: Women's productive activities in agroforestry systems are related to household food

security, as are their activities to harvest wild foods from forests, agricultural fields, rivers and intertidal and inshore waters.

Livelihood diversification is an essential labour optimization and risk management strategy of smallholder households. While the main activity may be agriculture related, it is often not the primary source of income. Women and men work together to operate agribusinesses, such as input supply stores, rice millers, fish hatcheries and plant and tree nurseries. In Cambodia, women account for 60–90 per cent of wholesale and retail traders of agricultural products (ADB and ILO, 2013). They also own many of the microenterprises that operate full time, part time or seasonally to process vegetables, non-timber forest products, dairy and fish products and to provide a range of non-farm goods and services.

Environmental degradation and climate change affect the activities of women and men in agricultural value chains differently. The differential impacts are more likely to make life harder for women, because of the expectation that they are to manage their family's food security. In comparison with men, women's crop production activities typically result in yields that are 20–30 per cent lower, primarily due to women's lower access to and use of productive resources (FAO, 2011b).

Women also have less access to or control over land than men. As of 2011, for instance, as few as 10–20 per cent of women in the Asia-Pacific region had secure tenure to the land they farmed (FAO, 2011b). They are, therefore, more dependent on men in their households and communities to access land to grow crops and raise livestock. Yet, this often results in women being given less land and less productive land (Buchy and Rai, 2008); land that lacks easy access to water; land that requires women to travel farther from home. Women face greater threats than men to their continued access to land as increases in population and environmental degradation combine to reduce the size of the landholdings; land for growing food crops competes with land for growing commercial crops, animal fodder or biofuels; or destroys agricultural land in the aftermath of sea-level rise, tsunamis, landslides or other climate-induced events.

Women lack financial and other resources to improve and diversify their economic activities, to protect their assets, enter markets and, in general, optimize the

sustainability of their efforts. Women have less access than men to formal credit because they do not control assets that can serve as collateral. Legal barriers and cultural norms may prevent women from entering into contracts on their own. And institutional biases can result in fewer or smaller loans given to women (FAO, 2011b). As a consequence, they are more likely to be caught in a self-perpetuating cycle of informal, high-interest debt that increases their vulnerability to crop damage or failure and compromises household food security. Without financial resources, women are less likely to invest in irrigated land-use inputs, such as chemical fertilizers, or have crop insurance or other protection against shocks.

Women farmers supply local markets and, in many areas, dominate the wholesale and retail marketing activities. They are constrained, however, through limited mobility (due to lack of transport to markets or social norms that prevent them from travelling), lower levels of literacy, less access to training and little access to market information. As a result, women are obliged to accept lower farmgate prices for their produce. When men market products for women, however, the women may be at greater risk of losing control of the income generated by their activities (IFAD and UNEP, 2013).

Women farmers often lack sufficient labour or have poor labour productivity. Female-headed households tend to have fewer adult members. Nutritional deficits, such as iron deficiency anaemia that is widespread among women in the Asia-Pacific region, reduce labour productivity. The reproductive time demands on women also reduce their labour productivity. Women have significantly less access than men to the mechanical equipment and tools that can reduce workloads and increase productivity. In Cambodia, for example, male-headed households were found to be seven times more likely to own a hand tractor than female-headed households (FAO, 2010). Soil degradation, the conversion of less suitable land to agriculture and climate change all have contributed to an increase in plant pests, diseases and weeds. The increased demands on women's time can result in reduced levels of production, with consequences for income and food security.

Women also face institutional constraints while accessing services. Gender disparities in the availability and access to extension services are a significant



constraint for women. The availability of services does not consider women's time, mobility and childcare constraints. Institutional biases favour the targeting of men to receive support. And, frequently, the scope and methods are not relevant to women's agricultural activities or sensitive to the sociocultural, educational or other factors. Women, therefore, encounter greater difficulties to acquire information and new technology skills that would help them make more efficient use of resources, such as weather forecasts as well as market information, new techniques to reduce losses during post-harvest and processing activities, the use of improved inputs or the introduction of new, climate-resistant crops.

Diversified smallholder agricultural systems are more resilient to environmental degradation and climate change. With access to appropriate knowledge and resources, women have proven to be just as likely as men to adopt new technologies and to pursue agricultural activities and strategies that are efficient, productive and profitable (FAO, 2011b). Without access and control of resources, however, women are less able to adapt. If these conditions persist, the existing gender inequalities may be reinforced, further reducing the capacity of women to respond to food security threats.

Throughout the Asia-Pacific region, governments are adopting economic development policies for exported agricultural development and trade liberalization.

Growing urban populations with rising incomes are increasing the demand for diverse and high-quality food products. Yet, the transition from small-scale subsistence farming to commercial production will be difficult for all smallholder farmers. Commercial value chains have complex requirements for quantity, quality, timeliness and other factors that place smallholder producers at a disadvantage, compared with larger agro-industrial companies. Entry into new markets requires a level of investment and access to new technologies and infrastructure that often exceed the capacity of smallholder farmers.

2.2.2

Women in the informal sector in urban areas

The majority of employment opportunities for women in the Asia-Pacific region outside the agriculture sector is informal, with much of it located in urban areas. These jobs range from street vendors and vendors in wholesale and retail markets to work in home-based cottage industries that supply garments. The share of women working in the informal sector ranges from 45 per cent to more than 80 per cent (ADB and ILO, 2013). The lower rates tend to be in more economically developed countries, such as the Philippines and Thailand, where there are greater formal sector opportunities for women.

Urban areas throughout the region are highly susceptible to the increasing frequency and intensity of extreme weather events. In 2016, Tropical Storm Risk predicted 22 tropical storms, 13 typhoons and 7 intense typhoons for the year, a forecast that was 20 per cent above the norm for 1995–2010 (TRS, 2016). In countries like the Philippines and Viet Nam, it is normal for seven to nine storms to make landfall per year, with effects felt far inland.

Women working in the urban informal sector are typically burdened with the same expectations to feed and ensure food security of their family as rural women. While food may be easily accessible through “pop-up” sidewalk restaurants, food carts and small restaurants, it also requires a larger proportion of income be set aside for purchasing food than in rural areas.

High winds, rains and floods cause informal workers to suspend, temporarily or permanently, their economic activities. The immediate consequence is the loss of income that is crucial to buy food and other necessities. For instance, women who have small plots or gardens where they grow vegetables and other food items may lose their crops and may not be able to replant them. Food prices will rise, leaving women with few alternatives to feed their family. If floods occur simultaneously in rural areas, urban women will not be able to rely on gifts from rural relatives that frequently “smooth out” the availability and access to food in urban areas.

Women working in the informal sector typically live in poor, crowded conditions, along rivers or in areas prone to flooding. During extreme weather events, housing can be damaged or destroyed; infrastructure is adversely affected, resulting in lack of safe water, proper sanitation and adequate solid waste management; there are high risks of waterborne diseases, such as malaria, dengue and cholera, along with the danger of children and other people drowning. Women are called upon to care for the physical and emotional needs of people, with limited or no resources and may, themselves, be vulnerable to illness and stress. Additionally, natural disasters like floods push people in affected areas to migrate to cities (ESCAP, 2013). Typically, these displaced persons would rely heavily on family networks in cities for their day-to-day survival.

2.2.3

Women as migrant workers

Labour migration is a coping strategy increasingly used by women and men in response to diminishing opportunities in the agriculture sector. Within the Asia-Pacific region, women accounted for 48 per cent of labour migrants in 2013, exceeding the global proportion of female migrant workers, at 44 per cent (ILO, 2015b). Temporary labour migration is the predominant mode of migration in Asia and the Pacific (ESCAP, 2015a). Temporary migrants typically work in low-skilled, low-status jobs. From the perspective of workers, the motivating factor is the income they can earn and, in large measure, remit to families. For example, in Cambodia in 2012, a plantation worker earned approximately \$3 a day, while a Cambodian working in a Thai factory earned \$9–\$10 a day (ILO, 2013). The ILO estimates that the number of voluntary but climate-triggered labour migrants from the Pacific islands may reach 240,000 by 2040, who will generate as much as \$10 billion in income (Curtain and others, 2016, cited in ILO, 2016a). The remittances from migrant workers often constitute the main source of income for recipient families.

For women who migrate for work, both positive and negative social and economic impacts are experienced. From the perspective of household food security, the income they earn is extremely important to ensure access to food. For the women, however, there are greater risks of undernutrition because they may scrimp on food to send money home. Or many are provided with little food, let alone good nutrition, by their employers (Human Rights Watch, 2009). When women migrate away from their communities, it increases workloads for the women left behind who are often grandmothers. In Sri Lanka, for instance, studies have confirmed greater time and energy demands on the women left behind, while men’s workloads remained unchanged (IOM, 2009).

Most female migrants return home, intermittently or permanently, in response to social pressure to marry. Yet, they are generally less likely than men to fit easily back into their former roles. The cultural and social norms of their communities have great influence on whether the knowledge and skills they have gained will be recognized as a source of accepted empowerment and opportunity or whether women will be expected to

readjust to traditional roles. Difficulties in reintegrating may lead to domestic violence or women's re-migration.

2.3

At the community and national levels



2.3.1

Women in community-based organizations

Community-based organizations (CBOs) have emerged in response to governments having devolved control to local communities for the management of resources and issues related to pastures, forests, fisheries, sanitation and water use for productive and domestic needs. Donors and NGOs have promoted participatory approaches to community management, among other reasons, to strengthen women's economic empowerment and to address the impacts of environmental degradation and climate change on rural and urban livelihoods. From a woman's perspective, CBOs can provide them with opportunities to express their perspective in areas directly related to their lives and livelihoods, including food security.

Available evidence suggests that many women do not participate in CBOs, however, and their leadership opportunities are limited. An assessment in India and Nepal dating to the late 1990s indicated that women accounted for less than 10 per cent of CBO membership in those countries and were rarely included among CBO leadership (Agarwal, 2001).

There are several factors that limit women's active participation in CBOs:

- Throughout hierarchical Asian societies, rights to the control of resources are based on sociocultural norms that favour men. Men are recognized as farmers and their needs for resources take precedence over those of women, who are often considered to be only "helpers". Women's access to group membership is limited or even prevented by laws or as a result of criteria that require members to hold formal title to resources, such as irrigated land, and/or to be recognized as the head of a household.

- The opportunity costs for women to participate in CBOs are high, due primarily to the heavy workload of their productive and reproductive expectations. CBO operations are often not conducive to women's participation, for example, because the timing and location of meetings or other activities do not consider conflicts women have with the timing of other responsibilities. There are limits on women's mobility due to distance, lack of transport or sociocultural norms. Or support systems, such as childcare, are unavailable. For women, the perceived benefits of their participation are reduced when they believe that their lack of education or literacy will limit their influence on decisions.

Women are more likely to participate in formal CBOs under certain circumstances (Resurreccion, 2008). Women in fishing communities in Cambodia, for example, participate more actively in community fisheries groups when their primary livelihood activity is fishing or fish processing rather than agriculture or when the man in their household is a leader in their village. The roles for women in CBOs are limited and evolving slowly. Capacity development that targets women tends to focus on their savings and lending interests rather than resource management skills. There is growing recognition of women's skills to peacefully negotiate conflicts, although social norms often prevent women from participating in night-time patrols. In Cambodia and elsewhere in South-East Asia, women are delegated the management of money, which men consider to be low status. This has resulted in many community fisheries groups choosing a woman as treasurer, while opportunities for other management positions are limited.

When women are unable to participate in CBOs, they utilize informal strategies to interact with the CBOs to obtain information and express their needs for natural resources. A common strategy is to get their needs met "from the rear", that is, by negotiating with their husbands and other male family members.

A particular strategy to promote greater equity in the control and management of natural resources has been to form all-women user groups, as in forestry communities in Nepal (Buchy and Rai, 2008). The objectives of these groups are to address specific concerns of women and to ensure that they benefit directly in how the use of forest resources meet their

livelihood needs. But these objectives have not been fully achieved, due, in part, to an assumption that women constitute a homogenous group. In allocating land, all-women's groups have tended to receive less land and less productive land than mixed-user groups. Within all-women groups, many of the biases of mixed groups are replicated: Female leaders are chosen from land-rich and higher-caste households, and the distribution of natural resources is based on a principle of equality rather than equity. As a result, poor, lower-caste and less food-secure women have less access to and control of resources.

Overall, there are limitations to the opportunities that institutions and processes for the community management of natural resources afford women to exercise control over their access to and use of resources. Generally, women may have fewer opportunities than men for effective participation and involvement in how resource user groups adapt to environmental degradation and climate change or how that will affect their roles and responsibilities for food security.

2.3.2

Women and food security in policy

Two events in 2008 catalysed international and national attention on the need for more effective food security policies and strategies. First, the financial crisis of that year brought into sharp relief the implications of food shortages and volatile food prices. Then *The Lancet* Maternal and Child Undernutrition Series¹⁵ mobilized advocacy around the importance of good nutritional status, particularly during the life cycle's "window of opportunity", from conception to a child's second birthday.

National policies: A rapid review of national policies of countries in the region revealed several distinct approaches to food security in the aftermath of the 2008 food crisis. The first approach consisted of direct action to address hunger and malnutrition among the most vulnerable groups. For example, the National Food Security Act, adopted in India in 2013 (also known as the Right to Food Act), expanded a food subsidy programme to reach poor households in rural and urban areas. Each eligible household is now entitled to 5 kg of rice, wheat

or cereal per person per month at a subsidized price, and pregnant women and school children receive a free meal daily. The oldest woman beyond age 18 years is designated the household head for the purpose of issuing ration cards for the programme.

A second approach addressed food security from the perspective of nutrition, with the goal to reduce malnutrition among mothers and young children. Nutrition has been recognized as an integral aspect of food security (FAO, 2009). In the region generally, national nutrition policies tend to focus on the dimension of food utilization and nutrition and narrowly address gender issues in terms of women as mothers. While some policies explicitly target adolescent girls and, in the case of Sri Lanka, the full spectrum of ages, a narrower perspective overlooks the nutritional needs of older women or of boys and men. Most nutrition policies also do not address underlying social and cultural norms and gendered power relations that frequently affect the household distribution of food. For example, a study in Nepal found that the micronutrient intake for girls and women was lower than for other household members. While staple foods were equitably distributed, micronutrient-rich foods were preferentially allocated to men and boys (Brody, Spielfoch and Aboud, 2014).

The Nepal Multi-Sectoral Nutrition Plan 2013–2017 targeted maternal and child undernutrition to safeguard against malnutrition as an impediment to future economic development and the well-being of Nepalis. Gender equity and inclusiveness were explicit principles, and interventions went beyond women of childbearing age, infants and young children to include adolescent girls. Initiatives integrated parenting and nutrition knowledge into life skills programmes and provided midday meals to support girls' participation and performance in school.

The Sri Lanka National Nutrition Policy, 2010–2018 adopted a full life-cycle approach to malnutrition among adults and older persons as well as mothers and children. Nutrition-specific initiatives are complemented by food-based and food fortification strategies. Although indicators and targets are included for the health status of women of reproductive age,

¹⁵ See www.thelancet.com/series/maternal-and-child-undernutrition.

there is no indication of further sex disaggregation in the monitoring and evaluation processes.

In Bangladesh, the National Nutrition Policy, 2006 and the National Nutrition Policy Plan of Action, 2008–2015 outlined objectives and strategies to address all food security dimensions. Prepared by the Ministry of Food and Disaster Management, the policies are closely aligned with emergency preparedness and disaster relief strategies. In addition to addressing maternal and child nutrition, they explicitly recognize that women are key agents of food security. Specific measures to enhance their income-generating activities include greater access to extension services, targeting women's opportunities in the fisheries and livestock sectors, facilitating women's participation in emerging agricultural and agro-based enterprises, improving access to enterprise-development assistance and commercial banking and expansion of childcare and other support services.

In 2014, the Government of Timor-Leste adopted the National Food and Nutrition Security Policy, which contains explicit commitment to women's rights and gender-specific strategies to achieve development outcomes. Women's expected roles in food production and feeding families have special attention. So, too, does increasing income-generating opportunities for women "to maximize the impact on household income and family nutrition". Strategies to improve nutrition education and advocacy include women's work in home gardens and urban gardens. In support of the policy, gender-specific indicators are identified, and all data are disaggregated by sex, age and geographic region.

Agriculture sector policies: Across the region, agriculture policies address food security as a correlate of economic growth in long-term strategies for intensive agricultural development. Several recent examples, however, demonstrate an increase in the gender responsiveness of these policies.

The Agricultural Development Strategy adopted in Nepal in 2014 sets out strategies to increase agricultural productivity, competitiveness, commercialization and trade, with the view that the sector will drive economic growth and contribute to food and nutrition security. At

the same time, the strategy commits to strengthening social inclusion and women's empowerment. Ownership of land by women is a key performance indicator for increased productivity. The food security and nutrition provisions are closely aligned with the Multi-Sectoral Nutrition Plan. During preparation of the strategy, three of twenty focus groups were conducted with women. To further strengthen the gender issues in the strategy, UN Women is assisting in the formulation of a Gender Equity and Social Inclusion Strategy.¹⁶

In Cambodia, the Agricultural Sector Strategic Development Plan (ASDP), 2014–2018 is closely aligned with the Rectangular Strategy, which is the Government's framework for socioeconomic development that affirms the role of agriculture in economic development and food security and recognizes women as "the backbone of Cambodian society and economy". The Gender Mainstreaming Action Group (GMAG) within the Ministry of Agriculture, Forestry and Fisheries has the delegated responsibility for the ASDP commitment to gender mainstreaming. The Gender Mainstreaming Policy and Strategy Framework in Agriculture, 2016–2020 promotes gender equity with strategic objectives to promote women's economic empowerment through access to goods and services for agricultural development and markets, as well as to strengthen the institutional capacity of the Ministry. Prior to the completion of an action plan, the GMAG had obtained partnership commitments from donors and international NGOs to support gender-specific initiatives, with detailed sex-disaggregated performance indicators related to access to inputs, information, extension services and improved market linkages.

Regional policies: There is growing support for a regional perspective on food security at the national level (Grochowska and Kosior, 2013; Marzeda-Młynarska, 2016). In the aftermath of the 2008 food crisis, members of the Association of Southeast Asian Nations "pledged to embrace food security as permanent and high policy priority" (ASEAN, 2015). This was followed through with the ASEAN Integrated Food Security Framework, adopted in 2009, which aims to improve farmers' livelihoods and assure long-term food security. The principal strategies of the framework are food security relief in the face of emergencies and

¹⁶ See the UN Women job announcement, August 2016, https://jobs.undp.org/cj_view_job.cfm?cur_job_id=67762.



shortages, promotion of sustainable food markets and trade, an integrated food security information system and agro-innovations to promote investment in sustainable food production.

Women, food security and government policies:

Throughout the region, the issue of food security and how women influence and are influenced by food security is a central theme of government policies. The effectiveness of strategies and the outcomes for women, however, vary considerably. It is noteworthy that the National Food Security Act is the first legislation in India to recognize women as heads of households, although issuing ration cards in women's names does not necessarily change social and cultural norms about how food is distributed within the household. Moreover, the scope of food assistance is often insufficient to meet the nutritional needs of household members in terms of daily energy requirements or dietary diversity.

Women's vital roles for ensuring food security through food production and income generation are increasingly recognized in agriculture and nutrition policies, and this is commendable. Yet, when developing strategies, many policymakers do not consider pre-existing biases in gender and power relations and may ultimately worsen the gender inequities. In attempting to remedy

this, gender-responsive policies that seek to integrate women may have the unintended impact of placing additional time burdens on women. The inclusion of women's land ownership as a key indicator in the Nepal Agricultural Development Strategy or indicators included in the Cambodia Gender Mainstreaming Policy and Strategy in Agriculture that measure outcomes in terms of fundamental changes that benefit women may lead to more sustained empowerment.

Many agriculture policies remain gender-blind, focusing on economic development that results from increased agricultural production and commercialization and trade liberalization. They tend to have an implicit male bias in the identification of needs, interests and priorities that determine the distribution of opportunities and resources. As previously noted, gender mainstreaming in Cambodia is delegated to a "gender working group" within the Ministry of Agriculture, Forestry and Fisheries, thus the success of the gender mainstreaming strategy and action plan may be affected by the culture of a male-dominated institution. The ASEAN Integrated Food Security Framework may worsen the gender inequalities in the region unless steps are taken to ensure that the perspectives of women as well as men are heard (UN Women, 2016).

2.4

Strategies that work



The following highlights four innovative initiatives and technologies that have created opportunities for women smallholders to access and use resources to achieve sustainable agriculture while increasing their income and food security.

1 Integrated agriculture-nutrition links—HKI Homestead Food Production Program

Starting in Bangladesh in 1988, Helen Keller International (HKI) developed and evolved the Homestead Food Production Program, a women-centred model for working with smallholder households in rural and peri-urban areas. Its purpose is to improve food security through integrated pathways that (a) increase the production and availability of micronutrient-rich foods, raise incomes and access to food through sale of surplus production and (b) increase knowledge and adoption of improved nutrition practices. In the Asia-Pacific region, the programme has been implemented in Cambodia, Indonesia, Nepal, the Philippines and Viet Nam.

Evidence from a 2010 evaluation of the programme in Bangladesh and Cambodia confirmed positive outcomes. In Bangladesh, improved cultivation techniques among programme beneficiaries produced yields three times larger than non-participating households; the economic rate of return on investment with those improved techniques was approximately 160 per cent (HKI, 2013). The frequency with which people consumed nutrient-rich vegetables and animal-source protein increased, as did the diversity of vegetables (Talukder and others, 2010). Household incomes increased as a result of sales of surplus products from growing vegetables and raising chickens. Most households used the money to purchase other food, pay for children's education or reinvest in agricultural and other income-generating activities.

In 2012, HKI initiated a pilot to adapt the model to better suit conditions and needs in Cambodia to tackle high levels of undernutrition. In the model adapted,

the cultivation of home gardens was combined with fishponds stocked with small indigenous, nutrient-dense species to reflect local preferences for fish as a protein source. Marketing groups identified products that are profitable based on local needs, established and maintained relationships with wholesale and retail vendors and coordinated cost-saving measures for members, such as bulk purchase of inputs and shared transportation of goods to market.

Women's empowerment is central to the HKI programme, and the focus on working with women is complemented by awareness raising and behaviour change training that targets both women and men in participating households. The outcomes have been positive. In Cambodian households, where husbands and wives nominally make decisions together, the greater responsibilities for women in the HKI programme strengthened their confidence to influence these decisions more effectively. Due to the increased income, women have also gained greater autonomy in making many decisions regarding purchases for food, children's education, health care and other needs. Men's participation in behaviour change training has resulted in changes in women's workloads, with men taking on more domestic responsibilities.

Similar initiatives, such as the United States Agency for International Development (USAID)-funded Cambodia HARVEST Program have demonstrated the potential to work with village-based groups of women to introduce savings-led microfinance and financial literacy training to support on-farm and off-farm economic activities that are crucial to food security. The HKI model is also highly adaptable to many different settings, as evidenced by its implementation in countries with diverse social, cultural, religious and economic systems.

Important aspects of the success of the HKI model:

- introducing innovation within the context of local farming practices;
- integrating agricultural production into a value chain with upstream inputs and downstream markets;
- the inclusion of nutrition education to influence improved feeding practices;

- embedding the programme within communities and building strong relationships with local government and health care services; and
- a strong understanding of the sociocultural norms of the target population.

2 The use of ICT technologies—Internet, radio and videos in Asia and the Pacific

Smallholder farmers have different information needs during each stage of the agricultural cycle. The opportunity costs of acquiring that information are high for all farmers, particularly women farmers. Many public and private extension services are biased to the needs of men farmers, while women are further constrained by limits on their time and mobility, level of literacy and social norms.

Mobile phone ownership is widespread throughout the region, rapidly increasing the access of all farmers to a range of information, such as weather and market prices. However, SMS-based platforms can only hold limited amounts of information and require some degree of literacy; voice-based systems are more difficult and costly to develop (Aker, 2010).

Radio and video technologies as well as the growing use of the internet are being exploited to develop accessible and cost-effective ways to communicate with farmers. Some strategies have been developed specifically to address women's concerns. They are interactive, involving women farmers directly, and are built on principles of adult learning and learning by doing. Although empirical evidence of their success is largely anecdotal, they reflect a wider recognition of the importance of reaching women.

WOMEN-RUN AND COMMUNITY-RUN RADIO STATIONS

Radio is an accessible, affordable and highly transportable option for smallholder farmers to receive technical and market information. Call-in programming enables real-time interactions. The following examples from India are reflective of strategies that address women's needs.

The Deccan Development Society established Sangham Radio in 2008, the first community radio service in Asia that is owned, managed and operated by women, specifically Dalit and other marginalized women. Sangham Radio broadcasts several hours daily to 75 villages in semi-arid Andhra Pradesh State, where the Deccan Development Society has established and facilitates village-based women's groups. These groups provide local women opportunities to discuss agricultural needs specific to their region as well as environmental, food security, land tenure and public health issues. The group members contribute monthly to support the radio and provide input for future programming.

In Tamil Nadu State, the farmers' federation in Madurai District initiated a community-run radio station in 2011 that broadcasts 12 hours daily, including three hours of live programming. The radio staff consists of two women and four men and teams of female and male volunteers who broadcast needs-based programming from the field as well as from a studio. The programming includes women-specific programmes as well as agriculture and farming-related information, weather reports, local employment information and community announcements.

PARTICIPATORY VIDEOS

Participatory videos involve community members in creating messages. Digital Green, an India-based NGO pioneer in the use of participatory videos, partners with extension services and other NGOs to train and facilitate farmers on how to use low-cost equipment to produce short videos on a variety of topics, including improved agricultural production and post-harvest techniques, market linkages and government schemes. In the Digital Green model, videos are disseminated to village-based groups of farmers using battery-operated pico projectors. Extension officers and NGO staff facilitate discussions to support farmers' adoption of new techniques. Evaluations of the Digital Green method have documented significant increases in the adoption rate of new technologies as well as decreases in the costs (Gandhi and others, 2009).

Using participatory videos to disseminate technical information combines learning with entertainment in a format that is highly accessible to rural communities and people with low literacy levels. Demonstrating techniques builds on people's experiences of learning

by doing; presenting local people as early adopters of new technologies builds confidence in other community members to follow suit.

Participatory videos are highly accessible and empowering tools for women. Women who have been early adopters as a result of Digital Green projects have gone on to build successful businesses, such as de-worming and vaccination services for other women's small livestock. Women have gained stature as community leaders by using Digital Green-produced videos to work with and train women's self-help groups.¹⁷ In Fiji, a women's cooperative used the participatory video methodology to promote sales of their group's food products and handicrafts (Harris, 2009). Participatory videos have been used by groups of women as an advocacy tool. In Nepal, the Consultative Group on International Agricultural Research facilitated a process for village women to receive training and produce a film on how environmental changes affect their livelihoods, including the impact of climate variability on crop cultivation, men's migration and women's status and decision-making power in the village. The video was screened in the village and at the district level, and at national and international forums (CGIAR, 2013). Digital Green is collaborating with Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING), a nutrition programme, to integrate participatory videos as part of behaviour change communications to improve maternal and young child nutrition (SPRING, 2016).

3 Labour- and time-saving tools and technologies

Time and energy demands on women are major constraints on their efforts to grow and process food and earn income that covers their family's food security. Increasingly, there is research and pilot projects to design tools and technologies that reduce the time and labour women expend on agriculture-related work. The following are examples that, although in their preliminary applications, suggest significant, measurable improvements. There are, however, insufficient rigorous evaluations of the benefits, and some indications that they are not equal for all women.

IMPROVED FISH-SMOKING STOVE

On the Tonle Sap Lake in Cambodia, women living in floating villages dominate the fish-processing activities, including making *prahoc*, a traditional fish paste, and smoking fish. In 2012, the USAID-funded Cambodia HARVEST Program contracted with Conservation International to implement an innovative three-year project to assist women fish processors in expanding the production and marketing of value-added products (Cambodia HARVEST, 2015). One of the most successful outcomes of this project was the development of an improved smoke stove that resulted from a participatory process with women who smoke fish to design and test models.

Traditional fish smoking uses a small open-air stove made of bamboo and zinc. The capacity of the stove is limited, and due to flimsy construction, it generally needs to be replaced within one or two years. Fuelwood is purchased or collected from the flooded forests around the edge of the lake. Each woman smoking fish uses an estimated 70 cu m of fuelwood per year, at a cost of more than \$6 per cu m if purchased. Using traditional methods, smoking fish is time- and labour-intensive: The total time and labour required to smoke one batch of fish is estimated at two to three hours and requires women to monitor the process every 10 minutes to ensure that the skewers do not burn and the fire does not go out.

The improved stove is a simple construction of sheet metal that was manufactured by a local metal shop using hand tools. The resulting stove is larger than the traditional stove, with a capacity to smoke three to four times the number of skewers at one time. It is enclosed, a feature that has several advantages. First, it significantly reduces both the time and the amount of firewood needed to smoke fish. The savings include needing only 1.5 hours to complete a smoking cycle (compared with two to three hours) and a 50 per cent reduction in the amount of firewood required. The improved stove also produces a higher-quality smoked fish that has been very successful with traders and local markets. Due to the faster smoking process, the smoked fish retain more moisture and has less fat than fish smoked using traditional methods and thus has a longer shelf life. Women in the villages are selling fish smoked in the improved stoves at a 20 per cent premium

17 See www.digitalgreen.org/blog/social-networking-how-our-future-of-food-depends-on-it.

over the price of fish smoked using traditional stoves. The improved stoves are also designed to regulate smoke emissions and help women control the indoor air quality. The stoves have an estimated life span of five to six years, and they have been designed to allow women to fold them up and store them easily when not in use, a feature that is important on small floating house platforms.

The stoves have been well received and are in high demand among women fish smokers. However, the floating villages are among the poorest in Cambodia, and use of the stove is not equally or easily accessible to all women fish smokers due to its initial cost as well as the cash outlays necessary to realize the efficiencies of smoking larger quantities of fish. Different strategies have been used in an attempt to facilitate women's access to the stove, including shared use of the stoves, marketing groups to leverage higher net income from fish processing and savings-led microfinance to improve access to credit. The Cambodia HARVEST Program ended before the issues of accessibility were fully resolved, although Conservation International is continuing to work with the women, providing loans to purchase stoves and investigating potential cost benefits from larger-scale production of stoves.

DIFFERENTIAL BENEFITS OF RICE DRUM SEEDERS

Not all time- and labour-saving innovations benefit women equally. A cautionary tale may be found in the introduction of a simple, inexpensive rice drum seeder that is hand-pulled through fields to sow rice. This technology is being widely introduced and taken up by farmers in the Mekong delta of Viet Nam, throughout Cambodia and in other countries growing paddy rice. Drum seeding technique involves direct seeding of pre-germinated paddy seeds. The benefits derive from time and cost savings related to eliminating the need for paddy nurseries and transplanting, lower seed requirements and increased yields due to regular line sowing and plant spacing.

A study conducted in the Mekong delta, however, concluded that not all people involved in cultivating rice benefit (Paris and Truong, 2005). Farmers with educated wives, those who keep in touch with extension officers, and people who used low seed rates had higher likelihood of adopting row seeders. In addition to preferential adoption rates, more than half of the poor women from farming households and landless women

who worked as wage labourers in hand weeding and gap filling in paddy fields were displaced by this new technology and unable to find alternative jobs.

2.5

The way forward: Policy lessons



Women are the key to food security. It is widely understood and recognized that women's contributions to subsistence, market-oriented and commercial agriculture equal and, in some instances, exceed those of the men in their households and communities. If women had access to and control of the same resources as men, their contributions would increase food production by as little as 2.5 per cent to as much as 4 per cent, enough to enable as many as 150 million people across the developing world to move out of hunger and poverty (FAO, 2011b).

Given the evidence to date of the adverse impacts of environmental degradation and climate change on food security in the Asia-Pacific region, expansion in agricultural production to meet rising needs due to population growth, urbanization, economic development and changing demands is unsustainable using prevailing farming practices. Sustainable agricultural intensification involves scaling up farming practices and technologies that remedy and maintain the land and water resources on which smallholders depend, alongside adaptation to climate variability, so that these resources continue to support food security and rural and urban development into the future.

This is true for both women and men. For women, though, equality and equity challenges affect their empowerment:

- achieving household food security alongside gender equality and equity for women and girls within the current and evolving environmental changes and household economic and social norms and realities;
- achieving gender equality gains for women in agriculture and rural communities that parallel gender gains being realized by urban women;

- creating equitable opportunities for rural and urban women to become the principal agents in food security and poverty eradication within the context of structural transformations in national economies, the declining importance of the agriculture sector and the emergence of new development priorities;
- preventing further marginalization of rural and urban women within the context of rapid regional and global economic integration and the commercialization of the agriculture sector; and
- empowering rural and urban women with the capacity to function effectively and efficiently in an increasingly complex world that is shaped by new technologies in the agriculture, information and communications sectors.

The following policy lessons invoke strategies to empower women to seize the opportunities and confront the challenges to sustainable food security.

1 Mainstream gender considerations throughout the process of formulating, implementing and monitoring legislation, policies, programmes and procedures and in institutional structures.

- Ensure that government policies and laws protect and promote women's land rights and prevent discrimination.
- Ensure that women are not dependent on men for access to and control of land.
- Promote changes to customary laws and structures to ensure that women have equal rights to owning land.
- Develop and implement evidence-based policies and programmes for agriculture, water resources, forestry and fisheries sectors and ensure that natural resources management explicitly recognize existing and emerging roles and opportunities for both women and men.
- Define strategies to mainstream gender equality in access to inputs, information and other resources and to achieve equitable outcomes for women to promote food security through subsistence and market-oriented activities.
- Promote women's needs and opportunities to participate equitably in the commercial development of agriculture and natural resources, regional integration and trade liberalization.
- Integrate gender into climate change policies and programmes at all levels of agencies and institutions with responsibilities for climate change mitigation and adaptation.
- Incorporate gender dimensions in programmes and qualifying criteria for funding to ensure that interventions will benefit women as well as men.
- Institute and strengthen policy processes and decision-making mechanisms at the national, subnational and local levels to ensure the full participation of women, including the presence and participation of women in policy formulation and in translating policy into practice at the local levels.
- Provide women with platforms to voice their aspirations and priorities—for farming and alternative livelihood strategies, to ensure food security and to adapt to climate change.
- Recognize and incorporate women's contributions into policies and programmes.
- Adopt gendered approaches for the implementation, monitoring and evaluation of policies and programmes, including gender budgeting for policies and programmes and performance and results-based indicators that measure quantitative and qualitative outcomes for women and men.
- Revise and strengthen institutional structures to promote equal and equitable opportunities for women and men, for example, the procedures and criteria for recruitment and advancement in civil service, training and networking opportunities and remuneration and benefits.

2 Provide technical assistance and capacity support to strengthen the development and accessibility of gender-responsive agricultural extension services (AES) and technical and vocational education and training (TVET) programmes.

- Engage women in the planning and design of programmes to ensure that they encompass the priorities of women for acquiring knowledge, skills and information, such as adopting new technologies and techniques at all stages of agricultural value chains; acquiring skills to support alternative economic activities and occupations in response to existing and emerging market demands; and addressing priorities for women's reproductive and community as well as productive concerns.
- Prioritize a gender approach to develop, deploy and scale up climate-smart agricultural practices and technologies to facilitate climate change adaptation by women, based on the economic, social and cultural conditions in different parts of the region that increase women's knowledge of short- and long-term impacts of environmental degradation and climate variability. For instance, identify effective and accessible strategies for climate-resistant crop cultivation, pest management, water resource management, aquaculture, livestock production, agro-forestry, post-harvest operations and processing. And in the context of disaster management, support women's roles to protect people, animals and productive resources.

3 Prioritize a gendered value chain approach to food security and nutrition, based on economic, social, cultural and nutrition conditions in different parts of the region.

- Promote production diversification and increased production of nutrient-dense crops and small livestock.
- Improve processing, storage and preservation techniques to reduce post-harvest losses, retain nutritional value, ensure food safety and reduce seasonal food shortages.

- Promote innovative and effective strategies to expand markets; incorporate nutrition promotion and education; and build on and strengthen existing knowledge, attitudes and practices.
- Strengthen gender-responsive modalities for delivery of AES and TVET, and help those systems adopt adult learning methods and materials that promote women's participation (short-term and/or refresher courses, village-based and local delivery) and materials that build on women's existing knowledge. Require those systems to recognize how women learn and to be sympathetic to literacy levels.
- Target women who are already in the labour force seeking to upgrade and/or acquire new skills as well as young women looking for skilled work.
- Support gender-responsive AES and TVET by recruiting female trainers and conducting training for both male and female trainers on the rationale for and substantive information regarding gendered approaches.

4 Develop new technologies that enable time and energy savings.

- Promote the development, dissemination, funding and adoption of new technologies that are appropriate to women's resources, needs and priorities to realize labour, time and energy savings and to adapt effectively to changing climate and resource conditions.
- Advocate for the development and marketing of new technologies and tools that are gender-responsive.
- Engage women as partners in identifying and designing appropriate and labour-saving tools.
- Promote opportunities for women to build enterprises around the development and marketing of innovative technologies.

5 Strengthen women's enterprise development.

- Conduct research on, advocate for and provide technical assistance and capacity development support to strengthen women's enterprise development in farming as a business and in non-farm businesses.
- Promote savings-led microfinance as an initial opportunity for women farmers and entrepreneurs to strengthen their access to credit to support productive activities as well as to meet the educational, medical and food security needs of their household.
- Build up the skills, capacity and confidence in women to manage a process of savings, borrowing and income generation from interest; and disseminate information about available credit and how to use it responsibly.
- Prioritize increased access for women to formal credit to invest in their enterprises through lending practices and products of public and private financial institutions, and offer and promote credit products with collateral, interest and repayment options tailored to women.
- Establish policies that do not discriminate against women; use technology and other means to overcome time and mobility constraints of women that are associated with accessing formal credit, such as repaying loans.
- Strengthen the knowledge, skills and confidence of women to develop, operate and manage micro and small enterprises, including financial literacy, enterprise development skills, business planning, marketing, communications, negotiation and facilitation skills.
- Prioritize opportunities and conditions for women farmers and entrepreneurs to form and/or participate effectively in existing groups, such as cooperatives, producer or marketing groups, user groups and other groups, to realize benefits for their enterprises, such as cost savings on inputs, marketing and other services; more efficient production planning, expanded and more reliable access to larger markets and higher value-added markets and greater commercialization of products; peer learning and technical support and greater innovation and opportunities to develop new and value-added products and services.
- Leverage information and communication technologies to facilitate and strengthen the opportunities for women's enterprises to access information, exchange information, promote their businesses and express their needs.



Chapter 3: **Gender inequality and sustainable energy**

MEN AND WOMEN DIFFER IN THEIR USE OF energy resources as well as in their level and mechanism of access. Ensuring equitable development outcomes of energy interventions necessitates factoring in these differences. Addressing gender issues in energy interventions extends the potential to contribute towards achieving the SDGs, including poverty alleviation (SDG 1), improved health and well-being (SDG 3), gender equality (SDG 5), good livelihoods and economic opportunity (SDG 8), sustainable urban environments (SDG 11) and climate action (SDG 13).

Clean energy can lift the burdens of domestic chores, thereby freeing up time for leisure and improving quality of life. The World Bank's Energy, Poverty and Gender initiative's study in Sri Lanka (Massé, 2003) revealed that women wake earlier than men each day and remain awake for 16 hours or more (of which 13 hours are for work), compared with 10 hours for men (see box 2). In most Pacific island countries, women

and girls are responsible for collecting traditional fuels and can spend up to three hours a day collecting fuel, with an additional six hours spent collecting water for daily needs and then preparing meals (ENERGIA, 2007).

Energy is used by women and men for subsistence as well as for productive purposes. Energy access is a critical enabler to development because it transforms productivity at home and at work. Yet, despite their contributions to development, women are underrepresented in decision-making in the energy sector and are rarely considered as stakeholders of energy initiatives. When women gain access to quality energy services, households experience multiple impacts related to health, income generation and family well-being. Studies show that women reinvest 90 per cent of their income in their families and communities, while men reinvest only 30–40 per cent (Borges, 2007). Thus, the implications for economically empowering women can reach far beyond the individual. Women are also more likely than men to

Box 2

Gender-differentiated benefits of electrification in Sri Lanka

In 2000, the Asia Alternative Energy (ASTAE) Program included studies within its Energy, Poverty and Gender initiative to improve the World Bank's rural and renewable energy projects. The initiative intended to bring about a better understanding of the impact of projects on poverty alleviation and gender equity. In Sri Lanka, the study covered 10 districts and 35 villages, including quantitative surveys and qualitative research techniques. That study found that women significantly benefited from home electrification:

- Eighty per cent of the interviewees reported saving between one and two hours of their time by no longer needing to take batteries to be recharged, going to the city to buy kerosene or collecting firewood. They also saved time when cooking, ironing, boiling water, house cleaning and chimney cleaning. Twenty-nine per cent of the female household members said that the time they saved was spent on extra housework, while nearly 5 per cent reported using it for productive activities.
- Women reported having more free time and new entertainment opportunities within the house. Women in the newly electrified households now watched up to two hours of television per day. For 83 per cent of them, this was their first opportunity for all the family to share leisure time together.
- More women than men appreciated the increased security and health benefits that came with village electrification.
- The impact on income generation was relatively less. Of the women with in-home activities, only 15 per cent used electrical equipment for the activity, compared with 32 per cent of men; and mostly it was men who had high in-home activity incomes.

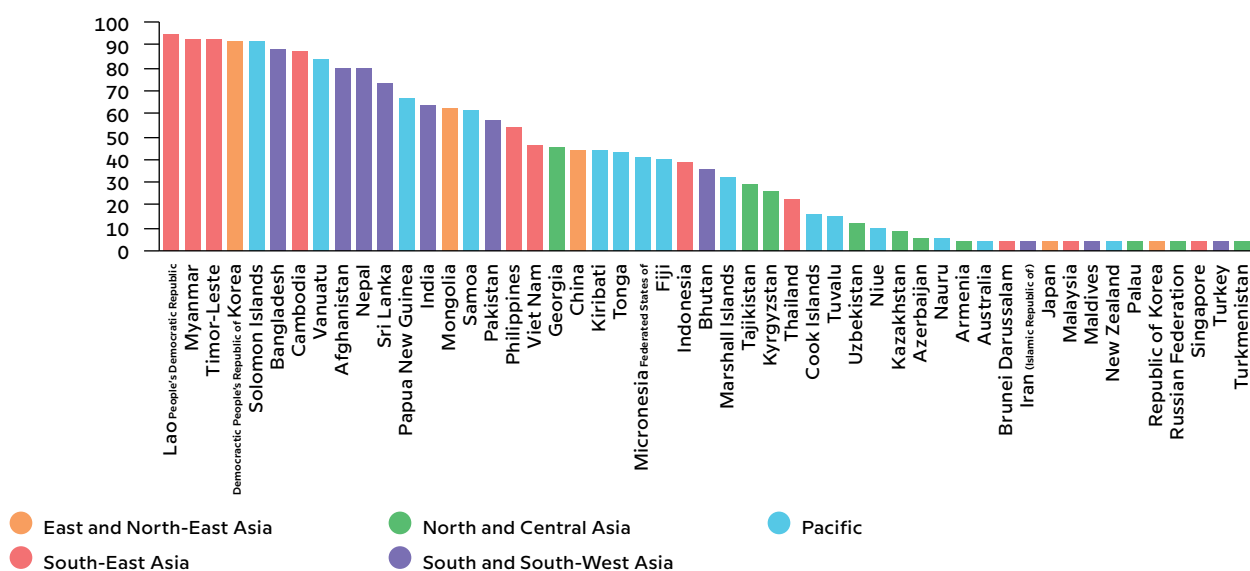
Source: Massé, 2003.

invest a large proportion of their household income in the education of their children, including that of girls (Lewis, 2013; Elborgh-Woytek and others, 2013).

While the presence of quality energy services has a positive bearing on raising living standards, the absence of clean energy has a detrimental effect. The Asia-Pacific region today has at least 455 million people who lack access to electricity and more than 2 billion people still relying on biomass, or solid fuel, for cooking (IEA

and World Bank, 2015) (see box 3). Women, especially in rural areas, bear the brunt of energy poverty and are heavily impacted by this reliance on biomass, which is the single most important feature of the energy mix in the region. The lack of access to clean, reliable energy exacerbates the many challenges women face on a daily basis, even though the challenges vary spatially, over time, across classes, between urban and rural areas and between countries.

Figure 5
Percentage of population using solid fuels in Asia and the Pacific, 2013



Source: ESCAP, based on WHO Global Health Observatory Database; see apps.who.int/gho/data/view.main.1701?lang=en (accessed 4 August 2017).

Box 3

Use of solid fuels in the Asia-Pacific region

- Despite some progress in most economies, an estimated 2 billion people still depend on solid fuels (ADB, 2015c), 276 million of them live in South-East Asia (IEA, 2015).
- Biomass is the most common primary fuel used by households for cooking (at 62 per cent), followed by gaseous fuels (at 32 per cent) and kerosene (3 per cent). Coal makes only a small contribution to the regional fuel mix as the main cooking fuel in only around 2 per cent of households. But electricity makes an even smaller contribution due to its use in less than 1 per cent of all households (WHO, 2016).
- Four countries in the region (Bangladesh, Myanmar, Sri Lanka and Timor-Leste) reported that more than 80 per cent of households rely mainly on biomass for cooking (WHO, 2016)
- More than 80 per cent of rural households use mainly biomass, compared with only one quarter of urban homes (WHO, 2016).

3.1**At the household level****Box 4****Case study: What do women need energy for?**

A field survey conducted in 2011 by the Indian NGO Vasudha Foundation reveals key priorities and energy needs of women in rural India. Of those surveyed, on average rural women felt that 10 per cent of energy resources were needed for cooking, 30 per cent for flour mills and livelihoods activities, 40 per cent for water pumping and irrigation (15 per cent of which was needed for household drinking water), 20 per cent for lighting, particularly for students to study, and 5 per cent for entertainment. What comes across clearly is that energy for cooking, and electricity for pumping drinking water are most pressing issues for women in relation to energy (Bast and Krishnaswamy, 2011). Women also value streetlights: “Now, we have access to light from the street lights... The street lights have also prevented anti-social elements and robbers from entering into the village, thus making the villagers, specifically the women feel safe” (Bast and Krishnaswamy, 2011, p. 22). Birmati on how solar-powered street lighting has changed life of women in Rampura village.

3.1.1**Time and effort spent in fuel collection**

In households that use fuelwood for cooking, collection is mostly done by women, who spend a huge amount of time and effort in doing so (WHO, 2016; Putti and others, 2015). In India, the Self-Employed Women’s Association found that women in rural Gujarat State spend as much as 40 per cent of their waking time collecting fuel for cooking (World LP Gas Association, 2014). Another survey of 700 rural households in Himachal Pradesh State in northern India found that women walked an average of 2 km to collect fuelwood. Finding, harvesting and transporting fuel to keep hearth fires burning took

each household an average of 40 hours per month. Procuring liquefied petroleum gas (LPG) was almost exclusively done by men, while women were mostly responsible for gathering wood, dung and crop residues (Parikh, 2011, cited in WHO 2016). In a study conducted in Nepal among adults who are the principal collectors of fuelwood, women carried the greater load (average number of adults collecting per household was 1.6, of which women accounted for 0.9) (Baland and others, 2010). Notwithstanding the burden women bear in fuelwood collection, it cannot be assumed that women are typically the primary collectors, however (see figure 6a and 6b). Some studies claim that both men and women collect, and men may even be the primary collectors (Cooke, Köhlin and Hyde, 2008).

Reliance on polluting fuels and technologies has been linked to drudgery and time loss for children, especially girls. Data from 30 countries in the World Health Organization’s (WHO) Household Energy Database (2016) reveal that girls living in households that cook mainly with polluting fuels bear the greatest time-loss burden for collecting fuelwood or water. In most of the countries reviewed, children of both sexes who collected fuelwood or water spent at least 15 hours a week on these tasks; in some countries, they spent more than 30 hours per week.

3.1.2**Energy-related health risks at home**

Solid fuel use is the single most important environmental health risk factor worldwide. According to the WHO, of the 4.3 million deaths worldwide attributed to household air pollution in 2012, 80 per cent were in Asia and the Pacific (ADB, 2015c). South-East Asia is home to the largest number of people exposed to the health risks associated with polluting cooking methods. More than 1.2 billion people in South-East Asia—equivalent to around 65 per cent of the population—mainly used polluting fuels for cooking in 2014. The situation is much bleaker in rural areas of the subregion, where around 85 per cent of the population cooks mainly with polluting fuels, compared with one third of the urban population.

In 2012, exposure to household air pollution linked to solid fuel use caused 4.3 million premature deaths globally (WHO, 2016). Of them, 60 per cent were women

and children. In China and India combined, more than 1 million premature deaths annually are attributed to household air pollution (WHO, 2016). Indonesia ranks second among East Asia and Pacific countries in mortality attributed to indoor air pollution from solid fuel combustion. The 2010 Global Burden of Disease Study concluded that an estimated 165,000 premature deaths each year in Indonesia can be linked to smoke emitted from solid cooking fuel (Lim and others, 2012 cited in ASTAE, 2013).

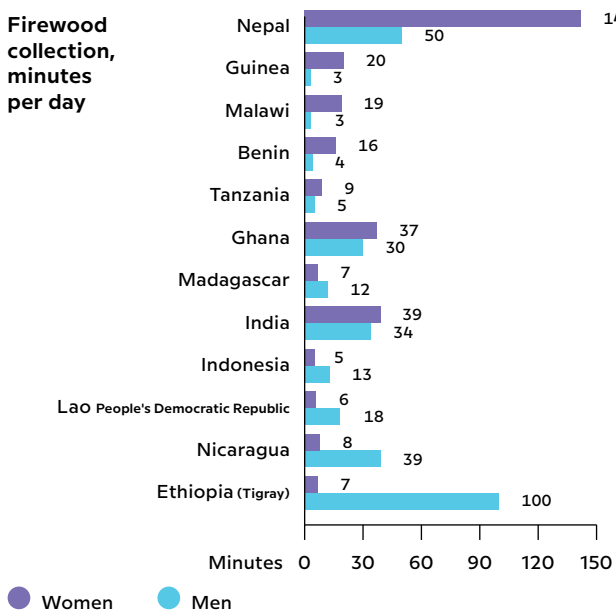
Women experience higher levels of exposure than men, owing to their greater involvement in daily cooking and other domestic activities. The single-biggest killer of children younger than 5 years worldwide is pneumonia, but more than 50 per cent of pneumonia deaths are caused by exposure to household air pollution. Globally, household air pollution is the second-most important health risk factor for women and girls (WHO, 2016).

Additionally, fuelwood collection entails physical effort and exposes women and girls to a host of discomforts and risks, including carrying heavy loads of wood on their back or head, risk of injuries, animal attacks and threats of physical and sexual violence.

An important factor that often does not enter any conversation about household energy interventions is how gender roles determine the adoption of improved cookstoves. Within the household, who cooks, who works outside the home, who makes decisions about buying fuels and appliances and other differences between men and women are major determinants of the relative health risks (WHO, 2016). One study in Bangladesh, for instance, found that men generally put more value on fuel savings and costs, while women were more likely to acknowledge the value of the health benefits of a more efficient stove (Panjawani, 2005). Because women lack decision-making authority within the household, their preference for healthier options may be trumped by men's concerns about costs, leading to lower adoption rates of health-improving stoves.

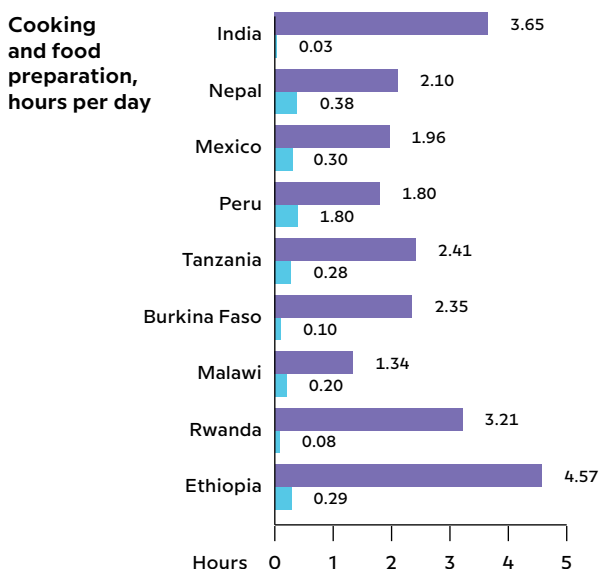
At the same time, while there is much research and action focusing on the gender-energy links in rural settings, there is little discourse and action on gender-related energy challenges specific to urban settings. For example, due to bureaucratic barriers, such as lack of a birth certificate or proof of a registered address, poor urban women may need to rely on energy connections that are illegal, unreliable and dangerous. Because

Figure 6a
Firewood collection time, by sex



Source: Putti and others, 2015.

Figure 6b
Cooking time, by sex



these connections are often informal, people who own the energy connections, such as a “slumlord”, have the potential to exploit users by charging exorbitant rates (Alvarez and others, 2006). Urban areas of South-East Asia still continue to demonstrate a heavy reliance on biomass for cooking, at 25 per cent of households (WHO, 2016).

Freeing up women’s time spent on energy matters is a necessary first step for them to make use of economic, political and social opportunities (World Bank, 2012). Clean energy can ameliorate the burdens of several domestic chores: fuels, such as LPG, can reduce the amount of time it takes to cook. Fuel savings from the use of efficient stoves can translate to savings of time and money, which can, in turn, be spent on productive investments, health care and education and much-needed rest and leisure. A study in Bangladesh showed that good-quality light allows women greater flexibility for managing their time (Barkat and others, 2002). In the Sunderbans of India, women reported less time spent cooking when there was electric light in the kitchen, which enabled them to combine tasks (Chakrabarti and Chakrabarti, 2002).

While women are typically the ones who stand to benefit most from switching to cleaner cooking, heating and lighting systems, it is the men who have more control than women over household budgets. “Investments to improve stoves, kitchens and cooking fuels tend to be considered as marginal items when men make the decisions about household purchases,” Lambrou and Piana found (2006, cited in Smart Villages Initiative, 2015). Yet, there is evidence that households with women who have their own source of income or savings are more likely to purchase cleaner cooking devices (Puzzolo and others, 2014, cited in WHO, 2016).

Education and awareness raising can have a huge impact on correcting this imbalance. A recent study in India showed that information and awareness have a major role in the transition to cleaner fuels, like LPG. When procured from a market, traditional fuels are more expensive than subsidized LPG. However, even though almost 72 per cent of surveyed households in that India study using only traditional biomass for cooking thought that it had adverse impacts on their

health, only 59 per cent thought that LPG had positive health benefits over traditional biomass-based cooking (Jain and others, 2015).

While electricity and clean fuels are generally seen to reduce time burdens, there is also contradictory evidence to suggest that electricity may actually increase work time, especially if the freed-up time is spent on income-generating work, even as domestic demands remain the same (Costa and others, 2009 cited in WHO, 2016). For instance, households using solar lanterns in Afghanistan reported that they stayed up longer in the evenings because they were no longer paying for expensive diesel to power the generator (Standal, 2008). This paradox highlights the need for surveys to capture more information on how domestic energy-related chores constrain women’s time and mobility and how involvement in the clean energy value chain influences livelihood opportunities for both women and men (Pachauri and Rao, 2013).

There is some evidence of a correlation but not causality between women’s literacy and electric light. Women’s literacy was found to be 22 per cent higher in electrified households in Bangladesh¹⁸ (Barkat and others, 2002), while in India it was found to have a positive impact on women’s reading capacity (Barnes and Sen, 2004).

3.2

At the income-earning level



The gender-energy link has several implications for women and their work. First, access to clean, affordable and safe energy can help improve the performance and productivity of informal or home-based entrepreneurial activities, like mini-grocery stores and food kiosks, which women typically own or operate. With safe energy, they can operate longer hours and bring in more income. At the same time, energy inputs can contribute towards increased profits and incomes in such sectors as agriculture and animal rearing, where women farmers predominate. Second, the energy sector can be a source of employment for both women

18 Data based on the Economic and Social Impact Evaluation Study of the Rural Electrification Program in Bangladesh, which was designed to evaluate impacts using a “with-without” (electricity) scenario to gauge the impacts. The impact indicators for household units were applied to analyse three broad groups of variables or measurable objects—economic, social (including gender) and cultural, and demographic.

and men. Third, women have started working in sales, distribution and servicing of energy products and services.

Box 5

Sex-disaggregated data for the renewable energy sector

IRENA (2016) conducted an online survey among private companies working in the renewable energy sector in more than 40 countries. Nearly 90 companies participated, representing the entire value chain of the sector (including manufacturing, installation, operations and maintenance, consulting and policymaking). Among the companies that responded, women represented an average 35 per cent of the workforce. This is a significant finding, considering women only accounted for 20–25 per cent of the workforce in the overall energy industry as of 2009. Yet, the percentage remains lower than women's economy-wide share in employment, which is 40–50 per cent for most member countries in the Organisation for Economic Co-Operation and Development. The survey also provided insight on the roles that women fulfill in the sector. On average, women represented 46 per cent of the administrative workforce, 28 per cent of the technical workforce and 32 per cent of management roles.

3.2.1 Energizing agriculture and microenterprises

Energy sources are necessary to provide mechanical power for agriculture, food processing, water pumping and irrigation. It is necessary for heating and for lighting, running equipment and automation, refrigeration and communications for informal commercial enterprises, many of which are run by women. According to the Food and Agriculture Organization of the United Nations (FAO), more than 70 per cent of economically active women in least developed countries work in agriculture (FAO, 2011b). Women produce between 60 per cent and 80 per cent of food in most developing countries (ENERGIA, 2015). Women farmers' productive potential is undermined by structural factors that

constrain their access to essential resources, in particular, water and the energy needed for irrigation. A field survey conducted by an Indian NGO, Vasudha Foundation (Krishnaswamy, 2010), found that rural women were using around 40 per cent of their energy resources for water pumping and irrigation. Creating clean, affordable, sustainable sources of energy, such as solar-powered drip irrigation systems, can free up household income to invest in other productive activities and to increase overall productivity.

Energy services are a significant input for informal enterprises. The majority of informal sector enterprises in developing countries are owned and operated by women, with women making up the largest proportion of the informal work force. The enterprises are typically based in the home to enable women to combine income-generating activities with household tasks. Women's enterprises thus tend to concentrate in a relatively narrow range of activities, such as cooking, hairdressing, clothes washing and tailoring (Hunt and others, 2012). Compared with activities undertaken by men, these are usually energy intensive, rely on biomass fuels and have disproportionately low rates of return.

In food-processing enterprises, energy costs amount to an estimated 20–25 per cent of the total inputs, which would suggest that technological interventions could increase the scale and profitability of these businesses (Lambrou and Piana, 2006). Modern energy services can improve the efficiency or productivity—and thus profitability—of many such activities: lighting that permits shops or small bakeries to stay open later, irrigation that improves agricultural yields or milling that adds value to grain (Hunt and others, 2012). In urban areas, where a more commercial market exists than in rural areas, electricity opens up business opportunities. For example, in the Philippines, many women provide clothes washing and ironing services that rely on electric appliances (Clancy, 2009).

Although access to modern energy can be an important input for earning a living, energy availability alone is not enough. Complementary inputs, such as access to finance, skills and markets, are needed (Kooijman-van Dijk and Clancy, 2010). Targeting women in appropriate ways can help overcome their specific constraints and help them take up highly marketable opportunities that modern energy enables.

3.2.2

Women in energy sector employment

There is evidence from other sectors that suggests that integrating women into various levels of the energy value chain will lead to more effective clean-energy initiatives and unlock greater return on investments (Pearl-Martinez, 2014). As the *2012 World Development Report* noted, “Greater gender equality is smart economics, enhancing productivity, advancing development outcomes for the next generation and making institutions more representative.” The report unveiled significant productivity gains that can be achieved by removing barriers that prevent women from having the same access as men to education and economic opportunities.

The energy sector offers employment and career possibilities for men and women. However, women are universally underrepresented in energy decision-making processes. Within energy companies, women are in the minority and not well represented in senior or technical positions (Clancy, 2009). Globally, women make up only 6 per cent of technical staff, 4 per cent of decision makers and only 1 per cent of top management in the fossil fuel-based sector (UN Women, 2012; World Bank, 2012a).

Such underrepresentation can be linked to the practice of young women opting less frequently than young men in university to pursue degrees or even courses in the physical sciences, engineering and economics, which would lead them to energy sector careers. Data from 97 countries indicate that courses in engineering, manufacturing and construction are dominated by men (World Bank, 2012). Even in countries where women opt for such courses, the engagement in the energy sector is low.

Women’s education choices are not the only hindrance, however. Women make up about 40 per cent of the workforce in businesses that rely on science, technology, engineering or math in China, according to the Chinese Academy of Science. Yet, women do not apply for degrees or jobs in mining, tunnel engineering and naval engineering because China’s labour law draws from the societal view that these jobs are unsuitable for women (Pearl-Martinez, 2014). Social stigmas prevent female engineering graduates in Sri Lanka from being placed in engineering jobs. In

the renewable energy sector, women face particular constraints, including their self-perception of jobs that are acceptable, the ability to be mobile for projects in remote areas, technical skills and the gender wage gap (Pearl-Martinez, 2014). Low levels of literacy and limited access to basic education make such skills particularly challenging for impoverished and rural women to acquire (Baruah, 2015).

Box 6

Women powerline workers in Maharashtra, India

Some 2,200 women have been recruited as linewomen, or *vidyutsahayak*, by the Maharashtra State Electricity Distribution Company, Ltd (Deshpande, 2013). This is the first time in India that such a company has taken on women as line staff to work hands-on with electricity poles, live cables, transformers and other pieces of field equipment that function as part of the power supply network. All of them have completed the mandatory requirements of the job: an electrician’s diploma from either a state-run Industrial Training Institute or a private establishment and an apprenticeship with the Maharashtra State Electricity Distribution Company. Training for the job is either imparted at the main training centre in Nashik District or at regional centres in Amravati, Sangli, Aurangabad and Nashik districts (which has a smaller unit). All these centres are exclusively training women’s batches at the moment. In all, the company has 7,000 men and women on its line staff. The recruitment is part of a policy that reserves 30 per cent of the jobs in the sector for women. Even though it is early days in the experiment, it is likely to yield interesting results.

Source: Deshpande, 2013.

In several countries in the region, the gender gap in energy sector employment is being bridged, although more so at the level of technicians and workers and less so at the decision-making levels. Organizations that provide customized solutions for training for individual women and opportunities for cross-mentoring among



local entrepreneurs, like the Indira Gandhi National Open University, the Solar Sister, the Grameen Shakti, the Barefoot College, the Innovation Centre for the Poor and Self-Employed Women's Association, are attempting to close some of the gaps (Baruah, 2015). In Bangladesh, Grameen Shakti had established by late 2013 46 technology centres throughout the country where customers, mainly women, are trained as technicians to service and repair solar home systems in their areas (Khandker and others, 2014). Grameen Shakti has sold more than 1 million solar home systems and 600,000 improved cookstoves; their network of 11,000 trained technicians and engineers includes 3,500 women who are renewable-energy technicians who install and service solar rooftop PV lighting systems.

India's Barefoot College, which has trained thousands of women as solar engineers, has benefited some 190,000 people in 16 states across India and has been replicated in numerous countries throughout South Asia, Africa and Latin America. The college provides six months of training in installing, repairing and maintaining solar lighting units for women to become Barefoot Solar Engineers.

Improved cookstoves, which constitute a crucial upgrade for sustainable bioenergy use, are also a source of employment. The partners of the Global Alliance for Clean Cookstoves, for instance, manufactured almost 10 million cookstoves through the employment of 76,000 people in 2012, of which 54 per cent were women (IRENA, 2016).

3.2.3 Women in energy value chains

In recent decades, there has been significant progress in expanding energy access through women entrepreneurs, especially to poor households and difficult-to-reach customers. An encouraging business model gaining traction is the increasing role of women and their networks in the promotion, sale, servicing and financing of household energy devices, such as solar lanterns and improved cookstoves.

There are a number of factors that make women ideal energy entrepreneurs. First, women are known to be good investors and planners, both important criteria

for entrepreneurial success. Large programmes, such as the Grameen Bank in Bangladesh, testify to the crucial role women have had in microenterprises. Women “think in terms steps and consensus, borrowing step by step to generate income, investing in the mid and long term, as well as the short term...” (Ernst & Young, 2012). Women as distribution agents, directly and through their networks, have easier access to markets (rural and slum locations) that are typically quite different from those of men. Women can serve as spokespersons for the use of clean energy, endorsing marketing messages and taking advantage of women-to-women communication strategies.

In countries in which gender disparity is considerable, women as sales agents is a good way to access untapped female markets because women can buy directly from other women in the community and do not need to venture to cities or marketplaces (Smith and Hart, 2015). Organized women’s groups are emerging in large numbers, particularly in rural areas, which offer ready vehicles for energy entrepreneurship, thereby also enhancing women’s empowerment. Women’s collective groups help empower individuals socially, economically and politically.

The Self-Employed Women’s Association (SEWA) of India is a member-based organization founded in 1972 to organize and unionize women workers. Today, SEWA has 1.73 million women members across 12 states of India. SEWA provides a combination of microfinance and entrepreneurial and leadership training, which help women to become self-reliant and employed. Since 2011, SEWA has been implementing the Hariyali Program aimed at delivering clean energy products and services to its members. The SEWA cookstove programme has reached out to nearly 40,000 individuals in more than 2,500 self-help groups in Gujarat State, where more than 2,000 cookstoves have been sold to date.

3.3

At the community and national levels



3.3.1

Energy for community services

Modern energy can have a transformative role in increasing the quality of community services that women stand to benefit from, such as health care (hospitals, clinics and health posts); education (schools and training centres); public institutions (government offices, police stations and religious buildings); and water supply and street lighting.

Of course, hospitals and health facilities perform better services with a reliable supply of electricity, including life-saving night-time services, which are particularly relevant in the context of child deliveries. Electricity enables the use of a vast range of equipment and appliances, essential for the general service readiness of a facility as well as in the delivery of specific services: refrigeration for vaccines, sterilization, illumination for patient care after dark, for operating theatres and for public safety surrounding hospitals, all of which increases the health system’s ability to serve poor populations. Improved lighting and hygiene from clean water helps reduce women’s mortality rate at childbirth. The maternal mortality ratio in particular is strongly correlated with access to electricity (UN Women, 2014 cited in Smart Villages Initiative, 2015). However, 1 billion people globally are served by health facilities without electricity, and more than 50 per cent of children in the developing world go to primary schools without any access to electricity (Hunt and others, 2012). In India, 46 per cent of the country’s health facilities, serving an estimated 580 million people, are without electricity (Practical Action, 2014).

Analysis of health facility survey findings in Bangladesh found that clinics with electricity operate, on average, an hour longer than clinics without electricity (IEG, 2008). Households with electricity reported a larger proportion of child deliveries assisted by medically trained persons (at 36 per cent), compared with households in villages without electricity, at 23.1 per cent (Barkat and others, 2002). Larger proportions of households with electricity (than without) reported

antenatal care, pregnancy check-ups by medically trained personnel, tetanus injections during pregnancy and postnatal check-ups after delivery (Barkat and others, 2002 cited in Smart Villages Initiative, 2015).

The other area that energy access can significantly influence is education, given that women account for two-thirds of the world's 774 million illiterate adults, a situation that has remained unchanged over the past two decades (Smart Villages Initiative, 2015). In Bangladesh, there is less gender disparity in adult literacy rates in households with electricity, in which parents (in particular, mothers and female family members) devote more time in assisting children's education, compared with their habits before having electricity (Barkat and others, 2002). Another study in Bangladesh on rural electrification found that the overall literacy rates in households with electricity was significantly higher (by 22 per cent) and with much less gender inequity (female literacy rates being 31 per cent higher) than households in villages without electricity (Panjwani, 2005).

Women in households with electricity in Bhutan were also found to be "better informed and more aware about education and health in general than their male counterparts, partly from increased social networking" (ADB, 2010). Children in households with electricity completed more years of schooling than children in households without electricity, with a more pronounced impact on girls than on boys as a result of time saved on fuelwood collection. In addition, education and access to information and communications enabled through electricity heightens gender awareness. Women in households with electricity watch more television and listen to the radio, which helps improve their access to information and increases their knowledge. In some studies, it also resulted in the empowerment of women (Panjwani, 2005; Barkat and others, 2002; Barnes and Sen, 2004). A study in rural India found that access to cable television resulted in lower acceptance of spousal abuse (Pachauri and Rao, 2013). Influencing social norms through access to information is just one of the ways energy can impact positively on the problem of violence against women. In South Asia, where the share of women who have experienced physical or intimate sexual partner violence is as high as 43 per cent

(Solotaroff and Prabha Panda, 2014), this finding is significant.

Another community energy service of particular relevance to women is street lighting and community spaces. In World Bank rural electrification projects in Indonesia, "women tended to appreciate increased security in the street at night thanks to lighting and freedom from fear of fire from kerosene lamps" (Lambrou and Piana, 2006). Increased safety with street lighting helps women to attend night school and participate in evening community activities.

3.3.2

Decision-making and women's leadership in the energy sector

There is evidence that women's participation in environment-related decision-making leads to improved environmental outcomes. When women are excluded from energy governance, decision-making processes are more likely to result in energy projects and policies that ignore women's unique needs, knowledge and contributions. Thus, women's participation is not only important for gender equality itself but may also determine the effectiveness of energy projects (Pearl-Martinez, 2014).

WOMEN IN ENERGY SECTOR GOVERNANCE

In general, data on women's share of decision-making positions in developing countries is not available. What is available indicates that women's representation (where it exists) is greatest at lower, local levels of governance. As previously noted, women accounted for nearly 23 per cent of parliamentarians worldwide in 2016, while in the Asia-Pacific region, women constituted approximately 18 per cent of national parliamentarians.¹⁹ In approximately one third of the countries in the ESCAP region as of 2015, less than 10 per cent of national parliamentarians in single and lower houses were women (ESCAP, 2015b). The proportion of women in energy sector governance and energy policy is even smaller. In a 2013 analysis of 72 countries, only four countries (6 per cent) worldwide—Gambia, Greece, Sweden and Switzerland—had female ministers overseeing the country's energy policies and

¹⁹ ESCAP Statistical Database, based on 2016 data from the Inter-Parliamentary Union's PARLINE Database; see www.data.unescap.org/escap_stat/ (accessed 20 July 2017).

programmes. Comparing this with other ministries, 27 of the 72 countries (about 38 per cent) had a female minister of environment or environment-related ministry, such as agriculture or fisheries (Pearl-Martinez, 2014). UN Women reported in 2010 that, worldwide, women occupied around 19 per cent of all ministerial (or equivalent) posts, but only 7 per cent of them related to the environment, natural resources or energy, and a mere 3 per cent were in science and technology (Inter-Parliamentary Union, 2011; UN Women, 2010, cited in UNIDO and UN Women).

WOMEN IN COMMUNITY-BASED ENERGY PROJECTS

Women have demonstrated their contribution in community energy projects in several countries. For example, the Rural Energy Development Project (REDP) that was launched in Nepal in 1996 to improve rural livelihoods through the installation of microhydro power systems. Between 1996 and 2010, the project reached more than 550,000 people living in rural areas to install microhydro systems, solar home systems, biogas plants and/or improved cookstoves (UNDP, 2010a). Early on, the project staff recognized that cultural norms would not accept women and men working together on the same committee. In response, several measures were instituted to encourage a meaningful involvement of women:

- Women were identified as a vulnerable group, and their empowerment was highlighted as one of the six basic principles of the REDP community mobilization process.
- At the community level, the project's operating modality required one man and one woman from each household to participate in programme activities, such as the formation of community organizations and functional groups,²⁰ training, implementation and benefit sharing, thereby ensuring gender balance.
- In project communities, separate male and female community organizations were formed, which met on a weekly basis and were provided capacity-building inputs.

- The project provided loans to men and women to set up enterprises, through an Enterprise Development Fund, and from weekly savings of the community organizations. Each household was encouraged to start at least one enterprise (energy or non-energy related).
- Potential entrepreneurs (men and women) were provided information, enterprise-development training and exposure visits and were linked with city-based markets.

The equal opportunities have had a visible and positive impact in mobilizing women and integrating them into mainstreamed activities. The women in the community organizations, for instance, have contributed a distinct perspective in local affairs and their self-confidence has increased, as has their capability for independent and collective action. With the inputs, women's involvement in small-scale cottage enterprises have increased. The number of such enterprises increased from 400 in 1996 to 700 in 2005 (Rana-Deuba, 2001; UNDP, 2011). Some of the microhydro schemes in the remote districts in western Nepal (an area where women have the lowest social status) are even chaired by women.

Women's self-help groups in India have traditionally been taking up environmental and social causes. One such example in the energy sector is Odisha State's Nayagarh District, where women's self-help groups were engaged in 2010–2011 as franchisees in energy distribution under the Rajiv Gandhi Gram Vidyutikaran Yojana, the rural electrification programme. The women's self-help groups had responsibility for meter reading, billing, delivery of bills, collection of revenue, facilitating new connections and theft control, following the training they received on each matter. Two to three group members now manage these tasks.

Each self-help group is allowed to provide services in up to two *gram panchayats*, and the total number of consumers is not to exceed 1,000. These parameters are to ensure service quality, with members undertaking repeat visits in their areas of operations and thus improving collection of the tariff. The self-help groups

²⁰ Community organizations consist of people living in close proximity and willing to work together on a microhydro project. Members constitute at least one male and one female member from each beneficiary household. A functional group is a higher-level community organization set up to manage the microhydro systems and is responsible for decisions on electricity distribution, electricity tariff, operation and maintenance of the schemes.



are working as franchisees in all 227 *gram panchayats*. Significant improvements are visible: In areas where women have been engaged, revenue losses fell, from 59 per cent to 38 per cent. The growth in collections has been significant, leapfrogging from 68 per cent to 79 per cent, and the consumer base of the companies went up, from 51 per cent to 58 per cent during the October–December quarter of 2011 (Mohanty, 2012). A 2015 World Bank study (Banerjee and others, 2015) reported that Nayagarh District had more than 154 women’s self-help groups engaged as microfranchisees and that the state government intended to create 5,000 additional groups to replicate the success across all distribution companies.

3.3.3 Gender in energy sector policies and data gaps

In most developing countries, national development goals and policies highlight the importance of development that is inclusive and that focuses on disadvantaged sections of the society, including women. These policies thus provide a framework conducive to gender-responsive sector policies and programmes. Yet, there is little mention of women or gender in the energy

sector policies. In general, the thrust of national energy policies has been on electrification, but with almost no mention of women or gender. The assumption is that men and women benefit equally from electrification, and implicit in that is the assumption that men and women have equal capacities to use electricity to meet their needs (ENERGIA, 2016).

The primary emphases in energy policy and investment are petroleum fuels and electricity and a reduction in subsidies for fossil fuels, with limited investment in non-commercial energy. In India, the Eleventh Five-Year Plan (2007–2012) detailed an investment of more than \$100 billion in the energy sector. But less than 2 per cent of that investment was likely to ever alleviate the burden on women and girls, who collected close to 28 per cent of primary energy at that time (Government of India, 2010). In Sri Lanka, the goal of the National Energy Policy and Strategies is to provide affordable energy services to support the socially equitable development of citizens. But there is no specific consideration for men or women. This policy primarily focuses on electricity but fails to mention cooking fuels and biomass, except to state that biofuels are a source of commercial energy. While the Government has targeted 100 per cent electrification, there is no target for clean energy or cooking fuels. The limited attention

to biomass, which contributes nearly 50 per cent to the total energy supply and affects the majority of rural communities, especially women, is a noticeable shortcoming.

From 2010 to 2012, there was negligible overall progress in the use of non-solid fuels, with annual growth in access to non-solid fuels globally falling by 0.1 per cent, well short of the 1.7 per cent target growth rate required to reach universal access by 2030 (Putti and others, 2015). In 2014, more than 140 countries had renewable energy targets and supporting policies in place, but almost all of these were for the power sector (ESMAP and IEA, 2015, cited in ADB, 2015c). There are a few exceptions to this pattern. In May 2016, the Indian Government launched the Pradhan Mantri Ujjwala Yojana (PMUY), a scheme which aims to safeguard women and children from the harmful health effects of indoor air pollution by providing a total of 50 million Liquefied Petroleum Gas (LPG) connections to families living below poverty line over a three year period. In India, around 100 million households depend on traditional sources of cooking fuel such as firewood, coal and kerosene. With PMUY, this dependency would be remedied, thereby saving trees and improving health conditions. As of August 2017, the initiative has provided 27.7 million families with LPG connections. Similarly, in Nepal, the Government launched the Clean Cooking Solutions for All by 2017 programme to lower indoor air pollution in households. It also adopted the Renewable Energy Subsidy Policy, 2013, which has specific subsidies targeted at women and socially excluded groups, at both the household and community levels, for renewable energy technologies, including biogas and metallic cookstoves. Clearly, there is need for greater political and financial commitment to ensure that all households in the region switch to clean fuels.

A critical gap in this area is lack of sex-disaggregated data on household energy use and health impacts, which has impeded the development of policies to promote clean and safe household energy. In cooking energy, for example, policymakers and people in charge of public health programming need relevant data to characterize the disparities in health status between and among populations of women and men (Sass, 2002; WHO, 2016). At the same time, lack of sex-disaggregated data or analysis hinders efforts to recognize the need

for and design of specific gender-focused interventions (World Bank, 2013).

Examples of programmes that have benefited from gender analysis include the Lao Rural Electrification Programme and Uzbekistan power sector transmission projects. A gender disaggregated mid-term assessment survey of the Lao Rural Electrification Programme, for instance, revealed that 20–40 per cent of rural households (nearly half with a woman head of household) were not connected to the grid due to upfront connection costs. Based on this, specific gender-focused interventions were designed. Similarly, gender analysis in Uzbekistan showed that women, the main users of electricity at home, were disproportionately affected by power outages due to the disruption of household chores and lack of refrigeration, leading to more frequent trips to the market to purchase food each day. It also showed that women who do not work outside their home were cut off from electronic media, local and international news and information. This analysis informed the resettlement action plan of the Uzbekistan Power Sector Talimarjan Transmission Project, which included compensation with specific consideration for women's and men's requirements.

Enhanced connectivity through mobile telephony is rapidly expanding possibilities for programmes that deal with women's energy entrepreneurship. ENERGIA, the international network on gender and sustainable energy, for example, works with partner organizations in Asia and Africa, many of whom have started using mobile platforms for data collection and for programming. The Indonesian partner, Kopernik, developed a centralized database to store the profile and performance data of all its women entrepreneurs, along with analytics dashboards that aid analysis of that data. The data is used to assess entrepreneur performance, including their involvement in awareness-raising and promotional events. Another partner, Solar Sister in Africa, has been using a Mobile Business Toolkit. This tablet-based platform has allowed Solar Sister to increase the quality and quantity of data collected on the impact of its model on entrepreneurs. Through the Mobile Business Toolkit, Solar Sister surveyed more than 300 entrepreneurs across Uganda and Tanzania at the end of the calendar year, gathering high-quality data that allows it to strengthen its work and support mechanisms.

3.4

Strategies that work



1 Reaching clean energy through a women's network in India

Swayam Shikshan Prayog (SSP) is an Indian non-profit organization that helps village women to become clean energy entrepreneurs. During its initial years and recognizing the need for clean cooking and drudgery-reducing options for rural women, SSP took up the opportunity to partner with a large company to co-create a clean fuel cooking stove and grass-roots business model that built on the strength of the existing women's self-help group network. SSP got a boost in 2012 through the support of the Partnership on Women's Entrepreneurship in Clean Energy (wPOWER), a programme supported by the United States State Department and USAID in India. By 2015, SSP had successfully established a network of more than 1,010 women entrepreneurs.

SSP promotes the use of clean-energy products and solutions by building up the entrepreneurial capacity of its women's network to deliver solutions to people who are part of the poorest socioeconomic groups. Rural women entrepreneurs are encouraged to undertake microbusinesses and are provided with training, technical support and access to technology, finance and markets.

Strategies for success include:

Credit support to women entrepreneurs. The main challenge related to providing credit support for women who wanted to establish a clean-energy business. The women were linked to Sakhi Samudaya Kosh, an independent company, for microfinance credit for the purchase of clean energy products and credit solutions to support women entrepreneurs. SSP also partnered with the National Bank for Agriculture and Rural Development to support consumer financing to access clean-energy products (Sarkar, 2016).

An ecosystem approach. The main reason for the SSP success lies in the creation of a grass-roots support ecosystem, which builds up capacities by fostering

entrepreneurship and vocational skills development, providing seed and business expansion loans, facilitating rural marketing and distribution links and enabling access to a peer network of grass-roots entrepreneurs who grow and learn with each other.

A focus on nurturing leadership. The SSP mission is to enable social change and economic empowerment by developing and strengthening the competencies of women as leaders and entrepreneurs. SSP staff note the challenge of working with women due to gender stereotypes and social constraints restricting their social and economic mobility. SSP claims women can overcome these barriers with the right support and emerge as successful entrepreneurs and community leaders. As entrepreneurs, the women participate in distribution but also take a role in improving the system, discussing community needs and giving feedback on product design, quality and pricing. The women entrepreneurs have received much appreciation within their family and gained respect and a higher status in the community for their contribution to village life.

The project has now reached more than 4 million people across four states in India (Sarkar, 2016). Their efforts have resulted in more than 100,000 women and households using improved cookstoves, which save almost 100 tonnes of fuelwood per day. The promotion of solar lanterns, biogas cooking units, organic farming, vermi-composting and efficient irrigation technology has been part of the SSP efforts to address climate change.

2 Power to the poor in the Lao People's Democratic Republic

In the Lao People's Democratic Republic, the Rural Electrification Programme increased electricity access across the country, from 16 per cent to 71 per cent between 1995 and 2010. However, the programme encountered an uneven distribution of growth, with large urban-rural disparities as well as gender disparities. The key issue, as shown by a 2004 social impact survey, was that in electrified villages, 20–40 per cent of the households were left off the grid because they could not afford the connection charges of \$80–\$100. This included households living below the poverty line. As many as 43 per cent of the households were headed by women.

In response, a Power to the Poor (P2P) scheme was launched in 2008 to target those 20–40 per cent of households not connected to the grid. Implemented by Electricité du Laos, the scheme is a targeted, subsidized, affordable and sustainable financing mechanism for connection and indoor wiring for the poorest rural households. It is designed with a gender focus to provide interest-free credit, which allows the poorest rural households that cannot afford to pay the entire cost of connection and internal wiring up front to access the electricity grid for basic service. The monthly payments for both the credit and electricity consumption are designed to be about the same as the cost for lighting by candles, diesel lamps or car batteries.

The scheme also helps women gain access to electricity through measures that include gender-responsive eligibility criteria: among non-electrified households, all female-headed and single parent households are automatically eligible for support, as long as their house is safe for electricity (ASTAE, 2012).

The pilot results showed that connection rates for female-headed households in the scheme increased, from 63 per cent to 90 per cent, and the electricity access rate in the provinces where the scheme was implemented increased, from 80.9 per cent to 97.4 per cent (ASTAE, 2012). Gender-inclusive processes for community consultations and gender-responsive outreach materials highlighting the benefits of electricity for women further helped.

3 Clean cooking options for the rural masses in Cambodia

Approximately 80 per cent of Cambodians live in rural areas with limited access to clean and affordable water and energy. More than 90 per cent of energy used for cooking comes from wood and charcoal, contributing to increased deforestation (World Bank, 2009). Women traditionally shoulder the burdens of collecting fuelwood and cooking in Cambodian society. They spend an average of three to four hours a day on energy-related activities, such as gathering fuelwood, boiling water and cooking.

In 1997, the Group for the Environment, Renewable Energy and Solidarity (GERES) began the Cambodian Fuelwood Saving Project in urban areas and developed

and distributed the New Lao Stove. Despite good adoption in urban areas (more than 2.5 million improved cookstoves have been sold since 2003), the high price and the lack of a wide distribution network kept rural adoption low. GERES recognized the need to develop an improved cookstove for rural users. They built on women's traditional skills in pottery and trained them in quality control and enterprise development to produce and disseminate improved cookstoves, called the Neang Kongrey stove. As of 2014, about 8,000 Neang Kongrey stoves built by women were disseminated each month (GACC, 2014).

Features of the programme:

Building on women's traditional skills in pottery.

GERES streamlined the Neang Kongrey stove production process, which offered an open call to interested women producers to participate in a training programme to learn how to make the cookstove. Selected women were paid a daily allowance so that they could earn income while away from their regular income-generating activities. They were trained on production techniques, bookkeeping, financial management and stock management. Part of the training programme involved helping the women open a bank account and being taught about the fundamentals of saving.

Enabling conditions for women to work as stove producers.

Because the Neang Kongrey stove production facilities are mostly home-based, it permits women to have a flexible work schedule so they can complete their household tasks while producing cookstoves. And because they are also using the Neang Kongrey stove in their home, the time saved in fuelwood collection allows additional time for other pursuits, including cookstove production. Because men are perceived as the official head of the family, GERES communicates with the husbands before accepting women into the training scheme to ensure they have the support of their husbands. Once trained and certified, the women producers become part of a collaborative enterprise called the Association of Producers and Distributors of Improved Cookstoves in Cambodia, which has approximately 250 members now. Its quarterly meetings allow for more collaboration and communication between the cookstove producers and includes facilitated discussions on challenges, distribution methods and access to markets and retail connections.

Addressing quality and consistency in production.

Assuring quality of production was a particular challenge, primarily because of the production capacity limitations of the women producers. In response, GERES created a model production facility in an area that had many potters and many traditional small and medium-sized cookstove enterprises interested in Neang Kongrey stove production. The facility, which doubled as a training centre, developed and tested technologies and production techniques, developed quality controls for production, trained producers in management and marketing, evaluated manufacturing processes and prepared for scaling up.

Using local networks to reach far and wide.

To increase coverage of the cookstove sales, GERES partnered with local NGOs that identified potentially interested villages, oversaw payment schemes (which differed by village) and selected retailers. Wives of village officials, female leaders or CBO members, female vendors of village grocery shops and entrepreneurs were roped in as retailers. Village grocery stores were the main outlet for sales and offered visibility because they are generally the nucleus of village activity, and women are regular visitors. Demonstration stations were set up at various grocery stores. Female heads of Village Development Committees had an important role in awareness raising by conducting cooking demonstrations and discussions.

4 Women-led dissemination of clean energy technologies in remote Indonesian islands

Kopernik is a non-profit organization that delivers simple, affordable technology products to people in poor and often remote communities. Through an online marketplace, it connects donors, makers of innovative technologies (such as water filters and solar lanterns) and people in underserved communities who can benefit from these products.

Kopernik's *Ibu Inspirasi*, or Wonder Women, make simple technologies available in rural communities across Indonesia. Ibu Inspirasi are technology agents who sell solar lanterns, water filters and fuel-efficient cookstoves in their communities, forming a crucial

link in the supply chain connecting carbon-friendly technology with the people who need it the most. Through this initiative, renewable off-grid energy solutions are able to reach remote communities in Indonesia that traditional supply chains do not serve because the cost of reaching them is so high. The women receive business training, technologies on consignment and a starter kit of sales and marketing material. As of 2014, more than 300 women have sold clean energy technologies to more than 50,000 people.

Success factors for this model, as identified by Kopernik (Hamakawa, Nakamura and Wojkowska, 2014):²¹

Activating local networks. When introducing new technologies, Kopernik identifies organizations that have networks in a local area and works closely with them. Such entities can range from CBOs, cooperatives, savings and loans groups, schools and churches to mom-and-pop shops. The type of partner organization depends on the local context. For example, on Mentawai Islands of West Sumatra, Kopernik collaborates with a small kiosk willing to serve as a retailer of the life-changing technologies, rather than trying to create a distribution mechanism from scratch. This is effective not only in reaching potential users but also in ensuring the sustainability of operations.

Addressing financial barriers. Families relying on subsistence farming with low cash incomes are highly price-sensitive. For entrepreneurs, the main barrier is the upfront cost of acquiring technologies. Kopernik mobilizes donor funds—from both individuals and corporate partners—to cover the upfront cost of supplying technology inventory to technology agents. This means women are able to start selling products without taking on risk or debt and earn a commission on every sale. As they repay the cost price of the products to a revolving technology fund, Kopernik reinvests this money in replenishing their inventory.

The products are sold to “last mile” communities at as close to retail price as possible (no price subsidies). But revenues are reinvested in the purchase and delivery of additional products in the same community or other remote geographic areas.

21 See also www.nextbillion.net/5-factors-for-last-mile-tech-adoption/.

Even if a product has clear long-term economic benefits, the willingness to purchase new technology is dependent on the offered price. In a project in East Java, lowering financial barriers involves using philanthropic money in the form of subsidies to reach the last mile. Lowering the financial barrier not only involves setting appropriate prices but requires flexible payment options. Kopernik allows instalment payments in most projects and surveys local practices in the project-planning phase to tap into existing platforms.

Focusing on tangible benefits. The *Ibu Inspirasi* programme engages women in remote Indonesian communities to sell the products so that customers can buy from a trusted source and receive reliable after-sales service. The women also use the products that they sell so they can speak knowledgeably about how to use them and the many benefits they bring. It is also designed to maximize affordability: The smallest solar light or water filter costs less than \$20, but that can be a lot of money for subsistence farming families. Women are able to accept payment in instalments, making the products accessible to very low-income households.

Many of the simple, products they sell bring multiple benefits. Solar lanterns, for example, not only leapfrog one of the key needs that comes with a lack of electricity but are also cheaper in the long run and safer than kerosene lamps. This is what makes these products truly innovative. In marketing these innovations, Kopernik has learned that the most tangible benefits need to be strongly communicated. Tangible usually means monetary benefits for people living in poverty. Oftentimes, a single, simple message is more powerful than trying to communicate multiple, abstract messages at once.

Continued engagement and building local capacity. The final factor in delivering and ensuring the uptake of technology to remote areas is to demonstrate commitment through continued engagement. Whether it is through local partners or on its own, Kopernik ensures that the targeted communities gain access to practical products and follow-up service, despite the geographical distance. One way to ensure sustainability is to train local people in remote communities who can help others with maintenance. In a remote community in East Nusa Tenggara, for instance, Kopernik's local partner did this while promoting local sales of fuel-

efficient stoves, water filters and solar lanterns. Empowering local people with simple maintenance techniques resulted in a higher sales volume, compared with similar communities that did not conduct the same maintenance training.

3.5

Status, persistent gaps and opportunities



It is well established that women are principal energy stakeholders and need to be recognized as key players, not only as suppliers and consumers of energy but as part of the solutions to sustainable energy use. They should be engaged directly in policymaking and project design. All elements of energy planning and policymaking need to factor in gender dimensions and actively advance women's leadership. Perhaps the most important need is to recognize that women are in a position to drive demand and catalyse the adoption and use of new technologies at the household and community levels.

The overall status of this field can be summarized as six trends:

Electricity provision and use is not gender-neutral.

There are gendered variations in the use of electricity within the household, and electricity has the potential to empower women and communities by improving quality of life and providing economic opportunities. Quality of electricity service is important not just in homes but also in energizing social infrastructure, such as schools, hospitals and drinking water supply.

Women are beginning to take a role in the dissemination of energy services.

There have been several experiences involving women in various functions in the delivery of energy services. These are especially prominent in decentralized renewable energy technologies, including dissemination of solar home systems and lanterns, improved cookstoves and the management of community-based off-grid systems. In grid-based electricity, there have been positive experiences with women's groups as franchisees for metre reading and collection of bills. However, the scale of these has been small, and they are not evaluated systematically.

Women's numbers in the energy sector need to be ramped up. The energy sector has considerably fewer women as workers than men. Where women have been hired, they are largely within the administrative or local level and less so at decision-making levels. In recent years, women have been slowly taking on new roles in the sector and proving their mettle. Yet, they continue to face a multitude of issues at work.

Energy sector policies are mostly silent on gender. In general, the thrust of national energy policies has been on electrification but with almost no mention of women or gender. The assumption is that men and women benefit equally from electrification, and implicit in that is the assumption that men and women have equal capacities to use electricity to meet their needs.

Credible empirical evidence on gender and energy is lacking. Collecting sex-disaggregated data and gender analysis is a first step towards developing gender-responsive policies and programming. Data that provide information on women's and men's energy use, access to resources and participation in decision-making contributes to sound policies. However, sex-disaggregated information is seldom used in national energy policies or programmes.

Access to clean cooking is a major gender and energy access gap, with implications for environmental sustainability. Extensive and inefficient use of traditional biomass for cooking and heating continues to remain a core gender issue for the energy sector across the Asia-Pacific region.

3.6

The way forward: Policy lessons



1 Mainstream gender into energy sector policies and programming.

Gender mainstreaming in the energy sector requires positive action at three levels (Lambrou and Piana, 2006): at the policy level “to ensure that the challenge of gender equality becomes a visible and key concern”; at the programme level “to ensure that

all energy interventions create opportunities for women's empowerment and gender equality” and at the organizational level “to ensure that space and opportunities are available to women as well as men”.

- In energy sector policies, commitment to addressing gender concerns must be reflected at the highest level. Gender policy declarations within sectoral policies are important because they demonstrate a government's intent to address gender concerns; provide a reference document for technical staff who are working on national policies and programmes; and provide the basis for action to develop the capacity of both women and men to address gender concerns. In the Philippines, a Gender and Development Focal Point was set up in the Division of Environment and Natural Resources to serve as a catalyst for gender-responsive planning and programming. National energy and development policies should recognize women not only as suppliers and consumers of energy but also as part of the sustainable energy solutions. It is thus critical to engage them directly in policymaking and project design.
- Key elements of a gender-sensitive energy programme strategy include setting a gender-based goal; setting targets for women, including for them to become clean energy employees and entrepreneurs; carrying out research to evaluate interventions and the impacts of design elements of gender-sensitive projects; designing gender-focused activities, including gender-targeted promotion and marketing strategies; and monitoring the results of such actions (Cecelski and Dutta, 2011). Project monitoring also must include data collection on how women and men perceive their energy needs as well as what actions they perceive as most beneficial (Lambrou and Piana, 2006). Financing of energy access programmes also needs to be gender sensitive. Gender-equitable financing is needed to meet both women's and men's needs (NORAD, 2011). “Investments need to be increased for improved cooking options and other needs that correspond to women's energy consumption and productive activities”, although discussions are needed on how this should be financed (NORAD, 2011).

2 Conduct gender-responsive data collection and analyses.

Universal energy access cannot be achieved without more gender-responsive programmes and policies, which in turn require better data collection, gender-responsive indicators and gender analyses. There is need to:

- Improve data collection on women's and men's resource use, knowledge of, access to and control over resources and opportunities to be involved in decision-making are needed.
- Conduct longitudinal analysis of energy access to enable better tracking of the energy and gender inequalities overlaps and the gender impacts of energy interventions. For example, longitudinal term mapping of work hours, energy access and qualitative analysis of women's roles in urban and rural economies are important to understand how development changes and realistically alters the gender balance.

3 Harness women's economic empowerment as a strategy for universal energy access.

Women's engagement as energy entrepreneurs provides opportunity for ensuring universal access to energy. Women, in the provision of sustainable energy and climate-change technologies, have many strengths. They understand what design features meet women's needs, they can go places where men cannot go, and they are more effective than men in selling to other women and especially in reaching "the last mile" in rural areas and the poorest customers. Some of the larger initiatives work on a two-pronged strategy of (a) including popularization of clean energy and empowering women entrepreneurs to educate people in their communities on the benefits of using clean energy products and (b) making them customers. However, these activities need to be scaled up, and in doing so, a number of conditions need to be ensured:

- capacity building and support to organizations that are willing and capable of supporting women energy entrepreneurs;

- a willingness to create a level playing field for women as energy entrepreneurs and systems and mechanisms that will help them overcome the additional constraints they face, which requires sustained investment support into these actions;
- greater policy commitment at the national level and enabling environment support for women to thrive; and
- systematic data collection to demonstrate further that this business model works.

4 Prioritize clean cooking fuels and technologies.

Energy for cooking, which has not received adequate attention, continues to have severe socioeconomic impacts for poor households and for women and children in particular. While there have been notable advances in electrification, by contrast, access to clean cooking continues to fall behind. There are at least three areas that need concerted action:

- There is a need for greater political and financial commitment to ensure that all households in the region switch to clean fuels.
- Research and development of such innovative, low-emissions technologies to provide household energy services should be a top priority for the global development agenda (WHO, 2016).
- Investment in education and awareness, particularly among men, is needed to redress the imbalance between women as beneficiaries and men as financial decision makers within the household.



Chapter 4: **Gender inequality and safe water**

WATER IS A RESOURCE THAT IS fundamental to achieving sustainable development. As a human right, the right to safe drinking water and improved sanitation is pivotal for realizing other human rights, such as the rights to life and dignity and to adequate food and housing as well as the right to health and well-being (WWAP, 2016).²² Global and regional water-related frameworks, such as the 1977 United Nations Water Conference at Mar del Plata, the International Drinking Water and Sanitation Decade (1981–1990) and the 1992 International Conference on Water and Environment have recognized the importance of involving both women and men in the management of water and sanitation. The latter explicitly recognized the central role of women in the provision, management and safeguarding of water. It continued with Agenda 21, the Millennium Declaration and the MDGs and the International Decade for Action, with the theme “Water is Life” (2005–2015), which called for women’s participation and involvement in water-related development efforts.

As in other areas, women and men experience access to safe water and sanitation services in different ways. Women especially are more vulnerable to changing water-related conditions, and they stand to gain from improved access and resilience and disproportionately lose out when conditions deteriorate.

Parts of Asia and the Pacific already suffer from water shortages and scarcity. The region’s stress on water resources is increasing due to simultaneous pressure on water supply and demand. The region’s water supply is diminishing due to the impacts of pollution and climate change. Yet, demand for water is rising due to population growth, urbanization and increasing prosperity. The Asia-Pacific region is a large and diverse region in which water-related issues play out very differently, depending on where a person lives.

Over the course of the implementation of the MDGs in the region, progress was made in terms of access to safe drinking water. Between 1990 and 2012, it increased by 19 per cent in South Asia and 23 per cent in East Asia, while 94 per cent of the region’s population now has access to safe drinking water (WHO and UNICEF, 2015). Most countries with special needs, however, still face serious issues with water-related infrastructure. According to ESCAP, countries with special needs include the 36 least developed countries, landlocked developing countries and small island developing States in Asia and the Pacific.²³ In Papua New Guinea, for example, only 40 per cent of the population had access to safe water sources in 2015; in Afghanistan, this figure was 55 per cent and in Mongolia, it was 64 per cent. Bhutan and Armenia, despite being among the countries with special needs, are close to achieving full access of their populations to safe water resources, showing that access to safe drinking water is a function of various parameters, not only a country’s economic standing (ESCAP, 2016b).

While overall, one in ten rural residents in the region and one in five rural residents in landlocked developing countries are still without access to safe drinking water, good regional progress has been achieved for universal access to safe and affordable drinking water in urban areas. Urban vulnerabilities in the form of outdated or non-existent water supply systems and inadequate capture and storage systems exacerbate water shortages in large and medium-sized cities alike. With cities in Asia and the Pacific undergoing the fastest and largest growth in human history, urban coverage is struggling to keep pace with the population growth (UNICEF and WHO, 2015). Urban populations, in particular poor and vulnerable groups, such as people living in informal settlements and slums, remain underserved. Female-headed households tend to be poorer and located in more precarious places, such as informal settlements or low-quality housing, compared with households that are headed by two adults (Albuquerque and Roaf, 2016).

22 The central focus of this chapter is on drawing out the intersections between gender inequality and water resources at the levels of household, work, community and policy. While the sanitation issue is discussed in connection with water, it is not examined in all aspects. For more information on sanitation, please visit www.who.int/topics/sanitation/en/

23 Countries with special needs: 36 countries of Asia and the Pacific that include least developed countries, landlocked developing countries and small island developing States. Small island developing States: Cook Islands, Federated States of Micronesia, Fiji, Maldives, Marshal Islands, Nauru, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Samoa, Tonga, Kiribati, Solomon Islands, Timor-Leste, Tuvalu, Vanuatu. Landlocked developing countries: Armenia, Azerbaijan, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Turkmenistan, Uzbekistan, Afghanistan, Bhutan, Lao People’s Democratic Republic and Nepal. Least developed countries: Afghanistan, Bangladesh, Bhutan, Cambodia, Kiribati, Lao People’s Democratic Republic, Nepal, Myanmar, Solomon Islands, Timor-Leste, Tuvalu and Vanuatu. See www.unescap.org/sites/default/files/CSN_per_cent20Report_per_cent202016.pdf.

For sanitation, progress has been less convincing, and the MDGs remain an unfinished agenda: Nearly 1.7 billion people in the region still did not have access to improved sanitation in 2012 (WWAP, 2015). An estimated 280 million people have gained access to improved sanitation since 2000, albeit in urban areas. Unequal access to improved sanitation between urban and rural areas continues to be a challenge in Asia and the Pacific, with progress in rural areas insufficient to close the urban-rural gap, which can be as high as 40 per cent within a country. By 2015, the urban populations' access to basic sanitation varied, from 64 per cent for least developed countries to 92 per cent of urban populations in the most developed countries. Meanwhile, only about half of the total rural population (1.1 billion people) had access to it. Among the lowest-ranking countries with special needs were Papua New Guinea, at only 19 per cent coverage, Solomon Islands, at 30 per cent, and Afghanistan, at 32 per cent coverage. A few countries with special needs had a high percentage of population with access to sanitation, such as Armenia (at 90 per cent), Azerbaijan (at 89 per cent) and Tonga (at 91 per cent) (ESCAP, 2016b).

The case of the Lao People's Democratic Republic illustrates the very real and high socioeconomic costs of poor sanitation, which caused 3 million hygiene-related disease episodes per year as of 2005 and led to economic losses of \$193 million. This translated into per capita losses of approximately \$28, or more than 5 per cent of GDP (ESCAP, UN-Habitat and AIT, 2015).

In terms of data collection, huge gaps remain in the region for measuring the status quo and progress in improving access to safe drinking water and sanitation. These gaps seriously impede evidence-based policymaking. Aggregate indicators may not reflect shortcomings in service quality, such as interruptions, water quality, disinfection, efficiency or sustainability. Nor do they consider populations' preferences for specific technological solutions. For example, national statistics may count a household as covered if it is within a certain distance from a public water source, regardless of whether it reliably supplies safe drinking water or not. Hardly any data exist that are disaggregated by location, sex or age and that are comparable across countries in the region. The differentiated impacts on men and women thus can be gleaned mostly from qualitative data sources, case studies, anecdotes or indirectly from other data sources.

Table 12

Access to improved sanitation and resources across Asia and the Pacific, by small island developing States, landlocked developing countries and least developed countries, 2014

COUNTRIES WITH SPECIAL NEEDS	ACCESS TO IMPROVED SANITATION	ACCESS TO WATER RESOURCES
	% OF TOTAL POPULATION	
Small island developing States ^a	71.0	89.0
Landlocked developing countries ^b	75.0	83.0
Least developed countries ^c	50.0	82.0
Asia-Pacific	65.3	93.7

Source: ESCAP, based on UNSD MDG Indicators Database; see http://data.unescap.org/escap_stat/ (accessed 4 August 2017).

Note: a=Cook Islands, Federated States of Micronesia, Fiji, Maldives, Marshall Islands, Nauru, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Samoa, Tonga, Kiribati, Solomon Islands, Timor-Leste, Tuvalu and Vanuatu; b=Armenia, Azerbaijan, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Turkmenistan, Uzbekistan, Afghanistan, Bhutan, Lao People's Democratic Republic and Nepal; c=Afghanistan, Bhutan, Lao People's Democratic Republic, Nepal, Bangladesh, Cambodia, Myanmar, Kiribati, Solomon Islands, Timor-Leste, Tuvalu and Vanuatu.

4.1

At the household level



Women typically are expected to collect, use and manage the household's water supply, as well as manage sanitation and health issues. Water is needed for drinking, cooking, cleaning, washing, personal hygiene and for taking care of other household members, domestic animals and kitchen gardens. Due to women's interactions with water resources, any hindrance in the access to safe drinking water and adequate sanitation first affects them at the household level.

For women more than men, inadequate access to safe, hygienic and private sanitation facilities is a source of shame, physical discomfort and insecurity. Cultural norms can make it unacceptable for women to be seen defecating, and thus many women leave home before dawn or after nightfall to maintain their privacy, which can entail additional risks to their personal safety. When women have to wait until dark to defecate or urinate in the open, they tend to drink less water during the day,

which may result in health problems, such as urinary tract infections. Often, latrine designs, including for primary and secondary schools, are mainly prepared by male masons unaware of the special needs of girls. This has resulted in girls staying away from schools when they are menstruating (United Nations, 2014).

The concept of time burden is apt in capturing the gender-differentiated effects of access to safe water and sanitation. A recent Asian Development Bank study (2015) in nine countries, including three in Asia (India, Nepal and Pakistan), found that women spent more time on water collection than men. On average, women spent more than five hours each week collecting water, compared with men who spent 3.6 hours. In Africa and Asia as of 2010, girls and children walked approximately 6 kilometres a day just to fetch water (United Nations, 2010).

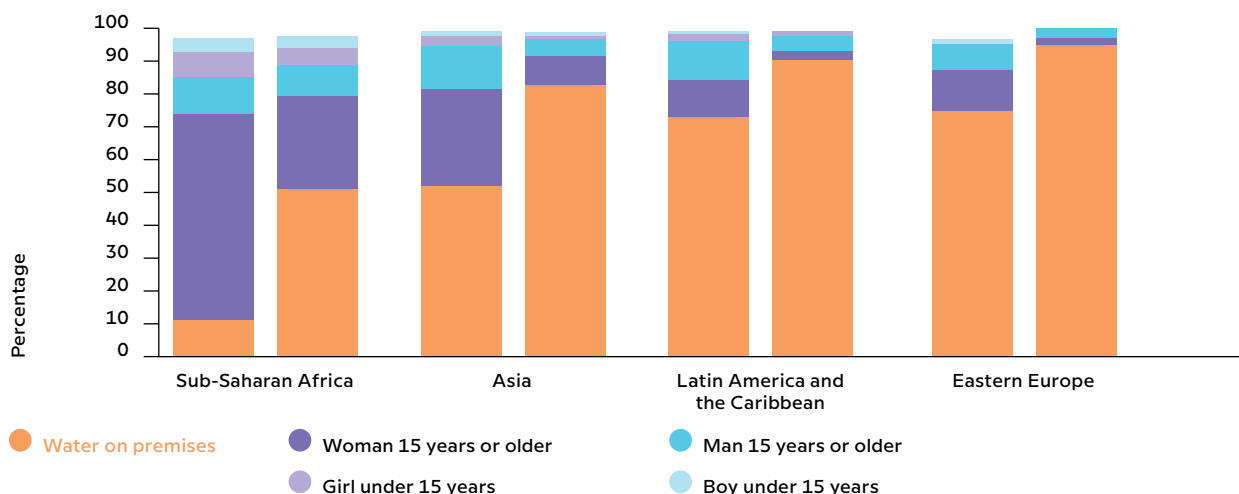
In some countries of the region, unsustainable withdrawal rates of total available water—mainly for agricultural production—is already a big problem and one that will grow in the future. It will be exacerbated by increasing populations, economic development and climate change. For example, the withdrawal rates were 68 per cent in the Islamic Republic of Iran (in 2004) and as high as 74 per cent in Pakistan (in 2008) (WWAP, 2015). When water resources become scarcer, women will suffer disproportionately because they have less decision-making power and control than men

over the access and development of water resources, although they have a more prominent role in the provision, management and allocation of water at the household level.

The Asia-Pacific region is one of the most disaster-prone regions, with more than 50 per cent of the world’s recent natural disasters affecting water supply infrastructure. Of the water-related disasters, floods represented about 50 per cent, waterborne and vector-borne diseases about 28 per cent and droughts about 11 per cent (ESCAP, 2015c). In 2013 alone, more than 17,000 people died from water-related disasters in the region, accounting for 90 per cent of all water-related disaster deaths globally. Economic losses totalled more than \$51.5 billion. In addition, the decline of glaciers lakes is affecting Asia’s major river basins, which are home to 1.2 billion people. With many of the region’s fast-growing cities in flood-prone or otherwise precarious places, exposure of people and assets to hydro-meteorological hazards has been significantly growing over the past few decades (WWAP, 2015).

In an analysis of disasters in 141 countries, the gender differential in mortality rates was found to be larger in societies where women did not enjoy the same economic and social rights as men. (Neumayer and Plumper, 2007). This study revealed that gender inequalities make women more vulnerable than men to the effects of natural disasters.

Figure 7
Water collection, by person collecting and by world region and urban or rural area, 2005–2007



Source: DESA, 2010.

4.2

At the income-earning level

With 4.3 billion people and representing 60 per cent of the world's population (ESCAP, 2014a), the Asia-Pacific region generates one third of the world's GDP. This translates to "thirsty" economic growth and the need to ensure safe and accessible water to further address income inequality, poverty and unemployment.

Water-related issues intersect with jobs across different sectors of the economy. This includes agriculture (including fisheries and aquaculture), energy and industry. Sectors with heavily water-dependent jobs include forestry, inland fisheries and aquaculture, mining and resource extraction, water supply and sanitation and most types of power generation. This category also includes some jobs in the health care, tourism and ecosystem management sectors (WWAP 2016).

4.2.1

Women in agricultural employment and the need for women's inclusion in agricultural water resource management

As previously noted, the Asia-Pacific region is characterized by stagnant—and in some cases decreasing—rates of female labour force participation. Figures on the sectoral composition of employment also show that women are working predominantly in agriculture and in the service sector, where they are likely to be employed in informal jobs or enterprises.

Agriculture is one of the largest consumers of available freshwater resources in Asia, where consumption is estimated to be in the range of 60–90 per cent (ADB, 2013). Yet, available freshwater resources have declined in the region. Projections for 2025 indicate the likelihood of physical water scarcity²⁴ in most of South Asia and throughout Central Asia, with economic water scarcity²⁵ in the remainder of the Asia-Pacific region (IWMI, 2000).

To further compound the impacts of water disruptions in agriculture, climate change is altering rainfall patterns, with serious consequences for crop production. Climate variability has meant increased rain in some areas, especially East, South and South-East Asia, and lower rainfall in other areas. Globally, rain-fed agriculture accounts for 80 per cent of the total agricultural area and produces 62 per cent of staple crops; in East and South Asia, it accounts for 60–65 per cent of farmed land (Okono, Monneveux and Ribaut, 2013). In 2011 for instance, major flooding inundated parts of Thailand, Cambodia, the Lao People's Democratic Republic and Viet Nam, affecting more than 2 million ha, or 8–12 per cent of total cultivated paddy, in each country and resulting in production declines of 2–7 per cent, over the 2010 levels (ADB, 2012).

In this context, the role of agricultural water management is critical. One element of agricultural water management is irrigation. Expanded irrigation is a driver of increased rice production throughout the region. Seven of the world's 15-biggest abstractors of groundwater are in Asia and the Pacific (ADB, 2016). Sustainable irrigation, therefore, is an issue that needs more attention in the context of climate change adaptation and mitigation.

However, access to irrigation and improved irrigation technologies is often skewed against poor smallholder farmers. And it is not gender-neutral. Often, women farmers are excluded in technology design, testing, dissemination and agricultural extension services (Maslog, 2015). Wealthier farmers are the ones who gain the most from the public provision of subsidies for credit, services, information, irrigation and agricultural research (IFAD, 2010). For rural women, this problem is compounded by gender-based barriers that hinder their ownership and control of productive assets. Because access to irrigation is strongly linked to land ownership and rights (Njie and Ndiaye, 2013), the fact that women are often at a disadvantage in regards to owning and controlling assets means that their access to irrigation and investments in improved irrigation technologies are likely to be curtailed. This is even more so when considering that women have less access than men to

²⁴ Physical water scarcity means that water resources development is approaching or has exceeded sustainable limits. More than 75 per cent of river flows are withdrawn for agriculture, industry and domestic purposes (IWMI, 2007).

²⁵ Economic water scarcity means that human, institutional and financial capital limit access to water, even though water in nature is available locally to meet human demands. Water resources are abundant relative to water use, with less than 25 per cent of water from rivers withdrawn for human purposes. Yet, malnutrition exists (IWMI, 2007).

credit and financial resources to invest in improved agricultural technologies.

Women are also important players and stakeholders in other aspects of agriculture water management, such as rainwater harvesting²⁶ and watershed management. This, in addition to their critical roles in agriculture, food production and consumption, should translate into gender considerations as a critical aspect in agriculture and water policies, as has been recognized in several international frameworks for the advancement of women's rights (for instance, the Beijing Declaration and Platform for Action). However, gender disparities in agricultural water management, which stem from unequal gender relations, are not taken into consideration when water policies are formed and when making decisions in water-related processes. Water policies based on generalized perspectives often omit local knowledge as well as social and gender dimensions. Thus, gender-responsive analysis at local levels is necessary to understand how policies differently impact women and men (Njie and Ndiaye, 2013).

Integrated water resource management has the potential to build capacities and resilience to climate change and water-related disasters. Governments have been working towards making their countries and societies more resilient, but much more work is needed, especially to include women's perspectives. Governments should facilitate the provision of integrated water policies and regulatory frameworks that address the needs of women (GWA and UNDP, 2006). Regulations for infrastructure investments and provision of water services in rural and urban areas should consider the specific priorities and constraints of women in the population that such infrastructure facilities are intended to serve. The proximity of water supply facilities to local populations can reduce the time and effort, as well as the risks involved for women who have to otherwise walk long distances to collect water.

Gender mainstreaming is increasingly recognized as an important pillar of integrated water resource management. Enhancing women's participation increases equal representation of water users in water management and can lead to more efficient ways of using and allocating resources and of coping with conflicting

demands, which, in turn, support the guiding principles of integrated water resource management (United Nations, 2014).

4.2.2

Women's employment in the water sector and the need for women's inclusion

The 2016 UN-Water *Report on Water and Jobs* describes three functional categories in which jobs in the water sector could be classified: (a) water resource management (including integrated water resource management and ecosystem restoration and remediation); (b) building and managing water infrastructure; and (c) provision of water-related services (including water supply and sewage and waste management). Each of these categories requires a variety of technical experts, such as: planners, managers, engineers, environmental specialists and other technicians, who deal with a range of issues, from building necessary infrastructure to financial planning, community mobilization, maintenance and monitoring and evaluation (UN-Water, 2016).

Systematic and extensive data on the composition of human resources in the water sector is not available, particularly sex-disaggregated data. However, studies that are available show that women lag in their participation in the water sector employment. Studies for the International Water Association, for example, developed a specialized methodology to assess capacity gaps in human resources. These studies included capacity assessments in six Asian countries: Bangladesh, the Lao People's Democratic Republic, the Philippines, Papua New Guinea, Sri Lanka and Timor-Leste. The following highlights women's participation in employment in the water sector in three of those countries:

- **Bangladesh:** As of 2013, the sector was dominated by men, with only 14 per cent of those engaged in the sector being women, many of whom were employed by NGOs. The study researchers estimated that the overall future requirement of total workers in the sector would increase, pointing to a need to offer more competitive conditions for workers—a potential opportunity to include more women (IWA, 2013a).

26 The substantial rural and gender-equality benefits of the application of rainwater harvesting in countries like India have been noted in various studies (see, for example, R.M. Pink, "Rainwater Harvesting: Water Security for Marginalized Communities in India", *The Solutions Journal*, vol. 7, N° 6, (2016), pp. 80–84).

- **Lao People's Democratic Republic:** As of 2013, men staff outnumbered female staff, at a ratio of 9:1 reported in the Nam Papas (state-owned water enterprise), 8:1 in the Nam Saat (Ministry of Health agency) and 2:1 in NGOs. In 143 district Nam Saat offices, with a total of 208 staff for water and sanitation, only 37 staff were female. Reasons for these disparities included that engineering was still a male-dominated profession in the country. There may have been gender biases because of rural work and travelling required with often all-male teams is less culturally acceptable for women (IWA, 2013b).
- **Papua New Guinea:** As of 2013, gender inequality in the water sector was pronounced, with only a few women entering the technical fields. This was evident at Eda Ranu (the parastatal company running water and sanitation provision), where of a total staff of 200, only 30 were women. While this seems to be the typical pattern in urban areas, in rural areas the gender split was more even because there more women participate in community mobilization, community development and hygiene promotion (IWA, 2013c).

These examples of gender disparities in water employment constitute further evidence of the lack of inclusion of women's perspectives in the water sector in general, which further exacerbates the need to include women's abilities, needs and knowledge in advancing inclusive water policies, programming design and leadership.

4.3

At the community and national levels



Given the all-pervasive importance of water, it is of little surprise that improving water and sanitation management (both in terms of quantity and quality), as well as reducing vulnerabilities to climate change and natural disasters, have been on the international development agenda for decades. While significant improvements have been achieved in some areas, many of the issues and challenges persist, including the gender dimension. With the 2030 Agenda and

the outcomes of the conferences in Paris on climate change and in the Sendai Framework for Disaster Risk Reduction, comprehensive mandates are in place to advance both sustainable water management in all its dimensions as well as gender empowerment and equality.

Women in Asia and the Pacific are hardly involved in decision-making in the water sector (ADB, 2006), even though it has been found that water projects that are gender- and poverty-sensitive and require the full participation of women are more sustainable (Gross, van Wijk and Mukherjee, 2000). Working closely with women leaders from local to national levels is important for advancing a gender-responsive perspective. Women should be more actively involved in water resource management and in the design of sanitation policies to ensure that the specific needs and concerns of women and girls are considered. It is also crucial to determine what people want, what they can and will contribute and how they will participate in making decisions on the types and levels of service, location of facilities and on operations and maintenance. Any such analysis should include a gender perspective to be truly effective and sustainable (Unturbe, 2015).

Experience²⁷ shows that the resilience of households and communities depends greatly on the resilience of women. Promoting women as decision makers is critical to ensure the sustainability of environmental policy, planning and programming. However, women are consistently absent from formal decision-making structures and bodies, making it a “missing women” scenario in water sector leadership (ADB, 2014b). Precise figures are not available to illustrate the full extent of these gaps in the region. The reasons for the dearth of women in water leadership comprise a complex interaction between social norms and educational dynamics. On one hand, it is the absence of women water professionals, since women tend not to choose fields of study in science and technology, thus the leadership pipeline is thin from the beginning. On the other hand, persistent gender stereotypes, both in educational structures and within society at large, steer girls away from scientific fields, reinforcing the scarcity of technical professionals for the water sector (ADB, 2014b).

²⁷ See web.unep.org/gender/.

In Asia and the Pacific, more than 85 per cent of wastewater remains untreated, creating the risk of a “silent disaster” from the pollution of surface and groundwater resources and coastal ecosystems.²⁸ Between 80 per cent and 90 per cent of the wastewater generated in developing countries are discharged directly into water bodies without any treatment (ESCAP, UN-Habitat and AIT, 2015). In Indonesia, only 14 per cent of wastewater is treated; in the Philippines, 10 per cent; India, 9 per cent; and Viet Nam, 4 per cent (ADB, 2016). Wastewater treatment (if it exists) is often at the household or community level only—with larger downstream treatment plants and wastewater recycling inadequate or absent. The problem is worsening as the amount of wastewater generated increases across the region. For example, between 2007 and 2010, the region’s upper middle-income economies almost doubled the production of their municipal wastewater, from 31 billion to 47 billion cu m of wastewater per annum, while 29.2 billion cu m were treated in 2009. In 2011, of 38 billion cu m of municipal wastewater produced in China, only 26.6 billion cu m were treated. It is of utmost urgency to take note of the situation and recommend adequate intervention measures at the local levels.

4.4

Strategies that work



1 Impacting macro-level water policies through community-level projects in Armenia

Since 1999, the NGO Armenian Women for Health and Healthy Environment has implemented more than 90 projects promoting sustainable sanitation, supply, the involvement of local people and their strengthened participation in decision making processes. The focus of the NGO has been rural communities faced with deteriorating drinking water supply systems and lacking sanitation systems. Historically, villagers supplied their own water through local springs, the upper reaches of rivers and other sources without any

treatment. Being outside of the service areas of large water supply companies, these communities could not benefit from national projects. While drinking water and sanitation are available in some rural schools, they do not work because the villages where they are located lack modern water supply and sanitation systems.

The Armenian Women for Health and Healthy Environment involved various stakeholders, notably including women, in the development and implementation of a United Nations-WHO Water Safety Plan. They launched awareness campaigns regarding health risks associated with unsafe drinking water. And they assisted in rehabilitating the old drinking water systems and constructed ecological toilets and septic tanks for schools. Over the course of the project, the NGO increased the role of women in communicating water- and sanitation-related issues in their communities as well as their participation in local decision-making processes.

The NGO has been contributing to decision-making processes on environmental issues at the national level: It has a representative in the National Council on Sustainable Development facilitated by the prime minister and a representative in the Steering Committee of the National Policy Dialogue on water-related issues. It is also linked to regional and global water, sanitation and environmental campaigning and governance bodies and processes.²⁹

2 An inclusive water, sanitation and hygiene programme for gender empowerment in Vanuatu

Gender-responsive water, sanitation and hygiene (WASH) programmes could go a long way in advancing the sustainable development agenda. Such programmes not only address pressing practical needs, such as access to safe drinking water and improved sanitation, but also improve overall relationships between men and women, thus contributing towards advancing gender equality and women’s empowerment.

In Vanuatu, an archipelago nested in the south-western Pacific Ocean, villagers (typically women and children)

28 Second Asia Pacific Water Summit, Chiang Mai, Thailand, 2013.

29 See www.awhhe.am/.

spend considerable time collecting safe water every day.³⁰ Paucity of safe drinking water and sanitation increases the risk of WASH-related diseases. UNICEF (2010) estimated that Vanuatu had the third-highest incidence of diarrhoeal disease among the Pacific island countries. To understand the links between WASH and gender-based realities in Vanuatu, the Institute for Sustainable Futures at the University of Technology Sydney, the International Women's Development Agency and World Vision Vanuatu joined forces to research the impact of a WASH programme on two communities, Puluau and Nanen.³¹ The programme used the participatory hygiene and sanitation transformation approach, through which women, men and children participate in the development process by identifying problems and discussing solutions.

Overall, the programme enhanced the respect and trust levels that women experience in both communities. In Puluau, disputes were known to erupt when husbands refused to fulfil the request of wives to fetch water. With improved access to water supply through the programme, the premise for the conflicts has abated and the incidence of domestic disputes has reduced. Upon understanding WASH issues better, men have started showing interest in tackling hygiene issues at home. Women's leadership skills have been recognized, and women now participate in decision-making bodies at the community level.

The inclusive and participatory approach proved key for the success of the programme. By being women focused, the programme considered time and mobility constraints when deciding the time and location of its activities. Programme personnel encouraged women to stand for local elections and continued to train them in leadership skills. They also induced the support of male community leaders to garner support for women's leadership.

This experience reinforces the contention that gender-responsive activities should be an important consideration during the planning stage of all programmes in this sector. It is also necessary to encourage the development of women leaders through sustained capacity-building programmes. Co-opting men is pivotal for sustaining women's participation

in leadership roles as well as for establishing long-term normative changes. Through gender-responsive WASH programmes, it is possible to address the daily needs of households as well as overarching structural impediments, which in turn enable the transition to a more equal society in which men and women work together to alleviate time burdens.

4.5

The way forward: Policy lessons



1 Mainstream gender into water sector policies and programming.

- Mainstream gender considerations into water sector legislation, policies and programmes and support the equal participation of women in water management decision-making at all levels.
- Assess the implications of any planned action on men, women and marginalized groups at all stages of development programmes, including planning, budgeting, design, implementation, monitoring and evaluation (WSP, 2010), with the ultimate goal of achieving gender equality and empowerment of women.
- Embed gender-responsive budgeting within local water management, thereby ensuring gender-equitable financing that addresses the needs of both men and women.

2 Empower women in water resource decision-making to enable equitable access.

Women's unique knowledge and capacities to manage water resources must be recognized. This can be realized by strengthening women's leadership in the water sector and across environmental decision-making bodies by engaging women leaders, especially as environment and water ministers (or the equivalent),

³⁰ See www.adra.org.nz/vanuatu-wash/.

³¹ The names of the communities were changed by the researchers to respect the residents' privacy.

to serve as role models in the effort to mainstream gender into water management. This, in turn, requires the following enabling factors:

- Establish political will to achieve gender equality at the local, national, regional and global levels.
- Synergize the capacities of government ministries in charge of water and women to enhance girls' and women's' access to knowledge and information by providing training on water use and sanitation and by increasing their participation in water and sanitation programmes.
- Facilitate the access of women entrepreneurs, leaders of civil society organizations and small-scale providers to financial resources by using an integrated approach. This would mean capitalizing on the cooperative work between different ministries in charge to synergize the provision of grants, credit lines or alternative financing mechanisms for improving existing or building new community-based water and sanitation services, thereby enabling the supply of safe drinking water to communities.

3 Apply a gender lens to integrated water policies and regulatory frameworks.

- Consider the priorities and constraints of women in the regulations for infrastructure investments and the provision of water services in rural and urban areas.
- Mandate representation of women in local water user associations to ensure the active participation of women in local water resources management.
- Harness the unique knowledge and expertise of women, acquired by virtue of their interaction with the environment in their daily lives, in management decisions, and facilitate women's contribution alongside men to society's welfare in innovative ways (Cap-Net and GWA, 2014).
- Build capacities and resilience to climate change and water-related disasters through gender-responsive integrated water resource management policies

and practices that explicitly include women's perspectives.

- Ensure that policies are sufficiently resourced for proper implementation, including any associated institutional capacity required.
- Integrate gender-responsive disaster risk reduction into development strategies through national development plans.

4 Generate sex-disaggregated data in water resource management.

- Improve sex-disaggregated data on access, use and control over water resources, which is critical for the development of gender-responsive policies and programmes. It is also essential for monitoring and evaluating the respective roles of men and women in the design and implementation of water resource development programmes, as well as for assessing the impact of such programmes on the lives of men and women (GWA and UNDP, 2006; Khosla and others, 2004). The lack of sex-disaggregated baseline and monitoring data makes it difficult to understand and analyse the effects of the interventions on different groups, particularly women (DESA and UNW-DPC, 2009).
- Review and revise data collection strategies in the water sector. Revision is required in cases in which sex-disaggregated baseline and monitoring data are not collected.



Chapter 5: **Gender inequality and sustainable fisheries and forestry**

DEVELOPING COUNTRIES AROUND THE WORLD have decentralized the management of fisheries and forests to the community level (Leisher and others, 2016). It is imperative to go beyond the community to figure out the place of women in the management of these two resources. Both sectors have specific jobs that are typically undertaken by men and women. The work done by women largely remains outside the ambit of official accounting systems, thereby staying “invisible” for effective policy interventions. There is also the cross-cutting issue of recognizing women’s knowledge and capacities in the management of resources. While this chapter emphasizes women’s participation, it also focuses on the importance of understanding the type of participation that women have access to.

5.1

The sustainable management of fisheries

Marine and coastal ecosystems provide various economic, social, environmental and cultural values to human societies, including income, nutrition, employment and ecosystem services. Fisheries provides men and women with nutrition, income and employment opportunities. It is a sector with a panoply of jobs within it—some of them performed more typically by men than women and vice versa. But because the engagement of men and women differ, interventions in this sector should take into account the gender differential vulnerabilities so as to promote efficient fisheries management.

5.1.1

Overview of the fisheries sector in Asia and the Pacific

Fish are an important source of protein. More than 20 per cent of the animal protein supply comes from fish for Brunei Darussalam, Cambodia, China, the Democratic People’s Republic of Korea, Indonesia, Japan, the Lao People’s Democratic Republic, Malaysia, Myanmar, the Philippines, the Republic of Korea, Thailand, Viet Nam and some small island States. Among these countries, per capita fish protein per day is highest (more than

10 grams) in Japan, the Republic of Korea, Malaysia, Cambodia, Myanmar and Brunei Darussalam.

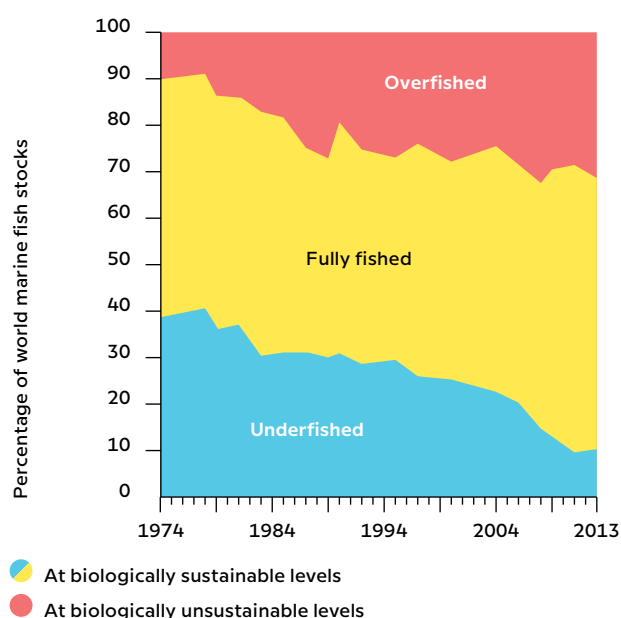
In terms of employment in the fisheries and aquaculture sector, Asia accounts for the largest share in the world: About 84 per cent of people engaged in fisheries and aquaculture in the world were in Asia and about 94 per cent of people engaged in fish farming were in Asia in 2014 (FAO, 2016a).

The Asia-Pacific region is also the largest consumer of fish. Of the 165 million tonnes of fish consumed in the world in 2014, the region consumed about 120 million tonnes. The consumption of fish in the region has been increasing due to increasing incomes, population growth and urbanization. China has been leading this trend, with per capita fish consumption increasing from 14.4 kg in 1993 to 37.9 kg in 2013, whereas the rest of the world saw only a modest increase in per capita fish supply, from 13.1 kg in the 1990s to 15.3 kg in 2013. China had the highest marine capture production in 2014, followed by Indonesia, the United States, the Russian Federation and Japan. Aquaculture production has become key in meeting the growing demand. The share of aquaculture in total production of fish for human consumption reached 54 per cent in the region in 2014. This is the largest share of aquaculture, compared with the rest of the world, where the share ranges from 12 per cent to 18 per cent and the consumption is mostly marine capture (FAO, 2016a).

Fisheries also provides an important source of foreign currency for many countries. For developing countries, fisheries net export revenues were \$42 billion in 2014 higher than other agricultural commodities, such as coffee, meat, rice and sugar. China, Viet Nam, Thailand and India were among the top-10 exporters of fish and fisheries products in 2014 (in the order of value). World trade in fish for human consumption is expected to grow by 18 per cent from the current level, to exceed 46 million tonnes in live weight equivalent by 2025. This growth will be driven by increased consumption, trade liberalization, globalization of food systems and technological advancement in the supply chain. Aquaculture will contribute to this growth. Much of the increase in trade in fish will be driven by developing countries, particularly in Asia, which will account for 67 per cent of the additional exports by 2025 (FAO, 2016a).

However, the world's marine fish stock is increasingly exploited (see figure 8). The proportion of fish stock within biologically sustainable levels (underfished and fully fished) continue to decline, reaching 68.6 per cent in 2013. The proportion of fish stocks that are fished at an unsustainable level (overfished) continue to increase, reaching 31.4 per cent of all marine fish stock in 2013 (FAO, 2016a).

Figure 8
Global trends in the state of world marine fish stocks, 1974–2013



Source: FAO, 2016a.

Although the region depends on ocean and marine resources for various purposes, it also pollutes and degrades the resources. Almost 80 per cent of marine pollution comes from land-based sources, such as agricultural and industrial run-off, and garbage, including plastics and untreated sewage. The remaining 20 per cent comes from ocean-based sources, including coastal tourism, port and harbour development, fisheries and vessels. Depending on the nature of pollutants, the impacts vary (Ocean Conservancy and McKinsey CBE, 2015).³²

5.1.2

Gender Inequalities and sustainable fisheries management

WOMEN'S EMPLOYMENT AND VOICE IN THE FISHERIES SECTOR

The world over, women are an important part of the labour force in the fisheries sector. According to 2014 estimates, women accounted for more than 19 per cent of all people directly engaged in the fisheries and aquaculture sector (FAO, 2016a, p. 33). A 2012 World Bank publication noted that, globally, when primary and secondary fisheries sector engagement are combined, women make up half of the workforce. When talking about inland fisheries, women make up at least half of the inland fisheries workforce, with 60 per cent of seafood marketed by women in Asia. The gender composition of employment differs from large-scale marine fisheries to small inland fisheries. In large-scale marine fisheries as of 2012, 34 per cent of workers were men and 66 per cent were women. In small scale inland fisheries, 46 per cent were men and 54 per cent were women (World Bank, 2012a).

Though more women work in the sector than men, women work more often than men as low-skilled, low-paid workers and have irregular seasonal employment in processing, packaging and marketing. They often lack proper contracts, health safety and labour rights protection. In general, fewer women than men are seen only in the actual catching of the fish. Instead, post-harvest distributions as well as processing are largely dominated by women. Although women participate in a range of activities throughout the value chain, it does not necessarily translate to decision-making power for women because some of their activities have no formal recognition. For instance, in Myanmar, official data on fisheries only focused on open-ocean and river fishing, which are male bastions, ignoring the rest of the fishing cycle, wherein women work (Fee and others, 2017). Women's work in Myanmar includes post-harvest processing, net-making and the selling of fish. They have primary responsibilities for such job as cleaning, smoking, salting and drying as well as for selling fish and seafood products in local markets. Lack of official status can be a barrier to access finances and policy support for women working in this sector.

³² See also UNESCO: Facts and Figures of Marine Pollution, www.unesco.org/new/en/natural-sciences/ioc-oceans/focus-areas/rio-20-ocean/blueprint-for-the-future-we-want/marine-pollution/facts-and-figures-on-marine-pollution/.

The gender wage gap in the fisheries sector also constitutes a barrier to their ability to fully access economic participation. For example, in Indonesia, the projected wage gap for 2016 was nearly 40 per cent; it had remained high between 2000 and 2015 as well (UN Women, 2016). Persistent gender stereotypes create difficulty for the implementation of gender equality laws and policies aimed at women's equality.

Women's participation in decision-making processes in the fisheries sector has positively impacted resource efficiency and conservation outcomes in Nepal as well as in India (Leisher and others, 2016). Empowering women to have a greater say in those decision-making processes has the potential to not only manage and conserve fish resources in a sustainable manner, it would also be furthering gender equality and women's empowerment generally.

Currently, the data and reporting on sex-disaggregated employment in the fisheries sector is limited. But as the data and reporting improve, the understanding of women's contribution to fisheries and aquaculture is expected also to improve. It is imperative that such data are collected and gender research is conducted so that appropriate interventions and policy changes are implemented.

WOMEN AND MARINE POLLUTION

An important case of marine pollution that particularly affects women is methyl mercury, which is a type of heavy metal discharged into the oceans that accumulates in fish. Methyl mercury poisoning causes human beings to have the neurological syndrome known as Minamata disease. The poisoning was first recognized in 1956 in Kumamoto, Japan, where mercury-contaminated wastewater was released from a factory untreated. People who ate fish and shellfish that had accumulated the mercury subsequently suffered from mercury poisoning. While mercury can be released from the human body, it easily passes through placenta into a foetus and results in foetal Minamata disease. Mercury poisoning has been found in China and the Philippines. A study on global methyl mercury exposure from seafood consumption and risk of developmental neurotoxicity published by WHO in 2014 looked at the association of exposure among populations that consume seafood regularly. The researchers estimated that mercury intake was highest among regular seafood consumers in Japan and the Pacific islands. The study

also found greater risk of mercury poisoning among seafood-consuming women and their infants in the coastal regions of South-East Asia and the Western Pacific (Sheehan and others, 2014).

Globally, 400 million women of reproductive age rely on seafood for at least 20 per cent of their animal protein intake; however, many of these women live in low- and middle-income countries, where they may not have adequate access to information on heavy metal poisoning of seafood (FAO, 2010, DESA, 2013 and UNEP, 2008, cited in Sheehan and others, 2014).

5.1.3

The way forward: Policy lessons

1 Mainstream gender considerations within the fisheries sector.

- Identify whether fishery sector policies in the region are gender-responsive. Incorporate gender thinking during the planning stage of policies, programmes and policies.
- Use quotas for ensuring representation of women in decision-making bodies. This needs to be supported with actions to ensure active and effective participation of women.
- Undertake gender analysis at the beginning of programmes and projects to understand the nature of tasks, daily routines and aspirations of social groups of men and women of relevance to the programme or project.
- Ensure that interventions are mindful of time burdens and mobility constraints of participants.

2 Generate sex-disaggregated employment data in the fisheries sector.

- Facilitate the collection of sex-disaggregated employment data for the fisheries sector. This would help policymakers gauge the extent of women's contribution to the sector and thereby design

appropriate interventions and policy changes to ensure that women are not left behind.

- Promote collaboration on gathering data between agencies and departments responsible for fisheries and statistics that looks at the gendered dimensions of the fisheries sector.
- Promote development of gender-responsive monitoring and evaluation indicators.

3 Map out the gender-mainstreamed systems within and across policy sectors.

- Conduct value chain analysis to determine the actors and organizations that are part of the fishing cycle, in pre-harvest, harvest and post-harvest stages. Conduct this analysis in a timely manner for marine and inland fisheries.
- Determine the value of the work done by women in this sector so as to govern and plan for these activities in national and state planning exercises.

4 Secure rights for women workers in the fisheries sector.

- Design appropriate legislation that recognizes women's work in the sector and secures the rights of women who work in the fisheries sector. An integrated treatment of this issue at the level of governance would be instrumental in removing the difficulties of women regarding access to credit lines, social security and land resources.

5 Recognize women's knowledge, capacities and agency in the sustainable management of fisheries.

- Establish policies that promote women's unique knowledge and capacities for managing fisheries sustainably. This would open up an alternative pathway to the sustainable management of fisheries.

- Identify women who have been successful in the sector and disseminate their stories far and wide.

5.2

The sustainable management of forests

Forests have multiple functions to support the lives of men and women. Forests provide various ecosystem services, such as prevention of floods and soil erosion, storage of carbon from the air, facilitation of the water cycle and maintenance of biodiversity. Forests provide timber, food, shelter, fodder and medicine and support food security, provide livelihoods and sources of income. They also offer recreation, support mental and physical health and keep cultural and spiritual values. Forests are critical for climate change mitigation and adaptation.

5.2.1

Overview of forestlands and biodiversity in Asia and the Pacific

FOREST COVER

Asia and the Pacific account for around 15 million sq km of forest, which is 39.4 per cent of the global forest area.³³ Despite the continued decline of forest cover in the previous decades, forest cover started to increase in 2000, with annual gains of 1.35 million ha, due to massive reforestation efforts, mainly in China. Between 1990 and 2015, there has been 0.2 per cent forest-area increase across the region.³⁴ However, forest cover change varies from country to country and subregion to subregion. During the fifteen year period between 2000 and 2015, a significant decline in forest cover, measured by percentage change, was observed in the Democratic People's Republic of Korea, Pakistan and Kyrgyzstan. Due to reforestation efforts, significant gains in forest cover has been achieved in Azerbaijan, China and Viet Nam (see figure 9).

In terms of subregions, the most concerning situation is South-East Asia. It is home to rich terrestrial biodiversity, yet it lost about 31.3 million ha between

³³ ESCAP, based on UNSD, SDG indicators global database, 2016 ; see www.data.unescap.org/escap_stat/ (accessed 21 July 2017).

³⁴ Ibid.

1990 and 2010, with an annual loss of 1.3 million ha. This is equivalent to a quarter of the world's loss of forest during the same period (FAO, 2015).

DRIVERS OF FOREST COVER LOSS

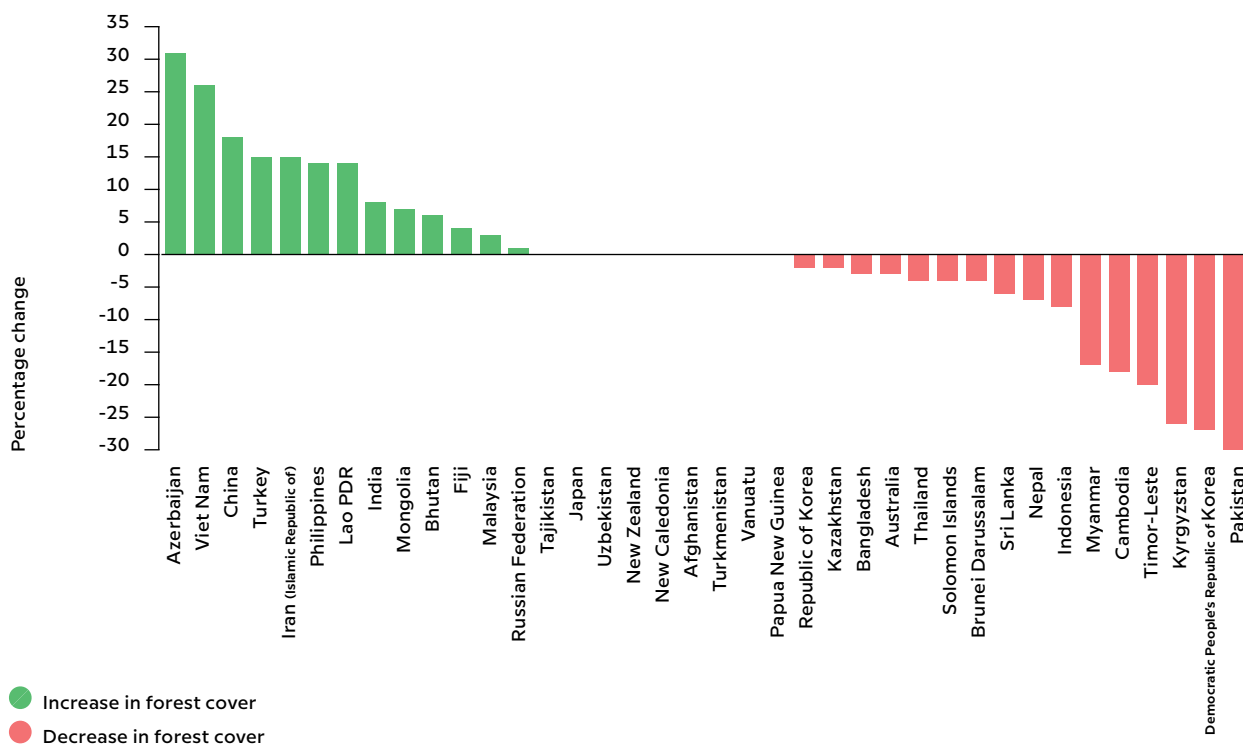
One of the main drivers for forest cover loss is deforestation for land use change. From 2000 to 2010, 6 million ha of 7 million ha of deforested areas were converted to agricultural land worldwide. The largest net loss of forest area and the largest net gain in agricultural land took place in low-income countries, due to the increase in rural populations. In Asia, more than 1.5 million ha of land was deforested in that same period. About 70 per cent of deforestation took place because of land-use change to agriculture for both subsistence farming and commercial agriculture. The remaining 30 per cent was due to urbanization, mining and infrastructure (Kissinger, Herold and De Sy, 2012).

Commercial agriculture expansion is currently slightly more significant than local and subsistence agriculture,

and it is growing as a result of increasing demands for food and consumer products, such as coffee, timber and palm oil. In Malaysia, palm oil plantations increased from 2.4 million ha to 4.2 million ha between 1990 and 2005, converting 1 million ha of forests. In Indonesia, palm oil plantations increased from 1.7 million ha to 6.1 million ha between 1990 and 2000, converting 1.7 million–3 million ha of forests (FAO, 2016b). Aiding this alarming extent of conversion is the lack of land tenure for forested lands, thereby providing incentives to exploit forests for short-term gains rather than long-term sustainability. Weak governance gives way to illegal logging.

The impacts of deforestation on men and women differ. Because it is often women's task to collect fuelwood and edible items from the forest, they must walk longer distances to find them after deforestation. Longer distances exacerbate women's time poverty. Their security on the way to and from forests is at risk. Less access to edible items in the forest can easily

Figure 9
Percentage change in forest cover in Asia and the Pacific, 2000–2015



Source: ESCAP, based on UNSD SDG indicators global database; see http://data.unescap.org/escap_stat/ (accessed 4 August 2017).

lead to women’s food insecurity because they often sacrifice their own intake when there isn’t enough food for other family members. Deforestation also undermines women’s privacy—in the absence of sanitary toilets, forests provide privacy to women in relieving themselves. Loss of forest also means loss of opportunities to earn income and livelihoods.

BIODIVERSITY LOSS

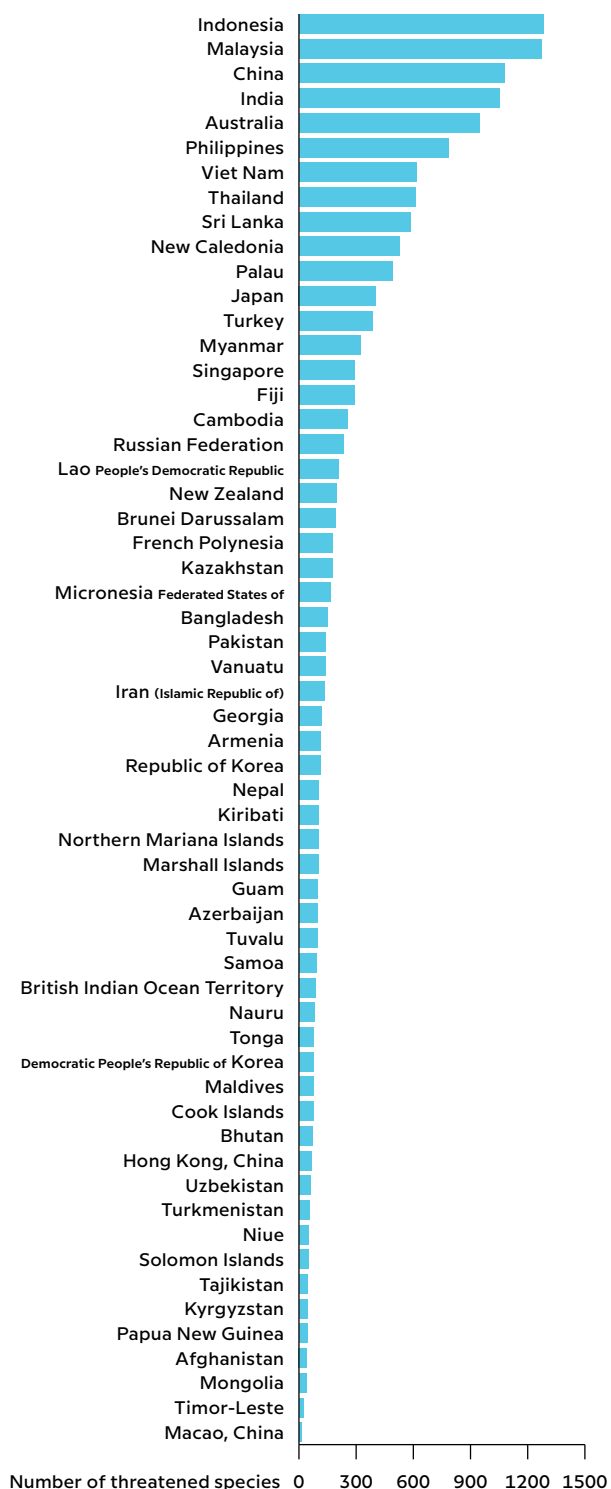
Nearly half of the world’s 35 biodiversity hotspots are found in the Asia-Pacific region. In particular, South-East Asia, in which countries with rich ecosystems (Indonesia, Malaysia and the Philippines) are located but where deforestation continues, encompasses 20 per cent of the global plant, animal and marine species and 25 per cent of the biodiversity hotspots (ESCAP, UNEP, UNU and IGES, 2016).

Deforestation, habitat loss, impacts of hunting and climate change threaten the region’s rich biodiversity. Since 2012, 27 species have become extinct, almost 120 species have become critically endangered and almost 1,000 species are vulnerable or nearly threatened in the region. Australia, China, India, Indonesia, Malaysia and the Philippines are among the world’s top-20 countries with the largest numbers of mammals under threat. Threatened native mammal and plant species increased by more than 10 and 18 per cent, respectively, in the past decade (see figure 10). Degradation of biota and ecosystems already affects the livelihoods of 50–80 per cent of rural people in Asia and the Pacific (UNEP, 2016).

FORESTLAND TENURE

Ownership of forests influences people’s degree of access to them for food security, livelihoods and income (Jagger and others, 2014). According to a study that examined 14 countries of Asia and the Pacific (RECOFTC, 2013), more than 55 per cent of forests is owned by governments, more than 34 per cent by communities and less than 10 per cent by companies as a whole (see figure 11). The countries with the most forest area owned by companies are Indonesia (at 26 per cent), Thailand (at 15 per cent), India (at 14 per cent) and the Philippines (at 8 per cent). Community-owned forests are increasing faster than government- and company-owned forests. The share of national forestland in community possession ranges widely from country to country. Community-owned forests account for 99 per cent of forests in Papua New Guinea,

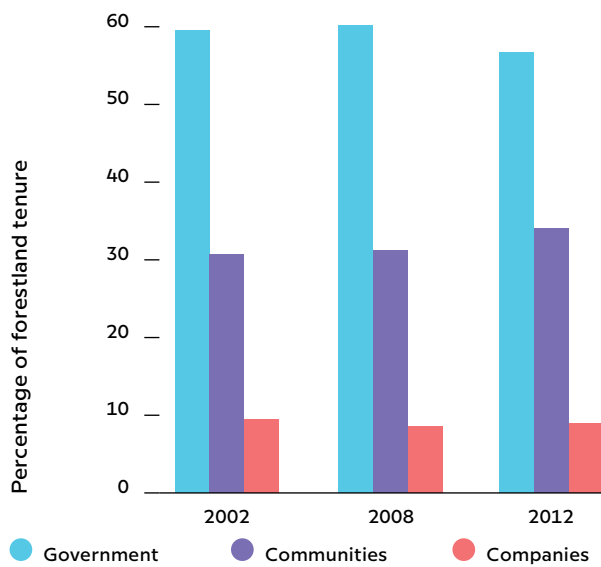
Figure 10
Threatened species in Asia and the Pacific, 2017



Source: ESCAP, based on IUCN Red List; see http://cmsdocs.s3.amazonaws.com/summarystats/2017-1_Summary_Stats_Page_Documents/2017_1_RL_Stats_Table_5.pdf (accessed 4 August 2017).

almost 60 per cent in the Philippines and China and about 30 per cent in India, the Lao People's Democratic Republic, Nepal and Viet Nam.

Figure 11
Distribution of forestland tenure in 14 countries in Asia and the Pacific, 2002–2012 (%)



Source: RECOTFC, 2013.

Some of these community-owned forests enjoy stronger land tenure than others. Community-owned forests in Bangladesh, China, Nepal, Papua New Guinea, the Philippines and Viet Nam are protected by the constitution or civil code and cannot be taken away by governments without legal procedures. Other countries, such as Bhutan, Cambodia, India, Indonesia, the Lao People's Democratic Republic, Myanmar and Thailand, provide weaker tenure rights; government agencies can take away or limit the duration of tenure rights of communities through administrative act.

The type of land tenure system in place has an impact on the access that men and women have to forest resources. The distribution of rights to land and trees between men and women are known to have important implications for women's empowerment and household welfare. For example, a 2006 global study suggested that women's rights to land and

trees give incentives to women to adopt agroforestry technologies more than other crop varieties due to the long time horizon between investment and returns (Garrity and others, 2006).

5.2.2 Gender inequalities and sustainable forest management

WOMEN IN FORESTRY: EMPLOYMENT AND INCOME

Men and women in areas with forest cover engage with forest resources differently. For instance, men typically engage in timber production, whereas women tend to focus on fuelwood and fodder collection (Sunderland and others, 2014).

According to a 2014 field study in Asia and other regions, the income derived from forests constituted 20.1 per cent of average household income in rural areas of tropical and subtropical Asia.³⁵ The reliance on forest for income was found to be greater in poor households than non-poor households. However, the absolute forest income was much higher in the non-poor households (Angelsen and others, 2014). Reliance on forest income was slightly less in female-headed households, compared with male-headed households because non-forest environmental income is often more accessible and attractive to female-headed households.

Sex-disaggregated data on formal employment in the forestry sector is not available for all the countries in Asia and the Pacific; however, available data indicate that formal employment in the sector is men dominated (FAO, 2015). Available data also indicate that, in the region, women make up almost a quarter of employment in the sector. Among subsectors, the proportion of jobs held by women is largest in sawn wood and panels in the Asia and Oceania region. This is because the data reflect the situation in China, where a large number of women have jobs in plywood production (FAO, 2014a).

Women's share of employment in the forestry sector, especially in management and decision-making positions, is relatively small (ILO, 2015a). Their underrepresentation in forestry does not mean that

³⁵ Forest income can be derived from plant products, animal products, mushrooms, fuelwood, charcoal, structural and fibre harvesting, medicine, resins, dyes, fodder and manure from natural and plantation forests.

women's role in forestry is insignificant, however. Much of women's work in forestry is unpaid and informal. Table 13 shows that women make up almost 80 per cent of all labour for part-time unpaid collection of fuelwood in Asia and the Pacific.

Table 13
Estimated number of people engaged in fuelwood and charcoal production, by sex and type of engagement, 2011

REGION	FULL-TIME (MILLIONS)		PART-TIME, UNPAID (IN MILLIONS)	
	MEN	WOMEN	MEN	WOMEN
Africa	19	<1	23	152
Asia and Oceania	11	<1	110	521
Latin America and the Caribbean	7	3	2	33
World	37	4	135	706

Source: FAO, 2014a.

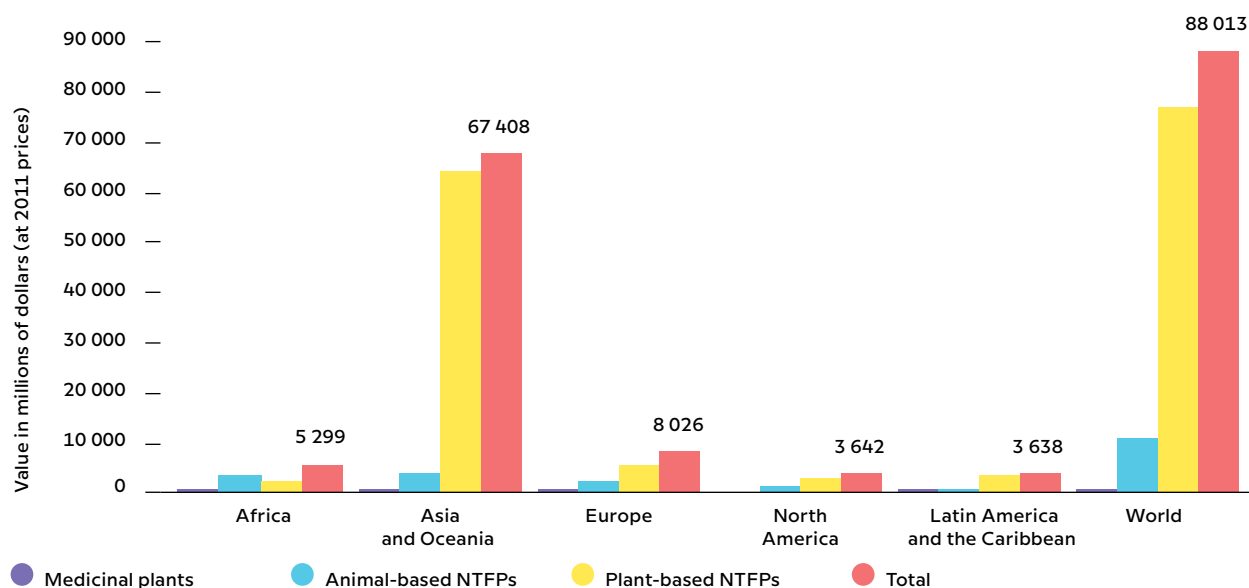
Non-timber forest products are an important source of income for many people, especially women (see figure 12). The Asia-Pacific region derives the world's largest share of income from the production of non-timber forest products, mainly from plants.

Table 14 shows that in Asia, unlike the other regions, the gendered specialization is not clear. For example, both women and men also contribute substantially to income generation from fuelwood, unlike in other regions. However, the gendered stereotypes of male domination in structural and fibre harvesting and animal product collection (hunting) appear to hold across the regions. In line with findings from the literature, women dominate for income earned from wild plant food in Asia.

WOMEN IN SUSTAINABLE FOREST MANAGEMENT

Protection of forests through improved forest management is seen as an effective way of enabling the sustainable use and management of resources, enhancing accountability in governance and improving livelihoods and opportunities. During the past few decades, gender issues have received increasing attention in forests as women have taken

Figure 12
Estimated income from the production of non-timber forest products, 2011



Source: ESCAP, based on FAO, 2014a.

Note: NTFPs=non-timber forestry products.

Table 14

Share of income from unprocessed and processed products, by sex, product type and region

REGION	PRODUCT	PERCENTAGE INCOME FROM UNPROCESSED FOREST PRODUCTS			PERCENTAGE INCOME FROM PROCESSED FOREST PRODUCTS		
		BOTH	WOMEN	MEN	BOTH	WOMEN	MEN
Latin America	Fuelwood	21.0	55.8	23.3			
	Charcoal				15.2	4.1	81.7
	Food: plants and mushrooms	25.2	48.4	26.4	21.2	34.8	44.0
	Structural and fibre harvesting	11.1	9.6	79.4	7.3	9.0	83.7
	Medicine, resins and dyes	15.0	29.2	55.8	11.5	61.4	27.1
	Food: animal	12.9	9.4	77.8			
	Fodder and manure	31.8	28.6	39.6			
	Other	16.3	28.8	54.9	15.5	31.0	53.5
Asia	Fuelwood	30.9	39.0	30.1	50.0	33.3	16.7
	Charcoal				18.7	43.9	37.3
	Food: plants and mushrooms	26.2	53.2	20.6	72.7	20.6	6.7
	Structural and fibre harvesting	8.8	9.7	81.5	12.5	9.3	78.3
	Medicine, resins and dyes	17.4	34.6	48.0	40.5	42.9	16.5
	Food: animal	8.5	17.9	73.6			
	Fodder and manure	48.0	32.0	19.9			
	Other	26.4	30.0	43.5	23.6	21.3	55.2
Africa	Fuelwood	13.4	77.0	9.6			
	Charcoal				13.3	18.7	68.0
	Food: plants and mushrooms	24.6	56.2	19.1	21.0	68.3	10.7
	Structural and fibre harvesting	10.1	10.4	79.5	5.7	7.2	87.1
	Medicine, resins and dyes	14.0	32.3	53.7	2.8	85.4	11.8
	Food: animal	22.9	13.4	63.7	0.0	0.0	100.0
	Fodder and manure	9.0	23.6	67.3			
	Other	9.6	30.7	59.7	15.7	23.1	61.1

Source: Sunderland and others, 2014.

on a more pronounced role in forest management at the community level. In this sector, men and women often have disparate knowledge and varying levels of dependence on forest goods. And accordingly, they tend to have distinct interactions with forest resources. These distinctions influence the way forests are managed (Sunderland and others, 2014; FAO, 2014a).

In the Asia-Pacific region, rural women are mainly responsible for the collection of fuelwood, water and other non-timber forest products as well as biodiversity conservation, while rural men are engaged in more income-generating activities, decision-making and high-value activities, such as cutting and hauling timber, hunting and fishing (Jattan, 2003). For example, the women of Ban Thung Yao in Thailand are involved with preserving traditional knowledge relating to their

forests, keeping records of customary procedures for conservation and forest protection and helping patrol and report any violations within the forests. Men hunt during the night, try to discover new routes into the forest and concentrate on enforcing written agreements on logging and forest patrolling (Upadhyay and others, 2013).

Leisher and others (2016) found that empowering women in local decision-making with respect to the conservation of forests and fisheries in India and Nepal led to better resource efficiency and conservation. Pathways to sustainable management of forest resources could benefit from the knowledge and capacities that women have learned through their interactions with forests. But to maximize women's embedded knowledge, a shift is needed, from a narrow

focus on “participation” of women in forestry to giving “recognition” to women’s knowledge and capacities to manage forest resources. While women’s participation remains important as ever, it is equally important to dissect the type of participation enjoyed by women in community forestry groups. Agarwal (2001) showed the limits to an approach that only looks at participation without giving due attention to pre-existing inequalities of power and socioeconomic status and created a typology of participation to reinforce what is needed for effective participation (see table 15).

Table 15
Typology of participation in groups

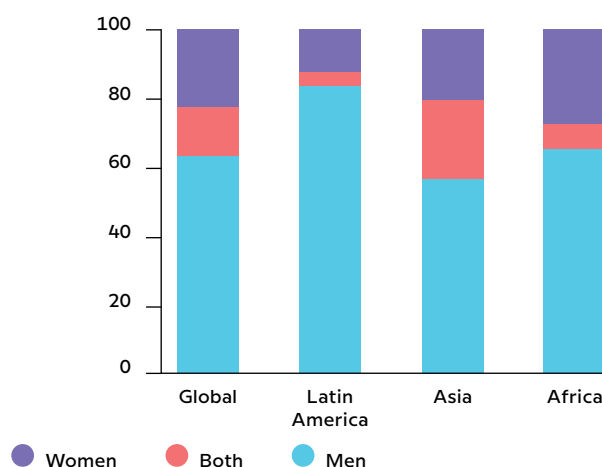
FORM OR LEVEL OF PARTICIPATION	CHARACTERISTIC FEATURES
Nominal participation	Membership in the group
Passive participation	Being informed of decisions ex post facto; or attending meetings and listening in on decision-making, without speaking up
Consultative participation	Being asked an opinion in specific matters without guarantee of influencing decisions
Activity-specific participation	Being asked to (or volunteering to) undertake specific tasks
Active participation	Expressing opinions, whether or not solicited, or taking initiatives of other sorts
Interactive (empowering) participation	Having voice and influence in the group’s decisions

Source: Agarwal, 2001.

Forestry largely remains a male-dominated sector, and women’s participation in forest institutions is relatively limited. To ensure the effective participation of women, data need to be collected and analysed on the typology

of women’s participation in community forestry groups so that policymakers can design suitable programmes to further gender equality and women’s empowerment. Figure 13 represents the percentage of men and women who participate in forest user groups around the world. In Asia, approximately 20 per cent of women participate in forest user groups, while the number of men who participate in forest user groups is much higher, representing about 60 per cent of the population. Overall, women’s participation in forest user groups is highest in Africa and lowest in Latin America, with Asia in the middle.

Figure 13
Percentage of men and women who participate in forest user groups, as of 2014



Source: Sunderland and others, 2014.

Understanding the different ways in which men and women interact with their environment is key to enabling development practitioners to design interventions that provide suitable opportunities for participation by all members of a community, while also ensuring the sustainable and efficient use of resources.

5.2.3**Way forward: Policy lessons****1** Generate sex-disaggregated data in the forestry sector.

- Collect and analyse sex-disaggregated data on access and use of forest resources and on employment in the forestry sector.
- Collect data on the participation of women in community forestry programmes. Facilitate the development of gender-responsive forest policies and programmes based on the data collected.

2 Recognize women's rights to forest resources.

- Mainstream the considerations to develop adequate land tenure systems, legislation and policies that recognize women's right to forest resources like land, trees and produce. Access to forest resources is known to contribute significantly to women's empowerment and household welfare.
- Monitor the laws that grant women access to forest resources to ensure proper implementation.

3 Generate knowledge on the work done by men and women in the forestry sector.

- Conduct evidence-based research on the contribution of women towards sustainable management of forests as well as on the effect of ownership rights to women on resource-efficient use of forests.
- Develop legislation, programmes and policies, based on the knowledge generated, to support and promote women's unique knowledge and capacities for the sustainable management of forests.

4 Conduct gender-sensitization programmes for policymakers and relevant officials.

- Organize gender-sensitization seminars for policymakers and forestry officials to understand the diversity and concerns of the social groups that depend on forest resources.
- Organize training on gender analysis and gender mainstreaming for forestry officials so that they understand the rationale behind these policies.

Conclusions

The 2030 Agenda for Sustainable Development strives for more balanced development by addressing the economic, social and environmental dimensions holistically. The momentum set forth by this agenda provides an historic opportunity for reducing inequality and closing gender gaps. This report examines the intersections between gender and the environment at the household, work, community and policy levels, particularly in the spheres of food security and agriculture, energy, water, fisheries and forestry, with a view to providing strategic entry points for policy interventions that will lead to inclusive and sustainable development.

i Gender concerns in the advancement of the sustainable development agenda

The gender-environment intersection is pivotal to advancing the 2030 Agenda for Sustainable Development. The 2030 Agenda and associated SDGs set the foundation for comprehensive and integrated actions on environmental sustainability. With the 2030 Agenda's focus to leave no one behind, national policies and strategies that address environmental concerns must consider the inequalities between women and men and the pathways to reduce those disparities. The gender-responsive policies and programmes in agriculture, energy, water, fisheries and forestry sectors, highlighted throughout the report, have enormous potential to reduce poverty, conserve the environment and expand women's opportunities for social, economic and political participation. For instance, if women had access to and control of the same resources as men, their contributions would increase food production by 2.5–4 per cent. This would be enough to move 150 million people out of hunger and poverty across the developing world.

Enacting gender-sensitive policies and interventions that recognize and respond to the discrete concerns of women and their critical management of resources is fundamental to tackling food security, water, energy and other environmental challenges. Actions to advance gender mainstreaming at the policy and programme levels include gender analysis and establishing gender targets and indicators within specific sectors, along

with gender-responsive budgeting to support the equitable distribution of resources. Additionally, gender mainstreaming in environmental policymaking must consider the local context—while gender inequality is pervasive, it takes particular shapes and hues based on local norms and customs. It is also important to engage social scientists in the design phase and throughout the life cycle of projects to crystalize their effectiveness.

Creating enabling environments that foster women's participation and leadership in the management of environmental resources would positively influence conservation and resource efficiency. Women's participation and leadership are outcome-changing factors for the sustainable management of resources. Country-specific evidence reinforces how empowering women in local decision-making over the conservation of forests and fisheries leads to better resource efficiency and conservation. Women's leadership will make a difference in the sustainable management of resources, which is why the sociocultural factors that impede their ability to lead must be recognized. To further the sustainable management of resources as well as drive towards gender equality, it is equally important to design strategies that enable women to navigate their social milieu successfully. Hence, a shift is needed from a narrow focus on the "participation" of women to the "recognition" of women's knowledge and capacities to manage environmental resources.

Clean energy has the transformative potential to enhance productivity and health outcomes. Energy access is a critical enabler to development—it has a transformative role for increasing productivity and well-being at home and at work. When women gain access to quality energy services, households experience multiple positive impacts related to health, income generation and family well-being. While the introduction of labour-saving clean technologies, such as improved cooking stoves, is critical to reduce women's time burden, it should be supported by interventions to change social norms, including engagement with men, to remove all barriers to women's empowerment.

Fostering gender-responsive ecosystems that support green entrepreneurship enable women's economic empowerment and environmental sustainability. The green economy provides a valuable opportunity to promote women's entrepreneurship,

enhance women's economic empowerment and encourage more environmentally sustainable products and services. This is evident with women's engagement in clean-energy enterprises. By leveraging their day-to-day experiences, women understand what design features respond to women's needs, and they are well positioned to reach other women in their communities to bridge the "last mile" in the distribution chain and thus expand the uptake of clean-energy products. It is important to create enabling ecosystems by addressing the structural barriers that hinder women, such as lack of access to finance and credit, difficulties in accessing markets, scarcity of skill development opportunities and time poverty.

ii The way forward—regional cooperation on gender and sustainable development

The Regional Road Map for Implementing the 2030 Agenda for Sustainable Development in Asia and the Pacific, adopted by all ESCAP members in 2017, considers gender equality and women's empowerment as central issues in the region's policy agenda. It articulates the need for regional and subregional dialogues on multisectoral policies, programmes and strategies to advance gender equality and women's empowerment. With its multidisciplinary expertise, ESCAP is well placed to facilitate the development of comprehensive measures in addressing the linkages between gender, the environment and sustainable development, through:

- a **Providing an intergovernmental platform for discussing gender concerns in environmental policymaking.** The 2030 Agenda strongly emphasizes the need to adopt an integrated approach to sustainable development. This report highlights how the intersections between gender and the environment, particularly in natural resource management, could be used to steer countries towards sustainable development. ESCAP can guide its members in designing, implementing and reviewing their national strategies regarding gender and the environment. The regional platforms of ESCAP, such as the Asia-Pacific Forum on Sustainable Development, could be used for exchanging insights, good practices and policy innovations among stakeholders.
- b **Developing a knowledge repository on gender and sustainable development.** The availability of sex-disaggregated data is vital to measure the intersections between gender inequality and environmental concerns. As discussed in this report, the lack of sex-disaggregated data is a major bottleneck in conducting gender analysis for environmental policymaking. ESCAP can help set the standards for collecting sex-disaggregated data, review data collection instruments and processes, and support member States in developing the systems to strengthen gender statistics. With the increased availability of data and focused research on effective strategies and good practices, a knowledge repository of gender and sustainable development can be established that will then support evidence-based policymaking.
- c **Supporting capacity building in developing gender-responsive policies and programmes.** Achieving gender equality is a critical catalyst towards addressing environmental degradation and protecting our planet. Gender-responsive environmental policies and programmes, including ensuring the active involvement of women in decision-making, have demonstrated positive outcomes for sustainable development. ESCAP is well suited to facilitate gender mainstreaming in environmental initiatives and foster multi-stakeholder engagement to ensure policy coherence and coordination. Furthermore, in leading the United Nations Asia-Pacific Regional Coordination Mechanism, ESCAP is collaborating with other United Nations agencies and partners to assist member States in adopting comprehensive and holistic approaches to advance gender equality and women's empowerment in the Asia-Pacific region.

By providing intergovernmental platforms for the sharing of knowledge and innovative strategies, conducting state-of-the-art research and analysis and supporting its members in policy development, ESCAP can make significant contributions to addressing key gender concerns in sustainable development, which is a pathway to achieve the 2030 Agenda.

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Gender, The Environment and Sustainable Development in Asia and the Pacific

The 2030 Agenda for Sustainable Development strives for more balanced development by addressing the economic, social and environmental dimensions holistically. The momentum set forth by this agenda provides an historic opportunity for reducing inequality and closing gender gaps. *Gender, The Environment and Sustainable Development in Asia and the Pacific* examines the intersections between gender and the environment at the household, work, community and policy levels, particularly in the spheres of food security and agriculture, energy, water, fisheries and forestry, with a view to providing strategic entry points for policy interventions. Based on a grounded study of the reality in the Asia-Pacific region, this report assembles good practices and policy lessons that could be capitalized on to advance the 2030 Agenda for Sustainable Development.



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