



# Costing Options for Measuring Gender Equality in Climate Action



Sverige



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# Costing Options for Measuring Gender Equality in Climate Action

# Foreword

In recent decades, there has been significant positive change in the overall progress in implementation of the Beijing Declaration and Platform for Action, which has marked its 25th anniversary this year. This progress can be seen in the promotion of gender equality and women's empowerment across many areas of concern, however, in some areas it has been slow and uneven, with the work on gender mainstreaming in environment and climate change lagging behind, compared to other areas. The progress in mainstreaming gender equality in climate change is particularly relevant for the Asia-Pacific region, which is one of the most vulnerable to climate change impacts and disasters in the world.

One major barrier to progress in implementation of the Beijing+25 agenda is persistent and chronic underinvestment in gender equality and women's empowerment in general and more specifically in climate action. Existing structural barriers, discriminatory norms and gender inequalities make women and girls particularly vulnerable to climate change. Recognising women's roles and reflecting gender-oriented needs in climate policies will allow us to advance more systematically in meeting the commitments of the 2030 Agenda and reaching a 50:50 Planet objective by 2030.

For that to happen, we need transformative financing for gender equality and women's empowerment that is unprecedented both in scale and scope, from all sources and at all levels. Interlinking women's empowerment, transformative economic solutions and climate action in a comprehensive approach will contribute to making the 2030 agenda a reality for all.

The Asia-Pacific Declaration on Advancing Gender Equality and Women's Empowerment adopted by the governments of the region in 2019 called for implementing gender-responsive strategies on climate change to support women's resilience and adaptive capacities through appropriate climate financing and investment flows. Focus should be directed on taking concrete actions to ensure the full, effective and accelerated implementation of the Beijing calls, through significantly increased investments to close the resource gaps which hinder the achievement of gender equality.

To support that next step in closing the financing gap, we need data, tools, methodologies and approaches for planning, budgeting and costing gendered outcomes to implement measures contributing to achieving gender equality commitments.



This study, 'Costing Options for Measuring Gender Equality in Climate Action' is a critical resource for us all. It is designed to support governments, multilateral and bilateral organizations, civil society and others in costing gender equality outcomes in climate action. This study provides information on how to assess the monetary value of gendered work, include it in the economic analysis of climate change, understand economic value of integrating gender in climate change policies and raise a greater awareness. It also provides practical tools and approaches to incorporate gender economy into climate change policies.

We must ensure that gender equality commitments are supported through better financing and increased investments that enable women and girls around the world to live a life of dignity and realize their full potential.

UN Women regional office in Asia and the Pacific strongly believes that recognising the economic value of gender equality in climate change and putting gender in the frontline of climate change action can make a tremendous impact. We will continue working with national policy makers to ensure that gender equality commitments are integrated in climate change policies in the region, place women and girls at the frontier of tackling climate change and build a better life for all, with higher levels of finance and investments.

**Mohammad Naciri**  
Regional Director  
UN Women Regional Office for Asia and  
the Pacific

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# Acronyms & abbreviations

<b>BCR</b>	Benefit Cost Ratio
<b>GGI</b>	Global Gender Gap Index
<b>GII</b>	Gender Inequality Index
<b>GRB</b>	Gender-responsive budgeting
<b>HPF</b>	Household Production Functions
<b>ILO</b>	International Labour Organisation
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>OECD</b>	Organization for Economic Cooperation and Development
<b>RCT</b>	Randomized Control Trials
<b>SDGS</b>	Sustainable Development Goals
<b>SEEA</b>	System of Integrated Environmental and Economic Accounting
<b>SIDA</b>	Swedish International Development Agency
<b>SNA</b>	System of National Accounts
<b>UN</b>	United Nations
<b>UNDP</b>	United Nations Development Programme
<b>UNEP</b>	United Nations Environment Programme
<b>WTA</b>	Willingness to accept
<b>WTP</b>	Willingness to pay



# Executive Summary

PHOTO: UN WOMEN/GIANG DONG SON

In the Asia-Pacific region, the intersections between gender inequality and climate change are critical for the lives and livelihoods of the majority of the population. As such, achieving the Sustainable Development Goals (SDGs) requires a more vigorous integration and articulation of the mutually overlapping and self-reinforcing environmental, gender and livelihood dimensions of sustainable development. However, it is not clear whether there is a unified methodological framework that allows gender, economy and climate change interlinkages to be brought together for the purposes of analysis, advocacy and policy-making. This report provides an assessment of the challenges in developing a unified methodological framework based on assigning monetary

values to processes of climate change and gender relations. It then describes the mechanics, strengths and weakness of four frameworks that are currently available, before presenting an example that demonstrates the insights that can be gained from monetarily 'valuing' the contribution of gendered work to an economy subject and climate change.

Following a review of the ways in which gender and climate change are interconnected in the Asia-Pacific region, the report explains why monetarily costing gender and climate change is an appropriate activity for policy-makers and advocates. Reviewing the principles of costing, the report focuses upon understanding the intersection between the 'unpaid work of the environment' and



the unpaid care and domestic work that is primarily performed by women, which are two very important, albeit partial, dimensions of climate action and gender inequality that directly connect to the operation of the economy. The report discusses the specific challenges that exist in costing each of these dimensions, before reviewing four frameworks that allow these dimensions to be costed.

Cost-benefit analysis is designed to evaluate the merit of a possible investment and is used by both the public and private sectors. However, cost-benefit analysis offers a limited understanding of costing gender in climate action because of its focus on a single action and the normative character of the discount rate. Randomized control trials are designed to evaluate the impact of an investment and are used by private sector consultants undertaking impact evaluation on behalf of public sector or international institutions. However, like cost-benefit analysis, they focus on a single action. Gender-responsive budgeting (GRB) analyzes the gendered impact of government budgetary expenditures and revenues on women and men and girls and boys. GRB is widely attempted and implemented (with work in more than 80 countries supported by UN Women over the last five years) but in countries where budget or time use data is not publicly available or where the practice of information-sharing is not active, implementation can be challenging. It has its implementation challenges, including in terms of limited data availability and need for stronger capacities in gender budget analysis.

Macroeconomic modelling is used by governments to understand the economy-wide effects of policy actions. It

is also used by private sector companies, academics and international development institutions to develop an alternative perspective on the economy-wide effects of policy actions. However, the choice of variables within macroeconomic models can be contestable, even if this is rarely done. Nonetheless, reforms led by the UN have sought to broaden and deepen the variables used in macroeconomic models, and these can now incorporate the unpaid work of the environment and unpaid care and domestic work. Moreover, there is a push to accelerate the implementation of the Paris Agreements, while there is also a need to increase the availability of gender- and climate-responsive macroeconomic data in order to meet the SDGs.

Therefore, macroeconomic modelling presents a unique opportunity to highlight the interlinkages between gender and climate change and derive macroeconomic policy advice for countries in the Asia Pacific region acting on climate change. However, data constraints currently limit the capacity to undertake macroeconomic modelling that is cognisant of gender relations in the context of climate change. In some countries though, data can allow the production of aggregate estimates of the magnitude of the monetary 'value' of key dimensions of gender relations that are directly affected by climate change as well as an examination of the comparative statics of change in those dimensions over time. Working through one example of costing gendered work that is not currently calculated in estimates of production and income and which is subjected to processes of climate change demonstrates the importance of even such a more limited approach for the policy and practice of integrating gender into climate change action.



# 1. Introduction

PHOTO: UN WOMEN/NGUYEN VAN DUNG

This report is developed by UN Women under the regional project “EmPower: Women for Climate Resilient Societies” that aims to help women and marginalized groups to leverage their knowledge, capacities and skills in adapting to and mitigating climate change and reducing disaster risks in Bangladesh, Cambodia, Viet Nam and elsewhere across the region. The project also aims to measure both the costs and relative benefits of both climate change and gender equality investments.

In this light, recognising that there is an increasing interest in understanding the intersection of, and reinforcing the benefits received, when addressing the gender dimensions of climate investments. UN Women organised a regional ‘thinkshop’ to explore options to value women’s roles and involvement in climate change, based on a collaborative



**This report provides understanding of the interlinkages between gender, the economy and climate change based on assigning monetary values to processes of climate change and gender relations.**

discussion among experts in gender, climate change and economics. As a result of these discussions, UN Women with the inputs from the United Nations Development Programme (UNDP) prepared this report, which draws upon the two projects funded by the Swedish International Development Agency (Sida), in order to identify ways to value women’s roles and involvement in climate change from the standpoint of economic analysis.

The purpose of this report is to provide further evidence of the interlinkages between gender, the economy and climate change, in order to demonstrate the need to develop a unified methodological framework that allows gender, economy and climate change interlinkages to be brought together for the purposes of analysis, advocacy and policy-making. The report goes on to provide an assessment of the challenges of developing a unified methodological framework based on assigning monetary values to processes of climate change and gender relations, before describing the mechanics, strengths and weaknesses of frameworks that are currently available. The report concludes by suggesting which of the available methodologies is best-suited to costing the impact of gender equality in climate change action.

This report is exploratory and as such, has clear limitations. It does not claim to comprehensively assign monetary values to processes of climate change and gender relations, because some of the potential environmental costs of gender relations may be exceedingly hard to monetarily quantify in any meaningful or responsible way. Rather, it seeks to show how developing a unified methodology that can assign monetary values to critical aspects of processes of climate change and gender relations can deepen the understanding of the economic consequences of interactions between gender and environmental change. In particular, the report focuses on how the quantification of the unpaid work of the environment and women's unpaid work offers one a way of costing gender into

climate action. However, as women's unpaid contributing family farm labour are estimated in the national accounts, and as the interactions between the unpaid work of the environment and women's unpaid care and domestic work have not been the subject of analysis by policy-makers, it will be the intersection between the unpaid work of the environment and women's unpaid care and domestic work that will be the focus of this report. While this remit is not narrow, it does suggest that the findings of this report should be taken as indicative and not definitive.

For some, the issue of monetarily costing climate change and gender relations is misguided. Gender inequality is a human rights issue first and foremost, and should not be reduced to an economic variable. It is also a matter of justice and equity and hence it is important to examine the political economy of gender equality. Similarly, addressing climate change is an intergenerational ethical imperative with clear material consequences for the wellbeing of present and future generations of people and the planet and should not be reduced to an aspect of economic activity. However, as will be seen, monetary costing is an important means by which to translate socioeconomic and environmental strategies and policies into potential action, the benefits of which are easily and widely understood. For this reason, the audience for this report is broad and includes policy-makers and policy analysts, academics and independent researchers, gender advocates working in non-government and civil society organizations, and the general public.



## 2. The intersection of gender and the environment

PHOTO: UN WOMEN/MOHAMMAD RAKIBULHAS

### 2.1. Gender equality in SDGs and Paris Agreement

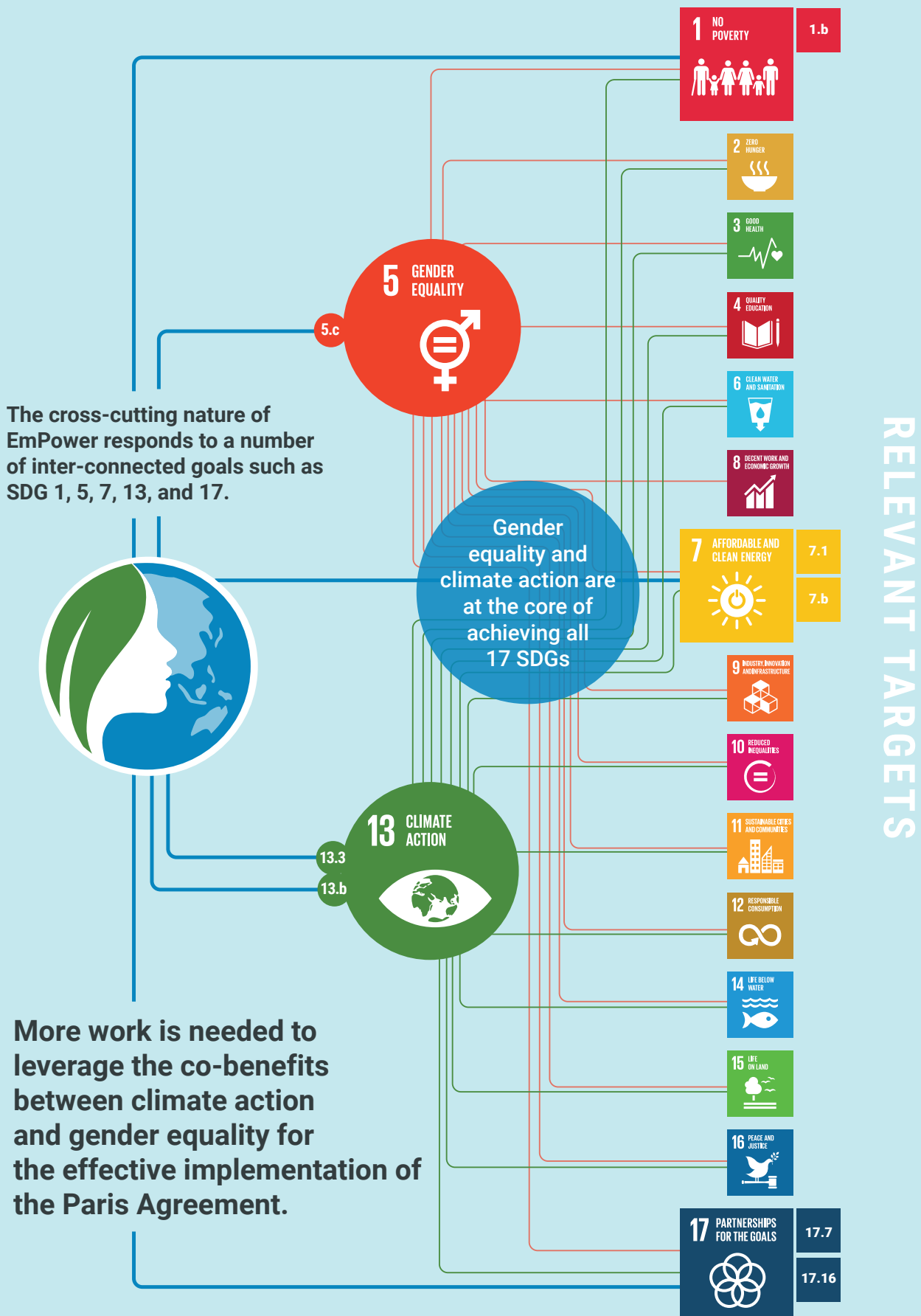
The Sustainable Development Goals (SDGs) are a set of universally agreed goals, targets and indicators that meet the urgent environmental, political and economic challenges facing the world. As a set of global goals, since 2015 UN member states have been expected to use the SDGs to frame their agendas and policies in the period to 2030 in order to leave no one behind. The goals are designed to interconnect with each other, meaning that success in one domain has an effect upon success in another domain, in order to address the global challenges faced by the international community of nations. The COVID-19 pandemic has not diminished the relevance of the SDGs; rather, it has reinforced the central importance

of these global goals in addressing the fundamental challenges facing the planet and its peoples.

Notwithstanding the COVID-19 pandemic, the immediacy of the climate crisis is still perhaps the biggest single barrier to accomplishing the SDGs. This was illustrated in 2018 when the UN Intergovernmental Panel on Climate Change (IPCC) reported that the world had 12 years to accelerate efforts and embed the structural reductions in greenhouse gas emissions necessary to limit global average temperature increases to no more than the “well below” two degrees above pre-industrial levels by the end of the 21st century that was agreed under the 2015 Paris Agreement.<sup>1</sup> Anything beyond the two-degree threshold will have a significantly more adverse impact

<sup>1</sup> Alan Buis 2019.

# GENDER EQUALITY AND CLIMATE ACTION and Sustainable Development Goals (SDGs)



upon increasingly larger percentages of life on Earth, with significant variations by region, ecosystem and species. To accomplish this demanding task, SDG 13, climate action, is strongly interwoven throughout the SDGs. In addition to climate change having its own goal, 12 of the 17 SDGs have targets or indicators that directly involve taking action on climate change.

Similarly, gender equality is interwoven throughout the SDGs. Pervasive gender inequalities continue to affect efforts to eradicate poverty and eliminate hunger, improve health and education, enhance the management and use of fragile natural resources, foster peace and inclusive societies, reduce inequalities and help economies prosper in climate-responsive and sustainable ways. However, the deep-seated intersections between gender inequality and climate change as a critical link for achieving the SDGs is not yet robustly understood. While some evidence exists on the intersecting nature of SDG 5 and 13, more work is needed to leverage the co-benefits between climate action and gender equality for the effective implementation of the Paris Agreement.<sup>2</sup>

## 2.2 Gender inequality in Asia and the Pacific

Gender inequalities in the Asia-Pacific region remain some of the most severe in the world. The World Economic Forum's Global Gender Gap Index (GGI) provides quantitative estimates of gaps in achievements between men and women across four thematic dimensions: economic participation and opportunity, educational attainment, health and

2 UN Women 2016.

### BOX 1: REFERENCE TO GENDER EQUALITY IN THE PARIS AGREEMENT<sup>3</sup>

The Preamble of the Paris Agreement highlights the importance of observing and respecting other related commitments to vulnerable groups by: "Acknowledging that climate change is a common concern of humankind, Parties should, when taking action to address climate change, respect, promote and consider their respective obligations on human rights, the right to health, the rights of indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations and the right to development, as well as gender equality, empowerment of women and intergenerational equity".

survival, and political empowerment. The purpose of the GGI is to demonstrate both the challenges posed by gender gaps and the opportunities created by reducing them. In 2020 the East Asia and Pacific region had an overall gender gap of 31.5 percent, which is only slightly better than Sub-Saharan Africa, while South Asia, with a gender gap of 33.9 percent, was the second-worst performing region in the world.<sup>4</sup> Only two countries in the Asia-Pacific region are in the top 20 GGI performers, and only one of these, the Philippines, is a developing country. At current rates of progress in reducing gender gaps, it will take South Asia 71.5 years to close the GGI, while it will take East Asia and the Pacific 163 years to close gender gaps.

Similarly, UNDP's Gender Inequality Index (GII) represents the compounded loss to human development due to inequality

3 United Nations 2015.

4 World Economic Forum 2019.

between female and male achievements in reproductive health, empowerment and the labour market. While East Asia and the Pacific are the second-best performing region in the GII, there are marked intra-regional variations, with Asia-Pacific members of the OECD far outperforming other countries in the region; South Asia is among the poorest performers in the GII. For the least developed countries in the Asia-Pacific region, the GII demonstrates that national progress is severely eroded due to gender inequalities in these countries, and thus that a lack of women's empowerment is holding back the developmental efforts of these countries.<sup>5</sup>

The lack of women's empowerment in the Asia-Pacific region is embedded in gendered social norms and values and are witnessed in the fact that women suffer from some of the world's lowest rates of political representation, face significant biases in legal structures and systems, and face some of the world's highest rates of gender-based violence.<sup>6</sup> Indeed, according to interviews of women and men across 75 countries presented in UNDP's '2020 Human Development Perspectives', only 14 percent of women and ten percent of men worldwide admit to having no gender biases in social norms across political, educational, economic and physical dimensions.<sup>7</sup> These gendered social norms and values are manifested in gendered roles, responsibilities and social status, which then intersect with issues of resource control and use, reinforcing the disadvantages women face in effectively responding to climate change.<sup>8</sup> This is because social processes and inequalities

5 UNDP n.d.

6 World Economic Forum 2017.

7 World Economic Forum 2017.

8 UNDP 2017.



**Gender inequalities in the Asia-Pacific region remain some of the most severe in the world.**

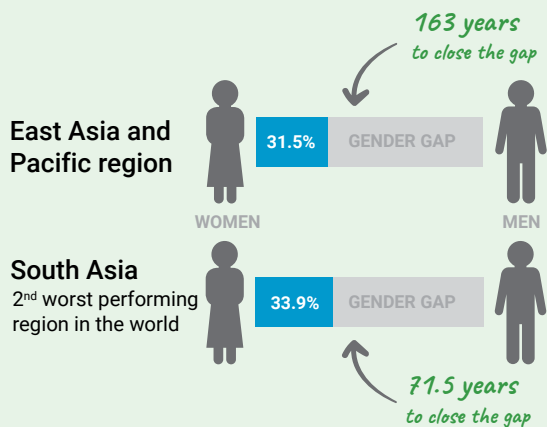
largely determine not only vulnerability and exposure but also people's ability to cope and adapt to the adverse impacts of climate change.

The IPCC Synthesis Report states with very high confidence that 'differences in vulnerability and exposure arise from non-climatic factors and from multidimensional inequalities often produced by uneven development processes (very high confidence). These differences shape differential risks from climate change.<sup>9</sup> In fact, intrahousehold differences of gender and generation produce markedly different forms of vulnerability with women, followed by young children and then the elderly, being most likely to suffer.<sup>10</sup> Further, intersecting social processes that discriminate against specific population groups result in heightened vulnerability to climate change. Evidence suggests the poorest and most socially marginalised women are the most vulnerable to the impacts of climate change. As a result, it can be argued that the deepening impact of climate change expected in the Asia-Pacific is likely to exacerbate gender inequalities across the region.

9 UNDP 2020.

10 IPCC 2015.

# GENDER GAP IN ASIA AND THE PACIFIC 2020

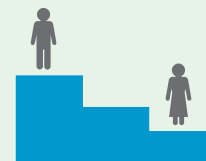


ONLY **2** COUNTRIES in the Asia-Pacific region are in the top 20 GGI performers, and only one of these, the Philippines, is a developing country.



World Economic Forum, 2019.

## GENDER INEQUALITY



**East Asia and the Pacific region**  
2<sup>nd</sup> best performing region in the Gender Inequality Index (GII), but there are marked intra-regional variations

Gender Inequality Index (GII) presents the compounded loss to human development due to inequality between female and male achievements in reproductive health, empowerment and the labour market.

**South Asia**  
among the poorest performers in the GII



UNDP, n.d.

## SOCIAL NORMS BIASES

### FINDINGS OF SOCIAL NORMS BIASES FROM THE INTERVIEW

According to interviews of women and men across 75 countries presented in UNDP's '2020 Human Development Perspectives',

ONLY **14%** OF WOMEN AND **10%** OF MEN WORLDWIDE

admit to having no gender biases in social norms across political, educational, economic and physical dimensions



**50%**  
of female and male interviewees think that men make better political leaders than women



OVER **40%**  
think that men make better business executives



**30%**  
agree it is justifiable for a man to beat his partner

Women are skewed towards less bias against gender equality and women's empowerment

UNDP, 2020



## BOX 2: DISPROPORTIONATE IMPACTS OF CLIMATE CHANGE ON WOMEN AND GIRLS

Inadequate and unequal women's access to essential resources and means of implementation, such as land, water, finance, information, technology and energy, makes women extremely vulnerable to climate change and undermines their capacity to adapt. A large proportion of women in Asia and the Pacific derive their livelihoods from climate-sensitive sectors, which threatens women's ability to generate income, and secure food and nutrition.<sup>11</sup>

### 2.3. The gendered impact of climate change in Asia and the Pacific

In Asia and the Pacific, the intersections between gender inequality and climate change are critical. The lives and livelihoods of the majority of the population in the region depend upon key environmental resources of forests, fisheries and waterways to produce food, energy and incomes; resources whose access to and use of is strongly and pervasively gendered in complex and at times contradictory ways. Moreover, the intersecting dynamics between gender inequalities and environmental resources have strong implications for the economic outcomes witnessed by women and men and girls and boys, which in turn feed back into gender inequalities and the control over and use of environmental resources. Thus, achieving the SDGs requires a more vigorous integration and articulation of the mutually overlapping and self-reinforcing environmental, economic and gender dimensions of sustainable development.

11 UN Women 2015.



**In Asia and the Pacific, the intersections between gender inequality and climate change are critical.**

The impact of climate change in the Asia-Pacific region is an immediate and pressing global development issue as the Asia-Pacific region has 60 percent of the world's population.

Four of the countries in the region (Australia, Japan, Korea and New Zealand) are members of the Organization for Economic Cooperation and Development (OECD), a grouping of the world's wealthiest economies. Three countries in the region (China, India and Indonesia) are considered "key partners" by the OECD, and the region has two of the world's largest economies: India and China. However, the Asia-Pacific region also has more than two-thirds of the world's extremely poor and low income people,<sup>12</sup> with 1.9 billion people living on less than \$2 per day.<sup>13</sup> Some 80 percent of all those living under the \$2 a day level in Asia and the Pacific, are women.<sup>14</sup>

As a whole, the Asia-Pacific region is the fastest growing greenhouse gas emitter in the world and is also the region that is expected to witness the harshest impacts of climate change.<sup>15</sup> A study of those countries at extreme risk from the negative impact of climate change, as measured by the Climate Change Vulnerability Index, found that five countries in the Asia-Pacific region are ranked in the category

12 Kochhar 2015.

13 Wehrfritz et al. 2005.

14 Regional Asia-Pacific Conference on Gender and Disaster Risk Reduction 2016.

15 UNDP 2013.

of top ten high-risk countries.<sup>16</sup> Extreme weather events appear to be increasing in the region, and with greater intensity, in the form of tropical cyclones, floods, thunderstorms, droughts, damaging winds, severe dust storms, and extreme temperatures. Simply put, in terms of the human toll, it has been estimated that 86 percent of the global population affected by climate-related disasters between 1998 and 2017 live in “flood- and storm-prone Asia”.<sup>17</sup> Extreme weather events have the potential to have serious negative consequences on human health, farming, fisheries, forests, water resources, infrastructure, public services and economic activities. Cumulatively, climate change will have a serious impact on economic and social development.<sup>18</sup>

## 2.4 Gender inequality in the agricultural sector

Understanding the issue of land and resource control and use, a particularly important issue in Asia-Pacific agrarian societies, is critical in relation to gender inequalities in light of the predicted worsening impacts of climate change. Women have lower levels of access to resources such as land, non-land assets and information, but also education and development services, when compared to men.<sup>19</sup> As a result, in the Asia-Pacific region, women suffer from some of the world’s lowest rates of property ownership and employment. For example, in Bangladesh, men own more than 86 percent of officially documented land plots with women owning less than 12 percent and joint ownership is just above 2 percent.<sup>20</sup>

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16 Verisk Maplecroft 2016.

17 CRED & UNISDR 2018.

18 Heinemann 2008.

19 UNDP Asia and the Pacific n.d.

20 Caitlin et al. 2015.

This has widespread ramifications. Within the patrilocal marriages that are common across the region, women are expected to live with their husband’s families. It is expected that the sons whom the women marry, will take care of the farm and will financially maintain their parents as they age, while the daughters-in-law provide care for the man’s parents.

In this type of setting, men are farm managers who control land, crop decisions, non-land agricultural inputs, credit, access to extension services, the marketing of output and the income that flows from farm production. Women, on the other hand, in addition to their care responsibilities, act as unpaid contributing family farm workers, and as such are economically dependent on their husbands. This means that women may be less able to capture opportunities to diversify their livelihood options and to lessen dependencies on natural resources that are exposed to climate-change related stresses.<sup>21</sup> As a result, because of women’s unequal decision-making power within the household and unequal access to resources they are often in a weaker position to make decisions to adapt and mitigate the impacts of climate change even though they may be more sensitive to climate change and its impacts.

The gender inequalities outlined above are especially true for women engaged in agriculture in the Asia-Pacific region. In Asia as a whole, family farmers constitute 99 percent of all farmers and operate 85 percent of farmed land.<sup>22</sup> In the East Asia and the Pacific, women comprise 23 percent of the agricultural labour force, while in South Asia they accounted for 57 percent of the agricultural labour force

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21 World Bank 2012.

22 Graeub et al. 2016.

## POVERTY LEVEL in the Asia-Pacific region

**60%** 

of world's population are in the Asia-Pacific region

 The Asia-Pacific region has more than two-thirds of the world's extremely poor and low income people

**1.9 billion**

people living on less than US\$2 per day

**80%** of all those living under the US\$2 a day level in Asia and the Pacific, are women



## THE GENDERED IMPACT OF CLIMATE CHANGE in the Asia-Pacific region

**5** countries in the Asia-Pacific region are ranked in the category of top ten high-risk countries



**Extreme weather events:** tropical cyclones, floods, thunderstorms, droughts, damaging winds, severe dust storms, and extreme temperatures

**86%** of the global population affected by climate-related disasters between 1998 and 2017 live in "flood- and storm-prone Asia"

**80%** of people displaced by climate change are women

Due to drought and saltwater intrusion in the Mekong Delta, women spent an additional 1-1.5 hours per day for water fetching in Ca Mau, Viet Nam in 2020



**OVER 70%** of those displaced by flooding in Pakistan in 2010 were women and children



According to interviews of women and men across 75 countries presented in UNDP's '2020 Human Development Perspectives'

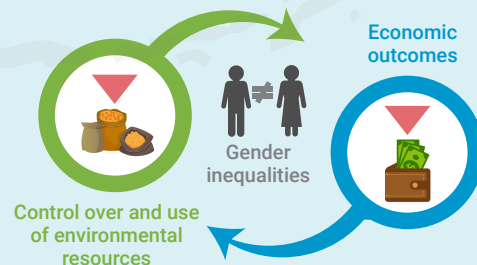
*BBC, 2020; Catholic Relief Services et al., 2020; UNDP, 2016*

## THE INTERSECTING DYNAMICS BETWEEN GENDER INEQUALITIES AND ENVIRONMENTAL RESOURCES

### KEY ENVIRONMENTAL RESOURCES

The lives and livelihoods of the majority of the population in the Asia-Pacific region depend upon **KEY ENVIRONMENTAL RESOURCES** to produce **RESOURCES**.

*Access to and use of resources are strongly and pervasively gendered*



**FORESTS**

**WATERWAYS**

**FISHERIES**

**FOOD**

**ENERGY**

**INCOMES**

in 2019.<sup>23</sup> Agriculture is also the primary provider of employment for women in the Asia-Pacific region; 75 percent of employed women in Nepal work in agriculture, in Pakistan and Afghanistan 65 percent of the female labour force is employed in agriculture. More than 63 percent of employed women in Laos work in agriculture, and even in China, 44 percent of the female labour force is employed in agriculture.<sup>24</sup>

There are strong gender dimensions to on-farm tasks, with women often having principal responsibility for the labour-intensive tasks, resulting in the fact that women's knowledge of the needs of the farm can differ significantly from that of men. Moreover, technical change, when it occurs, often takes place in the tasks that men do, meaning that women and men operate under different technical coefficients of production. Finally, the outcome of farm production, whether it be products or income, are usually inequitably allocated between women and men, to the detriment of women; households often do not pool and share the benefits from production.

Women's substantive contributions to agriculture and their vital roles in ensuring family food security have been widely documented; however, too much of their work remains invisible, in that women tend to remain unpaid contributing family-farm workers. Moreover, strong gender-based constraints and inequalities persist, such as the unequal access to and rights over land and resources as previously mentioned, as well as productive inputs and extension services and unequal participation in personal, family, and community decision-making.

23 World Bank 2020.

24 Ibid.



**Understanding the issue of land and resource control and use is critical to grasp the linkages between gender inequalities and climate change.**

These inequalities, coupled with some of the world's lowest rates of political representation, significant biases in legal structures and systems, and some of the world's highest rates of gender-based violence<sup>25</sup> continue to disadvantage women, impede their economic options and discount their contribution to agriculture in the region. In fact, according to the Women's Empowerment in Agriculture Index, unequal access to group membership, a lack of access to credit and heavy workloads pose the biggest constraints on women's empowerment in Bangladesh, Cambodia, Nepal and Tajikistan, inhibiting agricultural productivity and undermining resilience and sustainability efforts.<sup>26</sup>

In the Asia-Pacific region, the agricultural sector is particularly challenged by re-occurring stresses and shocks caused by environmental degradation, natural resource depletion and climatic variations. However, due to the gender gaps in the agricultural sector, climatic variations disproportionately increase the challenges faced by women and other marginalized farmers, and particularly those women that have *de facto* principal decision-making responsibility over the use of land and other natural resources, whether it be because of permanent male out-migration or the death of the senior male. In these circumstances, climate

25 World Economic Forum 2017

26 Malapit et al. 2014.

# GENDER INEQUALITY in the issue of land

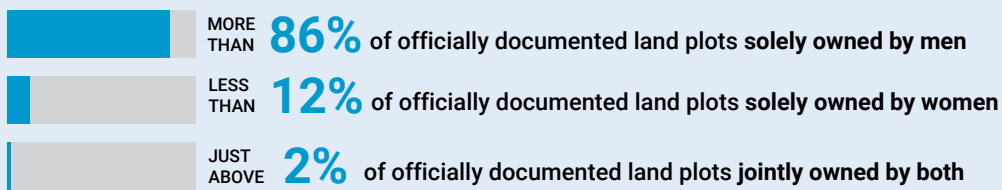


Women have lower levels of access to resources such as land, non-land assets and information, but also education and development services, when compared to men



In the Asia-Pacific region, women suffer from some of the world's lowest rates of property ownership and employment.

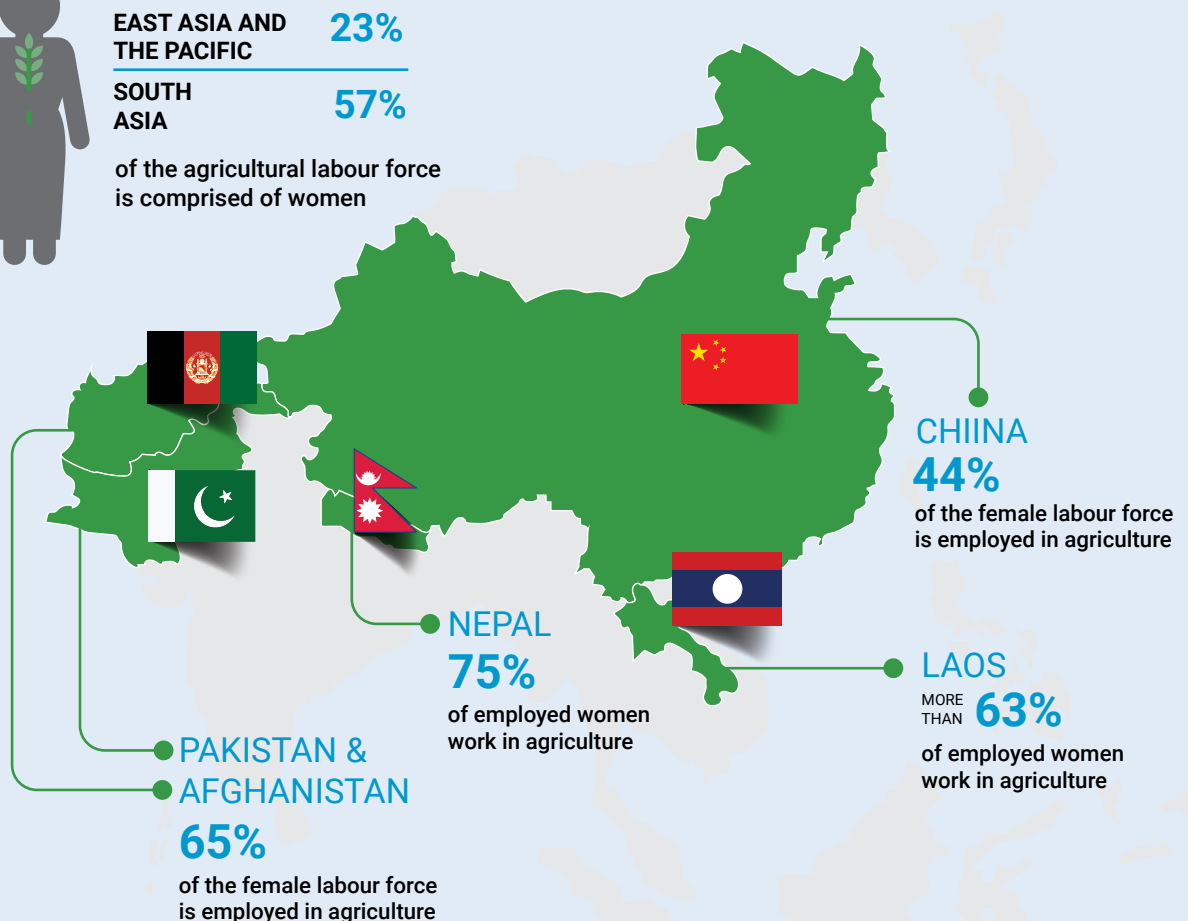
## In Bangladesh



# GENDER INEQUALITY in the agricultural sector



**EAST ASIA AND THE PACIFIC** **23%**  
**SOUTH ASIA** **57%**  
of the agricultural labour force is comprised of women



World Bank, 2020

change poses specific risks to women's sustainable agricultural production and their economic empowerment. Indeed, the IPCC has argued that there is a need to dramatically reconfigure agricultural land use in Asia-Pacific and elsewhere in order to mitigate the impact of climate change.<sup>27</sup>



**Due to the gender gaps in the agricultural sector, climatic variations disproportionately increase the challenges faced by women and other marginalized farmers.**

## 2.5 Women's unpaid care and domestic work

Beyond unpaid contributing family farm labour, gendered norms and social values also result in a gender division of labour within the household and as a consequence a significant share of women's working time being allocated to unpaid care and domestic work. The evidence from the Asia-Pacific region clearly shows that men work more in paid work than women, that women work more in unpaid care and domestic work than men, and that women work more hours per day than men overall, including their unpaid contributing family labour.<sup>28</sup> Women in the Asia-Pacific region spend up to 4.1 times as much time in unpaid care and domestic work than their male counterparts.<sup>29</sup> Women's unpaid care and domestic work in particular is critical to the economy and society, and is a significant livelihood source, but is not valued. It is noteworthy that particularly but not exclusively in the rural economies of the Asia-Pacific region, a large share of unpaid care and domestic work involves the use of natural capital and unpaid ecosystems services. The same is true of unpaid contributing family farm labour. Natural capital can be defined as the

stock of natural ecosystems which yield a flow of valuable ecosystem goods or services, called ecosystems services, into the future. Natural capital thus includes the resources that are easy to recognize and measure such as minerals and energy, forest timber, agricultural land, fisheries and water. Natural capital also includes ecosystems producing services that are often 'invisible' such as air and water filtration, flood protection, carbon storage, pollination for crops, and habitat for fisheries.

However, natural capital inputs such as water and energy and ecosystems services such as recycling in many circumstances cannot fulfill any needs unless they are further worked upon in order to be used. Indeed, households may rely upon unpaid care and domestic work securing access to natural capital and ecosystems services in order for the household to be sustained and unpaid contributing family farm labour to be performed. At the same time, in many instances the performance of unpaid care and domestic work on natural capital and ecosystems services is a precondition of supplying the labour of women and men for labour market participation and the production or services for household consumption.

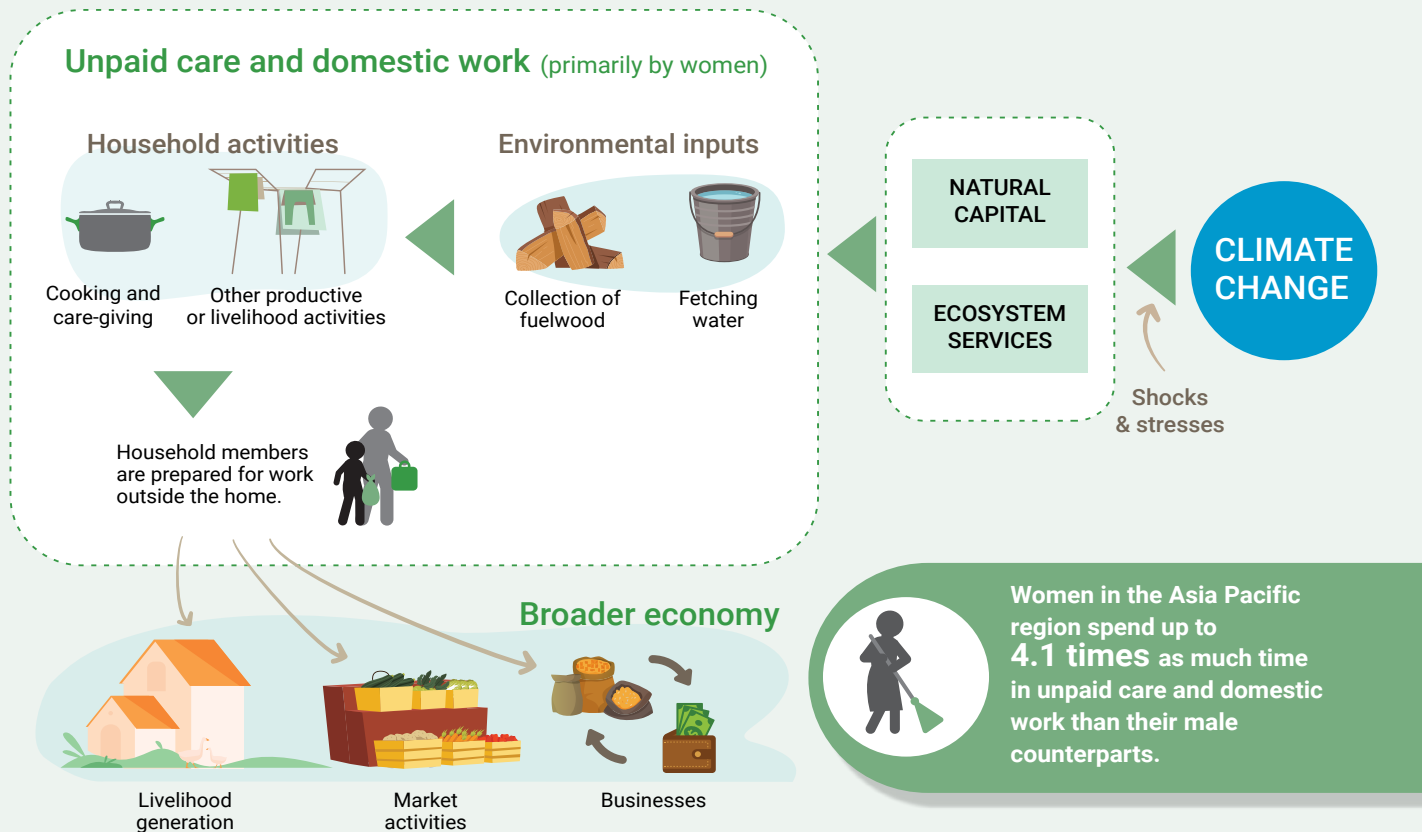
27 IPCC 2019.

28 ILO 2018.

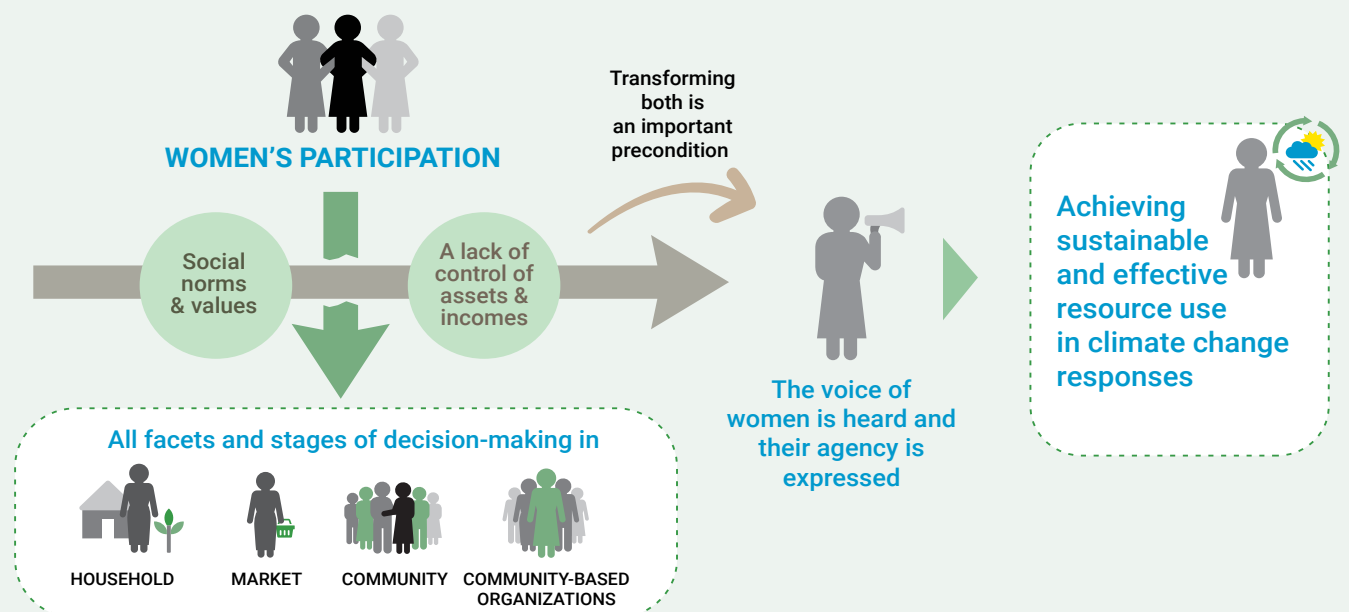
29 Addati et al. 2018.

# WOMEN'S UNPAID CARE AND DOMESTIC WORK AND ITS RELATIONSHIP TO CLIMATE CHANGE

## How Does Climate Change Affect Women's Unpaid Care and Domestic Work?



## Fostering Women's Participation in Climate Change Responses



Simply put, without the collection of fuelwood and the fetching of water, members of households, both women and men, are less able to be fed and prepared for the day's work outside the home. In other words, unpaid care and domestic work uses environmental inputs into household activities and these have consequences for the broader economy. They are a necessary condition of livelihood formation, market activity, and the ability of businesses to supply and sell goods and services. Thus, climate change, through its stresses and shocks to natural capital and ecosystem services, has implications for the unpaid care and domestic work that is performed within the household, primarily by women, and the livelihoods, labour market activity, and production for which it is an essential precondition.<sup>30</sup> For this reason, fostering women's participation in all facets and stages of decision-making is crucial to achieving sustainable and effective resource use in climate change responses.

Women's participation in decision-making can be formal or informal. It can occur within the household, in the market or within the community, and in the latter may work through community-based organizations. However, it is far too often the case that women's participation in decision-making is strongly constrained by social norms and values as well as a lack of control of assets and incomes. Transforming both is an important precondition for making the voice of women is heard and their agency is expressed.

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30 UNDP 2018.



**Women in the Asia-Pacific region spend up to 4.1 times as much time in unpaid care and domestic work than their male counterparts.**

## 2.6 Gender and climate finance

Given the lack of women's participation in decision-making within households, in communities and in governments in the Asia-Pacific region as well as globally, and in particular because of the lack of women in environmental decision-making positions, attention to the nexus of gender and climate has been inadequate. While this has been slowly improving, the pace of change remains less than it needs to be. Global investment flows to tackle climate change averaged \$410 billion across 2015/2016.<sup>31</sup>

The Global Landscape of Climate Finance 2017 report states that both public and private investments are becoming more effective in financing climate action. However, measuring the effectiveness of climate investments remains an area of debate, with several approaches to the issue of measurement on offer and no one globally agreed methodology. Moreover, the question of how equitable any benefits from climate investments are also remains. In particular, the gender and climate nexus suggests that it is important to understand how gender equitable and, where appropriate, gender transformative are any benefits from climate investments. Yet again, there is no agreed methodology as to how this can be done.

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31 Buchner et al. 2017.





**Transforming social norms and values is an important precondition for making the voice of women is heard and their agency is expressed.**

In both environmental economics and gender economics, efforts have been made to assign a monetary value to stocks and flows of activities that do not have a price. It has been argued putting a value on aspects of gender relations and climate such as unpaid care and domestic work, unpaid contributing family farm labour, natural capital and ecosystems services are attempts to commodify that which should not be commodified. However, proponents of monetary valuation of stocks and flows of activities that do not have a price argue the opposite: that prices have failed to reflect the true value of the contributions of gender and nature. Moreover, when people buy any physical product a comprehensive

value chain analysis would include the contributions of gender and nature to that product, in the form of natural materials, organisms and their derivatives, and flows of labour that occur outside of “economic” activities. Finally, without monetary valuation the value of leaving natural capital and ecosystems services intact is far less understood. Thus, there are reasons why attaching a monetary cost to unpaid care and domestic work, unpaid contributing family farm labour, natural capital and ecosystems services might be of use in understanding gender issues in climate action.

Valuation allows for a clearer understanding of the unpriced inputs sustaining economic growth. It also underscores that traditional growth metrics are inadequate as metrics for welfare and wellbeing, including ecosystem welfare and wellbeing. Consequently, the trend of maximizing GDP as it is currently measured and using existing prevailing prices to guide decision-making about how we use resources needs to be revisited.



PHOTO: UN WOMEN/PORNVIT VISITORAN



## 3. Issues in costing climate change and gender

PHOTO: UN WOMEN/PATHUMPORN THONGKING

### 3.1 Should the unpaid work of environmental resources and unpaid care and domestic work be costed?

Nature works for people. When the water from a river irrigates a farmer's field, energy flows from the river into the soil and from there into plants that grow and feed people. This energy flow is the work—that a gravitational, electric, magnetic, chemical or nuclear force can do. As such, energy is a universal constant; it can be neither created nor destroyed but can only be changed from one form to another, through work. More than 90 percent of all energy on earth is derived from the sun and this energy works for all, regardless of age or gender. Therefore, when thinking about “work” it is necessary to go beyond the world of labour market participation and to recognize the unpaid work of the environment as well as that of people, in unpaid subsistence-oriented contributing



**When thinking about “work,” it is necessary to go beyond the world of labour market participation and to recognize the unpaid work of the environment as well as that of people.**

family farm production and unpaid care and domestic work. In this way, food—as a product of natural capital and ecosystem services, is a way of capturing the work of the sun, as joules become converted into consumed calories through unpaid care and domestic work, which are then returned to the environment through the work of women and men, animals and natural resources or their by-products.

As a consequence, the unpaid work of the environment, unpaid contributing family farm labour and unpaid care and domestic work clearly impact upon economic growth, living standards, and well-being. However, while efforts are made to value unpaid contributing family farm labour in the national accounts, it is hard to estimate the monetary value of the non-market unpaid work of the environment and of unpaid care and domestic work because they are not priced. As the interactions between the unpaid work of the environment and unpaid care and domestic work have not been the subject of analysis by policy-makers, and are thus a missing “dimension” in policy-making circles, this will be the focus in what follows.

In that regard, it is certainly the case that not all of the unpaid work of the environment and unpaid care and domestic work can be measured in monetary terms, and indeed some would argue that assigning a monetary value to the unpaid work of the environment and unpaid care and domestic work is a fundamentally compromised task because of non-pecuniary non-economic intangibles that cannot be valued: say, the warmth of a summer’s day or the love of a parent for their child. More specifically, two criticisms are commonly levelled at those that seek to quantify the monetary value of the unpaid work of the environment and unpaid care and domestic work.

- The first criticism is that estimates require crude approximations such as taking the number of hours spent on unpaid care and domestic work and multiplying it by market wages in order to arrive at an estimate of its value. This criticism can be faulted because at present the monetary

value of unpaid care and domestic work is implicitly but consistently assigned an economic value: that of zero. It is difficult to conceive of a worse estimate of the value of unpaid care and domestic work than zero. Similarly, in a wide range of instances the unpaid work of the environment is implicitly assigned an economic value of zero – for example, the role of the oceans as a site of waste disposal.

- A second criticism is that assigning a monetary value to the unpaid work of the environment and unpaid care and domestic work is wrong because this work is not undertaken for monetary reward and thus valuation imposes a market logic where none exists because motivations are non-economic. This criticism can also be faulted because many who perform paid work do not do so exclusively for the pecuniary reward of wage payments; nurses and conservation officers, for example. For those professions, just because their work can be measured in wages does not mean that wages are the only reason people undertake these professions.

When a monetary value is assigned to the non-market unpaid work of the environment and unpaid care and domestic work, it implies that there is at least some substitutability between unpaid and paid work. Of course, this substitutability is likely to be quite clearly bounded, but nonetheless may be quite extensive. For example, much growth in economic output, as measured in gross domestic product, in both the developed and the developing countries may reflect a shift from non-market unpaid work to paid work, as households shift from tasks that use natural capital, ecosystem services and unpaid work on the farm

## The unpaid work of the environment shapes and is shaped by women's unpaid work

The work of the woman on the crop is unpaid contributing family farm labour, and hence a form of unpaid work

The transpiration from the crop is an ecosystem service

The energy flows in the crop that convert groundwater to transpiration is the unpaid work of the environment

The ground water is a stock of natural capital

and in the home to directly meet their own needs, to a far greater participation in labour and product markets. A failure to examine these changes may at best mislead our understanding of growth, living standards and well-being and at worst undermine our understanding of growth, living standards and well-being.

However, the most fundamental reason why the monetary value of the non-market unpaid work of the environment and of unpaid care and domestic work should be estimated, is that market-based exchanges are only one form of resource transfer in an economy. It might well be the case that estimates of the value of non-market transfers, both within the household through the performance of unpaid care and domestic work, and of the natural capital and ecosystem services that comprise the unpaid work of the environment, might result in market-based exchanges being only a small fraction, of all resource transfers in an economy. If so, economic analysis should not be confined to a narrow understanding of markets but instead should focus upon all resource transfers in an economy because a precondition of market-based resource transfers might be that non-market resource transfers take place.

Moreover, monetary estimates of the value of the unpaid work of the environment and unpaid care and domestic work can provide a common framework for the analysis of the relationship between all economic inputs and outputs across the widest range of resource allocations and activities undertaken by women and men.



**When a monetary value is assigned to the non-market unpaid work of the environment and unpaid care and domestic work, it implies that there is at least some substitutability between unpaid and paid work.**

Indeed, a narrow focus on markets might help to explain many of the policy failures that are witnessed, in that policy has affected the unpaid work of the environment and unpaid care and domestic work in ways that are detrimental to paid work. Thus, an inability or an unwillingness to value the unpaid work of the environment and unpaid care and domestic work can exaggerate the efficiency of the economy as well as miscounting the output of the economy. If so, estimates of the market value of the non-market unpaid work of the environment and of unpaid care and domestic work have the potential to provide important insights into how the economy operates, in terms of growth, living standards, and well-being.

However, it is important to remind that there is ample evidence of the linkages between the increase in women's unpaid care and domestic work and adverse impacts of climate change and environmental degradation and that conversely, environmental conservation has the potential to reduce this work.

## 3.2 Principles of costing

Estimating the monetary value of the non-market unpaid work of the environment and of unpaid care and domestic work should ideally measure both unpriced inputs and unpriced outputs in order to comprehensively calculate their full socioeconomic impact. Indeed, this indicates the first principle of costing: costing inputs, costing outputs, or both.

### COSTING INPUTS

In terms of costing inputs, these would consist of either estimating the value of the natural capital that enters into economic processes or estimating the value of the unpaid care and domestic work that enters into economic processes. This can be done over the short run, over the long run, or over both periods.

The short run is defined as the period of time in which one input in an economic activity is fixed and thus cannot be changed. For example, if a woman has to spend an hour preparing breakfast even as the contents of that breakfast varies, she is operating in the short run.

The long run is defined as the period of time in which all inputs into an economic activity can change. In the previous example, this would be witnessed when the time spent preparing breakfast and the contents of that breakfast could both vary. The long run is also subject to multiplier effects, which are witnessed when a given change in a particular input causes a larger change in an output. For example, when a woman preparing breakfast using a new technology sees both a reduction in the amount of time that she must spend preparing breakfast and an increase in the amount of food prepared for breakfast, both would be an example of the multiplier effects of technical change to breakfast preparation.

There are two general ways of estimating the value of unpaid inputs.

- **Replacement cost:** The first way is to estimate what it would cost to replace the unpaid work with paid work. This is called the replacement cost method. Thus, when unpaid care and domestic work acts as an input into the household production of goods and services, it is possible to estimate what it would cost to purchase such services in the labour market. For example, if a woman spends three hours every day fetching water and the cost of paying someone to fetch the water for her is \$2, the monetary value of the unpaid care and domestic work spent fetching water would be \$0.66 an hour. Multiplying \$2 by 365 days would yield an annual estimate of the value of the unpaid care and domestic work spent fetching water every year, which would be \$730. Similarly, when forests are felled to make charcoal, if one acre of trees yields 1,500 40 kilogram bags of charcoal a year and it would cost \$2,000 to purchase the wood necessary to produce 1,500 40 kilogram bags of charcoal a year, the monetary value of the unpaid work of the natural capital would be \$2,000 a year.
- **Opportunity cost:** The second way of estimating the value of unpaid inputs is to estimate the opportunity cost of the use of the unpaid work of the environment or the unpaid care and domestic work. This approach provides a measure of how resources might be allocated between uses, focusing upon the use of the resource which generates the highest return to the resource. For example, if for the woman spending three hours a day every day fetching water the best possible use of her time would be to

## THE REPLACEMENT COST

### FETCHING WATER



An annual estimate of the value of the unpaid care and domestic work spent fetching water every year

## THE OPPORTUNITY COST

### LABOUR MARKET INSTEAD OF FETCHING WATER



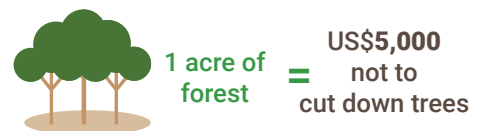
The opportunity cost of the unpaid care and domestic work allocated to fetching water

### MAKING CHARCOAL



The monetary value of the unpaid work of the natural capital would be **US\$2,000** a year

### A development agency paying community not to cut down trees



The opportunity cost of the unpaid work of the natural capital would **US\$5,000** a year

earn \$10 an hour in the labour market in those three hours, the opportunity cost of the unpaid care and domestic work allocated to fetching water would be \$30 a day or \$10,950 a year. Similarly, if the best possible alternative use of an acre of trees would be for a development agency to pay a community \$5,000 per acre a year not to cut down trees to make charcoal, the opportunity cost of the unpaid work of the natural capital would be \$5,000 a year.

As is clear from these simple examples, the data requirements to get a well-rounded estimate of the replacement cost or the opportunity cost of the unpaid work of the environment and unpaid care and domestic work are significant.

For this reason, the replacement cost method is the most common method of valuation; data requirements can be reduced on the basis of some elementary but not unreasonable assumptions. Moreover, the opportunity cost approach is not consistent with national accounting principles, which focuses upon market prices. At the same time, the opportunity cost approach values resources based on a very different type of use than that which is undertaken, which some consider to be an odd way of valuing the use of the unpaid work of the environment or unpaid care and domestic work.

Input costs can also be broken down into two mutually exclusive domains: direct costs and indirect costs.

- **Direct costs** are the visible result of the use of real resources, such as labour, natural capital, physical capital and financial capital, resources that, when used and not exhausted, must be replenished before they can be used again. Direct costs do not only involve payments to labour, or payment for the use of natural, physical or financial capital; direct costs can be incurred even when no payment is involved because the resource must be replenished if it is to be reused. Thus, when a woman collects firewood for use as energy in the home, the direct costs are the time and effort used in collecting the firewood as well as cost of restoring depleted forests. Direct costs that are not incurred through the market and which thus do not have a price can in principle be assigned a price, through the use of an appropriate methodology. So, the replacement cost approach just noted is an example of partial direct costing, in that not all direct costs are included, and thus partial direct replacement cost methods are the most common method of valuation.
- **Indirect costs** are also the result of the use of real resources but are not immediately visible. Opportunity costs are a subset of indirect costs, but indirect costs are broader. For example, the health effects of the use of firewood as a source of energy in the home is an indirect cost. Similarly, the productivity effects of soil depletion arising out of firewood collection is an indirect cost. Some indirect costs are also “negative externalities”: a cost borne by a third party as a result of an economic activity. The soil depletion arising out of firewood collection would be an example of both an indirect cost and a negative externality as the firewood collection may affect a broader group of people than just the woman collecting the firewood. Indirect costs can in principle also have price assigned to them through an appropriate methodology, but this is nonetheless more difficult because of the need to comprehensively evaluate all indirect costs in circumstances where some indirect costs may be hard to reveal and where data requirements may be demanding.

## DIRECT COST:

The visible result of the use of real resources

### COLLECTING FIREWOOD for energy in the home



**Direct cost =**  
 Time + Effort  
 + Cost of restoring depleted forests

## INDIRECT COST:

The result of the use of real resources but is not immediately visible



**EXAMPLE 1:**  
 The **health effects** of the use of firewood as a source of energy in the home



**EXAMPLE 2:**

The **productivity effects of soil depletion** arising out of firewood collection  
 \*also an example of “negative externalities”



## COSTING OUTPUTS

In terms of costing outputs, these would consist of either estimating the value of the ecosystem service that emerge from economic processes or estimating the value of the product of the unpaid care and domestic work that emerges from economic processes. Thus, the output-based approach to monetary valuation would ask what it would cost to purchase a product of similar quality to that of the product produced by the unpaid work of the environment or the unpaid care and domestic work.

For example, if the cost of purchasing the same volume of water from a water supplier that it takes a woman three hours a day to collect is \$3, the monetary value of the unpaid care and domestic work spent fetching water would be \$1 an hour. Multiplying \$3 by 365 days would yield an annual estimate of the value of the unpaid care and domestic work spent fetching water every year, which would be \$1,095. Similarly, when forests are felled to make charcoal, if one acre of trees yields 1,500 40 kilogram bags of charcoal a year worth \$2 a bag, the monetary value of the unpaid work of the natural capital would be the \$3,000 a year that would be needed to purchase the charcoal in the market. Again, given the range of outputs produced by the unpaid work of the environment and unpaid care and domestic work it is clear that the data requirements for an output-based approach to the valuation of the unpaid work of the environment and unpaid care and domestic work are significant.

Clearly, estimates of the monetary value of the non-market unpaid work of the environment and of unpaid care and domestic work must be done carefully.

## COSTING OUTPUTS



The monetary value of the unpaid care and domestic work spent fetching water

**US\$1,095**  
(PER YEAR)



THEN

The monetary value of the unpaid work of the natural capital

**US\$3,000** (PER YEAR)

Moreover, it must be recognized that because such estimates are constructed they are not definitive but are rather contestable. This is especially the case when estimating indirect costs. Finally, in that such efforts at valuation are highly unlikely to fully capture all unpaid work of the environment and unpaid care and domestic work, they should be presented as an approximate lower-bound estimate. This qualification does however have the benefit of rendering the estimate of the monetary value of the unpaid work of the environment and of unpaid care and domestic work as conservative.

### 3.3 Specific challenges in costing the unpaid work of the environment

The literature on costing natural capital, ecosystem services and climate change is voluminous and technically complex. However, underlying this complexity are rudimentary propositions, commencing with whether changes in natural capital, ecosystem services and the climate make people feel better or worse off. In either instance, monetary valuation becomes the means of empirically capturing changes to people's welfare. There are two basic methodologies that are used to value changes to people's welfare: revealed preferences and stated preferences.

#### REVEALED PREFERENCES

Revealed preferences is an indirect valuation method that explores the value of the unpaid work of nature to people by examining linkages between marketed goods and services and the non-marketed unpaid work of the environment. It assumes that because of those linkages, changes in the unpaid work of the environment will alter prices for marketed goods and services and vice-versa, impacting upon the consumption of both marketed goods and services and the unpaid work of the environment.

The question then is: what do people choose when faced with a new set of alternatives? For example, when rural households in north India invest in latrines that increases access to improved sanitation, it improves their lived environment; it also has implications for unpaid care and domestic work. It might be expected that people would then start using those latrines. Evidence suggests not,<sup>32</sup> indicating a paradoxical revealed preference for poorer sanitation and a

poorer lived environment, particularly among rural men.

Revealed preferences are the only methodology that allows an estimation of the direct input costs of the unpaid work of the environment, most commonly through various uses of technically-complex household production functions (HPFs). HPFs involve the econometric modelling of behaviour, based on the assumption of a substitutional or complementary relationship between the unpaid work of the environment and one or more marketed goods or services. The combination of the unpaid work of the environment and the paid commodity, through a household production process, results in a welfare-enhancing good or service being produced. For example, HPFs are widely used in modelling time allocation, including that between unpaid care and domestic work and the unpaid work of the environment. In a second example, a subset of HPFs, production function approaches, can quantify how water shortages reduce productivity for small-scale family farmers. Having said this, in much of the economics profession HPFs are discredited.<sup>33</sup>

Households are required to have a single welfare function even though a household is made of individuals whose welfare functions cannot be compared. They are supposed to consist of rationally optimizing individuals who allocate their time and resources on the basis of comparative advantage, without any recognition of social norms and values that hierarchically structure household activities. Thus, the numerous criticisms of HPFs mean that while they remain widely used by scholars their relevance for policy is quite limited.

32 Coffey et al. 2014.

33 Akram-Lodhi 1997.

Households are required to have a single welfare function even though a household is made of individuals whose welfare functions cannot be compared. They are supposed to consist of rationally optimizing individuals who allocate their time and resources on the basis of comparative advantage, without any recognition of social norms and values that hierarchically structure household activities. Thus, the numerous criticisms of HPFs mean that while they remain widely used by scholars their relevance for policy is quite limited.

### STATED PREFERENCES

Revealed preferences deduce social values toward the unpaid work of the environment based upon the actual behaviour that is witnessed. By way of contrast, stated preferences is a direct valuation method that asks people directly about their social values. For example, in the north India case just noted, when asked most users of open defecation did not understand its negative health consequences and thought that it was a more pleasant experience. Stated preferences thus provided a “why” to revealed preferences “what”. As such, they provide a fuller explanation of behaviour.

As a means of valuing the unpaid work of the environment, stated preferences are usually expressed through additions to or subtractions from cash income that leave people satisfied with or without a change in the services provided by the unpaid work of the environment. There are two ways of valuing stated preferences: willingness to accept (WTA) compensation for a change in environmental circumstances; and willingness to pay (WTP) for a change in environmental circumstances. This means that when costing natural capital, ecosystem services and climate variability

stated preferences focuses upon people’s inclinations among alternative outcomes. As such, stated preferences can only be used to evaluate direct output costs.

In practical terms WTA is hard to evaluate because it is more hypothetical than WTP. Thus, the most common means of evaluating stated preferences for a change in environmental circumstances is WTP. For example, WTP has been widely used to evaluate the comparative merits of connecting rural Kenyan households to either the national grid or a photovoltaic electric system, with the evidence indicating that rural Kenyans not only prefer the national grid but are also willing to pay more for such a connection.<sup>34</sup>

Stated preferences are widely used in environmental economics to cost the outputs of natural capital, ecosystem services and climate variability, particularly through WTP and a methodology called contingent valuation. Contingent valuation is conditional on the construction of hypothetical markets, reflected in the aforementioned expression of a willingness to pay for potential environmental benefits or for the avoidance of their loss, which is ascertained by directly asking respondents for their views. Contingent valuation is the basis of both carbon taxes and cap-and-trade systems, and with both the growth and importance of these in the Paris Agreement, WTP has a very strong influence on contemporary policy.

Stated preferences and WTP do however face significant limitations, with two in particular standing out. First, WTP is in essence a measurement of marginal cost and marginal benefit. The marginal cost

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34 Abdullah & Jeanty 2011.

is the cost incurred for an additional unit of something; WTP asks if the individual is willing to bear the cost. Similarly, the marginal benefit corresponds to the additional benefit that arises from an additional unit; WTP asks if the cost to the individual is worth the benefit. For example, the provision of clean water can be evaluated on the basis of the marginal cost of such provision versus the marginal benefit that such provision produces. However, in practice for the unpaid work of the environment marginal benefits and marginal costs are often difficult to determine and robustly value using WTP because an individual's capacity to express WTP is based upon their available information, which is usually both bounded and incomplete and which can thus generate unreliable estimates. This is particularly the case for the unpaid work of the environment which cannot be directly observed by individuals, such as carbon sequestration, as well as the unpaid work of the environment for which there can never be a market, such as clean air and biodiversity; individuals lack the information to make an informed choice about WTP.

Second, stated preferences and WTP cannot deal with non-marginal changes. Thus, if climate change is threatening a systemic shift in the operation of the planetary ecology, integrating these into WTP cannot really be made and conventional analysis may not be of benefit, particularly in the potential presence of climate feedback loops which have the potential to rapidly amplify the impact of climate change. Feedback loops bring with them the possibility of climate change having unforeseen catastrophic consequences. Thus, uncertainty is inherent in costing the impact of climate change.



**The advantages of valuing unpaid care and domestic work is to give it clearer visibility in economic discussions.**

### 3.4 Specific challenges in costing unpaid care and domestic work

Compared to the challenges involved in costing the unpaid work of the environment, the challenges involved in costing unpaid care and domestic work are less demanding. As was seen in section 3.2, partial direct replacement costs are the most common way of assigning a value to unpaid care and domestic work. However, that begs a question: how is the partial direct replacement cost estimated? Here, two possibilities present themselves: the generalist wage and the specialist wage. The generalist wage is that which on average accrues to a population. Four types of generalist wage have been used to estimate the monetary value of unpaid care and domestic work.

- The first is the average minimum wage a woman would receive, in the sub-region, region or country. This wage need not correspond to legislative requirements as they may not be enforced; this is rather an estimate of base wages for women. For example, the average wage received by a rural woman labourer would be used to estimate the value of unpaid care and domestic work;
- The second would be the wage that a paid worker would receive for care and domestic work; an average housekeeper's wage or the wage

of a worker in a child care facility, as it were, in the sub-region, region or country. It should be noted that especially at the sub-regional level in many agrarian economies of Asia and the Pacific there would be little difference between the base wage for a woman worker and a housekeeper's wage;

- The third would be to estimate the mean wage for women in the economy as a whole or in a specific sector;
- The fourth would be to estimate the median wage for women in the country or in a specific sector and divide it by two to value unpaid care and domestic work at one-half the median wage for women in the country.

The four methods used to estimate the generalist wage will all produce different estimates of the monetary value of unpaid care and domestic work. While these are contestable, they also provide a range of bounds for the estimation.

The second means by which partial direct replacement costs can be estimated is through a specialist wage approach. In this, the various activities that comprise unpaid care and domestic work are broken down into a discrete and specific set of tasks. For each task, a wage rate based upon a payment that would be made to a specialist whose function and circumstances match those who are undertaking the task is used to value the specific task being undertaken. These specialist rates are then used to produce a vector of wages paid across a specific

set of tasks in order to estimate the total monetary value of the unpaid care and domestic work that is performed.

As noted previously, the advantages of valuing unpaid care and domestic work is to give it clearer visibility in economic discussions. However, caveats exist. The first is that because societies do not pay for unpaid care and domestic work, it is often implicitly assumed that there is a limitless supply of unpaid care and domestic work. There is not- and quantifying the monetary value of unpaid care and domestic work does not recognize that the quality and quantity of unpaid care and domestic work can deteriorate when the providers of unpaid care and domestic work are given excessive burdens. The second caveat is that valuing unpaid care and domestic work fails to capture the multipliers generated by it.

Unpaid care and domestic work produce positive externalities, which are defined as a benefit from a transaction that is enjoyed by those that are not a party to the transaction. For example, when unpaid care and domestic work results in well-rounded individuals capable and willing to contribute to society, society as a whole, captures a positive externality from the performance of unpaid care and domestic work. Thus, even if a monetary value is assigned to unpaid care and domestic work it is an undervaluation of the social contribution of unpaid care and domestic work because it fails to capture positive externalities. In this way, the contribution of unpaid care and domestic work will be multiplied beyond the initial work that is performed.



# 4. Costing gender in climate action – the options

PHOTO: UN WOMEN/PIYAVIT THONGSA-ARD

The challenges of costing both the unpaid work of the environment and unpaid care and domestic work are clear – but so too are the potential benefits. In order to pursue an economic exercise to understand the cost of gender inequalities, as defined by the unpaid care and domestic work of women, in climate action, as defined by the unpaid work of the environment, both of these unpaid services need to be assigned a monetary value. That such an exercise will produce only a partial understanding of the cost of gender inequalities in climate action is recognized, but does not necessarily diminish the utility of such an exercise for it could provide previously unavailable insights.



**The challenges of costing both the unpaid work of the environment and unpaid care and domestic work are clear – but so too are the potential benefits.**

Once the unpaid work of the environment and unpaid care and domestic work is assigned a monetary value, there are a number of methodologies that can be used to cost gender within policy actions designed to address climate change and thus capture the interlinkages between gender and climate. The next sub-sections present four principal methodologies and their relative strengths and weaknesses.

## 4.1 Cost-benefit analysis

A cost-benefit analysis examines the costs of an action in relation to the benefits that action produces over time. It is principally used to evaluate the worth of investments undertaken by the private and public sectors. A cost-benefit analysis of gender in climate change actions weighs the benefits of changes in the unpaid work of nature arising from climate change and the way in which it interacts with unpaid care and domestic work versus the costs of specific policy actions to stabilize or even reduce changes in both the unpaid work of nature arising from climate change and unpaid care and domestic work.

Strong and specific policy action to prevent climate change and its impact on unpaid care and domestic should bring benefits equal to or greater than the value of the costs that are avoided for the policy action to be undertaken. So, the estimated benefits must be compared to the costs of taking action. If benefits outweigh costs, action is warranted. If costs outweigh benefits, action is not warranted.

However, the costs of acting can be borne today, in the near future, or both. Moreover, the benefits of taking action are further into the future. It is therefore necessary to decide how to balance not only current costs but also these future costs and benefits. The evaluation of current and future costs and future benefits is done through the use of a discount rate. The monetary value of goods or services in the present is viewed as higher than the expected monetary value of goods and services in the future. Thus, the further a potential benefit or cost is in the future the less is its value. It is this concept that is made tangible by a discount rate.



**A cost-benefit analysis examines the costs of an action in relation to the benefits that action produces over time.**

A discount rate is a number reported as a percentage that says how much resources are preferred now rather than in the future. The larger the discount rate, the higher the preference for consuming goods and services now; the smaller the discount rate, the lower the preference for consuming goods and services now. The discount rate thus shows how strong a preference there is for costs or benefits that occur in present versus costs or benefits that occur in the future.

The discount rate is used in a number of different types of cost-benefit analysis. The most common types that are used are the Benefit Cost Ratio (BCR), the Incremental Cost Benefit Ratio, Net Present Value, and the Payback Period. The latter three follow principles similar to that of the BCR, and so if the BCR is understood the other types of cost-benefit analysis will be understood. Therefore, the BCR method will be the only one presented here.

### BENEFIT COST RATIO

The BCR method is the ratio of all benefits versus all costs. It involves summing the total discounted benefits for an action over its entire duration and dividing it over the total discounted costs of the action. Costs would be those of a specific gender-responsive climate action to stabilize or even reduce the unpaid work of the environment arising from climate change, which can be expected to be differentially borne between women and men. Costs would be expressed in monetary values

and would require the quantification of the unpaid work of nature and unpaid care and domestic work using methods previously discussed. Benefits would be those attributable to the specific gender-responsive climate action. Benefits would be expressed in monetary values and would require the quantification of the unpaid work of the environment and unpaid care and domestic work using methods previously discussed.

The quantification of the BCR generates a number that can range from 0 to infinity. When the BCR is less than 1, the costs of the gender-responsive climate action exceed the benefits from the gender-responsive climate action. Solely on this criterion, the gender-responsive climate action should not proceed. When the BCR is 1, the costs of the gender-responsive climate action equal the benefits from the gender-responsive climate action, which means the project may be allowed to proceed, although its viability is highly sensitive to the estimates of costs and benefits. When the BCR is greater than one, the benefits from the gender-responsive climate action exceed the costs of the gender-responsive climate action, and the activity should be allowed to proceed.

Clearly, a cost-benefit analysis implies a range of normative value judgements that raise a number of questions about the scientific rigour of the methodology. Three in particular stand out.

- First, the challenges associated with costing both the unpaid work of nature and unpaid care and domestic work have been reviewed at length.
- Second, however, not only are these challenges present; for a cost-benefit analysis the monetary valuations of

both the costs and the benefits that accrue to both the unpaid work of nature and unpaid care and domestic work must be comprehensive. It is an open question as to whether it is possible to comprehensively capture and monetarily value all of the unpaid work of nature in climate action

- To these, a third question can be added: there is no objective basis by which to estimate the discount rate, and so it is not only a normative judgement but is also subject to manipulation to produce the “correct” result for the policy maker.<sup>35</sup>

Thus, cost-benefit analysis has a range of uncertainties associated with it. Where it may be useful is not so much in choosing whether or not to undertake a gender-responsive climate action, but rather when a decision has been made to undertake gender-responsive climate action using cost-benefit analysis to choose from a range of options for which not only is the costing of the unpaid work of the environment and unpaid care and domestic work similar but also a uniform discount rate is applied across the range of options.

## 4.2 Randomized control trials

Randomized control trials (RCTs) have become the dominant means by which the impact of specific policy actions are assessed for their effectiveness, and their importance has been reflected in the award of the 2019 Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel to three practitioners of RCTs. In development they are principally used by private sector consultants undertaking

<sup>35</sup> Wright 1990.



impact evaluation on behalf of public sector or international institutions.

RCTs randomly sample a population and assign people into one of two groups, a control group that does not receive a policy action and a treatment group that does receive a policy action. At the end of a specified period, the comparative positions of the two groups are evaluated for any evident difference. Indeed, the difference between the two groups is assigned quantitative precision: the relative magnitude of the causal effect of a policy action is determined. Evaluation then assesses how much of the difference – or lack of difference – between the two groups is an outcome of the policy action. Typically, all of the differences are assumed to be due to the intervention, within a certain margin of error, because the randomized sampling that underpins the RCT is assumed to have controlled for all relevant variables.

The costs of an RCT consist of the costs of the specific policy action, and in situations when the benefits from the policy action examined by the RCT are deemed to be acceptable costs may be amenable to unit costing. Unit costing extrapolates the total costs of providing a particular policy action, which in this case would be a gender-responsive climate action, based on the costs of individual goods or services provided under the policy action and rates of usage. For example, an expansion of gender-responsive climate-smart agricultural extension services that have been demonstrated to be effective by an RCT would be the kind of policy action that would be amenable to unit costing.

The benefits of the policy action are often not expressed in monetary terms, but this not need be the case. Thus, it would be



**Randomized control trials (RCTs) have become the dominant means by which the impact of specific policy actions are assessed for their effectiveness.**

in principle possible to design an RCT in which the benefits of gender-responsive climate action were monetarily valued in terms of the stabilization or reduction in both the unpaid work of the environment and unpaid care and domestic work. It would be then possible to compare the net benefits to society of the gender-responsive climate action as a ratio of the costs of the gender-responsive climate action. This would be similar to a cost-effectiveness analysis, which is used in medical research but not currently in social science research.

RCTs have become the “gold standard” of impact evaluation, but this does not mean that they are without criticism. Several stand out.<sup>36</sup>

- First, although RCTs are designed to minimize selection bias, it often remains: why take part in an experiment if an individual receives no benefit? Moreover, if individuals know that they will receive a benefit, does that lead to a change in behaviour? The only way these issues can be addressed is by not informing participants that they are taking part in an RCT, but that in turn throws up ethical questions.
- Second, RCTs emphasize the use of quantitative variables in controlling for difference; things like demography and income. Yet quantitative variables

<sup>36</sup> Akram-Lodhi 2014.

may not adequately capture some of the qualitative differences within and between groups that may be of central importance in explaining difference and change; social and cultural variables come immediately to mind, but many proponents of RCTs often view qualitative methodologies as unscientific.

- Thirdly, estimating the relative magnitude of a causal effect is predicated upon generating means; yet an average effect may not be as important as the degree of variation within a setting in order to understand impact. In such circumstances, randomization need not necessarily produce statistically significant results because of the extent of heterogeneity. In such settings, context would clearly matter. Indeed, because policy actions are introduced into and implemented within a particular and specific set of local social processes, which by definition must have an impact upon their outcome, RCTs could be rendered inadequate because what works in one place may not work in another. Yet RCTs are predicated upon an implicit assumption that what works in one place might work in another.

### 4.3 Gender-responsive budgeting

Gender-responsive budgeting (GRB) analyzes government budgetary expenditures and revenues to assess its effects upon women and men and girls and boys by identifying the gendered costs and benefits of government budgets. GRB can be undertaken within government, usually under the auspices of finance ministries,



**Gender-responsive budgeting (GRB) analyzes government budgetary expenditures and revenues to illuminate its effects upon women and men and girls and boys by identifying the gendered costs and benefits of government budgets.**

or can be used as an accountability tool by civil society organizations. According to one of the classification approaches to a gender responsive budget, the expenditure side of the budget can be broken down into three categories:

1. Expenditures that target women or gender issues;
2. Equal-opportunity spending within government; and
3. All other expenditure.

The third category does not examine whether such government expenditure has any differential effects on women and men and girls and boys. The bulk of expenditure needs to be analyzed or assessed to unpack where – if at all – indirect gender objectives are included and how this large portion of expenditure either does (or does not) support gender equality.

In this sense, it is gender-blind. Yet category three expenditures usually constitute the bulk of government expenditures. However, all fiscal policies and the entire budgets are the focus of GRB.

GRB often takes five steps<sup>37</sup>, although not all GRB initiatives cover these five steps

- The first is to undertake a situation analysis that describes the position of women and men and girls and boys in the sector of interest in the budget or across the budget as a whole. This is done to identify clearly defined gender gaps, including those in time use;
- The second is to evaluate whether sectoral policies, programmes and projects are gender-responsive, and thus address the gender gaps described in the situation analysis, including those of time use;
- The third is to evaluate whether adequate budgetary expenditures have been allocated to implement gender-responsive policy, programmes and projects that address identified gender gaps;
- The fourth is to evaluate at the end of the budgetary year whether the expenditure was spent as planned and reached those that needed it;
- The fifth is to judge the effect of the expenditure in ameliorating the gender gaps identified in the first step.

After the adoption of the 2030 Agenda, a global methodology was developed on how to track budget allocations for gender equality throughout the public finance management cycle and to make them publicly available in order to reach SDG 5 on gender equality. This methodology includes three criteria underpinning GRB practice and relating to policy frameworks, public finance management systems and data transparency.<sup>38</sup>

37 Budlender, D. et al. 2002.

38 More information, including the methodology, for the indicator can be found at UN Women (in collaboration with OECD and UNDP) 2018.

The intersection of gender and climate can occur throughout the GRB process. The situation analysis should include patterns of time use, including the gendered division of labour between paid work, unpaid contributing family work, and unpaid care and domestic work. The latter can be monetarily costed. It can also include women and men's differential engagement with natural capital and ecosystem services, which, where appropriate, can be monetarily costed.

The evaluation of the gender-responsiveness of sectoral policies, programmes and projects can include policies related to climate change, including policies that may have explicit gender objectives and those where gender equality is not the direct objective, but it has the potential to impact gender.

The determination of whether adequate budgetary expenditures have been allocated to implement gender-responsive climate action can be undertaken at step three. Step four judges whether spending on gender-responsive climate action went as planned, and step five determines whether such spending has ameliorated gender gaps identified in the situation analysis, including differential engagement with the unpaid work of the environment.

A GRB approach to costing the benefits of government expenditures and revenues can serve as a powerful policy approach that includes tools to identify gaps or absences in gender-responsive climate action. It can help governments decide how policies need to be adjusted, and where resources need to be reallocated to address gaps and inequalities in gender-responsive climate action.

However, GRB is also highly political as well as technical as it can illustrate weaknesses within the budgeting process itself, including a lack of coordination among various stakeholders working to address gender-responsive climate action. Moreover, in countries where budget data is not publicly available or where the practice of information-sharing is not active, implementing this method may be particularly challenging.

#### 4.4 Macroeconomic modelling and macroeconomic estimates

Macroeconomics is a branch of economics that deals with the structure, behaviour, performance and decision-making of an economy as a whole, focusing on the combined activities of all households, all firms and the government. The variables that make up these activities are estimated in the national accounts on the basis of definitions that are globally uniform but which, as will be seen, are not complete and there are capable of being contested, although they rarely are contested. The cumulative decisions of these agents determine the whole economy's total spending, income, and production of goods and services. Macroeconomic analysis can be applied to regional, national, and global economies.

A macroeconomic model is a tool of analysis designed to stylistically describe how a macroeconomy operates. This is done by theoretically specifying relationships between aggregate quantities such as the total amount of goods and services produced, total income earned, the level of employment of productive resources, and the level of prices. Driven by their theoretical specification, models are designed



**Macroeconomic models that incorporate gender and ecosystem services are necessary in order to effectively understand interactions between the economy, the environment and gender.**

to examine the comparative statics and dynamics of the macroeconomy. Comparative statics explores two different outcomes before or after a change in a macroeconomic aggregate. Dynamics explores how changes in the macroeconomy as a whole play out. Governments use macroeconomic models to understand the economy-wide effects of policy actions. Private sector companies, academics and international development institutions may also use macroeconomic models that are specified differently from that of government to develop an alternative perspective on the economy-wide effects of policy actions.

In macroeconomics, households are assumed to act in a unified way, but this assumption cannot be sustained. Intrahousehold divisions of labour between women and men determine the performance of unpaid care and domestic work and thus activity in labour markets. As gender relations therefore segment labour markets, this affects production, incomes, consumption, investment, savings and distribution. At the same time, unpaid care and domestic work have historically been excluded from macroeconomic models because it was not considered employment in the System of National Accounts (SNA) used by all countries under the auspices of the UN.

More recently, UN statisticians have begun to develop “satellite” national accounts that incorporate estimates of the monetary value of unpaid care and domestic work. At the same time, gender-responsive economists have developed macroeconomic models that integrate unpaid care and domestic work and gendered dynamics both in labour markets and within households, including critical interactions between paid and unpaid care and domestic work and private and public care provisioning. In these models a fine level of detail is provided for sectors, factors of production such as labour, and household types with the specific aim of highlighting the gendered structure of an economy. This modelling approach allows the assessment of the full range of gender distributional effects that might result from a variety of economic and social policies as well as their fiscal sustainability. However, these macro models have not been used by policymakers because satellite accounts are not considered as established as conventional SNA accounting.

Historically, macroeconomics did not incorporate natural capital and ecosystem services. Natural capital is a stock of resources and macroeconomics does not examine stocks of resources but rather flows from those resources. Ecosystem services are a flow from natural capital, but because they were not priced were taken for granted. This changed in 1993 when the System of Integrated Environmental and Economic Accounting (SEEA) was developed. The SEEA monetarily values ecosystem services and their interaction with macroeconomic variables. By internalizing positive and negative externalities it is possible to better understand flows between the unpaid work of the environment and the economy. However, the SEEA is not the

current basis by which macroeconomic activities are recorded, described and evaluated; this remains the SNA. Nor is the SEEA used to inform decision-making. Thus, the unpaid work of the environment and ecosystem services are not systematically incorporated into policy-making.

Macroeconomic models that incorporate gender and ecosystem services are rare. Yet such models are necessary in order to effectively understand interactions between the economy, the environment and gender. However, as yet there is no consensus about how to formalize macroeconomic relationships between the private and public sectors, households and their embedded gender relations, and how they interact with the ecosystem and so those macro-models that do exist have not entered into public policy discussions. However, costing the unpaid work of the environment and unpaid care and domestic work would be one means of integrating some important aspects of gender inequalities and ecosystem services into macroeconomic analysis. It would also facilitate a more dynamic understanding of some of the effects of gender-responsive climate action on the macroeconomy. Doing this will require a level of investment into the creation of a gender-responsive ecological macroeconomics that is currently not a priority for countries in the Asia Pacific region or elsewhere.

A second-best approach that is currently feasible within existing data constraints is not to produce gender-responsive ecological macroeconomic models but to examine correlations between macroeconomic variables that have been expanded beyond those of the conventional model to include unpaid care and domestic work. These

correlations can then be evaluated in light of an existing macroeconomic model. A positive correlation exists when two variables move in the same direction together. A negative correlation exists when two variables move in opposite directions together.

Quantifying a correlation within the context of an existing macroeconomic model would allow an evaluation of the impact of the variables on the structure of the model. For example, if an increase in unpaid care and domestic work is negatively correlated with lower levels of agricultural productivity, costing the monetary value of unpaid care and domestic work allows an estimation of the amount of “lost” agricultural production that is attributable to the performance of unpaid care and domestic work, which in turn allows an estimation of “lost” gross domestic product that is attributable to the performance of unpaid care and domestic work.

Similarly, it can be expected that a decrease in unpaid care and domestic work might be correlated with an increase in labour market participation. Costing the monetary value of unpaid care and domestic work allows an estimation of the “gained” gross domestic product that is attributable to the lesser performance of unpaid care and domestic work. Such correlations can encompass the impact of climate change on lives and livelihoods. For example, if an increase in unpaid care and domestic work can be demonstrated to be an outcome of adapting to climate change and is negatively correlated with lower levels of agricultural productivity, costing the monetary value of unpaid care and domestic work allows an estimation of the amount of “lost” agricultural production in the macroeconomy that is attributable to the increased performance

of unpaid care and domestic work that has resulted from climate change adaptation processes.

#### 4.5 Macroeconomic estimates of the monetary ‘value’ of gendered work impacted by climate change

In the Asia-Pacific region, no country currently produces systematic and comprehensive data that would facilitate the building of a comprehensive macroeconomic model incorporating gender, climate change and their interaction.<sup>39</sup> In terms of gender, the time use data that might be used to provide estimates of the monetary valuation of unpaid care and domestic work has been collected in a minority of countries, and usually at only one point in time.<sup>40</sup> Demographic and health surveys in the region rarely have time use data, and multiple indicator cluster surveys also fail to adequately incorporate time use dimensions in a systematic way. However, some countries produce much more limited amounts of time use data at a point in time, or produce time use data across a narrowly-defined range of activities that are part of unpaid care and domestic work. Some of these activities draw upon natural capital or ecosystem services and as such these activities can be impacted by climate change processes. When such is the case, the impact of climate change may be reflected in changing patterns of time use. Such data has the potential to be carefully used to draw some indicative conclusions around gendered patterns of time use and the impact of climate change on the basis of comparative

39 Efforts are underway to build a gender-responsive macroeconomic model for policy purposes in South Korea. These can be examined at Care Work and the Economy (n.d.).

40 Centre for Time Use Research n.d.

statics. However, they would not be able to explore dynamic interactions between variables such as gender and climate change.

One element of unpaid care and domestic work where data is collected in a number of countries is the time allocated to the collection of water and the fetching of firewood in the rural economy. This data falls outside the SNA for most countries, as unpaid work undertaken to provide a service to members of the household are not counted within the SNA, but does tend to be collected in labour force surveys that are undertaken for government and then delivered to the International Labour Organization.<sup>41</sup> As a general rule of thumb, such work is heavily gendered, being widely considered to be 'women's work.' It is also the case that such work is reliant upon the availability of natural resources to produce ecosystem services, which are becoming harder to access due to groundwater depletion and cutting down forest cover, both of which have a clear connection to climate change.<sup>42</sup> Thus, although the interactions may not be completely quantifiable even using techniques designed to produce indicative results, there are nonetheless interactions between water access, energy access, climate change and gendered patterns of time use, all of which have implications for production and incomes in the macroeconomy.

A specific example can be provided, using as a rule of thumb the empirically-substantiated proposition that climate

41 In the example presented in Table 1, as in many other countries, collecting firewood and fetching firewood fall outside the methodology used in the construction of the SNA even though national accounts statisticians have in principle accepted the fact that it should be included. See Antonopoulos 2008.

42 On the intersections of gender, climate change, water access and forest depletion see the extensive bibliographic overview at UNFCC n.d.



**There are interactions between water access, energy access, climate change and gendered patterns of time use, all of which have implications for production and incomes in the macroeconomy.**

change has been depleting groundwater and reducing forest cover and in so doing has possibly impacted upon the amount of time needed by women collectors to secure supplies of firewood and water for own use within the household.<sup>43</sup> In some countries estimates of the time used by women and men for the collection of water and the fetching of firewood are included in labour force surveys.<sup>44</sup> Intuitively, then, changes in gendered patterns of time use allocated to collecting water and fetching firewood captured in labour force surveys may be linked to processes of climate change and moreover such gendered patterns of time use can be assigned an estimated monetary equivalent for the 'value' of that time.

In Pakistan it is widely accepted in the country that climate change is depleting groundwater and reducing forest cover.<sup>45</sup> The annual Pakistan Labour Force Survey collects estimates of time spent by women and men collecting water and fetching firewood. It is a reasonable hypothesis to suggest that this unpaid care and domestic work is impacted by climate

43 On the intersections of gender, climate change, water access and forest depletion see the extensive bibliographic overview at UNFCC n.d.

44 In particular, former British colonies collect time use data on estimated amounts of time used to collect water and fetch firewood in their labour force surveys.

45 On the depletion of groundwater in Pakistan, see Watto 2018. On the erosion of forest cover in Pakistan, see IRIN News 2002.

change processes that result in depleted groundwater and reduced forest cover. Estimates of the monetary 'value' of the time used to collect water and fetch firewood, based upon the use of average rural wages of women as a measure of partial direct replacement costs, can be annualized to produce indicative estimates of the broad magnitude of the monetary 'value' of water collection and the fetching of firewood as a share of Pakistan's GDP. This is done in Table 1, based upon the 2012 / 2013 and 2017 / 2018 Pakistan Labour Force Surveys in order to produce two sets of estimates that allow indicative comparative statistics to be generated.<sup>46</sup>

**TABLE 1. The 'economic' contribution of women's unpaid domestic work – firewood and water collection**

Share of gross domestic product	2012 / 2013 Labour Force Survey	2017 / 2018 Labour Force Survey
Fetching firewood, %	0.23	0.18
Collecting water, %	0.32	0.25
Total, %	0.55	0.43
Men's as a share of women's time, %	0.01	0.01
Estimated monetary value, US\$ millions		
Fetching firewood	508.3	563
Collecting water	721.4	770.4
Total	1229.7	1333.4

<sup>46</sup> Data is from the annual Pakistan Labour Force Survey (ILO 2017). In both rounds rural observations by age and gender are extracted. The number of hours spent by women (and men) collecting water and fetching firewood and who were only engaged in 'homework' was summed, and estimated as a share of all 'homework'. This percentage was applied to women's (and men's) time spent in own-account activities, based on the rule of thumb that own-account rural workers must spend time collecting water and fetching firewood for household use (Siddiqui 2009), to derive an estimate of the number of hours spent by women (and men) collecting

The following conclusions can be drawn from Table 1.

- First, the results, while indicative approximations, are quite meaningful in suggesting the magnitude of the importance of this one individual component of the totality of unpaid care and domestic work performed primarily by females -- one-half of a percent of GDP is a significant economic activity in rural Pakistan, making this work an important part of the rural economy, women's lives, and women's livelihoods. Moreover, the magnitude is broadly comparable over the two time periods, suggesting consistency in both the activities and the methods to estimate the monetary equivalent of the activities.
- Second, collection of water and firewood is overwhelmingly women's work, and so the shares of GDP and the estimates of monetary valuation are only for women performing this work; men undertake an almost insignificant fraction of it.
- Third, while the share of GDP attributable to water and firewood collection has gone down between

water and fetching firewood for those that were engaged in own-account work. The two sets of hourly figures were combined and then used to estimate the average number of hours spent by women (and men) collecting water and fetching firewood across the entire rural population, as provided in the World Development Indicators (World Bank n.d.). Annualizing that figure using a methodology presented by the Organization for Economic Cooperation and Development (Ahmadi & Koh 2011.) and multiplying it by the average rural wage for women (and men) provides an admittedly rough 'back of the envelope' estimate of the 'monetary' value of the time spent collecting water and fetching firewood by women working in the rural economy of Pakistan as a share of gross domestic provincial product. Table 1 presents the estimates for women only. As is clear from this method, the resulting estimates are conservative, are indicative, and should not be treated as 'facts' but as a measure of the broad magnitude of the role of water collection and firewood fetching in total economic production in northern Pakistan.



the two periods, this is explained by aggregate economic growth increasing more rapidly than growth in the agricultural economy and the quantifiable hours of time spent in collecting water and fetching firewood. The monetary 'value' of the time spent on water and firewood collection in fact has gone up in absolute terms between the two periods. This is because between the two periods a significantly higher proportion of women are spending time on water and firewood collection. Given the evidence of groundwater depletion and reduced forest cover, it might be inferred that climate change is tightening constraints on water and energy, resulting in more women collecting these stocks of natural capital; certainly, as a hypothesis this bears much deeper investigation because it would appear that climate change may have impacted upon women's workloads in rural Pakistan.

- Finally, it must be stressed that while this is a conservative estimate — because of the use of the partial direct replacement cost method — it is surely better to have some kind of an estimate of the monetary 'value' of water and firewood collection than to assume that it has a value of zero, as is the case in most SNA-based economic analysis.

The lessons from this example would be: firstly, that two elements of unpaid care and domestic work, the collection of water and the fetching of firewood, are themselves significant but non-valued parts of the agricultural economy; that climate change, by impacting these stocks of natural capital has probably impacted gender-based patterns of work, and particularly unpaid care



**Climate change, by impacting the stocks of natural capital, has impacted gender-based patterns of work, particularly unpaid care and domestic work, with implications for livelihoods.**

and domestic work, with implications for livelihoods; and thirdly, that by not evaluating gender, environment and climate change interactions in the rural economy of Pakistan policy will misconstrue livelihoods and that this may result in policy failure.



PHOTO: UN WOMEN/PATHUMPORN THONGKING

# SUMMARY OF COSTING OPTIONS

	Cost-benefit analysis	Randomized control trials	Gender responsive budgeting	Macroeconomic estimates
OBJECTIVES	To evaluate the merit of a possible investment	To evaluate the impact of an investment	To analyzes the gendered impact of government budgetary expenditures and revenues on women and men and girls and boys	To understand the economy-wide effects of policy actions To develop an alternative perspective on the economy-wide effects of policy actions
USER	Public and private sectors	Private sector consultant undertaking impact evaluation	Governments and civil society organizations	Governments, private sector companies, academics and international development institutions
ADVANTAGE	Costs of taking action are examined in relation to the estimated benefits	Benefits of gender-responsive climate action are monetarily valued	Powerful tool to identify gaps or absences in gender-responsive climate action	Unique opportunity to highlight the interlinkages between gender and climate change
DISADVANTAGE	Limited understanding of costing gender in climate action because of its focus on a single action	Focus on single action	Implementation is challenging if budget data is not publicly available	Choice of variables within macroeconomic models can be contestable



# 5. Conclusion

PHOTO: UN WOMEN/PIYAVIT THONGSA-ARD

The purpose of this report is to provide a methodological approach toward understanding some of the interlinkages between gender, the economy and climate change, in order to demonstrate the need to develop a unified methodological framework that allows gender, economy and climate change interlinkages to be brought together for the purposes of analysis, advocacy and policy-making. To that end, it has focused upon understanding the intersection between the unpaid work of the environment and unpaid care and domestic work, which are two very important, albeit partial, dimensions of climate action and gender inequality that directly connect to the operation of the economy.

Despite the inherent difficulties in costing the unpaid work of the environment and unpaid care and domestic work, predominately done by women in the



**The unpaid work of the environment and unpaid care and domestic work are very important dimensions of climate action and gender inequality that directly connect to the operation of the economy.**

Asia Pacific region, options do exist. Moreover, trying to make visible that which is not visible has the potential to not only influence policy but make policy better, especially by incorporating gender equality into climate action. Examining the available costing options presented in this report, each has their merit but also have challenges in effectively measuring the impacts of gender equality in climate action.

Cost-benefit analysis is primarily designed to evaluate the merit of a possible investment and is used by both the public and private sectors. In principle, the unpaid work of the environment and unpaid care and domestic work can be incorporated into cost-benefit analysis, but cost-benefit analysis offers an extremely limited understanding of costing gender in climate action because of its focus on single action and at the same time can be questioned because of the normative character of the discount rate. RCTs are primarily designed to evaluate the impact of an investment and are used by private sector consultants undertaking impact evaluation on behalf of public sector or international institutions.

Impact evaluations can in principle incorporate the unpaid work of the environment and unpaid care and domestic work, but despite their wide usage have come under criticism. At the same time, they offer a limited understanding of costing gender in climate action because of their focus on a single action.

GRB analyzes the gendered impact of government budgetary expenditures and revenues on women and men and girls and boys, including with regard to their respective patterns of time use. GRB can be undertaken within government, usually under the auspices of finance ministries, or can be used as an accountability tool by civil society organizations. GRB is a powerful policy approach that includes tools to identify gaps or absences in gender-responsive climate action. It can help governments decide how policies need to be adjusted, and where resources need to be reallocated to address gaps

and inequalities in gender-responsive climate action. However, GRB is highly political, and in countries where budget or time use data is not publicly available or where the practice of information-sharing is not active, implementing this method may be particularly challenging.

Macroeconomic modelling is used by governments to understand the economy-wide effects of policy actions. It is also used by private sector companies, academics and international development institutions to develop an alternative perspective on the economy-wide effects of policy actions. However, the ways in which variables within macroeconomic models are constructed make them contestable, even if this is rarely done. Reforms over the past 25 years in the SNA led by the UN have sought to broaden and deepen the variables used in macroeconomic models, and these have the potential to incorporate the unpaid work of the environment and unpaid care and domestic work.

Moreover, given the push to accelerate the implementation of the Paris Agreements and the importance of data in order to meet the SDGs, macroeconomic modelling presents a unique opportunity to highlight the linkages between gender and climate change and derive macroeconomic policy advice for countries in the Asia-Pacific region acting on climate change.

However, macroeconomic models that incorporate natural capital, the unpaid work of the environment, ecosystem services and unpaid care and domestic work are rare and are not currently in the toolkit of policymakers. In the absence of such models, where data is available

generating macroeconomic estimates of the monetary 'value' of the unpaid work of the environment or unpaid care and domestic work can allow an examination of comparative statics, which has the potential to provide important insights into the relative magnitudes of gender or climate change on the macroeconomy as well as quantified indications of the ways in which gender, climate change and the macroeconomy intersect and interact.



**Generating macroeconomic estimates of the monetary 'value' of the unpaid work of the environment or unpaid care and domestic work has the potential to provide important insights into the ways in which gender, climate change and the macroeconomy intersect and interact.**



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**\*Note: if the hyperlink does not open the source, it could be typed directly in a web browser.**



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