

ADAPTATION TO CLIMATE CHANGE: IMPLICATIONS TO THE WELL-BEING OF WOMEN AND THEIR HOUSEHOLDS IN AN AGRICULTURAL LANDSCAPE

Abstract*

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Background and Rationale

The Cordillera region of the Northern Philippines, is home to more than 1.4 million indigenous peoples. Like the rest of the country, it has not been spared from series of disasters, directly or indirectly caused by certain climate change scenarios. Its mountainous fragile ecosystem characterized by an undulating to rugged topography constantly exposed to extreme rainfall makes it uniquely vulnerable to climate change. In 2001, Baguio City and La Trinidad of Benguet province experienced extraordinary landslides triggered by record breaking hour rainfall of 1,085.5 mm (Greenpeace, 2007). In 2009, the fury of typhoon Pepeng hit Northern Luzon, bringing millions of damages to the region. In 2002-2003, the vegetable belt areas of Benguet and Mt. Province experienced the leaf miner menace, considered a major crisis which is on top of the felt differential effect of agricultural liberalization. The occurrence of new Pests and diseases in the agricultural sector has been hypothesized as caused partly by climate change. The actual safety nets for this crisis situation were women in the households, with them showing resilience in the face of economic disenfranchisement (Sidchogan-Batani, 2004). Yet, in the face of these crisis situation, certain sectors take the burden. Gender studies show that women are further marginalized during economic downturns (Lim, 1999; Chatterjee, 2010; Floro, 2010).

Because adaptation to climate change can be costly, and in the context of the agricultural sector that is oriented to producing crops for the market, it can mean adoption of new seeds, more intense time use, a need to review land use plans, climate change, among others, the need to determine the vulnerability of critical sectors is imperative. Hence this study.

Climate Change is amplifying the socio-economic burdens already felt by Filipino families such as hunger and water scarcity – even more with indigenous populations, whose livelihood is deeply rooted in the well-being of the environment. This is not to discount the fact that Ifugao province in the region, among others, has been listed by the Manila Observatory as one area that is most at risk to climate change and weather related changes; are also noticeably areas with high poverty incidence. In a recently conducted study assessing the vulnerabilities and resilience of households to climate change, in selected communities of Benguet and Ifugao provinces, households are surprisingly resilient. But this comes not without costs, specifically to the women of the households. While women show flexibility in terms of mobility and livelihood diversification (FAO-Commissioned Climate Change Project, 2010) the well-being and the ‘care dimension’ is at stake. Literature has proven that ‘unpaid work’ to which women overwhelmingly are categorized, represents a large contribution to economic activity but has yet to be reflected appropriately in the system of national accounts (UN-ESCAP, 2003:7). In the context of job loss, which is expected with harsher and more drastic climate change scenarios that puts agricultural sector much more vulnerable, women get attracted to working in off-farm sectors, even overseas as caregivers. Already, in the country, care crisis is felt with children and transnational families (Parrenas, 1998;

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2001). According to Floro (2010), there is an increasing demand for women workers in the care industry. And in the society where there is absence of institutions that provide care, the default solution is to rely on women's work (Durano, 2008). Where traditional social support system are disintegrating, "women's unpaid work would indeed figure.

Another scenario brought about by the effects of climate change is to diversify sources of income to help the household cope. As a result more women and their households are engaging in the informal employment to augment their income. When households rely more on informal sources of income then these households are at risk to poverty (Guerrero, 2010). As risk of poverty increases for these women and their households, time poverty should also be measured. Indira Hirway (2010) defines time poverty as the time dimension of poverty which includes time stress and time burden particularly on women.

What all these scenarios point to is the increasing need to conduct studies in relation to climate change with focus on the social and gender dimensions, which will push for the long desired appropriate space in the national accounts. In the context of climate change, this can be the defining social justice issue of this generation.

It is against this backdrop that this study has been conducted. Specifically, it hopes to contribute to the ongoing conceptualization of research and development agenda that is gender sensitive. It is indeed an irony that women's work has been consistently underrepresented in many national statistics survey due to inadequacies in conceptualization, definition of terms and data gathering methods (AP-GEM training workshop, 2010).

As climate change policy is actively being drawn, the study can be an input or can be a venue for dialogue. While exploratory in nature and miniscule in scope, it hopes to contribute to the on-going efforts of policy formulation with climate change as an important context.

Study Objectives

The study attempted to look at the well-being of women and their households in two farming communities in the province of Benguet, Cordillera region, Northern Luzon Philippines. The study sites, namely Madaymen in the municipality of Kibungan and Betag, in the municipality of La Trinidad represent the high elevation and mid elevation respectively. Specifically, it sought to

1. To determine the implications of climate change to the well-being of women and their households in selected communities in the region;
2. With the changing landscapes of Cordillera households, to determine what constitutes 'well-being' in an agricultural household;
3. To determine the coping mechanisms and the gender differentials in the employment of remedies in response to climate change;
4. To assess the resilience and vulnerabilities of women and their households to specific climate change scenarios.

Method

Using Time Use stylized questionnaire and Time Use Diary as well as Key Informant Interviews, 147 respondents from La Trinidad and Madaymen served as respondents. The stylized time use questionnaire was facilitated by an enumerator while the time use diary was a 'take home' research instrument filled up by the respondent. In this instrument, respondents were asked to complete the time diaries of how they spent the previous seven days in both paid and

unpaid work situated inside and outside the home. Specifically for Madaymen, high school students were asked to assist their parents in completing the diaries.

Study Sites

The study sites chosen were Madaymen, Kibungan to represent the high elevation areas which is 1,800 to 2,000 masl of Benguet while Betag, La Trinidad was chosen to represent the medium elevation of Benguet, about 1,500 masl. These two sites were also chosen in order to present the urban-rural dynamics of communities in an agricultural setting. Both sites are largely engage in producing crops for the market.



The pictures below show the study sites of Betag, La Trinidad and Madaymen, Kibungan. The first site is located in an urban setting characterized by clustered houses at the background and at the foreground are limited garden plots assigned per famer incorporators. The latter study site is located in a rural setting set at a high elevation in the mountains of Benguet frequented by fogs and a very cold temperature in late afternoons and early mornings.

FINDINGS OF THE STUDY

Climate Change Scenarios.

The study sites, occupy one of the most fragile regions of the country – Northern Luzon where one major group of indigenous communities of the country settle. Climate change scenarios that figure for the respondents would include prolonged droughts, erratic typhoon episodes, warmer midday and colder afternoons, irregular rainfall patterns. Occurrence of hailstone [locally called dallalo] and frost [andap] at a time when it is not expected and in places where these do not usually happen, are likewise observed. In August of 2010, there was another dry spell when it should be wet; in September, five

tropical cyclones struck: typhoon Ondoy and in October, in a supposedly dry condition, typhoon Pepeng hit Northern Luzon area. Pepeng's fury was witnessed in the region - bringing millions of damages.

Table 1. Respondents Recollection on Worst Year (Source: STQ Instrument, 2011)

YEAR	La Trinidad (n= 53) %	Madaymen (n=21) %	Description of Year
2011	32.08	9.52	Flooding had become a global phenomenon; early rains - worst for strawberry farmers, " <i>basit ti apit</i> " (low production/harvest), low gross income; " <i>nginmato amin</i> " (price increase of every commodity), crisis, " <i>awan ti pangatang ti kaspulan</i> " (no money to buy needs)
2010	1.89	14.29	typhoon, destroyed roads, can't sell produce
2009	33.96	47.62	Typhoon Pepeng and Ondoy - roads close, " <i>awan pang-gatangan ti bagas</i> " (no source of rice), relief from Munisipyo, " <i>agbulod kadwa</i> " (borrow from others) ; Pepeng and Ondoy - swamp flooded, " <i>kasapulan agbangka</i> " (needed to travel in boat), landslide, " <i>mabankrupt</i> " (bankruptcy), " <i>tumayaw puonan</i> " (capital loss), " <i>malayos boarding house</i> " (flooded boarding house), scarcity of food, " <i>pagistay natay</i> " (nearly died), " <i>awan makan</i> " (no food), " <i>nagaburan garden</i> " (garden eroded), " <i>adu natay</i> " (many died)
2008	3.77	0	Meningo coccemia/A1H1, erratic rain and temperature
2007	3.77	4.76	Madaymen - <i>andap</i> during summer; La Trinidad - agbaliw baliw ti schedule
2006	1.89	0	"panay tudo" (frequent raining)
2005	5.66	0	typhoon juan; meningo coccemia scare; crop loss
2003	0	4.76	Farm frost
1995	0	4.76	father was shot, unsolved
1990	11.32	4.76	earthquake; problem on food; " <i>ado ti natay</i> " (many died); landslides; road and livelihood damages; panic buying; increase of prices; no food to feed children
1967	0	4.76	Trining
Others	1.89	0	yearly (since 2000) where crop produce have lessened - " <i>maawan ti apit</i> " (expected harvest would not be attained)
None	3.77	4.76	

For La Trinidad respondents, they mentioned that 2011 (erratic and early rains) and 2009 (Typhoon Pepeng and Ondoy) as the worst years followed by 1990 where the July killer earthquake happened. They mentioned 2011 as worst in terms of low production thereby affecting their income and livelihood security

coupled with the national inflation of prices of almost all commodities. The other year mentioned was in 2009 where many died in high risk areas of La Trinidad (“Little Kibungan Village” in Puguis, La Trinidad and Buyagan) and where ‘swamp garden plots’ were flooded and their crops destroyed. For the respondents climate change impacts on their wellbeing becomes an experiential recollection of what happened and what could have happened. Some of their recollections involved lives being risked (“pagistay natay”), boarding houses were flooded, needed a makeshift boat for transportation (“kasapulan nga agbangka”) which is particularly a new experience since ‘flooding’ used to be a phenomenon in the lowlands. Also, food became scarcity for their household (“naawan ti makan”), livelihood bankruptcy and/or loss of capital (“tumayaw ti puonan”) are common narratives.

For Madaymen, 2009 was also the worst year for them because of the continuous and strong rains brought about by Typhoons Pepeng and Ondoy. A lot of erosions/ landslides occurred thereby cutting them off from other communities because of massive road cuts. As a result, some of the households stock of food nearly became scarce. On the other hand, as a result of these climatic disasters, indigenous socio-cultural practices such as “aluyon” or “obbo” (mutual self help systems) and “binulod” (borrowing in cash or in kind without interest) made the communities and the household as the basic unit resilient in adapting to the impacts of climate change. Gender roles are seen in these cultural practices when “obbo” or mutual aid systems is needed, the men are in charge with handling the manually intensive tasks such as carrying heavy loads and digging. Women are tasked to solicit for food and help and support those who have joined the relief and rehabilitation. Performance of community voluntary activities apparently is a woman’s domain.

Household Dynamics. In the two study sites, Betag, La Trinidad represents the mid-elevation area characterized by an urban agricultural setting while Madaymen, Kibungan represents the high elevation area which is a rural agricultural community. Average household sizes for both sites are 5 and 6. Most households interviewed in La Trinidad have children of mixed ages while those of Madaymen have most children under 5 years old. Mean age of respondents in La Trinidad is 42.57 years old while Madaymen has a younger mean age of 37.46.

In the urban study site, there are more variable sources of income as it also include off farm employment both formal and informal; in the latter, farming for the market is the predominant livelihood source. This makes them more vulnerable to climate change. It is also noted that part of the household dynamics for La Trinidad is the non-nuclear set up – ie when a son or daughter marries, it is expected that they have a separate dwelling unit, although dwellings can be within the same compound. As most of the farm workers are migrants from other places, it was also seen that some women respondents rent a common boarding house – where a group of three to five live together. In terms of resource sharing, ie., rent payment is shared equally, information of ‘where work is,’ or even ‘working together’ in a farm and not separate farms, is certainly a bonus. It is interesting to note that this group of daily wage farm workers have their own negotiating capacities.

Table 2 . Demographic Profile of the Respondents (STQ data)

Attributes	La Trinidad (n=53)			Madaymen (n=20)		
	Male % (n=15)	Female % (n=38)	Total (Male and Female)	Male % (n=7)	Female % (n=13)	Total (Male and female)
1. Sex	28.3	71.7	100	35	65	100
2. Mean Age	41.3	43.84	42.57	38.5	36.43	37.465
3. Highest Educational Attainment						

No formal education	0	5.3	3.8	5	0	41.2
Elementary Level	33.3	10.5	17	5	5	10
Elementary Graduate	20	28.9	26.4	10	10	20
High School Level	6.7	7.9	7.5	0	0	0
High School Graduate	13.3	18.4	17	10	0	10
College Level	20	10.5	13.2	0	0	0
College Graduate	6.7	13.2	11.3	5	45	50
Vocational/Diploma	0	5.3	3.8	0	5	5
<i>Total</i>	100	100	100	100	100	100

4. Household Status

Father	78.6	18.4	34.6	85.7	0	30
Mother	0	73.7	53.8	0	84.6	55
daughter	0	5.3	3.8	0	15.4	10
Sibling	7.1	0	1.9	0	0	0
other relative	14.3	2.6	5.8	0	0	0
none relative	0	0	0	14.3	0	5
<i>Total</i>	100	100	100	100	100	100

5. Occupation of Respondents

Housewife/farmer	0	2.6	1.9	14.3	7.7	10
Professional	7.1	2.6	3.8	0	23.1	15
Farmer	64.3	31.6	40.4	85.7	53.8	65
businessman	0	18.4	13.5	0	7.7	5
laborer/unskilled	28.6	44.7	40.4	0	7.7	5
<i>Total</i>	100	100	100	100	100	100

6. Years living in the community

1 to 5 years	0	23.7	17	42.9	7.7	20
6 to 10 years	13.2	13.2	13.2	0	7.7	5
11 to 15 years	20	18.4	18.9	0	0	0
16 to 20 years	26.7	13.2	17	0	7.7	5
21 and more years	40	31.6	34	57.1	76.9	70

7. Household Size

1	0	7.9	5.7	0	0	0
2	6.7	7.9	7.5	16.7	7.7	10.5
3	6.7	5.3	5.7	16.7	15.4	15.8

4	13.3	10.5	11.3	16.7	30.8	26.3
5	20	18.4	18.9	16.7	30.8	26.3
6	20	7.9	11.3	16.7	0	5.3
7	0	10.5	7.5	0	0	0
8	13.3	5.3	7.5	16.7	7.7	10.5
9	6.7	5.3	5.7	0	0	0
10	0	13.2	9.4	0	0	0
11	6.7	2.6	3.8	0	0	0
12	6.7	5.3	5.7	0	0	0
16	0	0	0	0	7.7	5.3
<i>Total</i>	100	100	100	100	100	100

8. Ages of children in Households

under 5 years old	0	8.8	13.6	40	41.7	41.2
6 to 12 years old	8.3	9.4	9.1	0	16.7	11.8
Teens	0	9.4	6.8	0	0	0
young adults	16.7	3.1	6.8	20	16.7	17.6
Adults	8.3	25	20.5	40	16.7	23.5
mixed ages	66.7	34.4	43.2	0	8.3	5.9
<i>Total</i>	100	100	100	100	100	100

9. Combined Household Income

less than 5000	6.7	15.8	13.2	40	7.7	16.7
5001 to 10,000	13.3	26.3	22.6	20	30.8	27.8
10,001 to 15,000	20	18.4	18.9	0	15.4	11.1
15,001 to 20,000	13.3	15.8	15.1	20	23.1	22.2
20,001 to 25,000	13.3	7.9	9.4	0	0	0
25,001 to 30,000	6.7	7.9	7.5	0	0	0
30,001 to 35,000	6.7	2.6	3.8	0	7.7	5.6
35,001 to 40,000	13.3	2.6	5.7	0	7.7	5.6
40,001 to 45,000	0	0	0	0	7.7	5.6
45,000 to 50,000	6.7	0	1.9	20	0	5.6
50,001 and up	0	2.6	1.9	0	0	0
<i>Total</i>	100	100	100	100	100	100

10. Type of Household

Single	0	10.5	7.5	14.3	7.7	10
Nuclear	53.3	42.1	45.3	42.9	38.5	40
Extended nuclear with helpers	26.7	39.5	35.8	42.9	45	45
extended with helpers	6.7	0	1.9	0	7.7	5
others (i.e.	6.7	7.9	7.5	0	0	0
	6.7	0	1.9	0	0	0

acquaintances)

<i>Total</i>	100	100	100	100	100	100
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There are two sets of respondents across the two areas: household farm operators [regardless of whether renting the farm or own the farm] and daily paid farm workers [por dia]. At the household level, however, there are more variables: farmer-teacher; por dia and seasonal carpenters, farmer-small scale entrepreneur.

In Madaymen, households that have bigger farm sizes usually hire a farm helper. Data from interviewed 'stay-in' farm workers (por dia) show a wage differentials in both study sites. However, ranges of daily rate is higher in La Trinidad compared to Madaymen; too there are stark wage differentials in terms of sex.

Table . Wage Differentials between Sexes in Pordia (Daily Hired Labor) Rate in La Trinidad and Madaymen

Daily Rate Responses	La Trinidad		Madaymen	
	Male (Php/day)	Female (Php/day)	Male (Php/day)	Female (Php/day)
Lowest rate quoted	150	100	100	100
Highest rate quoted	250	250	200	150
	200	200	150	100
Modal rate	250			120

The table above shows the range of responses of daily wage rates of por dias across study sites and sexes where La Trinidad have the highest wage rate quoted (Php250/day) for both males and females but different lowest wage rate quoted Php150/day for males and Php100/day for females. Most common answers show that Php200 and Php250 are the daily rate for males while Php200 for females.

The rural site shows a lower wage rate that ranges from Php100/day to Php200/day for males and Php100/day to Php150/ day for females. Common answer given is Php150/day for males and Php100 and/or Php120/day for females. This low pordia rate is due to the fact that these hired helps are asked to stay in with the farmer-employers.

Data show that the reason for this wage differential is that males have 'heavier workload.' The table below presents the most common responses across study sites on gender roles in the different agricultural activities.

Table 3. Common Responses in the Differences in Gender Roles in Agricultural Activities

Male Tasks	Female Tasks
" <i>Ag gabyon ken agsibog ti lalaki.</i> " (Males would till the land and water the plots)	"Babae ket aglaslas ti strawberries ken aglugan." (Females would clean the harvested strawberries and weed the garden.)
" <i>ti lalaki ket agspray/agsibog</i> " (Males would spray and water.)	" <i>ti babae ket agburas, aglugam, aglaslas</i> " (Females would harvest, weed, 'thinning' of leaves and clean agricultural produce.)
" <i>Ag-awit ti maysa nga kaban nga abono, agaramid ti balay, ag-awit ti maysa nga tekli nga napunot repolyo</i> " (Males carry one sacks of fertilizer, make a house and carry one basket full of cabbage)	" <i>agdalos ti root ken aglaslas ti strawberry</i> " (Remove weeds and clean harvested strawberries)
"Male works in digging, hauling, spraying and watering tasks."	"Female works more on weeding/ cleaning and harvesting."
"Male carry the cook jams."	"Female cook jam."

From the table, males are assigned majority of the tasks during land preparation stage where much manual labor is needed in carrying things needed and in manual tilling of the land. In harvesting they carry and deliver the gathered produce in baskets. Females are in charge with maintaining garden thru weeding; harvesting, cleaning and packing produce; and processing produce like jams. Participant observation also reveals that females are in charge of direct selling to customers.

While respondents claim women have 'lighter' work in the farm, with climate change, this becomes the site of additional work hours and work intensity. As can be shown in the ensuing discussions, every time the community experiences erratic weather conditions such as heavy rainfall or untimely frosting especially in high elevation, tending of the crops or repairing the plots [so-called 'crop maintenance work'] falls on the women farmers. Farming for cash requires a non-stop care of crops, in the first place.

It is interesting to note that women say that if they hire a helper, it is not for domestic, but is for the farm. Women respondents strongly feel that when one hires a helper, it is for the farm. Household chores is something 'natural' and no one is suppose to complain about it. There is a negative perception on a woman in the household hiring for househelp – usually associate it with 'laziness.' As such, hiring househelpers is a 'no-no' in the community. This is in the context where each woman is expected to be 'industrious' and with hands always busy with things. Moreover, they consider housework as a training ground for their children to be industrious and knowledgeable in practical survival skills. One respondent mentioned "ta haan nga-ma-spoil ti ubing" (so that children will not grow up spoiled). Another main reason why households won't hire a maid is for practical reasons that the households cannot afford to hire

a maid. Another reason mentioned is that farmers can multi-task work at home and work in the garden. One mentioned that “Ti farmer kaya na nga pagsabayen ti agluto, aglaba, ken apan agtrabaho no umaldaw, dagijay mangopisina ti agkasapulan ti maid” (a farmer can simultaneously cook, wash clothes and go to their daily work, unlike office workers who need to hire a maid.)



While parents are busy farming, children are brought alongside where they do simultaneous tasks of farming while taking care of their children.

Well-being. Well-being is operationalized in this study as quality of life, that may constitute the material and the non-material. This is to say that ‘how well life goes for someone’ could be tangible or spiritual or more. In the more philosophical sense, well being is a kind of value and what marks it out is the notion of ‘good for.’ Captured indicators of well being include material, spiritual, good health, time and security as well as relationship with others. The latter seem to be a resounding concern; as several respondent would say, ‘even if you have the material resources, if you don’t maintain good relations to your family and neighbors, then it is useless.’ Respondents also say that one is healthy ‘as long as one can get up and work.’ Respondents do not dichotomize well-being as ascribed or achieved but rather their notions fall in a continuum of luck, work, spirituality or even in the immortal.

In relation to the World Health Organizations (2005) five components of wellbeing (material wellbeing, time, health, security, freedom of choices and actions) scores from the two sites generally views changes in these wellbeing indicators as the same. However, for La Trinidad respondents they view material wellbeing changed negatively by the fact that inflation is rapidly felt by consumers where purchasing power of their income is reduced by half. One common statement given by respondents is that “ngumina amin nga magatang, haan met nga ngumina ti nateng” (prices of almost every commodity

increases yet prices of vegetables remain the same). With this alone, farmers are facing the reality of bankruptcy by multiple factors including socio-political realities coupled with climate effects on loss of crops and reduction of harvest due to unpredictable and erratic climatic conditions leaving the farmers at the mercy of the weather and of uncontrollable economic forces.

Table . Perceived Changes in Quality of Life

Wellbeing Indicator ²	La Trinidad (n=53)			Madaymen (n=20)		
	Positive (%)	Same (%)	Negative (%)	Positive (%)	Same (%)	Negative (%)
Overall Quality of Life	19.2	28.8	52	40	35	25
1. Material Wellbeing	29.1	18.8	52	36.9	47.4	15.8
2. Time Wellbeing	21.7	54.3	23.9	10.6	57.9	31.6
3. Health	0	95	5	26.3	63.2	10.5
4. Freedom of choices and actions	2.8	91.7	5.6	13.3	86.7	0
5. Security	15.4	59	25.7	21.1	57.9	21

Gender Differentials:

Employment of remedies to cope with specific climate change scenarios show gender difference: women take time to look for other sources of water, primarily for domestic consumption and secondarily for the farm; men for the farm needs.

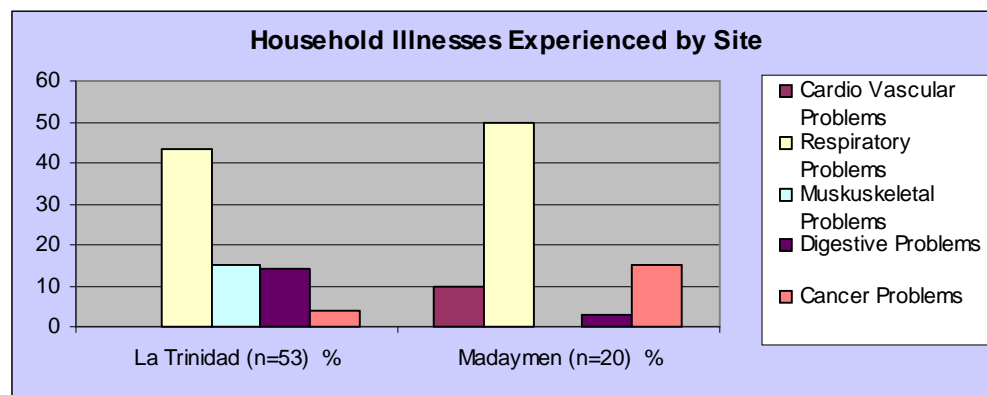
When the income or yield of crop is low either due to pest or lost market price, some of the farmer respondents seek 'por dia' [per day wage farm work] to augment their income. Women, are usually the ones moving out to seek for off-farm employment. Too, women, known to have the facility of 'speaking and negotiating' are the ones going out to look for loans or credits. The women's facility of speaking, is also acknowledged by male respondents as important especially when notorious loan sharks are to be dealt with.

Food security seem to be a non-issue in the study sites. This is because of the social networks that women maintain. One effective and traditional way of addressing food shortage is through the practice of binnulod or the process of lending and borrowing either in cash or in kind within their own network. This somehow spares them from depending on formal creditors, known to have unethical lending practices. In this case, even 'labor power' can be borrowed.

² The four wellbeing indicators in this study are based on the "Millennium Ecosystems Assessment Framework" of the World Health Organization (2005) <http://who.int/globalchange/ecosystems/ecosys.pdf>. Time use as another indicator, is based on the UNDP gender empowerment framework.

Gender and Time Use

Initial results show that the well-being of women and their households, have increasingly been made vulnerable with unstable climate patterns and unpredictable climate related disasters for the last five years or so. Household members are forced to move out to look for off-farm employment as farming seem to shrink as a sustainable source of livelihood. With climate change, work has intensified for both men and women; however women shoulder the burden of unpaid work and family farm work as they need to spend more time in the farm while at the same time maintaining household tasks including the 'caring role' not only in the household but also in their communities. The increasing occurrence of respiratory diseases, for instance, takes additional care work of the mother respondents as seen in the figure below. This is not to discount the fact that women serve as the 'actual safety nets.' Specifically in Madaymen, Kibungan, the rural site of the study representing high elevation, the 'hot-and-cold' climate scenario including unpredictable 'frosting' and typhoon episodes, saw the employment of labor intensive and time consuming adaptation mechanisms: more frequent application of pesticides, crop replacement, searching for new water source, to name a few. This somehow is a break from the traditional role women play in the farm.



In La Trinidad valley, the second study site, is seemingly show more resilience primarily because of a more variable source of income but have also expressed the felt burden of additional financial and time costs in farming vulnerable to market costs and erratic climate changes.

Probing further reveal that a difficulty in terms of 'time' is prevalent, especially in relation to the felt "stress" as expressed by women respondents. 'Stress' has become an idiom of speech and when seen in the context of commercial farming with capital invested as a major drive to 'keep on working in the farm,' this put respondents as oversubscribing to time. It is widely accepted that when one invests in farming for the market, farm income is not disposable income as one has to set aside for the capital needs in the next cropping.

Table . Male and Female Average Paid and Unpaid Hours per Week in La Trinidad and Madaymen

Research Variables	La trinidad		Madaymen		Average for two sites	
	Male	Female	Male	Female	Male	Female
STQ respondents (n)	15	38	7	13	n/a	n/a

TUD Respondents (n)	18	23	16	17	n/a	n/a
Paid Hours per Week (STQ)	59.95	50.73	55.2	40.25	57.575	45.49
UnPaid Hours per Week (STQ)	17	36.52	13.53	32.83	15.265	34.675
Paid Hours per Week (TUD)	58.86	48.92	47.87	30.64	53.365	39.78
UnPaid Hours per Week (TUD)	11.75	20.22	8.85	25.8	10.3	23.01
Leisure Hours per Week (TUD)	8.79	3.48	4.35	3.88	6.57	3.68
Paid Average Hours (TUD and STQ)	59.41	49.83	51.54	35.45	55.47	42.64
UnPaid Average Hours (TUD and STQ)	14.38	28.37	11.19	29.32	12.78	28.84

From the table, one can say that 'unpaid work' for women is far greater at an average of 28.84 hours per week compared to males where average unpaid work is measured at of 12.78 hours per week has been recorded. Still part of the dynamics of the households is that women bring children to the farm – hence simultaneous work is being done – weeding, keeping watch of children playing in the farm and still do the selling in times where farmers have crops to sell to 'walk-in tourists.' Probing further show that women's paid work in the farm constitutes multiple and overlapping tasks. 'Leisure time' here can also be tricky. While leisure time for women is much smaller than males, it also has to recognize the fact that women while watching TV are also assisting children do their assignments. For total average paid hours, male have more time spent in doing paid work by an average of 55.47 hours per week compared to 42.64 average hours per week spent by females. T test results for both average weekly hours between sexes for both paid and unpaid work show a highly significant difference where males spent more time in paid work while females spent more time in unpaid work.

Table . T test Results on Paid Hours between Male and Female both in La Trinidad and Madaymen

Variable	Observation	Mean	(Std. Error)	σ (Std. Dev.)
Male	34	52.28	2.99	17.46
Female	40	39.94	2.88	18.22
Combined	74	45.61	2.19	18.8
Difference		12.34	4.17	
$t_{.01} = 2.65$			$t = 2.96^{**}$	
$t_{.05} = 2.38$			df = 72	

**Highly significant difference between Paid and unpaid Hours between male and female

Table . T test Unpaid Hours between Male and Female both in La Trinidad and Madaymen

Variable	Observation	Mean	(Std. Error)	σ (Std. Dev.)
Male	34	8.91	1.38	8.05
Female	40	22.59	2.36	14.9
Combined	74	16.3	1.62	13.96
Difference		-13.67	2.73	
		$t_{.01} = 2.66$		$t = -5.01^{**}$
		$t_{.05} = 2.00$		df = 62

**High significant difference of average unpaid hours between male and female for the two sites

There are instances when 'unpaid work' is not fully captured due to the fact that other relatives, usually aunties, or grandparents who live nearby, take care of their children while these women work. There is therefore, somewhat a diffusion of the heavier toll of unpaid work to certain sectors of the community. Literature also show that there is significant labor market effects of relatives caring for children [Marcotte, 2007].

With regards leisure time, On the cross tabulation of the type of occupation and leisure time, daily paid farm workers have lesser leisure compared to farmer-operators. This coincides with the data coming from the paid and unpaid work of both types of respondents.

Leisure Hours by Occupation both in Madaymen and La Trinidad

Leisure Hours in One Week						
Occupation	1 - 5 Hrs	6 - 10 Hrs	11 - 15 Hrs	16 - 20 Hrs	21 - 25 Hrs	Total
Professional	0	5	1	0	1	7
Farmer(Owner)	37	12	5	0	0	53
Laborer	10	2	0	1	0	13
Total	47	19	6	1	1	74

$X^2_{.01,8} = 20.09$; $X^2_{.05,8} = 15.51$;

$X^2 = 27.26^{**}$

Leisure Hours by Occupation in La Trinidad

Leisure Hours in One Week			
Occupation	1 - 5 Hrs	6 - 10 Hrs	Total

Non Gainful	0	1	1
Professional	4	0	4
Farmer(Owner)	20	3	23
Laborer	3	2	5
Total	27	6	33

$$X^2_{.01,3} = 11.34; X^2_{.05,8} = 7.81; X^2 = 7.4^{ns}$$

Leisure Hours by Occupation in Madaymen

Leisure Hours in One Week						
Occupation	1 - 5 Hrs	6 - 10 Hrs	11 - 15 Hrs	16 - 20 Hrs	21 - 25 Hrs	Total
Professional	2	0	1	0	0	3
Farmer(Owner)	10	9	3	1	1	24
Laborer	3	1	2	0	0	6
Total	15	10	6	1	1	33

$$X^2_{.01,8} = 20.09; X^2_{.05,8} = 15.51;$$

$$X^2 = 4.4^{ns}$$

Furthermore, leisure time shows differences between sites where Madaymen has the highest participation rate in leisure time spent with family during 8-9pm in the evening. La Trinidad on the other hand have a low rate in leisure time with family because some of the respondents spent their leisure time with friends and relatives or alone. When they spent their time with friends or relatives, males would be usually doing a social drinking activity. Leisure time spent alone differs in the morning where some of them would just be sitting and drinking coffee or listening to the radio. At the evening they would be just sitting, watching movies/television, playing computer games or reading literature.

Figure . Distribution of Hourly Participation in Leisure Time Activities in La Trinidad and Madaymen on Unpaid Work: Cleaning Activities

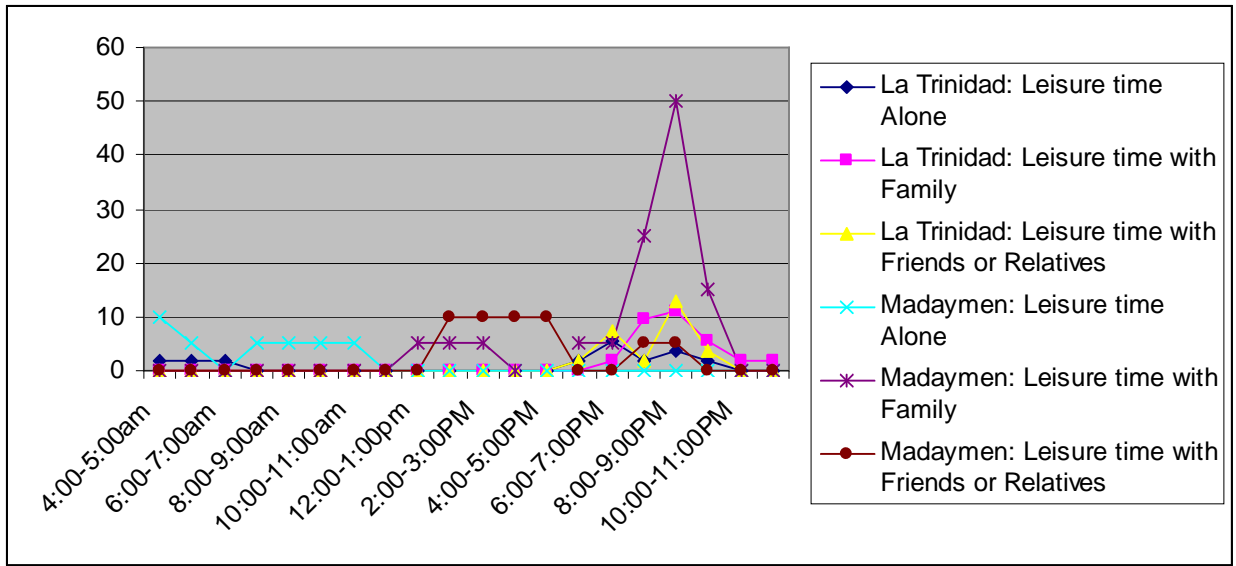
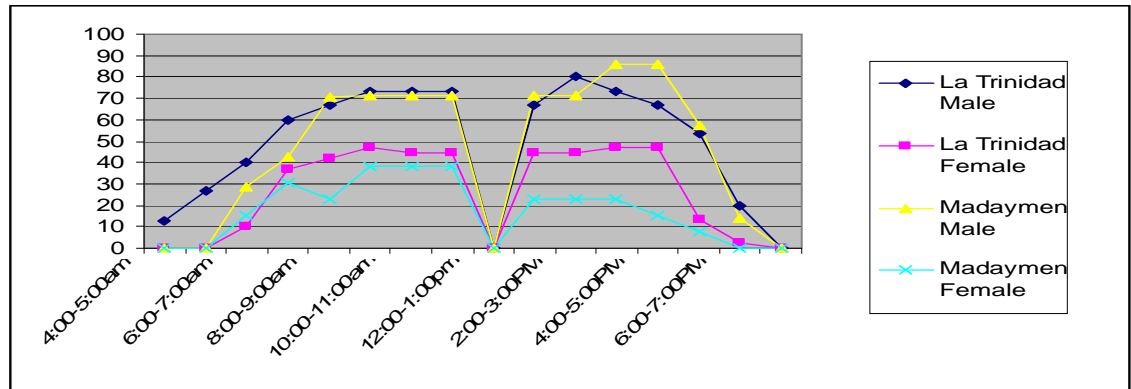


Figure . Distribution of Hourly Participation Rate of Farmer-Incorporators/Owners in Paid Work: Farming Related Activities

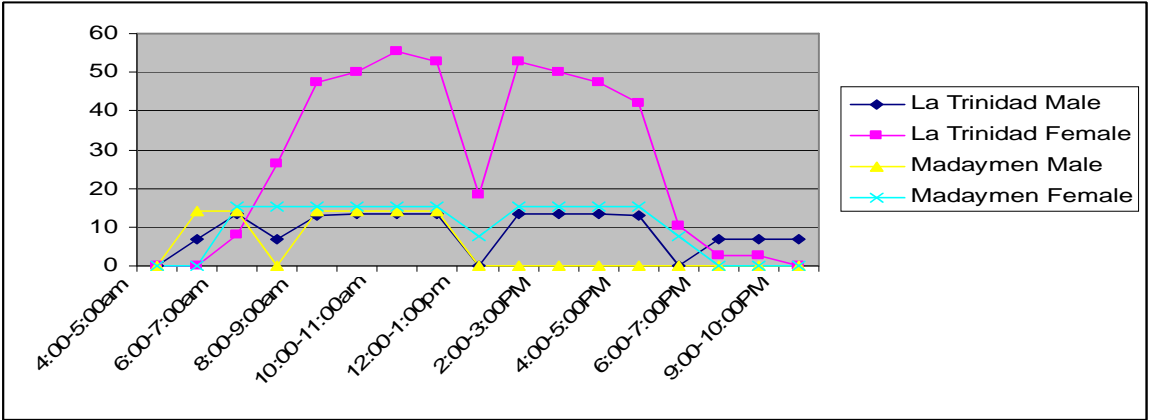


Based on the Stylized Time Use Questionnaire data, farm related activities by farmers (owners and incorporators) are largely participated by both La Trinidad and Madaymen males where peak hours are usually from 8-12noon in the morning and 4-6pm in the evening. Though females are also active in farming activities, both La Trinidad and Madaymen female respondents have a lower participation rate in concentrated farm activities.

The trend mention above reverses when it comes to unpaid work such as cooking and cleaning at the home which would be explained at the latter part of this section.

Another trend by farmer incorporators/owners is that they usually start very early in the farm at about 4 to 5am and end up in the evening at 6 to 7 unlike with informal worker.

Figure . Distribution of Hourly Participation Rate of Informal Workers (i.e. pordia and laborers) in Paid Work: Farming Related Activities



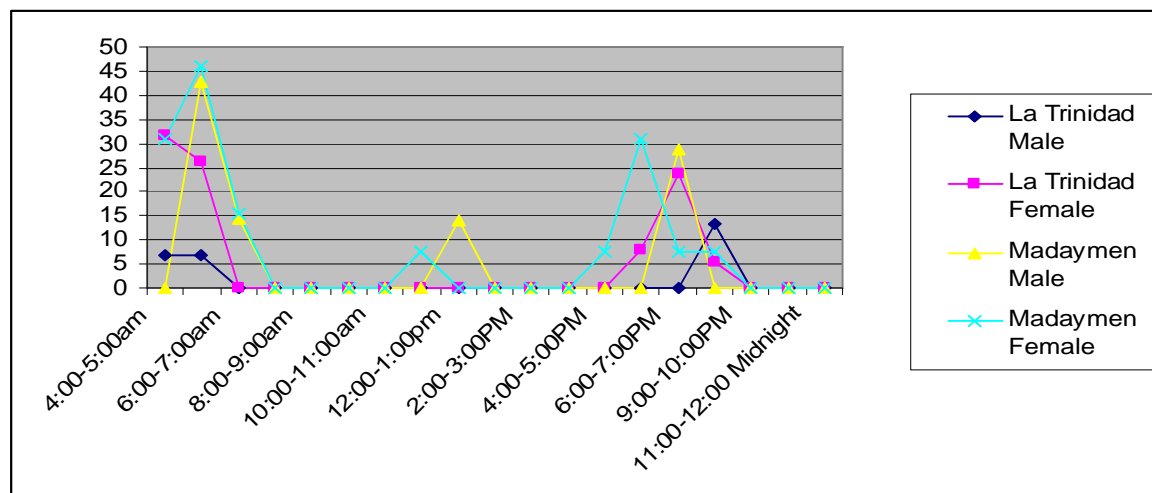
For farm activities done by informal workers such as pordia/ laborers and agri- vendors, females outnumber males by more than 50% especially in La Trinidad where female participation reaches its peak at 10-12 in the morning and 1-2 in the afternoon. This could be attributed to the fact that La Trinidad is

becoming a tourist-demand driven agricultural business where more informal workers are needed to meet demand. Participant observation in the location would reveal women sitting side by side cleaning and packing strawberries although a few men would also participate in the process.

Madaymen female has a slightly higher participation rate compared to Madaymen males and La Trinidad males. However, the trend demonstrates a more stagnant participation rate from 7am to 5 pm with 12-1 as the break point for this activity.

Though there are gender differences in participation rate in paid work as shown by the STQ data, there are also differences in the unpaid work as illustrated in the succeeding graphs.

Figure . Distribution of Hourly Participation between Sexes in La Trinidad and Madaymen on Unpaid Work: Cooking Activities

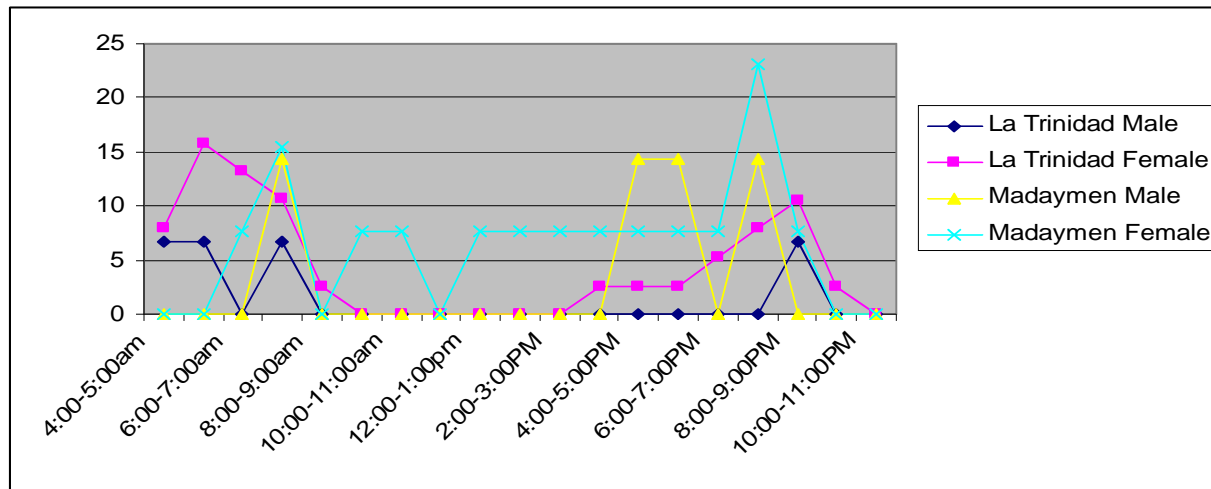


The graph above shows that Madaymen female outnumbers Madaymen male in the unpaid household activity (cooking) with a slightly higher participation rate especially in the morning and late afternoon hours. In the dawn hours, females in both sites are the early risers who cook for their family. Male participation in this activity increases at a later time at around 6-7am for Madaymen males and increases at around 9-10pm for La Trinidad males.

In general, the bulk of cooking is largely done in the morning by females.

The next unpaid activity is cleaning which is also largely done by females in the early morning, late afternoon and early evening where Madaymen females have the highest participation during 8-9 in the evening. Madaymen males have a higher participation than La Trinidad males. La Trinidad female participation reaches its peak in the morning.

Figure . Distribution of Hourly Participation between Sexes in La Trinidad and Madaymen on Unpaid Work: Cleaning Activities



Thus, in a given regular day, gender differences in hours spent differs where males largely spent their time in paid work activities in the farm while females do a range of tasks from informal work, farm work and unpaid work in the home.

In the agricultural sector, the ‘division of labor in the family remains contested (Lu, 2007). The assertion of respondents for instance that ‘both men and women’ or all family members perform household tasks – is quite revealing of this contestations. This situation makes the nature of work in the household and occupation of each family member which can predispose them to say, certain health problems.

Care work is rendered by women in the households. In the urbanizing site, househelp is afforded by the more affluent respondent [ie farm operators] but is not full time, hence are expected to do domestic work. In the rural study site, households hire additional hands but not for household work, but for farmwork.

Upon closer examination, while climate change crisis is experienced both by men and women, the attitudes in dealing with it is manifested differently and this is partly due to the differences in social positions and circumstances. In both sites, in most cases, the time and effort needed to do ‘unpaid work’ in their homes, and in the community [as barangay health workers, as PTA volunteers among others] is largely done by women. For education and health volunteer activities, women are largely the ones participating for both Madaymen and La Trinidad. For Madaymen’s women’s organization, women power is also seen in their participation in other trainings/seminars, people’s organizations and cooperative activities. However, for religious activities, relief/rehabilitation, funerals/wakes and celebration activities both sexes participate with different gender roles assign. For instance, in wake activities women are assigned to serve refreshments and cook food while men are assigned to carry and cut wood needed.

Table . Households Gender Participation on Community Activities

Community Activities	La Trinidad (n=53) %			Madaymen (n=20) %		
	Male	Female	Both	Male	Female	Both
1. School Work for Parents	13.3	46.7	40	28.6	71.4	0
2. Parent's Teacher's Activities	10	70	20	0	72.7	27.3
3. Church/ Religious Activities	5.1	23.1	71.8	0	16.7	83.3
4. Trainings/Seminars	33.3	23.3	43.3	18.8	50	31.7
5. Community Health Activities (i.e. trainings)	6.7	80	13.3	16.7	50	33.3
6. People's Organization	28.6	14.3	57.1	23.1	46.2	30.8
7. Cooperative Activities	8.3	41.7	50	40	40	20
8. Relief and rehabilitation Activities	28.6	9.5	61.9	22.2	11.1	66.7
9. Funerals/Wakes	14.3	5.7	80	5.9	5.9	88.2
10. Other Community Activities	14.3	7.1	78.6	50	25	25

Overall, it can be concluded that in crisis situation, while it poses constraints and limitations to households, can also be an area where women's resilience are negotiated but at the same time where women's vulnerabilities are heightened. The understanding of this complexities of a 'normalized' and ignored situation calls for a framework that do not take out the women's work in the farm in isolation from the work women perform at home and in the community. These findings unpack layers of unpaid work yet necessary activities to sustaining lives of households and communities.

Gender as a cross cutting theme:

In the context of climate change, any adjustments in the agricultural calendar or any experienced prolonged economic disenfranchisement in the agricultural sector, takes toll on women. A concrete example would be the ripple effect of decreasing water correspondingly demand more hours spent on looking for alternative water source or on financial resources whenever the household decides to buy water pump. 'Care for the households' due to illnesses brought about by erratic weather conditions is usually handled by women. Volunteer work outside the farm [Parents Teachers Association, bayanihan or mutual cooperation, attending wakes etc] puts women in the forefront. All these fall into what is termed as "unpaid work" yet are necessary for household resilience and eat so much time and energy.

Other remedies to meet household needs include por dia [work paid per day] mostly in the neighboring farms, outmigration for off-farm employment, planting of 'subsistence crops' all point to women performing the task.

Once again, the results validated the need to give recognition to women's work – both paid and unpaid, formal and informal across class and ethnicity. In the country's 2010 Census of Population and Housing, the occupational standard used for housekeepers, pensioners and retired, among others is

“nongainful occupation” which is indeed distorting and conceptually problematic. The call for inclusion of ‘unpaid work’ in the system of national accounts is certainly in place.

Recommendations:

Policy recommendations along technological, knowledge and governance as well as protective interventions are much wanting. Already, data from the field show that access and control over resources is an area where support mechanism for these women is imperative. Health support system is needed which boils down to the need to provide care work children of women who are informally employed. In the data, in the life cycle of women who are poor, the importance of social network can not be overlooked – especially when they reach the stage of ‘elderly’ support should be given in terms of providing mechanisms where ‘security’ for old age is channeled. Too, Health and Capacity building of existing institutions and human resources such as Barangay Health Workers to address climate change illnesses is needed.

Technological support is also wanting in terms of providing basic farm infrastructure such as efficient irrigation system for the communities such as drip irrigation or small water impounding systems and Irrigation system that are ‘communal’/ collectively owned and managed is but appropriate considering indigenous irrigation practices. The role of science and technology in developing new varieties that are resistant to new forms of pests and diseases brought about by changes in the climate can not be under estimated. The need to develop Safety nets in terms of production and marketing assistance as well as basic agricultural support services is very much wanting. As they say, climate change is not only a ‘science’ issue. Climate change adaptation is a policy and governance issue. It is also an economic issue as it involves the computation of ‘costs.’ [Boquiren, 2010]. Women’s opportunity cost and opportunity losts due to multiple functions that are paid and unpaid, deserves the recognition it should get. As reiterated by Rovillos [2010] the analysis and diagnostics of the ‘social’ reshapes climate change as a human and social issue; it helps to determine thresholds and targets. In terms of process, the study of the social dimension of climate change can be the key to authoritative advocacy and can provide the needed information to influence policy making. Finally, results of social researches can help address social justice concerns: to input into policies addressing vulnerabilities and resilience.

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