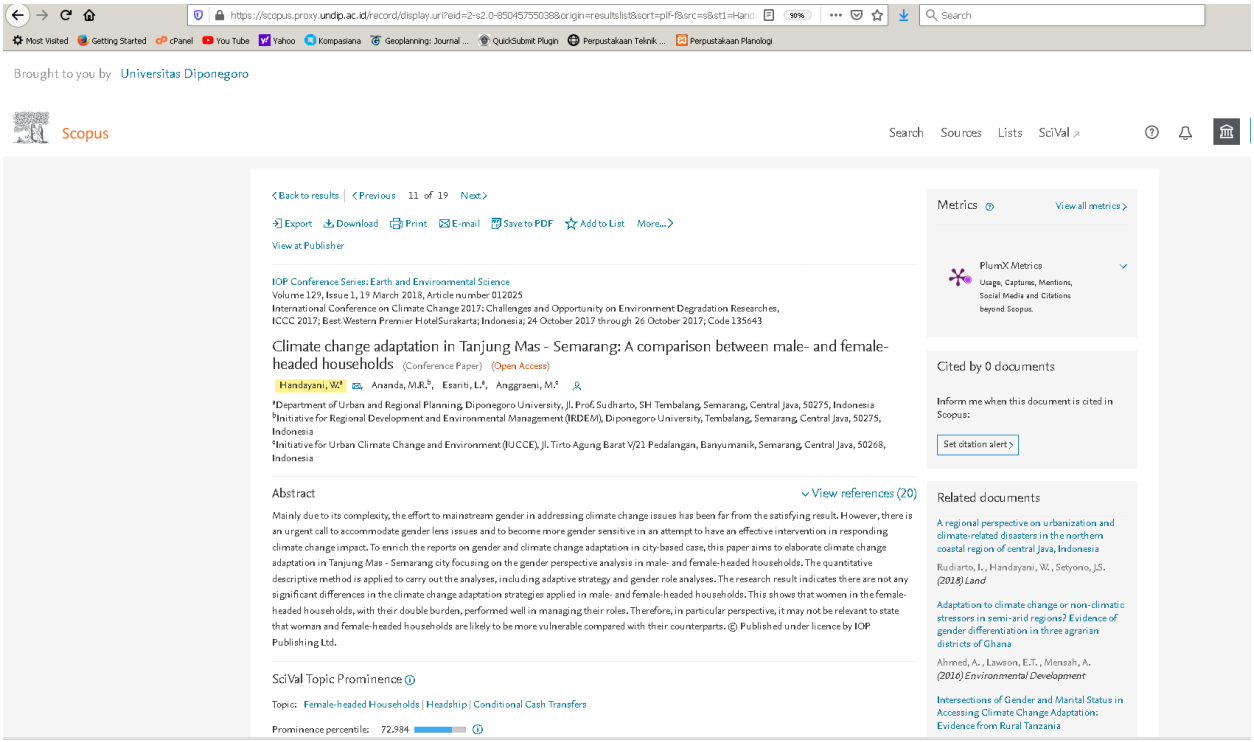
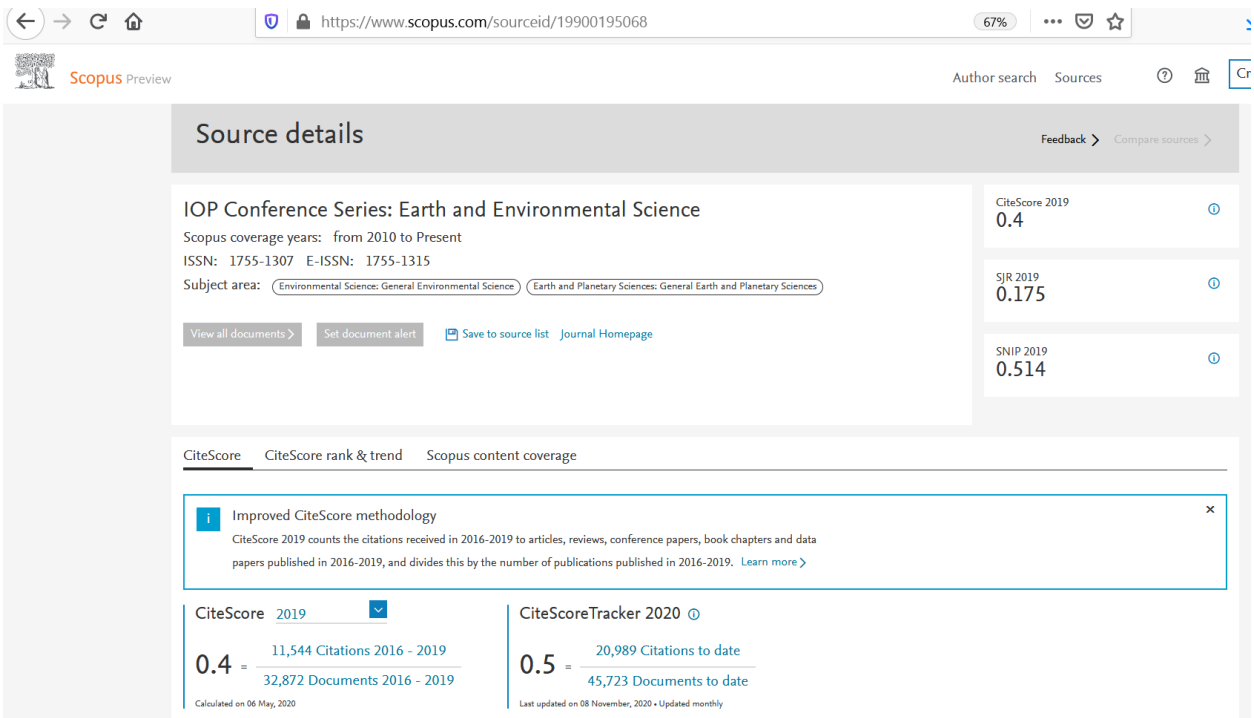

https://scopus.proxy.undip.ac.id/record/display.uri?eid=2-s2.0-85045755038&origin=resultslist&sort=plf-f&src=s&st1=Hand
Search
Most Visited
Getting Started
cPanel
You Tube
Yahoo
Kompasiana
Geoplanning: Journal ...
QuickSubmit Plugin
Perpustakaan Teknik ...
Perpustakaan Planologi
Brought to you by Universitas Diponegoro
Scopus
Search
Sources
Lists
SciVal
Back to results
Previous
11 of 19
Next
Export
Download
Print
E-mail
Save to PDF
Add to List
More...
View at Publisher
IOP Conference Series: Earth and Environmental Science
Volume 129, Issue 1, 19 March 2018, Article number 012025
International Conference on Climate Change 2017: Challenges and Opportunity on Environment Degradation Researches, ICCC 2017; Best Western Premier HotelSurakarta; Indonesia; 24 October 2017 through 26 October 2017; Code 135643
Climate change adaptation in Tanjung Mas - Semarang: A comparison between male- and female-headed households
(Conference Paper)
(Open Access)
Handayani, W.[a]
Ananda, M.R.[b]
Esariti, L.[a]
Anggraeni, M.[c]
[a]Department of Urban and Regional Planning, Diponegoro University, Jl. Prof. Sudharto, SH Tembalang, Semarang, Central Java, 50275, Indonesia
[b]Initiative for Regional Development and Environmental Management (IRDEM), Diponegoro University, Tembalang, Semarang, Central Java, 50275, Indonesia
[c]Initiative for Urban Climate Change and Environment (IUCCE), Jl. Tirto Agung Barat V/21 Pedalangan, Banyumanik, Semarang, Central Java, 50268, Indonesia
Abstract
View references (20)
Mainly due to its complexity, the effort to mainstream gender in addressing climate change issues has been far from the satisfying result. However, there is an urgent call to accommodate gender lens issues and to become more gender sensitive in an attempt to have an effective intervention in responding climate change impact. To enrich the reports on gender and climate change adaptation in city-based case, this paper aims to elaborate climate change adaptation in Tanjung Mas - Semarang city focusing on the gender perspective analysis in male- and female-headed households. The quantitative descriptive method is applied to carry out the analyses, including adaptive strategy and gender role analyses. The research result indicates there are not any significant differences in the climate change adaptation strategies applied in male- and female-headed households. This shows that women in the female-headed households, with their double burden, performed well in managing their roles. Therefore, in particular perspective, it may not be relevant to state that woman and female-headed households are likely to be more vulnerable compared with their counterparts. © Published under licence by IOP Publishing Ltd.
SciVal Topic Prominence
Topic: Female-headed Households | Headship | Conditional Cash Transfers
Prominence percentile: 72.984
Metrics
View all metrics
PlumX Metrics
Usage, Captures, Mentions, Social Media and Citations beyond Scopus.
Cited by 0 documents
Inform me when this document is cited in Scopus:
Set citation alert
Related documents
A regional perspective on urbanization and climate-related disasters in the northern coastal region of central Java, Indonesia
Rudiarto, I., Handayani, W., Setyono, J.S. (2018) Land
Adaptation to climate change or non-climatic stressors in semi-arid regions? Evidence of gender differentiation in three agrarian districts of Ghana
Ahmed, A., Lawson, E.T., Mensah, A. (2016) Environmental Development
Intersections of Gender and Marital Status in Accessing Climate Change Adaptation: Evidence from Rural Tanzania


https://www.scopus.com/sourceid/19900195068
67%
Scopus Preview
Author search
Sources
Source details
Feedback
Compare sources
IOP Conference Series: Earth and Environmental Science
Scopus coverage years: from 2010 to Present
ISSN: 1755-1307 E-ISSN: 1755-1315
Subject area: Environmental Science: General Environmental Science
Earth and Planetary Sciences: General Earth and Planetary Sciences
View all documents
Set document alert
Save to source list
Journal Homepage
CiteScore 2019
0.4
SJR 2019
0.175
SNIP 2019
0.514
CiteScore
CiteScore rank & trend
Scopus content coverage
Improved CiteScore methodology
CiteScore 2019 counts the citations received in 2016-2019 to articles, reviews, conference papers, book chapters and data papers published in 2016-2019, and divides this by the number of publications published in 2016-2019.
Learn more
CiteScore 2019
0.4 = 11,544 Citations 2016 - 2019 / 32,872 Documents 2016 - 2019
Calculated on 06 May, 2020
CiteScoreTracker 2020
0.5 = 20,989 Citations to date / 45,723 Documents to date
Last updated on 08 November, 2020 • Updated monthly

International Conference on Climate Change: Challenges and Opportunity on Environment Degradation Researches

Preface

The International Climate Change Conference 2017 (ICCC 2017) is an event organized by Graduate School of Universitas Sebelas Maret (UNS), Indonesia to mediate the experts, researchers, practitioners, students, and societies to discuss the findings, problems, and solution about climate change. ICCC 2017 addressing the researches relate with climate change to the adaptation and mitigation strategy and the implementation to the societies. ICCC 2017 was carried out at Best Western Premier Hotel, Surakarta city, Indonesia from 24 to 26 October 2017.

ICCC 2017 develops new partnerships and associations with key decision makers across all sectors of climate, and accomodates the latest research findings, as well as the future impacts. The scope of subjects discussed in this conference are: Impact of depletion or enhance of capability of resources of air, water, soil, and vegetation; ecosystem and habitat destruction research; strategy for environmental disaster reduction research; thermal expansion research; climate model and uneven precipitation distribution; pollution and contamination of land surface and atmosphere; carbon footprint, greenhouse gas emission, recycle and reuse energy research; involuntary migration and forced displacement; direct and indirect risks to wellbeing; implication of climate adaptation and mitigation research; infrastructures risks and planning on climate adaptation; policy and legal aspect of climate change; and the economic and social elements of climate change.

The following are the pictures of the ICCC 2017.

Figure 1. Opening by Vice Rector of Sebelas Maret University, Indonesia

INTERNATIONAL CONFERENCE ON CLIMATE CHANGE 2017

"International Conference on Climate Change:
Challenges and Opportunity on Environment Degradation Research"

Environmental degradation is essentially caused by the presence of intervention or excessive human intervention to the existence of the environment naturally. Ruled out this problem and environmental impact in the development of a major factor environmental degradation which has the influence of the social and economic quality. This condition means the climate change will encourage and accelerate disaster and environmental damage.

This Conference aims to accommodate the new related inspiration about how to minimize the climate change and environmental degradation that occurred at this time. Attendees can access practical and valuable information to help them provide an excellent international forum for sharing knowledge and research results in theoretical and practical aspects of climate change and global warming as well as their industrial applications.

Time & Venue

24 – 26 October 2017 at Best Western Premiere Hotel, Solo City, Indonesia.

Keynote Speaker

Dr. David Grimes* President of World Meteorology Organization Geneva, Switzerland	**Prof. Bambang Brodjonegoro*** Ministry of National Development Planning (BAPPENAS), Indonesia

https://iccc.uns.ac.id/index.php/iccc-2017/ 67%

Invited Main Speakers

Speakers	Speech Topic
Prof. Dr. Sutarno Universitas Sebelas Maret, Indonesia [download]	Climate Change and Biodiversity
Dr. Dodo Gunawan BMKG, Indonesia [download]	NATIONAL FRAMEWORK ON CLIMATE SERVICES: The Research-based and Scientific-sound Services
Assist. Prof. Takeo Onishi UGSAS Gifu University, Japan [download]	Evaluation of climate change and land cover change impacts on water quality of the Ise Bay and its watershed
Assist. Prof. Dr. Keigo Noda UGSAS Gifu University, Japan [download]	Effects of Climate Change and Socio-economic change to sediment yield – A case of Upper Citarum River Basin-
Prof. Dr. Ir. Patrick Van Damme Ghent University, Belgium [download]	How can (tropical forest) biodiversity help humanity cope with growing climate change challenges - examples from the field

Dr. Anwar Fitrianto UPM, Malaysia [download]	Climate Change in Number: Statistical Point of View
Dr. Anthony Kent Victoria University, Australia [download]	CHALLENGES AND OPPORTUNITIES -ENVIRONMENTALDEGRADATION RESEARCH: CLIMATE CHANGE INFLUENCES ON RURAL COMMUNITIES IN AUSTRALIA
Dr. James Mac. Gregor Eco-Tourism, Canada [download]	Responding to Global warming impacts (2018-2050) ADOPTION + MITIGATION
Assoc. Prof. Dr. Avishek Datta Asian Institute of Technology (AIT), Thailand [download]	Weed and Agricultural Water Management Strategy to Cope with Climate Change
Dr. Haris Gunawan BRG, Indonesia [download]	PEATLAND DEGRADATION IN INDONESIA WHY AND HOW TO RESTORE?

https://iccc.uns.ac.id/index.php/editorial-board/ 50%

International Conference on Climate Change

EDITORIAL BOARD

IOP Conference Series: Earth and Environmental Science

Table of contents

Volume 129

2018

Previous issue Next issue

International Conference on Climate Change: Challenges and Opportunity on Environment Degradation Researches 24–26 October 2017, Surakarta, Indonesia

Accepted papers received: 28 February 2018

Published online: 19 March 2018

Open all abstracts

Preface

Papers

Impact of depletion or enhance of capability of resources of air, water, soil, and vegetation

OPEN ACCESS 012006
A vulnerability assessment for water availability related to the impacts of climate change in Banyuasin Valley, South Sumatra, Indonesia
Y Hamdani
+ Open abstract View article PDF

OPEN ACCESS 012007
Mycorrhizal diversity of stevia (*Stevia rebaudiana* Bertoni) rhizosphere in Tawangmangu, Indonesia
D Y Astuti, Parjanto and V R Cahyani
+ Open abstract View article PDF

OPEN ACCESS 012008
Land use, climate parameters and water quality changes at surroundings of Code River, Indonesia
Muryanto, Suntoro, T Gunawan and P Setyono
+ Open abstract View article PDF

OPEN ACCESS 012009
The effect of nano-silica fertilizer concentration and rice hull ash doses on soybean (*Glycine max* (L.) Merrill) growth and yield
T Suciaty, D Purnomo, A T Sakya and Supriyadi
+ Open abstract View article PDF

OPEN ACCESS 012010
Soil degradation level under particular annual rainfall at Jenawi District– Karanganyar, Indonesia
A Herawati, Suntoro, H Widijanto, I Pusponegoro, N R Sutopo and Mujiyo
+ Open abstract View article PDF

OPEN ACCESS 012011
Study on rhizobium interaction with osmoprotectant rhizobacteria for improving mung bean yield
Y Maryani, Sudadi, W S Dewi and A Yunus
+ Open abstract View article PDF

https://iopscience.iop.org/issue/1755-1315/129/1 67%

OPEN ACCESS 012012
Graphical approach to assess the soil fertility evaluation model validity for rice (case study: southern area of Merapi Mountain, Indonesia)
E A Julianto, W A Suntoro, W S Dewi and Partoyo
+ Open abstract View article PDF

OPEN ACCESS 012013
The effect of pricing level to the loss of welfare costs (case study: Indonesia region II water company)
B Rosalina E W K, E Gravitiani, M Raharjo and T Mulyaningsih
+ Open abstract View article PDF

OPEN ACCESS 012014
Study on osmoprotectant rhizobacteria to improve mung bean growth under drought stress
Y Maryani, Sudadi, W S Dewi and A Yunus
+ Open abstract View article PDF

Strategy for environmental disaster reduction research

OPEN ACCESS 012015
Local adaptive capacity as an alternative approach in dealing with hydrometeorological risk at Depok Peri-Urban City
I S Fitrinitia, P Junadi, E Sutanto, D A Nugroho, A Zubair and E Suyanti
+ Open abstract View article PDF

OPEN ACCESS 012016
Genetic diversity of pigeon pea (*Cajanus cajan* (l.) Millsp.) based on molecular characterization using randomly amplified polymorphic DNA (RAPD) markers
N Khoiriyah, E Yuniastuti and D Purnomo
+ Open abstract View article PDF

Climate model and uneven precipitation distribution

OPEN ACCESS 012017
Mapping the rainfall distribution for irrigation planning in dry season at pineapple plantation, Lampung Province, Indonesia (Study case at Great Giant Pineapple Co. Ltd.)
P Cahyono, N K Astuti, Purwito and A Rahmat
+ Open abstract View article PDF

OPEN ACCESS 012018
Evaluation of cropping pattern in rainfed areas based on studies of *pranata mangsa* and weather dynamics
M K Zaki, N T Furi, Jauhari Syamsiyah and Sumani
+ Open abstract View article PDF

OPEN ACCESS 012019
Assessment of the Standardized Precipitation Index (SPI) in Tegal City, Central Java, Indonesia
Y Pramudya and T Onishi
+ Open abstract View article PDF

Pollution and contamination of land surface and atmosphere

OPEN ACCESS 012020
Effects of intermittent acid rain on proline and antioxidant content on medicinal plant "*Pereskia bleo*"
Sulandjari and W S Dewi
+ Open abstract View article PDF

Carbon footprint, greenhouse gas emission, recycle, and reuse energy research

OPEN ACCESS 012021
Organic carbon sequestration under selected land use in Padang city, West Sumatra, Indonesia
Yulnafatmawita and S Yasin
+ Open abstract View article PDF

https://iopscience.iop.org/issue/1755-1315/129/1 67%

OPEN ACCESS 012022
The ecological impacts of primary education facilities based on a child-friendly neighborhood unit criteria in Surakarta
E F Rini, R A Putri, Mulyanto and N Handayani
+ Open abstract View article PDF

OPEN ACCESS 012023
The rapid measurement of soil carbon stock using near-infrared technology
B H Kusumo, Sukartono and Bustan
+ Open abstract View article PDF

Direct and indirect risks to wellbeing

OPEN ACCESS 012024
The diplomacy of scientific research in the South China Sea: the case of join to oceanographic marine scientific research expedition between Vietnam and the Philippines
I A Satyawan
+ Open abstract View article PDF

OPEN ACCESS 012025
Climate change adaptation in Tanjung Mas – Semarang: a comparison between male- and female-headed households
W Handayani, M R Ananda, L Esariti and M Anggraeni
+ Open abstract View article PDF

OPEN ACCESS 012026
Improving Indonesian cinnamon (c. burmannii (Nees & t. nees) Blume) value chains for Greater Farmers Incomes
S R Menggala and P V Damme
+ Open abstract View article PDF

OPEN ACCESS 012027
A climate risk assessment of clean water supply in an urban area: A case study of South Tangerang city, Indonesia
S I W Nastiti, H Kusnoputranto, R Boer and S W Utomo
+ Open abstract View article PDF

Implication of climate adaptation and mitigation research

OPEN ACCESS 012028
A Group in Urban: The Social Capital of Ciliwung Depok Community (KCD)
D M Tampi, J Sumabrata, A Zubair and N H Kinan
+ Open abstract View article PDF

OPEN ACCESS 012029
Land management on soil physical properties and maize (*Zea mays* L. var. BIMA) growth (An adaptation strategy of climate change)
M K Zaki, Komariah, B Pujiasmanto and K Noda
+ Open abstract View article PDF

OPEN ACCESS 012030
The Dutch colonial architecture of buildings in Manado's Old City: A response to the coastal tropical climate
V A Kumurur and D M Tampi
+ Open abstract View article PDF

OPEN ACCESS 012031
Stakeholders' perspectives towards effective climate change adaptation on the Mongolian livestock sector
A Batbaatar, P Apichayakul and S Tantanee
+ Open abstract View article PDF

https://iopscience.iop.org/issue/1755-1315/129/1 67%

OPEN ACCESS 012033
Climate change and farmers' cropping patterns in Cemoro watershed area, Central Java, Indonesia
Sugihardjo, J Sutrisno, P Setyono and Suntoro
+ Open abstract View article PDF

OPEN ACCESS 012034
Assessment of water quality from water harvesting using small farm reservoir for irrigation
W S Dewi, Komariah, I Y Samsuri and M Senge
+ Open abstract View article PDF

Infrastructures risks and planning on climate adaptation

OPEN ACCESS 012035
Environmental heat stress enhances crystallization in urine
H Setyawan, Q C Pratiwi, I Sjarifah, T B Atmojo and Khotijah
+ Open abstract View article PDF

OPEN ACCESS 012036
Climate-sensitive urban design through Envi-Met simulation: case study in Kemayoran, Jakarta
K D Kusumastuty, H W Poerbo and M D Koerniawan
+ Open abstract View article PDF

OPEN ACCESS 012037
A preliminary study of mechanistic approach in pavement design to accommodate climate change effects
S R Harnaeni, F P Pramesti, A Budiarto and A Setyawan
+ Open abstract View article PDF

Policy and legal aspect of climate change

OPEN ACCESS 012038

The precautionary principle in fisheries management under climate change: How the international legal framework formulate it?

E Latifah and M N Imanullah

+ Open abstract View article PDF

OPEN ACCESS 012039

The future of climate change policy by provincial government in Indonesia: A study on the vision and mission of elected governors in 2017 election

T Kurniawan

+ Open abstract View article PDF

The economic and and social elements of climate change

OPEN ACCESS 012040

An adaptation strategy of sandland peasants in Yogyakarta toward climate change

E Rusdiyana and Suminah

+ Open abstract View article PDF

OPEN ACCESS 012041

A roadmap to effective urban climate change adaptation

R Setiadi

+ Open abstract View article PDF

OPEN ACCESS 012042

Relationship of various factors affecting the sustainable private forest management at Pajangan District, Special Regions Yogyakarta, Indonesia

B Widayanto, R Karsidi, Kusnandar and J Sutrisno

+ Open abstract View article PDF

OPEN ACCESS 012043

The interrelationship of households economics activities of upland rice farmers in rain-fed farming in Ponjong Sub-district, Gunungkidul District, Indonesia

W D E Rini, M Harisudin, Supriyadi and E S Rahayu

+ Open abstract View article PDF

Stakeholders' perspectives towards effective climate change adaptation on the Mongolian livestock sector

Stakeholders' perspectives towards effective climate change adaptation on the Mongolian livestock sector

A Batbaatar[1,3], P Apichayakul[2] and S Tantanee[2]

[1] Department of Civil Engineering, Faculty of Engineering, Naresuan University, 99 Moo 9 Tambon Tha Pho, Muang Phitsanulok 65000, Thailand
[2] Department of Electrical and Computer Engineering, Faculty of Engineering, Naresuan University, 99 Moo 9 Tambon Tha Pho, Muang Phitsanulok 65000, Thailand
[3] Corresponding author: amarjargalb58@email.nu.ac.th

Abstract. Climate change is one of the greatest threats that world is facing today, and having significant deleterious effects on natural and human systems. Recent climate-induced extreme events and their impacts demand timely adaptation actions to the changing odds of their occurrence. The great phenomenon is already being felt in the Mongolian plateau, especially on the livestock sector. The sector provides the main income and livelihood for one-third of the population of about three million people. A high number of livestock is lost due to a unique phenomenon is known as a "dzud". This paper examines the key stakeholders' perspectives in the implementation of climate change adaptation and identifies its barriers, with a focus on the livestock sector. In order to meet the objectives, this research used a semi-structured interview with organizations related to the livestock sector and climate change. The extent of stakeholders' perspectives might be depending on the way they share information, stakeholder engagement, and their experiences with extreme events, as well as their location and level in government. The research findings will indicate an understanding of climate change perspectives, adaptation, and level of capacity of organizations, which can be used as a guideline for organizations to develop climate change adaptation policies related to the livestock sector in Mongolia.

1. Introduction

The Earth's climate is changing in profound ways, while there has been growing debates on, that have addressed the risk and vulnerability of affected systems, and have issued Declarations that have been endorsed by most countries. Among the climate science community, there is a growing consensus that climate change is not just an unfortunate phenomenon, but indeed it is an anthropogenic tragedy by emitting greenhouse gas (GHG) into the atmosphere. Nevertheless, this trend is still not completely approved [1]. However, it is certain that the phenomenon has created uncertainty in, and a threat to, the future of sustainable development. The increasing number of extreme events has gained massive attention from a scientist, questioning how and what is the connection of those events to climate change. The following are several extreme events occurred over the past few years; 1) the 2013 typhoon Haiyan in Southeast Asia (especially in the Philippines), considered as one of the deadliest cyclones ever recorded [2], 2) the disastrous flooding in 2011 in Thailand [3], and countries bounding the Bay of Bengal is the most exposed to cyclones and flooding that have resulted in the loss of thousands of lives, displacement, damaged infrastructures and economic crisis, and 3) the 2008

catastrophic cyclone Nargis that resulted in enormous destruction of socio-economic sectors and more than 130.000 mortalities [4].

As a result of climate change, millions of people are suffering from scarce natural resources, unsanitary living conditions, insufficient health services, and insufficient or non-existent social services [5]. Most tragically, affluent industrialised nations have the biggest role to release GHG into the atmosphere, whereas the world's poorest communities mostly located in the Asian and African continent, who solely depend on agriculture and livestock as their livelihood and income, are suffering most from harmful effects of climate change, yet they are least responsible for causing it [6]. The recent science tells us that impacts of climate change will become more harmful in a myriad of ways including more frequent and widespread of extreme events, accelerating the extinction of biodiversity and destroying ecosystems, infrastructures, economic losses, and diminishing natural resources. Therefore, many countries have been trying to diminish such adverse effects through developing climate change adaptation approaches and related policies at all levels and sectors. The livestock sector is now and will inevitably be affected by climate change. Adverse effects felt in the livestock sector can threaten other sectors, including the economic sector, through the loss of livestock for herders. It means that they have less income to buy goods, which impacts the sales and income of providers, or the shortage of produce; meat, milk, milk products that lead to increasing prices of these foodstuffs. Therefore, it will cause economic hardship and hunger, even starvation, to many, as well as affecting the food security of countries.

Since no country is immune to climate change, Mongolia has not been left from the harmful effects of climate change. Developing adaptation strategies to climate change with the focus on the livestock sector is important in Mongolia. Thus, this paper aims to explore the key stakeholders' perspectives on climate change impacts on the livestock sector, identify adaptation approaches and barriers, identify stakeholders' capacity to overcome those barriers, and conclude with a summary of the discussion and some suggestions for further work.

1.1. Climate change adaptation

The higher average global temperature and variations of precipitation are projected to have a wide range of impacts on natural resources including fresh water, agricultural and grazing areas, and such natural resources likely to become more limited so that livestock, of significant importance in economies, will find it harder to survive in certain areas with harsh and deteriorating conditions [7]. The livestock sector provides livelihoods for approximately 2 billion people and uses the largest land surface areas of drylands that covers more than 40% of the total surface areas of the Earth. Since the sustainability of the livestock sector is a subject susceptible to climate change, it is crucial to implement an appropriate form of adaptation [8].

According to the Intergovernmental Panel on Climate Change, adaptation is "the process of adjustment to actual or expected climate and its effects" [5]. A variety of adaptation has been developed by stakeholders; such as capacity building (e.g., education and training), management (e.g., livelihood diversification), policy (e.g., implementation or revision of regulations and policies, integrating adaptation into development policies), financing (e.g., livestock insurance, contingency fund) and technology (e.g., enhance water access technologies) [9]. Numerous factors are being and will influence the effectiveness of adaptation, which can create sudden or dramatic changes in adaptation. Consequently, it is important that adaptation should appropriately target a certain level, location, and duration. Sometimes, success in the short-term adaptation may turn out to have little or no benefit in the long-term process and vice versa. Thus, we need more viable adaptation to the increased risk and vulnerability of the future.

2. Climate and the livestock sector in Mongolia

2.1. Mongolia's climate

Mongolia is a landlocked country situated between Russia to the north and China to the south, which experiences a continental climate. A long-lasting harsh cold winter, dry hot summer, with an annual average temperature of minus 0.8^{o}C, with the temperature dropping below -45^{o}C in winter and reach up to more than 40^{o}C in the summer season for each year. The significant changes have been observed on the Mongolian plateau. Climate change brings ever drier and hotter conditions, and average temperature has been risen by 2.1^{o}C in the 1940-2007, and future climate scenarios indicating that annual average temperature will be increased by 0.4-1.6^{o}C in the coming next 30 years [7 10 11]. The increased average temperature in the winter season is estimated as 3.6^{o}C. The trend of increasing temperatures in winter has been accompanied by several adverse events such as strong wind storm and heavy snowfall. This temperature is sometimes rapidly rising over a short period of 3-7 days and then abruptly dropping again to sub-zero temperatures. This situation has led to the ice-sheet coverage of grassland areas in some years, making it harder for livestock to find and access feed [12]. Snow is one of the main sources of water for livestock during winter, but an excessive amount of snowfall that accompanies low temperatures creates unfavorable conditions for herders and livestock.This unique phenomenon is usually called as a "dzud". According to Mongolian Second Assessment Report on Climate Change in 2014, drought and dzud are the most catastrophic extreme events due to their impacts on socio-economics [10].

2.1.1. Dzud. It is a Mongolian term for a complex and long-lasting natural disaster consisting of summer drought followed by cold and harsh winter that result in a high number of livestock losses due to hunger, exhaustion, and exposure to freezing air temperatures. There is also a potential for loss of human life and damaging impacts on herder livelihoods and infrastructures [13]. Currently, Mongolia has experienced 5 types of dzud: tsagaan, khar, tumer, khuiten and khavsargan (table 1). The duration of a dzud continues from the beginning of November; possibly little earlier, lasting to the end of March [14]. In the last two decades, Mongolia has faced with four devastating dzuds. First, three consecutive dzuds in 1999-2000, 2000-2001 and 2001-2002 that resulted in the impoverishment of thousands of herder households and livestock losses estimated at 30% of total livestock. Then, a severe dzud in 2009-2010, with temperatures dropped below -53^{o}C in some areas in January, resulted in widespread livestock losses of some 20% of the total livestock, with an estimated 28% of the Mongolian population being harshly affected in 17 out of 21 provinces [13].

Table 1. Typologies of dzud.

Types of dzud	Description
Tsagaan dzud or White dzud	The higher amount of snowfall with low air temperature.
Khar dzud or Black dzud	Lack of snowfall which leads to insufficient water availability for livestock and herders.
Tumer dzud or Iron dzud	Mixed temperatures, sudden temperature drop after a short-term warming resulted in ice sheet on grazing areas.
Khuiten dzud or Cold dzud	Low precipitation with strong stormwind.
Khavsargan dzud or Combined dzud	Combination of two or more of the above-mentioned dzuds.

2.1.2. Drought. In Mongolia, drought occurs ever longer periods, and its intensity and frequency are significantly increased since the end of the last century [11]. As a result, more than 880 out of 5138

rivers and approximately 1200 out of 3747 lakes are dried up at the beginning of 21st Century [15]. Along with the three consecutive dzuds, there were three consecutive summer droughts considered as the worst drought that Mongolia ever faced with, which affected 50-70% of the total territory. The growing season for livestock forage and agricultural crops in Mongolia is relatively short, between May and September, and the growth of grasses is heavily dependent on the weather condition. If there has been insufficient forage and hay, livestock will fail to fully fatten and gain the necessary strength for the coming winter [12]. When the drought is followed by dzud, a huge number of livestock losses are experienced. Particularly, a combination of drought and white dzud has a higher risk and impact than drought and other types of dzud. Thus, drought is considered as one of the triggers that intensify dzud [16].

2.2. The livestock sector in Mongolia

Mongolia has a traditionally nomadic society and the livestock sector or animal husbandry as a principal component of culture and identity, a primary means of livelihood and income for herders, and the main food for the rest of the population. Accordingly, climatic conditions are of primary importance in the success of that significant sector of the Mongolian economy and society [12]. The total number of livestock is approximately 61.5 million, consisting of horse, cattle, camel, sheep, and goat. The sector is dependent almost solely on forage productions, hence, is highly vulnerable to natural hazards. Mongolia is divided into six ecological zones that experiences more localized conditions such as high mountains, steppe, forest-steppe, desert-steppe, desert, and taiga.The herding in the high mountains, forest-steppe, steppe and arid grassland areas are highly sensitive to extreme climatic conditions that pose a higher risk of dzud and drought [17].

3. Research method

This research conducted semi-structured interviews with the key stakeholders from public and private, and international organizations at all levels, to gather their experiences with, and perspectives of climate change, impacts and adaptation, and identify barriers encountered in developing adaptation approaches. Stakeholders for the interview were identified firstly, through eliciting the organizations related to disaster management and climate change and the livestock sector. Secondly, in order to collect reliable information and select rightful stakeholders, this research is based on the possible criteria for selection of stakeholder participation. The selected stakeholders are those who have the most appropriate information, knowledge, and expertise, the capability to influence adaptation process, and an envisaged pluralistic of perspectives. In addition, they should be willing to give information and available for the interview [18].

3.1. Developing interview questions

The interview, with pre-developed 21 questions, is divided into four sections: (i) stakeholders' perspective on climate change, (ii) adaptation approaches (iii) barriers of adaptation (iv) organizational capacity.

3.1.1. Section 1: Stakeholders' perspectives on climate change. This section aims to draw out stakeholders' perspectives and understanding on impacts of climate change and identify the main drivers of changes in the livestock sector. The number of drivers of climate change to the livestock sector is identified: quantity and quality of feeds; heat stress; water availability; livestock diseases; and biodiversity [6].

3.1.2. Section 2: Identification of adaptation approach. This section is aimed to identify specific examples of adaptations and potential responses to climate change based on stakeholders' experience and knowledge. First, this section will analyze the efficiency of previously implemented adaptations related to the livestock sector. Then, the selection of adaptation approaches, which they consider as the most necessary or required, is implemented. All identified distinct adaptations will be grouped into ten

categories including capacity building, management and planning, practice and behavior, policy, information, physical infrastructure, warning and observing systems, green infrastructure, financing, and technology [9].

3.1.3. Section 3: Identification of barriers. This section is aimed to identify common barriers that exist within the development of adaptations and how stakeholders overcome those barriers. Every adaptation approach has a challenge of how to handle the diverse barriers, so defining the adaptation scope must include the identification of the barriers that are likely to be encountered. Several researchers categorized adaptation barriers such as institutional governance issues, financial, politics, leadership, and communication [19]. Nevertheless, this research focuses primarily on politics, and institutional and governance related to the barriers so that it can explore the strategies that they used to overcome such barriers.

3.1.4. Section 4: Capacity of organizations. The aim of the section is to assess the organizational capacity of stakeholder. The purpose of this assessment is to recognize the capacity and resources that they have in order to develop effective adaptation approaches. The capacity of organizations includes highly educated human resources, sufficient and reliable scientific information, sufficient financial resources, and effective cooperation with other related organizations [20]. As well, this section is also used to identify their enhancement strategies for improving their capacities.

4. Discussion

As a global phenomenon, the effects of climate change are experienced differently in every region. Since climate change is persistently broadening its negative effects, stakeholders' involvement in the adaptation to climate change will be more important to reduce the risk of vulnerable systems. The frequency and intensity of dzud and drought are predicted to increase the more scarce availability of natural resources and threaten more population, mostly in local areas, properties and other sectors across Mongolia over the next coming decades.

The sustainability of the livestock sector is directly influenced by herders' livelihoods. It is interesting to note that herders are not only become vulnerable due to loss of their livestock but also vulnerable to some other non-climatic factors. For instance, most of the herders have little or no formal education, somehow its influence being not able to access loans from the bank to diversify their income or source of livelihoods. The diversification of income source of herder households is important as a safety net in times of dzud and drought occurrence. There is a growing number of adaptation on the sustainability of livestock sector and herders' livelihood in Mongolia, yet it is not clear that all of these adaptations would be successful due to underlying barriers. Sharing scientific information, partnership and qualified perspectives of stakeholder has the potential influence to the successfulness of adaptation approaches.

5. Conclusion

Mongolia is the nomadic society and has the dependency on natural resources. It makes the country more vulnerable to extreme events. Thereby, this research intends to explore the most appropriate adaptation approaches to the impacts of climate change, which is inspired by the series of the historic dzud and drought events. A broad perspective of stakeholders is important to enhance the quality and quantity of adaptation that can provide sustainability of herders' livelihood, of the livestock sector and pastoralism.

For further research, this research recommends that the focus is on the climate change communication and how information sharing and engagement of stakeholders could be improved for the rational decision making, for possible actions in response to climate change. As well, one of the most important needs is mainstreaming climate change adaptation into sustainable development policy. The ultimate climate change adaptation needs to involve all potential stakeholders and be viable targeted at specific context and spatial so that it can increase the capacity of affected sectors and

sustainable development. Overall, the Government of Mongolia's support should focus on formulating climate change adaptation policies and programmes related to the livestock sector that improve the capacity of livestock and herder community.

References

[1] Cook J, *et al.* 2013 Quantifying the consensus on anthropogenic global warming in the scientific literature *Environ. Res .Lett.* **8**(**2**) p 7

[2] Dai K, Chen S E, Luo M and Loflin G 2017 A framework for holistic designs of power line systems based on lessons learned from Super Typhoon Haiyan *Sustain. Cities Soc.* **35** pp 350-64

[3] Saito N 2014 Challenges for adapting Bangkok's flood management systems to climate change *Urban Clim.* **9** pp 89-100

[4] Tasnim K M, Shibayama T, Esteban M, Takagi H, Ohira K and Nakamura R 2014 Field observation and numerical simulation of past and future storm surges in the Bay of Bengal: a case study of cyclone Nargis *Nat. Haz.* **75**(**2**) pp 1619-47

[5] IPCC 2014 *Climate Change 2014: Synthesis Report* (Geneva, Switzerland: IPCC Press)

[6] Thornton P K, van de Steeg J, Notenbaert A and Herrero M 2009 The impacts of climate change on livestock and livestock systems in developing countries: A review of what we know and what we need to know *Agric. Sys.* **101**(**3**) pp 113-27

[7] Wang J, Brown D G and Agrawal A 2013 Climate adaptation, local institutions, and rural livelihoods: A comparative study of herder communities in Mongolia and Inner Mongolia, China *Glob. Environ. Change* **23**(**6**) pp 1673-83

[8] Martin R, Müller B, Linstädter A and Frank K 2014 How much climate change can pastoral livelihoods tolerate? Modelling rangeland use and evaluating risk *Glob. Environ. Change* **24** pp 183-92

[9] Biagini B, Bierbaum R, Stults M, Dobardzic S and McNeeley S M 2014 A typology of adaptation actions: A global look at climate adaptation actions financed through the Global Environment Facility *Glob. Environ. Change* **25** pp 97-108

[10] Ministry of Environment and Green Development of Mongolia "Mongolia second assessment report on climate change" *http://www.jcm-mongolia.com/* 2014 [Online] Available: http://www.jcm-mongolia.com/wp-content/uploads/2015/11/MARCC-Final-Bk-2014-book-lst.9.17-ilovepdf-compressed.pdf [Accessed: 04-10-2017]

[11] Batima P "Climate Change Vulnerability and Adaptation in the Livestock Sector of Mongolia" *http://start.org/* 2006 [Online] Available: http://sedac.ciesin.columbia.edu/aiacc/progress/FinalRept_AIACC_AS06.pdf [Accessed: 04-10-2017]

[12] Batima P, Bat B and Tserendorj T "Evaluation of adaptation measures for livestock sector in Mongolia" *http://start.org/* 2006 [Online] Available: http://www.start.org/Projects/AIACC_Project/working_papers/Working%20Papers/AIACC_WP41_Batima.pdf [Accessed: 04-10-2017]

[13] UN Mongolia Country Team "Mongolia: Dzud Appeal" *http://www.unocha.org/* 2010 [Online] Available: https://docs.unocha.org/sites/dms/CAP/2010_Mongolia_DzudAppeal_SCREEN.pdf [Accessed: 05-10-2017]

[14] Begzsuren S, Ellis J E, Ojima D S, Coughenour M B and Chuluun T 2004 Livestock responses to droughts and severe winter weather in the Gobi Three Beauty National Park, Mongolia *J Arid Environ.* **59**(4) p 785-96

[15] Szumińska D 2016 Changes in the surface area of the Böön Tsagaan and Orog lakes (Mongolia, Valley of the Lakes, 1974–2013) compared to climate and permafrost changes *Sediment.*

Geol. **340** pp 62-73

[16] Tachiiri K and Shinoda M 2011 Quantitative risk assessment for future meteorological disasters *Clim. Change* **113**(**3-4**) pp 867–82

[17] Sternberg T 2008 Environmental challenges in Mongolia's dryland pastoral landscape *J Arid Environ.* **72**(**7**) pp 1294-304

[18] Hage M, Leroy P and Petersen A C 2010 Stakeholder participation in environmental knowledge production *Futures* **42**(**3**) pp 254-64

[19] Ekstrom J A and Moser S C 2013 Institutions as key element to successful climate adaptation processes: results from the San Francisco Bay Area *Successful adaptation to climate change: linking science and policy in a rapidly changing world* pp 97-113

[20] Measham T G, *et al.* 2011 Adapting to climate change through local municipal planning: barriers and challenges *Mitig. Adapt. Strategies Glob. Chang.* **16**(**8**) pp 889-909

Improving Indonesian cinnamon (c. burmannii (Nees & t. nees) Blume) value chains for Greater Farmers Incomes

To cite this article: S R Menggala and P V Damme 2018 *IOP Conf. Ser.: Earth Environ. Sci.* **129** 012026

Improving Indonesian cinnamon (c. burmannii (Nees & t. nees) Blume) value chains for Greater Farmers Incomes

S R Menggala[1], P V Damme[1]

[1] Department of Plant Production, Faculty of BioscienceEngineering, Ghent University, Coupure Links 653, Gent 9000, Belgium
[2]Corresponding author: sidirana.menggalasusanto@ugent.be, patrick.vandamme@ugent.be

Abstract. Genus *Cinnamomum (Lauraceae)* regroups some species whose stem bark are harvested, conditioned and traded as cinnamon in an international market. Over the centuries, the species have been domesticated so that now at least six different ones are grown in Southeast Asia countries. One of the species is *Cinnamomum burmannii*, also known as Korintje Cinnamon, which generates income for most smallholder farmers in Kerinci district, Jambi, Indonesia. Most cinnamon consumed in the world originates from this Korintje Cinnamon products. It is recognized for its unparalleled quality that comes with its sharp and sweet flavor, with a slightly bitter edge. However, international market requirements for product certification and quality standards make it difficult for a farmer to comply. Our research will address issues related to (improvement of) productivity, sustainability and value chains faced by cinnamon producers in Kerinci, to strengthen their product's value chains. Smallholder farmers are very vulnerable to climate change impacts, and thus empowering the value chains of agricultural products will increase farmers resilience to climate change. The research will analyze the development of agricultural value chains, certification & standards on trade mechanism to help farmers earn a better income and future prospects.

1. Introduction

Indonesia is a tropical country crossed by the equator. It has the second largest biodiversity and the third largest natural resource reserves for oil, natural gas, gold, copper and other minerals in the world. The country is also rich in various types of ecosystems: aquatic ecosystems, freshwater ecosystems, tropical rainforests, peat swamps, mangroves, coral reefs and coastal ecosystems. The highest biodiversity in Indonesia is to be found in the tropical forest environment. Not only serving as a source of commercial and industrial wood products, it also provides people's daily necessities, such as lumber, pulp, and paper. However, Indonesia is now facing multiple problems such as illegal logging, chaotic urbanization, unsustainable agriculture, and forest conversion (converting forests into large-scale plantations). As a result, Indonesia faces the great challenge of combining poverty alleviation and economic growth with sustainable use and conservation of biodiversity. For this reason, Indonesia needs to find solutions for the long-term sustainable use of biodiversity that will improve the social welfare of local communities.

Indonesia has several native natural products that have a potential value in local and global markets, such as *Cinnamomum burmannii Nees ex Blume*. This is one of the four types of cinnamon categorized as high economic value cinnamon besides *Cinnamomum verum, Cinnamomum cassia* (*C. aromaticaum*, also called Chinese cinnamon), and *Cinnamomum loureiroi* (also known as Vietnamese or Saigon cinnamon) [1]. Genus *Cinnamomum (Lauraceae)* regroups some species whose stem bark

are harvested, conditioned and traded as cinnamon. It is categorized as spice products in an international market [2]. In addition, during the harvesting process, other commodities can also be obtained from a cinnamon tree, i.e., stem, leaves, root, and twigs, because these parts also contain beneficial constituents [3]. Cinnamon is considered as a high-value plant because every part of the plant, besides functioning as a spice, can also be used for pharmaceutical and perfume [4]. Cinnamon wood can be used as raw materials for particle board, while the leaves and branches can be distilled to obtain oil. Over the centuries, the species have been domesticated so that now at least six different ones are grown in Southeast Asia. One of the native cinnamon species in Indonesia is *Cinnamomum burmannii*, also known as Korintje Cinnamon, which generates income for most small growers in Kerinci district, Jambi, Indonesia. The largest cinnamon plantation is situated in West Sumatra in the region known as Kerinci, near the city of Padang. This native plant is a prime commodity, especially in West Sumatra and Kerinci regency, as the center of cinnamon production in Indonesia. Most of the cinnamon consumed worldwide is the Korintje Cinnamon products. It is recognized for its unrivaled quality that comes with its sharp and sweet flavor, with a slightly bitter edge.

Although cinnamon bark belongs to one of the Indonesia's export commodities, the prices obtained by farmers for its transactions are still low. Thus, this small income affects the revenue of cinnamon farmers and their families. Basically, the price of cinnamon received by farmers adapted to the type of cinnamon bark. However, international market demands of product certification and quality standards make it difficult for small growers to meet the request. The international consumer protection agency requires safe products that are free from chemical elements harmful to human health. It causes the exporters to be careful in providing quality commodities, as well as requiring farmers to conduct the cultivation process based on the operational standards.

Another factor is related to the gate prices received by small growers for the transactions that are still low.Besides, the price of the cinnamon in a producer level does not correlate with the export corporation rate [5]. Although cinnamon is not a primary revenue for the producer, its function is critical as a reserve fund for the farmers to meet the needs of their daily life. Most cinnamon small growers have a small area of land that decreases the number of crops. One cinnamon tree can produce approximately 20 - 25 kg of cinnamon. Korintje Cinnamon, one of the highest cinnamons consumed worldwide has a trouble in this value chain scheme. Small growers must wait for the harvesting time for up to 15 years. This long wait will certainly affect the total revenue of the farmers, causing them to have a low-income and lead to poverty. There should be particular efforts such as product derivation and diversification to create its added value. Accordingly, this research is aimed at finding the variables that can improve the welfare of cinnamon farmers.

2. Methods

The research was conducted in Talang Kemuning Village, Bukit Kermai Subdistrict, Jambi Province, Indonesia in February 2017. The object of this study were the relevant stakeholders, including small growers, cooperative initiatives, cinnamon collectors, local government and the other trading channels of Korintje cinnamon. The place for collecting the sample was chosen purposely by selecting the location where the producer and buyer work closely together in the concept of sustainable agriculture. The sample farmer population is a farmer who produces and sells cinnamon. A 10% sample is taken from each of the heads of households in Talang Kemuning Village. Collecting samples and other trading agents involved in the value chain channel using the purposive sampling method, which is traced to the producer to end market.

The research has addressed some of the issues on value chains improvement faced by cinnamon producers in Talang Kemuning village. The community lives in Bukit Kerman sub-district. It is located in the district of Kerinci, Jambi, Indonesia. Having an area of 1,600 Ha, there are totally 1,200 people living in this community, spreading in 520 families. The majority of people's livelihoods are farmers because the area has enough land to produce agricultural products such as cinnamon, coffee, and cocoa.

There are two types of data in this research, namely primary and secondary data. The primary data were collected through in-depth interviews with key informants. From this type of data, the researcher obtained the information of general economic actors, economic potentials, marketing channels, production and trading costs, and the purchase price and selling price. The secondary data were garnered by recording the related institutions or Non-Governmental Organizations (NGOs) and searching from the relevant sources of literature.

Based on a field study at Talang Kemuning in February 2017, the yields of cinnamon accounted for 10% of the total fixed revenue of a small cinnamon grower, where the other 90% is obtained from other crops. This little contribution of cinnamon income is caused by its low price and extended harvest period.

3. Result and Discussion

Nearly 90% of small growers in Talang Kemuning, Kerinci have the other sources of income to support their livelihoods. They work as a labor in a rubber plantation, housemaids in Malaysia, and many other types of hard work. The findings showed that there are two major constraints identified, namely on-farm and off-farm problems.

3.1. On-Farm Issues in Kerinci

Based on the value chain stream, in the first phase, there is a source of bark obtained by small growers that are lacking competence and knowledge on agricultural practices. It has been proven that they are the only clearcutting without replanting new trees. Small growers also use traditional tools to cultivate the bark from the cinnamon tree. Then, the second constraint deals with the ownership of land, most of 1 Ha wide (birding) are rented. The yearly production of cinnamon bark is increasingly high because of the external factors, such as seeding, fertilizers and labor cost. Due to this concern, the third constraints appear, there is a lack of industry to support products and research development in Kerinci. Furthermore, there is also a lack of investment in tree rejuvenation, replanting and further development of technologies for processing plant into essential oils and oleoresin either from government or buyers (business). The most important constraint is the lack of infrastructure to support cinnamon transportation from plantation to warehouse. Small growers used only water buffalo to carry their raw bark, from plantation to drying of the bark location.

3.2. Off-Farm Issues in Kerinci

Constraints in post-harvest cinnamon process arise because of regulations, standards, laws and also informal rules & norms that are not supporting the value chains improvement. Jambi provincial government should issue a policy stating that cinnamon should not be sold as raw materials (bark) but it should be processed through the cinnamon grinding mill to improve its value so that it can be sold both in local and international markets. Jambi provincial government can set and enforce rules to initiate and finance a grinding machine that can make cinnamon powder, essential oils, and oleoresin that has a higher sale value in the market. Another constraint is related to the direct supply chain. Because of the absence of harbor facility in Jambi, the product should be delivered to another city takes another process of trading. The last constraint in the off-farm issues deals with the international standards for agriculture practices that are difficult for small growers to comply. All of those issues eventually ended up in small growers as price takers on the basic gate-price of the cinnamon market.

Even though the income earned from cinnamon plays an important role for small growers, but the primary concern of cinnamon farmers deals with a long period of harvest time. One cinnamon tree produces about 20 kg of bark with the range of age up to 20 years for production with a variant of quality and price. Cinnamon tree is cultivated three times for its bark. The first harvest occured when the tree reaches the age of 6 years, and the second harvest is at ten years and the last harvest time is at 15 years old. During that harvest time, the farmers are looking for other solutions to generate income, such as intercropping and planting another product that is more productive [6]. Therefore, it is important to find a solution for the farmers to produce derivative products and create a product

diversification that can give added value and improve the value chains for greater income. There are four types of upgrading [7]:

- Process improvement, where the transforming production process will reorganize or improve processing technology;
- Product development, where natural products will develop into diverse and more sophisticated product lines, with higher values per unit volume;
- Functional improvement, which refers to cases where new and superior functions will draw up in the value chains;
- Inter-sectoral upgrading, which occurs when new research or technology enables a product to shift from one sector to a different "new area."

The involvement of other parties to improve the value chains for greater farmer income is also important in the outcome, such as described below:
Business, producer associations, universities, NGO's and local government through policy support;
Establishment of research and development (R&D) capabilities of national or regional universities, or R&D facilities of large firms with whom partnerships will form;
Strategic use of labeling, branding, trademarks, and certification.

Majority of small growers in developing countries, including those who are in Korintje area, are facing series of constraints that often limit their ability to participate competitively in a value chain improvement model including supporting functions. The following are the model of four major constraints that limit the competitiveness of small and medium-sized manufacturers and their entry into value chains [8]:

- Access to end-market
- Access to skills and capacity improvement
- Collaboration and cooperative building
- Access to finance and incentives

First, access to the end-market is relevant to improve value chains for smallholders. In the context of this model, it refers specifically to the presence of value chain connections between small growers and buyers and how they can be established. It is also important for the consumer to be informed about the origin of the products using traceability tools and sustainable measurements. In this case, neither the small-grower organic or chemical pesticide can reduce the climate change impacts. Second, while smallholders work at the farm from their childhood, a specific training is often required to improve the productivity and product quality. Such training can include the introduction of new technologies and plant varieties, not only explaining how to comply with food safety and other certification requirements but also how the value chains works [8]. Nevertheless, there are also new agricultural practice adaptations including new cutting that impact on biodiversity loss and land-slide.
Third, building coordination and collaboration at two coordination levels that can trigger R&D and infrastructure improvement by any condition. Finally, the last part is an access to finance that can support for product diversification and technology investment including more environmentally friendly agricultural machinery.

To enhance cinnamon value chains for greater farmer income, it can be conducted on several models such as educating farmers about the sustainable practices for the environment, helping them to access local and international markets, supporting their productivity improvement, promoting good agricultural practices, providing organic fertilizer, and so forth. However, it also important for the farmers to increase their knowledge about the regulation standard so they can access EU market. Below are the issues dealing with the quality and standard affecting the performance of cinnamon export value chains according to the interview conducted with Cassia Coop and VECO.

- Marketing: Understanding about EU markets due to complying with food safety standards.
- Production and processing: Poor of the application on good agricultural practices and lack of traceability system in the supply chain.

- Technology and training: Poor of R&D work in value addition, new technologies, and mechanization (traditional cultivating), applied agricultural training programs for farmers by NGO's.

Branding the Korintje Cinnamon products by putting trademarks of traceability and certification can have a significant role in the future of Indonesia's spices export markets. Putting labels, marks and food safety certifications can influence the customers to pay more for the product that is certified and meet the standard regulations and categorized as a premium product. Consumers in Europe are increasingly interested in consuming a product that has a 'clean & green' label because they are aware of the health and security of the product that will be consumed. When the products have claimed for its sustainability and traceability campaign, it is crucial to ensure that those claims can be traced. It requires a system of traceability to be implemented in Korintje Cinnamon products. However, if the cinnamon farmers in Kerinci can achieve the demanding quality standards, they surely can get more benefit and gain brighter future prospects. Therefore, for the purpose of livelihoods improvement, the farmers should choose and decide whether or not a particular set of standards is good for their cinnamon through-out sustainability objectives.

4. Conclusion

Implementing several models to improve the farming system and marketing is associated with enhancing farmers' knowledge on the standard regulation to access EU market so that it can benefit cinnamon farmers in Kerinci in the future. Improving the cinnamon commodity is still prospective in Kerinci. However, farmer's traditional ways of cultivating cinnamon cause them to receive less income than the actual price. Therefore, farmers are expected to decide the standard of Korintje Cinnamon products in order to improve their income and livelihoods.

References

[1] Chen P, Sun J, and Ford P 2014 Differentiation of the four major species of cinnamons (*C. burmannii*, *C. verum*, *C. cassia*, and *C. loureiroi*) using a Flow Injection Mass Spectrometric (FIMS) fingerprinting method *J Agric Food Chem* **62** pp 2516–2521

[2] Al-Dhubiab BE 2012 Pharmaceutical applications and phytochemical profile of *Cinnamomum burmannii Pharmacogn Rev* **6** pp 125–131

[3] Kaul PN, Bhattacharya AK, Rajeswara Rao BR, Syamasundar KV and Ramesh S 2003 Volatile constituents of essential oils isolated from different parts of cinnamon (*Cinnamomum zeylanicum* Blume) *J Sci Food Agric* **83** pp 53–55

[4] Thangaselvabai T, Joshua JP and Jayasekar M 2009 Cinnamon (Cinnamomum verum presl) - the sweet bark spice for flavor and fragrance- a review *Agric. Rev.* **30** pp167-175

[5] Jaya A, Rustiadi E, Gonarsyah I, Bratakusumah DS, and Juanda B 2009 The cinnamon commodity development effect to regional economic: case study of Kerinci regency Jambi *Forum Pascasarjana* **32** pp 67-79

[6] Adlaida, Nainggolan S, and Murdy S 2015 *Jurnal Penelitian Universitas Jambi Seri Sains* **17** 50-67

[7] Humphrey and Schmitz 2001 *Governance in Global Value Chains* [IDS Bulletin 32.3] (Brighton, UK: Institute of Development Studies) pp 1-16

[8] Lie H, Rich KM, Kurwijila LR, and Jervell AM 2012 Improving smallholder livelihoods through local value chain development: a case study of goat milk yogurt in Tanzania *International Food and Agribusiness Management Review* **15** 55-86

[9] Tonsor GT 2011 Consumer inferences of food safety and quality *European Review of Agricultural Economics* **38** pp 213–235

GRADUATE SCHOOL
UNIVERSITAS SEBELAS MARET

CERTIFICATE OF APPRECIATION

PRESENTED TO

Dr-Ing Wiwandari Handayani, ST., MT.,

As a **PRESENTER**

in The International Conference on Climate Change
"Challenges and Opportunity on Environment Degradation Research"
Surakarta, 24 - 26 October 2017

Dwi Priyo Ariyanto, SP., MSc. PhD.
Chairman Committee
International Conference

Prof. Dr. M. Furqon Hidayatullah, MPd.
Director of Graduate School
Universitas Sebelas Maret
Surakarta, Indonesia

Climate change adaptation in Tanjung Mas - Semarang: A comparison between male- and female-headed households

by Wiwandari Handayani

Submission date: 19-Mar-2020 03:46PM (UTC+0700)
Submission ID: 1274155057
File name: arang_a_comparison_between_male-and_female-headed_households.pdf (717.84K)
Word count: 3962
Character count: 20984

Climate change adaptation in Tanjung Mas – Semarang: a comparison between male- and female-headed households

Climate change adaptation in Tanjung Mas – Semarang: a comparison between male- and female-headed households

W Handayani[1,4], M R Ananda[2], L Esariti[1] and M Anggraeni[3]

[1]Department of Urban and Regional Planning, Diponegoro University, Jl. Prof. Sudharto, SH Tembalang, Semarang, Central Java 50275 Indonesia
[2]Initiative for Regional Development and Environmental Management (IRDEM), Diponegoro University, Tembalang, Semarang, Central Java 50275 Indonesia
[3]Initiative for Urban Climate Change and Environment (IUCCE), Jl. Tirto Agung Barat V/21 Pedalangan, Banyumanik, Semarang, Central Java 50268 Indonesia
[4]Corresponding author: wiwandari.handayani@pwk.undip.ac.id

Abstract. Mainly due to its complexity, the effort to mainstream gender in addressing climate change issues has been far from the satisfying result. However, there is an urgent call to accommodate gender lens issues and to become more gender sensitive in an attempt to have an effective intervention in responding climate change impact. To enrich the reports on gender and climate change adaptation in city-based case, this paper aims to elaborate climate change adaptation in Tanjung Mas – Semarang city focusing on the gender perspective analysis in male- and female-headed households. The quantitative descriptive method is applied to carry out the analyses, including adaptive strategy and gender role analyses. The research result indicates there are not any significant differences in the climate change adaptation strategies applied in male- and female-headed households. This shows that women in the female-headed households, with their double burden, performed well in managing their roles. Therefore, in particular perspective, it may not be relevant to state that woman and female-headed households are likely to be more vulnerable compared with their counterparts.

1. Introduction

Climate change is a global phenomenon that is calling for further attention. The impact of climate change significantly influences human activities in various sectors mostly for those who live in a coastal area [1],[2][3]. Most rapid growing cities in developing countries are located close to the sea. These high-density cities are at risk due to different climate change hazards mostly flood and water surges [3]. Accordingly, there has been a growing concern on the policy-making process as well as academic research on climate change adaptation to minimize damage and loss as the impact of the climate change. However, mainly due to its complexity, the effort to mainstream gender in addressing climate change issues has been far from the satisfying result [5][6].

There are at least two themes to relate gender and climate change. Those are "vulnerable" and "virtue" [7]. Women are likely to be more vulnerable than men. Women mostly in the developing and less developed countries have relatively lower education, limited ability to find support and information, and most importantly has so little control to the family outcome compared to the men in the family. Even though it is not formally stated, there are more women categorized as poor compared to men as their counterpart. Despite women are commonly defined as vulnerable, women are, however, have more consciousness on environmental issues. They are more sensitive, closer to natural

surroundings, better prepared for dealing with changes, and likely to be more supportive to deal with new/different policies. Therefore, there is an urgent call for the government at every level to accommodate gender lens issues and to become more gender sensitive to create more robust policy in responding climate change phenomena [8].

An important first step to accommodate gender lens in climate change analyses is based on a comparison between male- and female-headed households [9][10],[11]. There are growing numbers of female-headed households across the globe for various reasons [12],[13],[14]. Based on several studies, it is generally indicated that female headed-households are likely to be more vulnerable than the male headed-households as they are poorer because of the lower capability of the women as the breadwinner to earn incomes [14],[15]. However, the current research to connect climate change adaptation and types of households are mostly focusing on rural area and agricultural based activities [10],[11][13]. Even though both women who live in the rural and urban are classified as the most vulnerable, however, there are some differences in the strategy options as well as norms/values applied. To enrich the discourse on gender and climate change adaptation in city-based case, this paper aims to elaborate climate change adaptation in Tanjung Mas – Semarang city focusing on the gender perspective analysis in male- and female-headed households. The climate change adaptation analyses are focused on the way of the people at the household level respond to the flood as most obvious climate change impact emerge in the City.

Semarang City has quite a significant climate change impact. The city has been experiencing coastal inundation for 30-70 cm on average, and reaching 100 cm in certain area, as well as land subsidence for about 13.5 cm annually [16]. Tanjung Mas is one of the most vulnerable prone areas because of flood due to the coastal inundation and land subsidence. It is the densest urban village and becomes one of the pockets of poverty in the city. Therefore, to have more detail findings, the study area is only focusing on the neighborhood of Tanjung Mas.

2. Study Area and Methods

Tanjung Mas is an urban village located within the administrative boundary of Semarang city, the capital of Central Java Province. Fig. 1 illustrates the study area. It consists of six *Rukun Warga (RW)*[1] with 9,604 inhabitants and 1700 households [17]. The sex ratio of the population is 0.88, indicated there are more female compared with male living in the area. Most of them work as blue collar workers in the neighboring industries and construction laborers in the Tanjung Mas Harbour and therefore, categorized as poor. Flood happens almost every day before developing Banger polder and seawall. It is only since 2014 the flood decreases significantly up to 2-3 times a week in the tied season with 3-20 cm high of the flood. The condition in RW 1 is slightly better than in RW 12-16 as its location is not directly alongside to the sea.

Analyses used the quantitative descriptive method, with 98 households as the respondents. Primary data obtained from questionnaires in combination with interviews with particular nominated stakeholders. The number of respondents set by using Slovin formula [18]:

$$n = \frac{N}{Ne^2 + 1} \quad (1)$$

n: number of respondents (i.e. households)
N: number of population
e : error tolerance (i.e. 10%)

[1] Rukun Warga in an adminitrative boundary in neighborhood level. It consists of several sub-neighbourhood called as Rukun Tetangga.

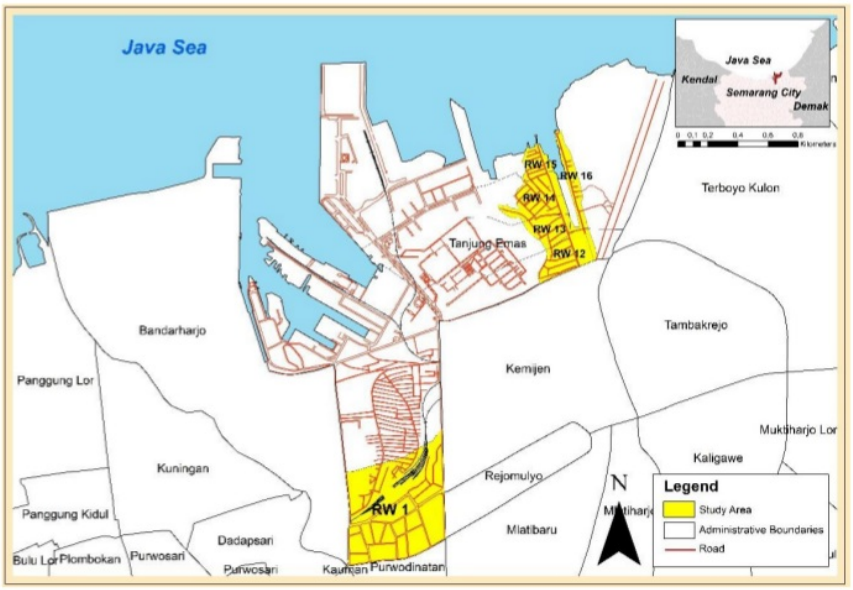


Figure 1. Study Area

The sampling method was proportional random sampling which means the number of respondents is proportionally based on the number of households in each selected RW. The respondents are divided into two main categories; 53 respondents are classified as male-headed households and 45 respondents are defined as female-headed families. The questionnaires are then compiled and interpreted in two main analyses, i.e. adaptive strategy and gender role. Types of adaptation and role of gender are summarized based on the results of the literature review.

3. Result and Discussion

3.1. Adaptation Strategy in the Selected Areas in Tanjung Mas

Adaptation strategies are those actions initiated by each household to cope with the flood in the six selected RWs in Tanjung Mas. There are three types of adaptation, categories as physical, social, and economic (see Table 1). As illustrated in the Table, there are not any significant differences on the strategies applied in male- and female-headed family. In physical aspect, elevating the house is the most common adaptation strategy. They are likely to elevate the house every 5-10 years. The cost ranging from US$ 350 – US$ 6,000 to elevate at least 3-4 meters high. Among the 98 respondents, about 50% both from male- and female-headed households borrow the money from the bank, cooperatives, and even money lenders to ensure that they are able to renovate their house. Both types of the family prefer to stay rather than move to better (no-flooded) area. There is only a slightly higher percentage of female-headed households those are move but only temporarily (during the disaster) compared to the male-headed households. The main reason why they like to stay is mainly that the current house is close enough to their workplace. Besides, they do not have enough money to move as the money has been utilized to elevate the house. Most of them are also born in the area so they have strong bonding with the place and may find difficulties to adapt to the new place.

Table 1. Adaptation Strategies in the Selected Areas in Tanjung Mas

Adaptation Form	Types of Family	YES	NO	Total
Physical				
Elevating the house	Male-headed households	85%	15%	100%
	Female-headed households	80%	20%	100%
Evacuate to temporarily place	Male-headed households	6%	94%	100%
	Female-headed households	13%	87%	100%
Social				
Being a member of social organization related to disaster	Male-headed households	19%	81%	100%
	Female-headed households	9%	91%	100%
Improving knowledge/information on the disaster (i.e. flood)	Male-headed households	74%	26%	100%
	Female-headed households	64%	36%	100%
Borrow money from neighbors	Male-headed households	51%	49%	100%
	Female-headed households	56%	44%	100%
Economic				
Alternative job during disaster	Male-headed households	25%	75%	100%
	Female-headed households	24%	76%	100%
Working family members	Male-headed households	57%	43%	100%
	Female-headed households	38%	62%	100%

Similar to the physical aspect, both types of households also have similar adaptation strategy in the social aspect. Only a few of them are engaged in the social organization. Male-headed households are more likely to be a member of social organization compared to the female-headed households. There are least four main local organizations established in the area; women organization so-called *PKK (Pendidikan dan Kesejahteraan Keluarga)*, youth organization named *Karang Taruna*, neighborhood watch known as *Siskamling*, and Save and Rescue or *SARDa*. Other adaptation strategies in the social category are improving knowledge/information and borrowing money from neighbors. All the respondents considered that knowledge is important. There are not any differences between male- and female-households in gaining and implementing their knowledge. They mostly learn and get the knowledge related to disaster from their experience. All the respondents do not receive information regularly from an appropriate official capacity building activity. Some of the interesting and practical knowledge is how they put electronics and other valuable assets on the 2nd floor and building a "small barriers" at the door to slow down water intrusion to the house. The last adaptation strategy in social aspect is borrowing money. An interesting finding that is closely related with common custom in the neighborhood is that more than half of the respondents in both types of households consider borrowing money from neighbors as a choice to deal with the disaster. There are higher percentages of female-headed households having this strategy compared with the male-headed households. On average, the money is more or less 30% of their monthly income (US$ 50), and. use to fulfill their basic daily needs.

There are also comparable adaptation strategies for both types of households in economic aspect. Most of them do not have an alternative job during the disaster and therefore, most of them are very vulnerable as they do not have an alternative to fulfill their daily needs during the disaster event. However, there are more family members work in the male-headed households compared to the female-headed households. Accordingly, mainly in economic, the female-headed households are more vulnerable compared with the male-headed households. Despite the similarity, the financial capacity is important in the adaptation strategies.

3.2. Gender Role in the Selected Households in Tanjung Mas

Following an explanation of the adaptation strategies, Table 2 explains the gender role in the selected households in Tanjung Mas. As found in the previous research, there are three categories in gender role, namely productive, reproductive, and community responsibility which is focusing on disaster preparedness and response [19][20]; with two types of families, i.e. in male- and female-headed households. There are at least two obvious findings. First, the female has a significant role as the bread-winner and the decision maker in female-headed households only. Second, the female has a dominant role in domestic works for both types of households. There is only slightly higher role of man in taking care of the children in comparison two other types of domestic responsibilities such as washing dishes and cleaning the house. Those two profiles suggest the households applied traditional family value where the man has more concern on the economic issues while the woman more into the responsibility for managing the household works.

Regarding the gender role related to the disaster (i.e. flood), Table 2 shows the role in three phases; pre-disaster, during disaster, and post-disaster. It can be seen in Table 2 that obviously in t of male-headed households, men have a very significant in all stages (pre, during, and pot disaster), and the women have a role mostly only in the female-headed family. However, in particular role, namely accessing knowledge on the disaster, rescuing family members and assets and almost all post-disaster activities, there is slightly an equal role between men and women mostly in the male-headed households.

3.3. Brief Discussion

This study has shown adaptation strategies at the household-level in one most vulnerable neighborhood in Semarang coastal area to deal with the flood, regarded as a regular or common disaster. Following the findings on the adaptation option, there is an analysis of the gender role to further elaborate implementing the strategy.

Female-headed households in the study area are likely to be more vulnerable at least for two reasons. The first is because the women in the family who performs as the bread-winner is low educated, so the second is women are likely to have lower income compared with men in the male-headed family. Fig. 2 and Fig. 3 present the comparison of income and education between male and female-headed households.

Despite female-headed households are more vulnerable for several reasons, however, both types of households have similar adaptation strategies. Both households are likely to elevate their house as the priority to live in the area. The main differences on the strategies are only in regard to the social form of adaptation such as taking part in the social organization and improving knowledge those are preferable only for the male-headed households and decision to stay in the temporary houses during a flood is preferable only for the female-headed households.

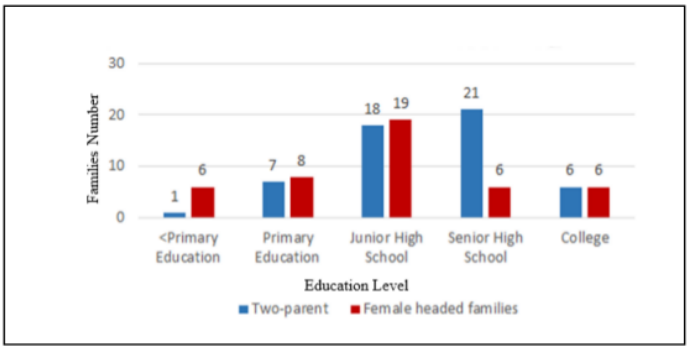


Figure 2. Education Level in Tanjung Mas, 2015

Table 2. Gender Role in Selected Households in Tanjung Mas

		Male	Female	Male Dominance	Female Dominance	Equal	Total
Productive Profile							
Breadwinner	Male-headed households	28.3%	0.0%	37.7%	3.8%	30.2%	100%
	Female-headed households	6.7%	75.6%	0.0%	11.1%	6.7%	100%
Family decision maker	Male-headed households	37.7%	0.0%	58.5%	1.9%	1.9%	100%
	Female-headed households	4.4%	75.6%	6.7%	13.3%	0.0%	100%
Domestic Responsibilities							
Taking care of the children	Male-headed households	1.9%	47.2%	11.3%	34.0%	5.7%	100%
	Female-headed households	0.0%	88.9%	0.0%	11.1%	0.0%	100%
Preparing food	Male-headed households	1.9%	77.4%	0.0%	18.9%	1.9%	100%
	Female-headed households	0.0%	88.9%	0.0%	11.1%	0.0%	100%
Washing dishes	Male-headed households	1.9%	64.2%	3.8%	28.3%	1.9%	100%
	Female-headed households	0.0%	84.4%	0.0%	15.6%	0.0%	100%
Washing clothes	Male-headed households	1.9%	71.7%	0.0%	24.5%	1.9%	100%
	Female-headed households	0.0%	84.4%	0.0%	15.6%	0.0%	100%
Cleaning house	Male-headed households	1.9%	52.8%	9.4%	34.0%	1.9%	100%
	Female-headed households	0.0%	80.0%	0.0%	20.0%	0.0%	100%
Cooking	Male-headed households	1.9%	79.2%	0.0%	17.0%	1.9%	100%
	Female-headed households	0.0%	88.9%	0.0%	11.1%	0.0%	100%
Disaster preparedness & response							
Pra Disaster							
Building protection	Male-headed households	20.8%	0.0%	64.2%	0.0%	15.1%	100%
	Female-headed households	2.3%	69.8%	9.3%	4.7%	14.0%	100%
Knowledge on disaster	Male-headed households	17.0%	0.0%	30.2%	0.0%	52.8%	100%

		Male	Female	Male Dominance	Female Dominance	Equal	Total
	Female-headed households	17.8%	44.4%	0.0%	0.0%	37.8%	100%
Being a member of social organization	Male-headed households	7.5%	0.0%	3.8%	0.0%	1.9%	13.2%
	Female-headed households	2.2%	11.1%	0.0%	0.0%	6.7%	20.0%
During Disaster							
Rescuing family members	Male-headed households	1.9%	0.0%	67.9%	0.0%	30.2%	100%
	Female-headed households	0.0%	40.0%	15.6%	15.6%	28.9%	100%
Rescuing assets	Male-headed households	3.8%	0.0%	52.8%	0.0%	43.4%	100%
	Female-headed households	0.0%	46.7%	11.1%	24.4%	17.8%	100%
Basic needs fulfilment	Male-headed households	28.3%	3.8%	30.2%	1.9%	35.8%	100%
	Female-headed households	4.4%	77.8%	2.2%	6.7%	8.9%	100%
Post Disaster							
Cleaning the house	Male-headed households	0.0%	0.0%	54.7%	0.0%	45.3%	100%
	Female-headed households	0.0%	60.0%	6.7%	4.4%	28.9%	100%
House renovation	Male-headed households	24.5%	0.0%	47.2%	0.0%	28.3%	100%
	Female-headed households	4.4%	42.2%	6.7%	11.1%	35.6%	100%
Living cost	Male-headed households	34.0%	0.0%	26.4%	3.8%	35.8%	100%
	Female-headed households	0.0%	75.6%	13.3%	11.1%	0.0%	100%

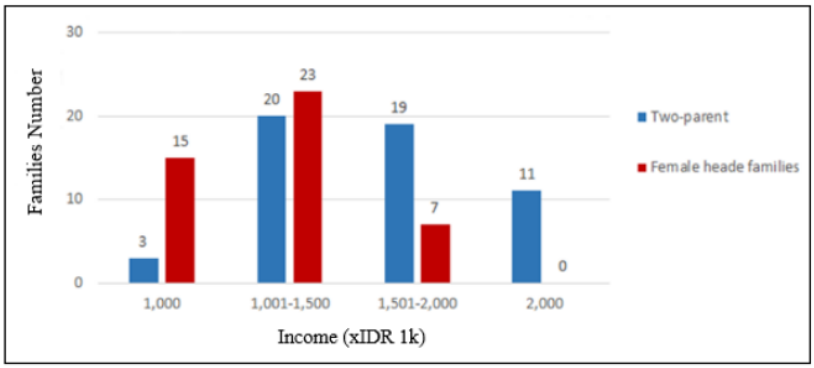


Figure 3. Level of Income in Tanjung Mas, 2015

The situation is an imbalance in the female-headed family where the women become the breadwinner. In this household, women have the double burden, to generate income as well to ensure that various domestic jobs are well completed. In the male-headed family, even though women have the responsibility in doing all the domestic jobs, but they are not the main income earner in the family. However, both types of families are likely to have a similar approach in dealing with flood and end with the same decision, i.e. stay instead of move to the saver areas. The findings much in line with a study in Nigeria, it does not necessarily to assume that female-headed families are poorer and therefore regard as more vulnerable even though they are likely to be low educated and earn less income than man [14].

4. Conclusion

The research resulted there are not any significant differences in the climate change adaptation strategies applied in male- and female-headed households. This shows that women in the female-headed households with their double burden, perform very well in managing their roles. Even though female-headed households are categorized as more vulnerable but the study has shown an evidence that women have good adaptation strategies to survive and even more become resilient. To end, in particular perspective, it may not be relevant to state that woman and female-headed households are likely to be more vulnerable compared to their counterparts.

References

[1] Takagi H, Esteban M and Thao N D 2014 *Introduction: Coastal Disasters and Climate Change in Vietnam* ed Thao N D, Takagi H and Esteban M (UK: Oxford) pp xxi-xxviii
[2] Wamsler C, Brink E and Rivera C 2013 Planning for climate change in urban areas: from theory to practice *Journal of Cleaner Production* **50** pp 68-81
[3] McGranahan G, Balk D and Anderson B 2007 The rising tide: assessing the risks of climate change and human settlements in low elevation coastal zones *Environment and Urbanization* **19**(**1**) pp 17-37
[4] Chandrappa R, Gupta S and Kulshrestha U C 2011 Coping with climate change: principles *and Asian context* (Heidelberg: Springer Science & Business Media) pp. 117-46
[5] Alston M 2013 Women and adaptation *Wiley Interdisciplinary Reviews: Climate Change* **4**(**5**) pp 351-8
[6] Terry G 2009 *Climate change and gender justice* (Warwickshire, UK: Oxfam GB,)
[7] Arora-Jonsson S 2011 Virtue and vulnerability: Discourses on women, gender, and climate change *Global Environmental Change* **21**(**2**) pp 744-51

[8] Alston M 2014 Gender mainstreaming and climate change *Women's Studies International Forum* **47** pp 287-94
[9] Van Aelst K and Holvoet N 2016 Intersections of gender and marital status in accessing climate change adaptation: Evidence from rural Tanzania *World Development* **79** pp 40-50
[10] Bhattarai B, Beilin R and Ford R 2015 Gender, agrobiodiversity, and climate change: A study of adaptation practices in the Nepal Himalayas *World Development* **70** pp 122-32
[11] Huynh P T and Resurreccion B P 2014 Women's differentiated vulnerability and adaptations to climate-related agricultural water scarcity in rural Central Vietnam *Climate and Development* **6**(**3**) pp 226-37
[12] Liu C, Esteve A and Treviño R 2017 Female-headed households and living conditions in Latin America *World Development* **90** pp 311-28
[13] Flatø M, Muttarak R and Pelser A 2017 Women, weather, and woes: the triangular dynamics of female-headed households, economic vulnerability, and climate variability in South Africa *World Development* **90** pp 41-62
[14] Oginni A, Ahonsi B and Ukwuije F 2013 Are female-headed households typically poorer than male-headed households in Nigeria? *The Journal of Socio-Economics* **45** pp 132-7
[15] Buvinić M and Gupta G R 1997 Female-headed households and female-maintained families: are they worth targeting to reduce poverty in developing countries? *Economic development and cultural change* **45**(**2**) pp 259-80
[16] Handayani W and Kumalasari N R 2015 *Migration as future adaptive capacity: The case of Java – Indonesia* ed Hillmann F, Pahl M *et al* (London: Environmental Change, Adaptation and Migration: Bringing in the Region) pp 117–38
[17] CBS (Central Bureau of Statistics) 2016 Tanjung Mas Village Monograph Semarang
[18] Singarimbun M 1982 *Survey Research Method* (in Indonesia) (Jakarta: Lembaga Penelitian Pendidikan dan Penerangan Ekonomi dan Sosial)
[19] Rochmayanto Y and Kurniasih P 2013 Gender role in climate change adaptation of mountainous ecosystem in Solok Regency, West Sumatra (in Indonesia) *Jurnal Analisis Kebijakan Kehutanan* **10**(**3**) 203-213.
[20] Fakih M 1996 Gender as a Tool in Social Field of Analysis (in Indonesia) *Jurnal Analisis Sosial* ed 4

Climate change adaptation in Tanjung Mas - Semarang: A comparison between male- and female-headed households

ORIGINALITY REPORT

10%	8%	9%	%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	repository.up.ac.za Internet Source	4%
2	catalog.ihsn.org Internet Source	2%
3	"Climate Change Adaptation in Africa", Springer Science and Business Media LLC, 2017 Publication	1%
4	www.rff.org Internet Source	1%
5	mpra.ub.uni-muenchen.de Internet Source	<1%
6	iccc.uns.ac.id Internet Source	<1%
7	Byela Tibesigwa, Martine Visser. "Assessing Gender Inequality in Food Security among Small-holder Farm Households in urban and rural South Africa", World Development, 2016 Publication	<1%

8	Gideon Baffoe, Hirotaka Matsuda. "An Empirical Assessment of Households Livelihood Vulnerability: The Case of Rural Ghana", Social Indicators Research, 2017 Publication	<1%
9	Jemimah Njuki, Mariam Mapila, Susan Kaaria, Tennyson Magombo. "Using community indicators for evaluating research and development programmes: experiences from Malawi", Development in Practice, 2008 Publication	<1%
10	Sara Horrell, Pramila Krishnan. "Poverty and productivity in female-headed households in Zimbabwe", The Journal of Development Studies, 2008 Publication	<1%
11	Cynthia B. Lloyd, Anastasia J. Gage-Brandon. "Women's Role in Maintaining Households: Family Welfare and Sexual Inequality in Ghana", Population Studies, 1993 Publication	<1%
12	www.worldvision.ca Internet Source	<1%
13	Rijkers, Bob, and Rita Costa. "Gender and Rural Non-Farm Entrepreneurship", World Development, 2012. Publication	<1%

14	Heumann, Nicole(Zentrum für Internationale Entwicklungs- und Umweltforschung, Sektion 2: Ernährungssicherung). "Social support networks of South African farm dwellers in the context of household food and livelihood security : a mixed methods approach from a gender perspective ", Justus-Liebig-Universität Gießen, 2011. Publication	<1%
15	Sylvia Chant. "Women-Headed Households", Springer Science and Business Media LLC, 1997 Publication	<1%
16	Katrien Van Aelst, Nathalie Holvoet. "Climate change adaptation in the Morogoro Region of Tanzania: women's decision-making participation in small-scale farm households", Climate and Development, 2017 Publication	<1%

Exclude quotes	On	Exclude matches	Off
Exclude bibliography	On		