Migration management to reduce the risk of climate change: government perspective

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Abstract. This research is driven by the phenomenon of the increasing trend of population migration from agricultural and coastal areas due to climate change. The impact of climate change that is felt most severely by the population is the reduction in agricultural production, which then impacts decreasing household income. To meet household economic needs, some residents respond by migrating outside the village in search of work. This research uses a qualitative approach with in-depth interview techniques, Focus Group Discussion (FGD), and observation. The research locations were East and North Lombok Regency, NTB Province. The results showed no management of migration due to the impact of climate change by the NTB provincial government and district governments. There are no programs aimed at facilitating migration due to the impacts of climate change. Therefore it is necessary to include migration as a strategic issue in the adaptation and mitigation action plan to address the impacts of climate change at both the national and regional levels with the Ministry of Manpower and its aides-de-camp as the sector leading.

1. Introduction

The increase in temperature over the last ten years has caused changes in rain patterns that impact water availability and drought on the island of Lombok[1-4]. The drought that hit several areas on the island of Lombok had a more severe impact than in previous years, especially in North Lombok and East Lombok districts[5,6]. This condition impacts decreasing agricultural yields, particularly plantation crops such as cocoa and tobacco in North Lombok and East Lombok [7,8]. As a result of the extreme rainfall, hundreds of hectares of tobacco plants have been damaged. The extreme rainfall has also caused a decline in cacao plants' production in North Lombok up to 50 percent [8].

Farmers and fishers have carried out various strategies to overcome the decline in income due to uncertain climate variability [9]. Migration as a strategy for climate change impacts is generally the last option, which is carried out when there are no more strategies that can be carried out in the environment where they live in adapting to environmental changes or climate change that occurs[10-11]. To avoid uncontrolled migration, the government in the origin's area should take anticipations to direct or control migration due to climate change. Anticipation can be done by issuing various policies or programs related to migration management to minimize the negative impact of migration as a result of climate change.

Migration related to climate change does not stand alone but is influenced by other factors, including social, economic, political, demographic, and environmental factors[12]. The decision to migrate also depends on the household characteristics and among other factors that can prevent or facilitate migration related to climate change. Migration can be carried out permanently or non-permanently both within the country (internally) and abroad (internationally). In the future, migration...
flows due to climate change's impact will increase[13-15]. Therefore, specific migration management is needed compared to regular migration management.

The International Organization for Migration-IOM has developed a population mobility management model, but it focuses on forced migration, known as the “Migration Management Cycle”[16]. According to the IOM model, migration management includes five stages, namely as follows: preventing, preparing, managing, mitigating and addressing. The Migration Management Model developed by IOM will be referred to in this study but carried out with various adjustments. The framework that will be used in this research includes: prevention, preparation, arrangement, mitigation and handling stage. The focus of this research is related to the management of migration as a result of climate change from a government perspective. Boldly, the results of this study can be used as material for consideration in the formulation of migration policies that are sensitive to climate change.

2. Methods
This research uses a qualitative approach and data collected through desk reviews, in-depth interviews, focus group discussions (FGD), and observations. The data and information sought in this study are about policies and programs related to migration management, which is an alternative strategy for the adaptation of the population in facing climate change. Migration is a strategy to maintain oneself in social and economic life. The information and data explored are related to the government's concern in responding to climate change problems that have occurred in their regions and what policies have been made by the government in managing migration to overcome the impacts of climate variability. The government referred to in this research is the provincial government, including local governments in the area of origin.

This research is conducted in East and North Lombok, West Nusa Tenggara (NTB) Province. Aside from the climate change experience, another reason underlying the choice of NTB Province as the research location is that the provincial government has responded to climate change. The NTB Provincial Government has formed a Task Force Team to Control the Impact of Climate Change (Tim Kecil Satuan Gugus Tugas Pengendalian Dampak Perubahan Iklim) which is preparing Regional Action Plans (RAD) related to climate change. The RAD of the NTB provincial government will also respond to the concern of the impacts of climate change at the city/district level, and it is also related to the management of migration as a result of climate change.

3. Results and Discussion

3.1. NTB Government policies related to climate change
The NTB government is the first province to respond to the National Action Plan for Climate Change Mitigation and Adaptation (RAN-MAPI) by forming a Task Force for Mainstreaming the Aspects of Climate Change through the Governor's Decree Number 219 of 2007 which was later refined and reaffirmed through the Governor of NTB Decree Number 68 of 2008 [17-20]. This task force was formed to anticipate further the impacts of climate change that will occur in NTB. The formation of this task force demonstrates the high awareness of the NTB government of the various possibilities and impacts of climate change. The main tasks of this Task Force are[20]:

a. Increase the understanding and awareness of global warming and climate change;

b. Developing information and communication systems, including global warming data and climate change and maps of disaster-prone areas;

c. Formulate and propose action plans for adaptation and mitigation of global warming and climate change;

d. Encouraging the integration of aspects of global warming and climate change on regional development policies and programs;

e. Monitoring and evaluating policies and programs related to adaptation and mitigation of global warming and climate change;

f. Reporting the results of his duties to the Governor of West Nusa Tenggara.
The membership of the task force comes from various agencies, especially specialized agencies. This formation can optimize the performance of each agency in facing the impacts of climate change. Besides involving various agencies, this task force also accommodates community participation by involving several non-governmental organizations. The parties involved and their roles in the task force can be seen in the table below.

**Table 1.** Agencies involved in the Task Force for Mainstreaming the Aspects of Climate Change in West Nusa Tenggara Province

| Agency | Focus roles in a task force |
|--------|----------------------------|
| Governor and Deputi Governor | Take full responsibility for the entire program and the activity of the task force in its role as task force builder |
| Regional Secretary | Directing the course of program and cluster activities duties in his role as task force director |
| Regional Environmental Impact Management Agency (Bapedalda) | Manage and lead the operationalization of activities task force as head of the task force |
| Food Security Affairs Agency (Badan Urusan Ketahanan Pangan) | Focus on performing roles: increase understanding and awareness of the parties about the causes and impacts of global warming and climate change |
| National Unity Agency, Community Protection (Badan Kesbanglinmas) | Focus on performing roles: Formulation of proposed adaptation action plans global warming and climate change related sectors fisheries and marine affairs and their implementation |
| Department of Fisheries and Marine Affairs (Dinas Perikanan dan Kelautan) | Focus on performing roles: Information and communication system development among others, data on global warming and climate change and maps of disaster-prone areas its implementation |
| Department of Settlement and Regional Infrastructure (Dinas Kimpraswil) | Focus on performing roles: Formulation and proposal of mitigation action plans on global warming and climate change related sectors mining and energy and their implementation |
| Mining and Energy Agency (Dinas Pertambangan dan Energi) | Focus on performing roles: Formulation and proposal of mitigation action plans and adaptation to global warming and climate change related to the forestry sector and its implementation |
| Forestry Agency (Dinas Kehutanan) | Focus on performing roles: Formulation and proposal of mitigation action plans and adaptation to global warming and climate change related to the forestry sector and its implementation |
| Agriculture Agency (Dinas Pertanian) | Focus on performing roles: Formulation and proposal of mitigation action plans and adaptation to global warming and climate change related to the agricultural sector and its implementation |
| Meteorology Climatology and Geophysics Council | Focus on performing roles: Geophysics Development of information and communication systems, including data on global warming and climate change |
| Health Agency (Dinas Kesehatan) | Focus on performing roles: Formulation and proposal of adaptation action plans global warming and climate change related sectors health and its implementation |

Sources: Primary data based on policy text, observation, interview and FGDs (2013-2019)

The results of field studies show that the policies implemented by various agencies at the provincial level are still sectoral and do not explicitly mention the impacts of climate change. Policies and programs are still being carried out to overcome various problems that arise in each sector. For
example, to overcome the drought that occurred in NTB Province, the Public Works Agency has created spring protection and water conservation through the construction of water ponds. In the fisheries and marine sector, wave breakers have been built, for example in the affected coasts north of Papena Beach. This program is part of adaptation activities to climate change in coastal areas. In the agricultural sector, the NTB provincial government has a plant pest control program such as for cocoa and coffee plants. The pest control program for plantation crops is essential in this study because it is one of the impacts of climate variability that affects farmers' income in the plantation sector.

The results of the FGDs with various agencies in NTB Province indicated that the RAD-GRK had begun to be implemented in each agency. An example is the climate village program that is under the Provincial Environmental Agency (BLHP) in the climate village program. In NTB, the climate village program is implemented in dry areas. The community is studying how to harvest rainwater for their daily needs. In this climate village, they manage their waste, i.e. not burning garbage because it can contribute to the formation of the greenhouse gas effect. Besides, there is also assistance for several cattle breeders to process cattle waste into biogas. There are also reforestation programs carried out by the forestry service and other programs which are the obligations of each agency in supporting the reduction of greenhouse gas emissions.

3.2. **The phenomenon of migration due to the impact of climate change in NTB**

As explained in the previous section, climate change has disrupted plantation production in the study area. The prolonged rainfall during the last four years has caused cocoa production in North Lombok and tobacco production in East Lombok to decrease, which has an impact on the household income of smallholder farmers on cocoa and tobacco. One of the strategies adopted by garden farmers is to migrate abroad or become migrant workers.

The results of research conducted in North Lombok Regency, which is not the origin of migrant workers sending, indicate a significant increase in the number of migrant worker shipments in early 2010, which reached nearly 50 per cent compared to the previous year. This significant increase occurred after cocoa production in this district decreased drastically. The results of interviews with tobacco farmers in North Lombok show that before 2010 they could pick tobacco fruit twice a month with a yield of 200 - 300 kilos per ha, but since 2010 they have only been able to pick two months with a yield of 10 kg per ha. The decline in cocoa production was caused by the development of pod rot pests on the cocoa plant due to prolonged rain. This condition has an impact on decreasing farmer household income. After making various efforts to restore cocoa production to normal but unsuccessful, finally encouraging some cocoa plantation farmers in North Lombok Regency to seek income in other areas, including becoming migrant workers. Before 2010, the income obtained by tobacco farmers from cocoa was relatively high. Based on this experience, some cocoa farmers take motorcycle loans from existing dealers, not only one unit, some even credit three motorbikes in one household. However, the prolonged rain, which then occurred in the following years caused the production of their cocoa plantation to experience a drastic decline and reduce their household income. As a result, some household needs cannot be met, such as sending their children to school, including paying for motorbike instalments that they have already taken. This condition forced them to look for new sources of income. Although they can fulfil basic needs such as food, they can still use intercrops such as bananas, coffee and coconuts in their gardens. To overcome this condition, one of the strategies adopted by these cocoa farmers is to become migrant workers abroad.

Although North Lombok Regency is one of the districts that send migrant workers in NTB Province, this district is not a source of migrant workers because it does not send large numbers of migrant workers, such as East Lombok, Central Lombok, West Lombok, Sumbawa and Dompu districts. The increase in the number of migrant workers from this district is suspected not only of coming from villages which are indeed migrant workers sending areas but also from villages where previously none of the communities has ever been migrant workers. This phenomenon is found in Bimbi-North Lombok. Almost all households in this hamlet earn income from cocoa farming. Before 2010, not a single resident of this hamlet worked as a migrant worker. However, when the prolonged rain caused the production of their cocoa plants to decrease drastically, some residents of this hamlet decided to become migrant workers. This migration by people in other nearby hamlets is known as
“not usually”. They use this term for people from Bimbi who previously did not become migrant workers, but now many people have become migrant workers. The results of interviews with village officials showed that in the year the number of residents who became migrant workers in this village was nine people. Meanwhile, in Selelos-North Lombok, 15 people were found who became migrant workers for the first time for the same reason.

As explained in the previous section, climate change is not the only driving factor that causes garden farmers in the study locations to migrate abroad as well as pull factors from the destination area. However, it needs to be emphasized that climate change is one of the factors that encourages them to migrate. Other driving factors include low levels of education, lack of job opportunities in the area of origin and low wages, while the pull factor from the destination area is the information on job opportunities that occur abroad and the social networks owned by migrants. These factors also influence in encouraging or attracting migrant workers at the research location to migrate abroad.

3.3. Management of migration due to climate change impacts

One of the impacts of climate change on humans is migration. Climate change will increase the migration number and will affect migration patterns and flows[13, 22-25]. Therefore, migration due to the impact of climate change needs to be appropriately managed. Even though Indonesia has made a National Action Plan to deal with Climate Change, so far not one has included migration as one of the impacts of climate change. The Ministry of Manpower, which in this case has the main task of dealing with labour management, including migration in Indonesia, does not have an action plan related to climate change. This condition has an impact on policymaking related to climate change at the regional level, including the regional government of NTB Province.

Migration management due to climate change that occurs in Indonesia can adopt migration management made by IOM for the management of forced and permanent migration due to the impacts of climate change because the migration referred to in this study is temporary migration. According to IOM, migration management due to climate change can be divided into several stages, namely the stages of preventing, preparation, managing, mitigation and addressing. The five stages contain the principles that: 1) Prevent migration by carrying out various programs to overcome the impacts of climate change so as not to disrupt or cause migration. 2) If migration must occur, the government must prepare and facilitate the best possible so that migration is carried out in a planned manner.

The results of FGDs with various agencies at the provincial and regency level show that there are no policies/programs aimed at managing migration due to the impact of climate change, either directly aimed at preventing migration or preparing or facilitating migration to take place by cocoa plantation farmers in North Lombok and tobacco farmers in East Lombok. Nonetheless, the local government, through related agencies has indirectly made efforts to prevent migration through programs to improve the production of plantations owned by smallholders in the two districts. For example, the plantation office in North Lombok has carried out a program of mowing or wrapping cocoa pods to prevent fruit pests, rejuvenating cocoa plants with new plants or with a shoot grafting system. However, this program can only be carried out on a small scale due to the limited budget owned by the government and the capital owned by the farmers so that not all farmers can benefit from the program. Meanwhile in East Lombok, to overcome the decline in tobacco production, the government through the plantation office has made various efforts, including conducting counselling and conveying rainfall information (from BMKG) to tobacco farmers so that they can help farmers determine planting time and provide seed assistance to farmers who are not company partners. If these programs are successful in overcoming the decline in the production of farms owned by farmers, they can automatically prevent migration. However, it seems that the programs carried out by the local government are not entirely successful so that some farmers decide to look for work in other areas, including becoming migrant workers.

In addition to programs to deal with reduced production due to the impact of climate change, provincial and district governments have programs to prevent migration that occurs due to the impacts of climate change. Among other things, through expanding job opportunities by creating 100,000 new entrepreneurs and providing capital for community empowerment through collaborative business groups. In enhancement to the absence of policies or programs explicitly aimed at preventing
migration, both the provincial and district governments do not have policies to facilitate or facilitate migration due to the impact of climate change. Migration management policies that are carried out are still like regular migration management (business as usual). As is well known, NTB is one of the second largest migrant workers sending in Indonesia. Sending Migrant workers is still considered as a solution to the problem of unemployment which is relatively high in the area of origin [26]. Several policies issued by the NTB provincial government to facilitate the sending of Indonesian migrant workers abroad, including the One-Stop Services program for the placement and protection of Indonesian workers in Mataram City. Through this program, all the document-making processes required for the departure of Indonesian labour migrants to be completed in one place are expected to accelerate or shorten the time for processing documents. This policy has been in effect since 2008 and is still running today.

4. Conclusion
The results of this study indicate that the phenomenon of migration resulting from climate change has begun to occur in Indonesia. Although this phenomenon is currently insignificant, with the increasing impact of climate change, especially in agricultural and fisheries areas, where most of the population's livelihoods are highly dependent on climate change, the flow of migration may be even more significant in the future.

Migration management due to climate change's impact can actually be carried out in several stages, but basically contains two principles, namely preventing migration or if migration must occur, then migration must be planned migration. The results showed no management of migration due to the impacts of climate change by the NTB provincial government and district governments. Some government officials do not yet understand migration as one of the strategies undertaken by the population to overcome the impacts of climate change, so it is still challenging to make migration management policies due to climate change impacts.

Migration management that has been carried out so far is still ordinary. Although some government programs can be categorized as preventing migration, this is not explicitly stated. Meanwhile, the programs implemented are related to efforts to facilitate migration, especially for international migration, such as dealing with business as usual. There are no programs aimed at facilitating migration due to the impacts of climate change. Therefore it is necessary to include migration as a strategic issue in the adaptation and mitigation action plan to address the impacts of climate change at both the national and regional levels with the Ministry of Manpower and its staff as the sector leading.

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