

# Analysis Indonesia government policy on mitigation and adaptation of climate change in the livestock sector

A Prima<sup>1</sup>, E Prayitno<sup>1</sup>, D W Harjanti<sup>1</sup>, R Hartanto<sup>1</sup>, D Koubodana<sup>2</sup> and M Mumtaz<sup>3</sup>

<sup>1</sup>Department of Animal Science, Faculty of Animal and Agricultural Sciences, Universitas Diponegoro, Semarang, Central Java, Indonesia

<sup>2</sup>Section Climate Change and Water Resources ITRA, Lomé, Togo

<sup>3</sup>Department of Management Science, University of Haripur, Haripur, Pakistan

E-mail: ari.prima56@gmail.com

## Abstract

Livestock sector are contributors of green house gases (GHG) emissions caused climate change, at the same time, climate change also has a negative impact on the livestock sector. This study aimed to analysis Indonesia government policy on mitigation and adaptation of climate change in the livestock sector. The method for analysis in this study namely 1) collect documents related to climate policy related to climate, environment, national development plan, land and agricultural. 2) Analysed documents related to the livestock sector that was in alignment with national development and also with sustainable development goals (SDGs). The results of the analysis in the second step are then scored. Based on the policy areas that have been made, policies related to sector climate change adaptation and mitigation in the livestock sector was found in the policy area on climate, namely in the policy document on the Guidelines for Determining Climate Change Mitigation Action, the policy area on climate gets a score of 1 for mitigation policy strength and coherence, while in other policy areas there are no policies related to adaptation and mitigation in the livestock sector. It can be concluded that Indonesian government policies related to adaptation and mitigation efforts in the livestock sector were still lack.

Keywords: livestock, climate change, policies, Indonesia goverment

## Introduction

Climate change has been coming over the world. This is characterized by increasing temperatures, changing rainfall patterns, extreme droughts, and rising sea levels [1]. This climate change is caused by greenhouse gas emissions from human activities, one of which is in the livestock sector. The main GHG emissions from the livestock sector are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and (N<sub>2</sub>O). Globally, the livestock sector contributes 44% anthropogenic CH<sub>4</sub>, 53% anthropogenic N<sub>2</sub>O, and 5% anthropogenic CO<sub>2</sub> emissions [2]. At the same time, climate change also has a negative impact on the livestock sector. The negative impacts include limited availability of

feed and water, decreased feed quality, increased disease cases, heat stress attacks, which in turn will reduce livestock productivity, so that food security will be disrupted which will certainly make it difficult to fulfil the food supply of humans whose population continues to increase [3].

Seeing the large contribution of the livestock sector to climate change and the negative impact it has on the livestock sector, adaptation and mitigation efforts are needed to address these problems. The need for adaptation is an effort to increase the resilience of livestock productivity to climate change that is currently happening, while mitigation is a technical and management effort in order to reduce GHG emissions from the livestock sector and an environmentally friendly integrated livestock system [4]. These adaptation and mitigation efforts need to be a concern for farmers, academics, and also the government. Farmers as actors who are directly involved in activities at the on-farm level, academics can play a role in providing input based on the results of studies from research to farmers and the government, and no less important is the government as a policymaker. Adaptation and mitigation efforts to climate change will be more effective if they are increased at the policy level [3]. IPCC [5] reported countries in the Southeast Asian region such as Indonesia are experiencing extreme increases in temperature and the contribution of GHG emissions at high levels from human activities. Based on this explanation, this study is important to analyse the Indonesian government's policies in making policies related to adaptation and mitigation in the livestock sector.

## Materials and Methods

This study analysed the policies of the Indonesian government in adaptation and mitigation efforts in the livestock sector to climate change. The method for analysis in this study refers to Ashley [6]. 1) the first step is to collect documents related to climate policy related to agricultural policy because livestock is one of the sub-sectors of agriculture and policy area of the national development plan it cannot ignore the livestock sector because livestock is one of the contributors to national income. Policy in land-related the livestock sector is one of the businesses that require a large area of land. In the environmental area, the livestock sector is one that contributes to emissions. These documents were collected from the relevant institutions. The document was reviewed to study further whether there are discussions related to adaptation and mitigation in the livestock sector. 2) The second step was analysed documents related to the livestock sector that was in alignment with national development and also with sustainable development goals (SDGs). The results of the analysis in the second step are then scored according to the provisions in Table 1.

**Table 1.** Scoring for policy strength and coherence for livestock sector climate change adaptation and mitigation

| Level of Coherence | Description                                                         | Score |
|--------------------|---------------------------------------------------------------------|-------|
| High               | The policy strongly aligns with SDGs related to livestock sector 1) | 3     |

|         |                                                                                                                                                                                                                     |   |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|         | adaptation or 2) mitigation. Policy devotes specific attention to climate adaptation and/or mitigation in the livestock sector. The policy includes specific activities, measures, and approaches aligned with SDGs |   |
| Partial | The policy supports SDGs related to livestock sector 1) adaptation or 2) mitigation but has relatively fewer details and specific activities, measures, and approaches                                              | 2 |
| Limited | The policy supports the SDGs related to livestock sector 1) adaptation or 2) mitigation but lacks details and specific activities, measures, and approaches.                                                        | 1 |
| None    | There is no evidence that the policy supports the SDGs related to livestock sector 1) adaptation or 2) mitigation                                                                                                   | 0 |

## Results and Discussion

Documents on policies related to climate change made by the Indonesian government are shown in Table 2. Policies related to climate and the environment were obtained from the Ministry of Environment and Forestry, policy documents related to agriculture were obtained from the Ministry of Agriculture, and policy documents related to the national development plan were obtained from the Ministry of National Development Planning. Policies related to land are obtained from the Ministry of Agrarian and Spatial Planning. Based on the documents that have been collected, in general, the Indonesian government is quite serious in addressing climate change, this can be seen from the various policies that have been made related to climate change. The reviews carried out on these policy documents are used to determine the Scoring for policy strength and coherence for livestock sector climate change adaptation and mitigation as shown in Table 3. Based on the policy areas that have been made, policies related to sector climate change adaptation and mitigation in the livestock sector was found in the policy area on climate, namely in the policy document on the Guidelines for Determining Climate Change Mitigation Action, the policy area on climate gets a score of 1 for mitigation policy strength and coherence, while in other policy areas there are no policies related to adaptation and mitigation in the livestock sector.

The policies found in the Determining Climate Change Mitigation Action document related to the livestock sector are described in mitigation actions in the agricultural sector. In this sector there are two components related to livestock, 1) mitigation actions through the use of livestock manure for biogas, including the development of a biodigester and the use of animal manure as organic fertilizer, with indicators of success in increasing biodigester development and increasing the use of organic fertilizer by farmers. This mitigation action component is also supported by policymaking on the provision of incentives; 2) improvement of feed supplements,

including the application of molasses in feed and the application of concentrates for animal feed, with indicators of success in increasing the provision of molasses and feed for livestock, this mitigation action is supported through socialization activities. Although there were policies related to mitigation efforts in the livestock sector, the mitigation action policies have not been clearly spelled out and do not lead to SDGs so that they get a score of 1. Such as providing incentives related to biodigester improvement, has not been explained to whom incentives are given and how many incentives are given. Pineiro et al. [7] suggest that the provision of incentives as a mitigation effort must have clear and detailed targets on how much incentives are given and it is emphasized whether the incentives are voluntary or mandatory because if it is a voluntary form, farmers tend to be reluctant to carry out low-emission farming practices because the low emission farming could have a negative impact on the productivity of the livestock. Then in the provision of concentrate feed, it is also not explained about the quality of the concentrate given and what is the maximum percentage of molasses for livestock. Giving concentrates does have a positive impact on reducing emissions such as methane gas, but it needs to be clarified, such as by determining nutrient quality standards in concentrates and levels of concentrate fed to animals because if the concentrate is given too high it will cause the rumen pH to become acidic and acidosis. Haque [8]. Seeing these conditions in making government policies, it is better to involve farmers as well as academics and practitioners who understand the technical conditions so that the policies made are targeted and sustainable.

**Table 2.** Policy Documents Related to Climate Change

| Policy Area | Document                                                                                                                                                                                                                                                                               | Source                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Related to livestock                                              |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| Climate     | <ul style="list-style-type: none"> <li>Guidelines for developing climate change action adaptation</li> <li>Climate Village Program</li> <li>Guidelines for Determining Climate Change Mitigation Action</li> <li>Climate Change Vulnerability Index Data Information System</li> </ul> | <ul style="list-style-type: none"> <li>Regulation The Minister of Environment And Forestry of The Republic Indonesia Number P.33/Menlhk/Setjen/Kum.1/3/2016</li> <li>Regulation The Minister of Environment and Forestry of The Republic Indonesia, Number P.84/Menlhk/Setjen/Kum.1/11/2016</li> <li>Director General of Climate Change Control, 2018</li> <li>Director General of Climate Change Control, 2017</li> <li>Regulation of The Director General of Climate Change Control P.9/PPI/SET.8/REN.2/9/2020</li> </ul> | Yes (Guidelines for Determining Climate Change Mitigation Action) |

|             |                                                                                                                                                 |                                                                                                                                                                                     |    |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
|             | <ul style="list-style-type: none"> <li>• Strategic plan of the directorate general of climate change control 2020 – 2024</li> </ul>             |                                                                                                                                                                                     |    |
| Agriculture | <ul style="list-style-type: none"> <li>• Early Warning System and Management the Impact of Climate Change on the Agricultural Sector</li> </ul> | <ul style="list-style-type: none"> <li>• Regulation of The Minister of Agriculture, Number 39/PERMENTAN/HM.130/8/2018</li> </ul>                                                    | No |
| Development | <ul style="list-style-type: none"> <li>• Climate Resilience Development Policy</li> </ul>                                                       | <ul style="list-style-type: none"> <li>• Ministry of National Development Planning/Bappenas. 2021</li> </ul>                                                                        | No |
| Land        | <ul style="list-style-type: none"> <li>• Guidelines for Developing Spatial Plan for Province, District and City</li> </ul>                      | <ul style="list-style-type: none"> <li>• Regulation The Minister of Agrarian and Spatial Planning/Head The National Land Agency The Republic of Indonesia Number 1, 2018</li> </ul> | No |
| Environment | <ul style="list-style-type: none"> <li>• Protection and Management of The Environment</li> </ul>                                                | <ul style="list-style-type: none"> <li>• Law The Republic of Indonesia Number 32, 2009.</li> </ul>                                                                                  | No |

**Tabel 3.** Policy Area Strength and Coherence for Livestock Sector Climate Change Adaptation and Mitigation

| Policy Area | Adaptation Score | Mitigation Score |
|-------------|------------------|------------------|
| Climate     | 0                | 1                |
| Agriculture | 0                | 0                |
| Development | 0                | 0                |
| Land        | 0                | 0                |
| Environment | 0                | 0                |

The absence of evidence of policies for adaptation and mitigation related to the livestock sector in agricultural areas, development plans, land and also the environment needs further attention for the Indonesian government. In making adaptation and mitigation policies in the livestock sector, integrated policies are needed in the areas of climate, environment, land and development planning as well as the need for an important role from policy makers from the agricultural sector. For example, in Kenya and Ethiopia, integrated policies across sectors (climate, environment, land and

development planning, agriculture) have succeeded in supporting mitigation and adaptation efforts in the livestock sector [6].

## Conclusion

Based on that study, it can be concluded that Indonesian government policies related to adaptation and mitigation efforts in the livestock sector were still lack.

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