

Macroeconomic impacts of climate change on four priority sectors of adaptation in Indonesia*

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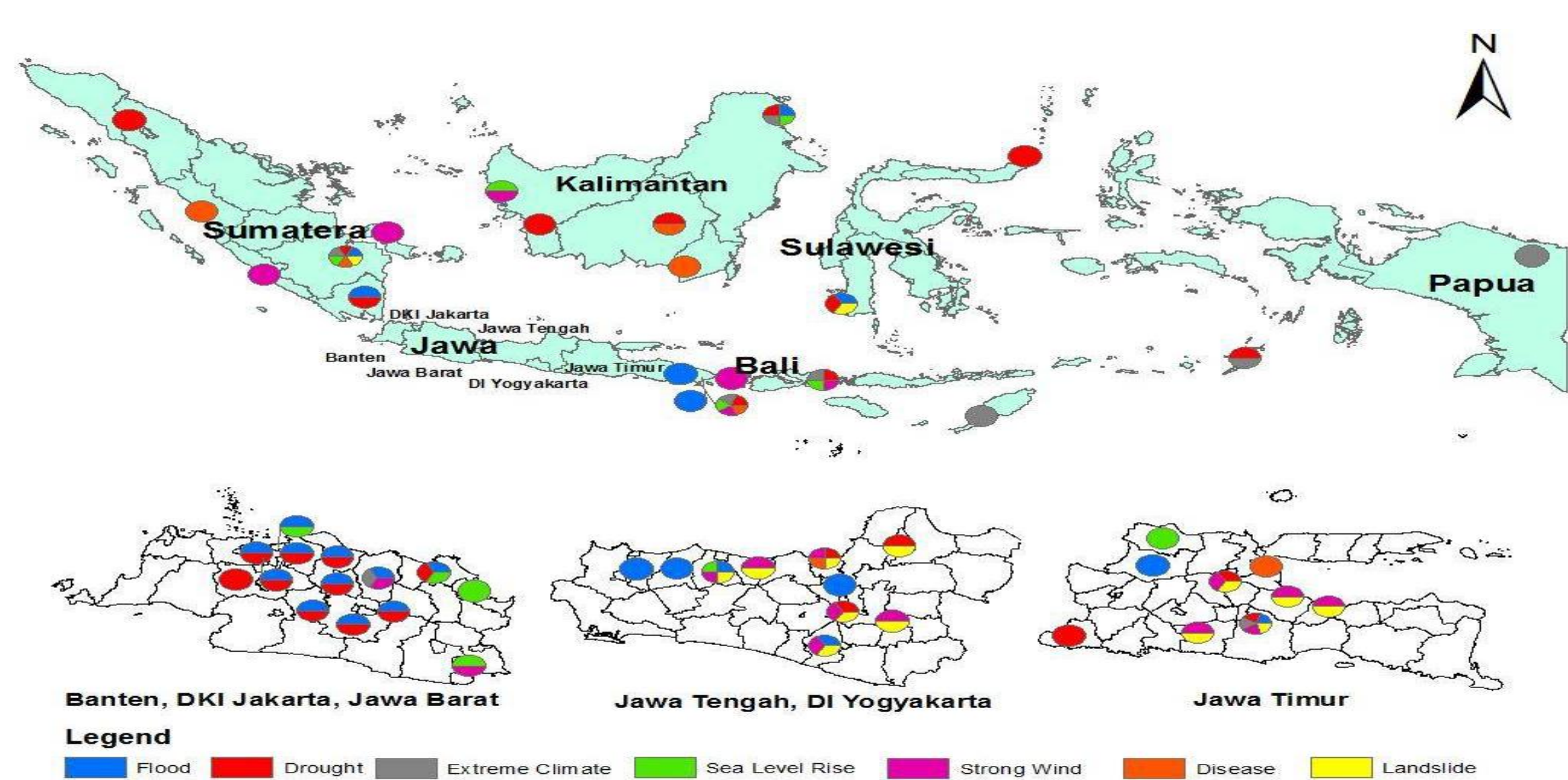
*It is under finalization for journal submission

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Background

- Climate change is predicted to increase the climate change related disasters in Indonesia by 80% which requires the integrated approach between mitigation and adaptation (UNFCCC, 2016);



Source: CCVIA Country Report (2016) as mentioned at the following link:
http://ditjenppi.menlhk.go.id/reddplus/images/resources/ws_transperancy_framework/r2_04_adaptasi.pdf

- The Indonesian national planning (BAPPENAS) selected four key sectors of adaptation in Indonesia (agriculture, water, marine and fishery, and health) (RAN API Review, 2018);
- The Indonesian government aims to secure the resilience of priority development sectors by aiming to reduce the GDP loss due to climate change impacts to **0.11% by 2024** (RPJMN, 2020-2024);
- As the negative impacts of climate change will also affect the overall economic sectors, it is necessary *to examine the macroeconomic impacts of climate change on four priority sectors of adaptation in Indonesia to estimate total adaptation cost.*

Method and scenario setting

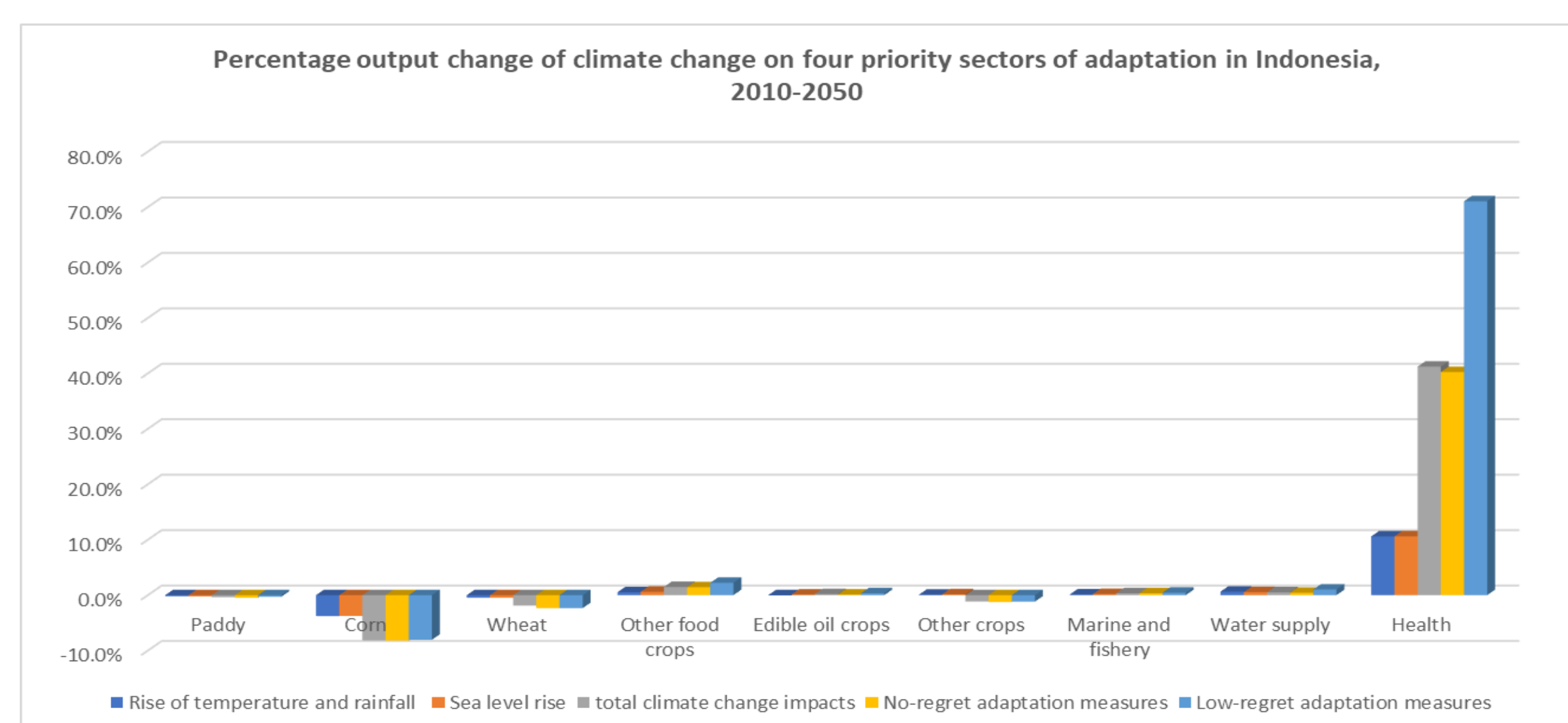
- The method applied in this study is comparative static AIM/CGE [Indonesia] model developed by the NIES;
- The AIM/CGE [Indonesia] model is based on 2010 Indonesia IO table published by Bureau of Central Statistics with modification to have 46 sectors (Abdullah and Masui, 2019).
- The scenarios setting in this study consists of two parts: (i) climate change impacts scenarios by 2050 (scenario 1,2&3); and (ii) adaptation scenarios (scenario 4&5) (see table 1).

Table 1: Scenario setting in this study

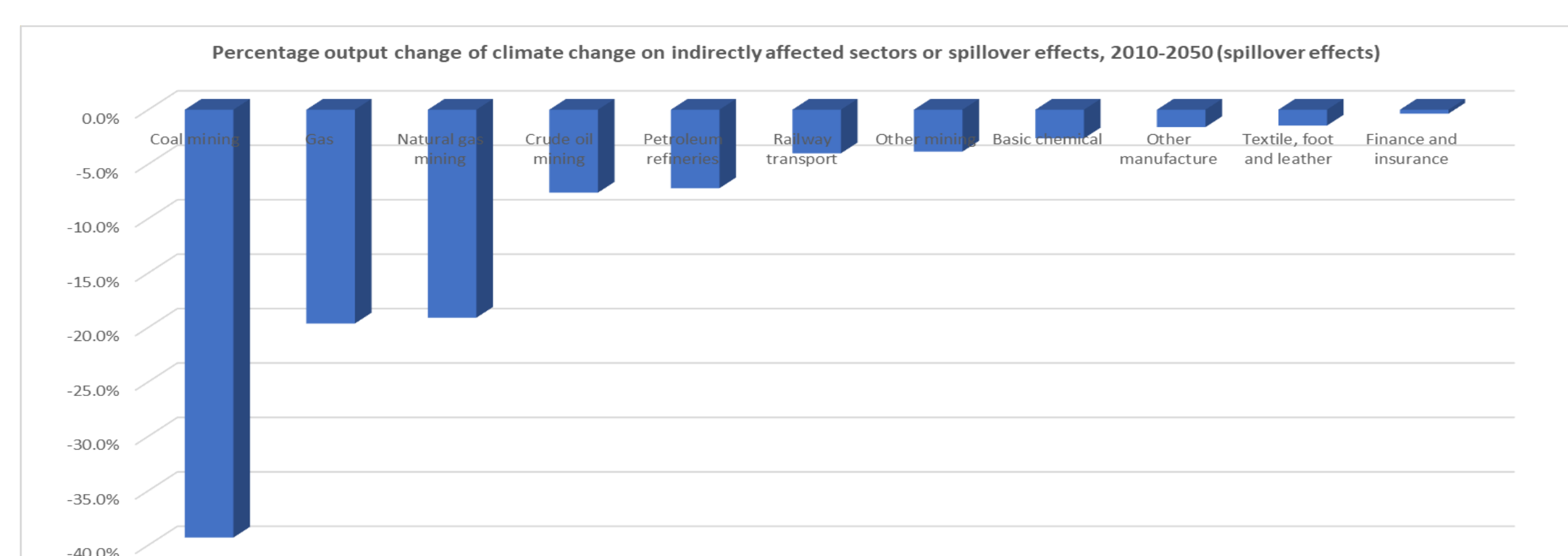
No	Scenario	Paddy	Soybean and sugarcane	Corn	Marine and fishery	Health	Settlement due to coastal flooding
1.	Rise of temperature and rainfall	-21.9%	-1.73%	31.3%	0	-32.3%	0
2.	Sea level rise	-0.4%	0.02%	-0.2%	-0.6%	0	-0.8%
3.	Total climate change impacts	-22.3%	-1.75%	31.2%	-0.6%	-32.3%	-0.8%
4.	No-regret adaptation measures*	9%**			-5%	6%	9%
5.	Low-regret adaptation measures***	-6%			7%	100%****	16%

Note: * represents the average change of total budget of four ministers (agriculture, marine and fishery, health and public work of Indonesia) from 2015 to 2019; ** represents the average change of all budget under ministry of agriculture, *** represents the average change of the total budget spent for the planned adaptation measures under the four ministries (agriculture, marine and fishery, health and public work of Indonesia) from 2015 to 2019; **** it is assumed that maximum percentage share is 100%. Source: Author's calculation based on 2010 Indonesian IO table, BAPPENAS (2014; 2015; 2019), USAID (2016) with some adjustments to have the same base year of 2010, Ministry of Finance of Indonesia (2015; 2017; 2018; 2019)

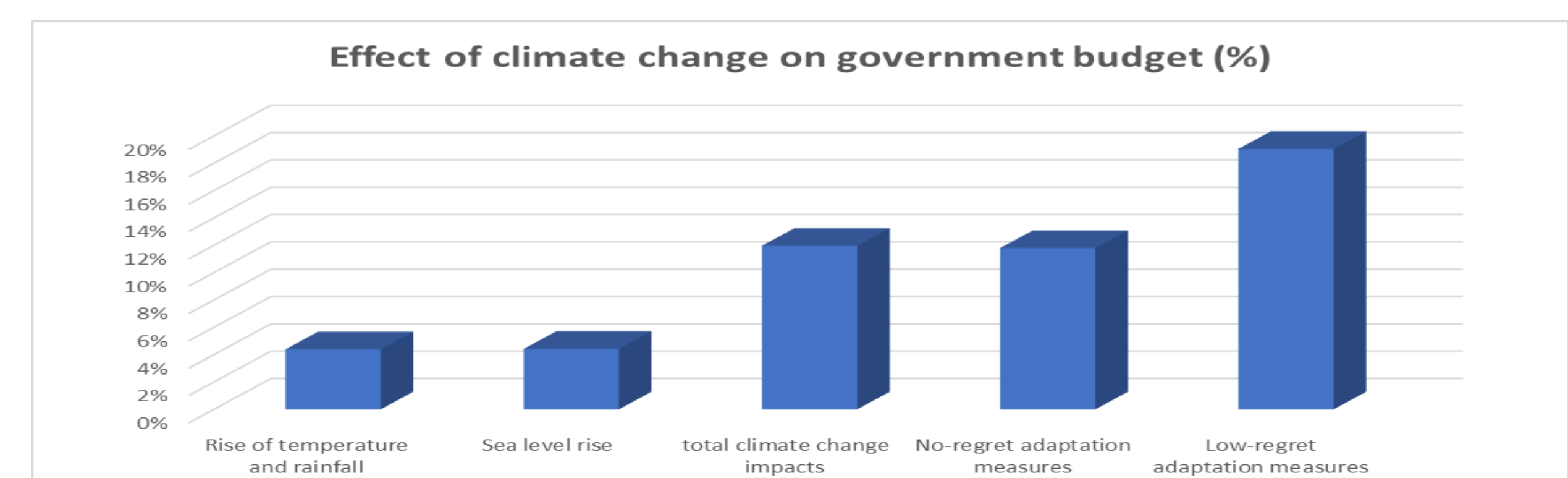
Results



Source: Authors' calculation



Source: Authors' calculation



Source: Authors' calculation

Discussion and conclusion

- The modelling results show that without any adaptation measures, the climate change affects not only four priority sectors of adaptation but also the indirectly affected sectors (energy and industry sectors) during 2010 to 2050;
- The modelling results show that the current scale of government budget spent for adaptation measures is not adequate to cover the economic impacts of climate change to 2050. This provide insights for policy makers in Indonesia to seize the opportunity for the international adaptation financial sources.