Research project of counterparts funded at UNJA

Name	Counterpart	Title
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Research summary

At the COP-26 Summit in Glasgow in 2021, Indonesia set an ambitious greenhouse gas (GHG) reduction target of net zero emissions by 2060. To achieve that goal, all sectors that contribute to the national GHG emissions have to take the necessary action to lower the GHG emissions. Agriculture is one of the contributing sectors to GHG emissions (Glenday and Paoli, 2015). It is estimated that more than 300 million tons of soil carbon have been lost from forest transformation to oil palm plantations (Shanmugam *et al.*, 2018). Indonesia is the world's major CPO producer, with a total oil palm area of more than 16 million ha, and is the biggest contributor to non-CO_2 emissions to the atmosphere. Indonesia, therefore, needs to take systematic action for the reduction of GHG emissions from the agricultural sector to support Indonesia's net zero emission by 2060.

National and international climate policies are more concentrated on reducing GHG emissions in the energy, industry, and transportation sectors and deforestation (Smith *et al.*, 2008). However, there is a lack of focus on the potential to reduce GHG emissions from agriculture. Agriculture activities contribute about 17% to GHG emissions and 7–14% to land use change (OECD, 2015). Agriculture in tropical developing countries is estimated to account for 7–9% of anthropogenic GHG emissions annually (Smith *et al.* 2014). Jambi Province is one of the ten highest-priority provinces in Indonesia to be considered for improvements to policies and programs related to smallholder oil palm farmers' improving management practices to achieve improved yield as well as to climate change (Woittiez *et al.*, 2021). The study aimed to identify smallholder farmer management practices contributing to GHG emissions from oil palm plantations.

This study was conducted in Muaro Jambi, Jambi Province. Data were collected from June to September 2022. Smallholder oil palm farmers owning 2 hectares or less of oil palm cultivation were chosen as respondents. Fifty smallholder farmers were interviewed to identify the farmers' activities in managing oil palm cultivation. The respondent scores were then grouped into the following categories: (1) 0-25% is categorized as bad (highly contributes to GHG emissions), (II) 25.01-50% (moderately contributes to GHG emissions), (III) 50.01-75% (lowly contributes to GHG emissions), and 75.01-100% is categorized as no contribution (no contribution to GHG emissions).

The 50 respondents represented a diversity of oil palm ages and farmer demographics. The farmers managed an average of 1.8 ha. The majority of farmers were aged between 40 and 53, and female respondents were in the minority (14%). In this study, the farmer's activities related to emission production are limited to agriculture, land use, forestry, tree cutting, and burning activities. Emissions practices include cutting trees for firewood, burning bushes for weeding, burning bushes as part of land clearing activities, and burning bushes after cultivation. Figure 1 shows the number of farmers' activities participating in production emissions based on these four categories.

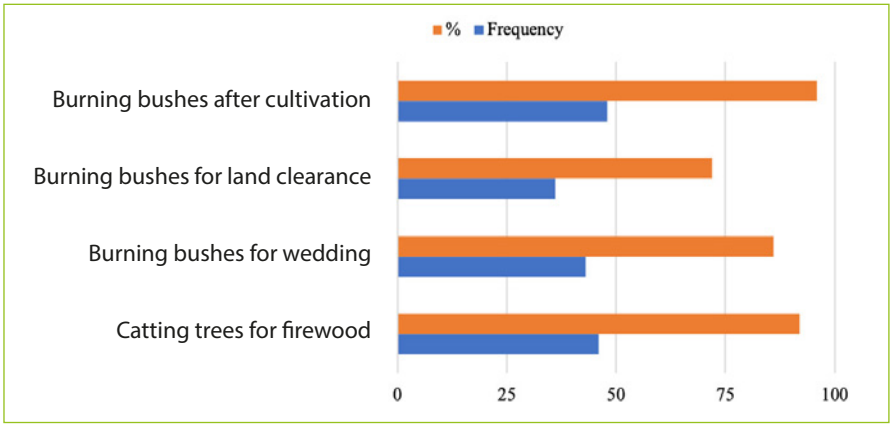

Figure 1. Farmers' activities contributing to emission production.

It can be seen from Figure 1 that the farmers are participating in all four activities that are contributing to the emissions. Of the total 50 farmers participating in this study, all are involved in activities contributing to emission produc-

tion, such as cutting trees for firewood (92%), burning bushes for a wedding (86%), burning bushes for land clearance (72%), and burning bushes for cultivation (96%). The majority of farmers weeding by burning bushes, clearing land after cultivation and gathering wood for cooking, which may be related to the smallholders' large contribution to emissions (Israel MA *et al.*, 2020). On average, 86.5% are engaged in activities that produce emissions.
The high contributions of smallholder farmers toward GHG emissions compared to farmers that implement Smart-Climate Agriculture (SCA) may indicate that the farmer's awareness and knowledge of the emissions from management practices are important factors for emission reduction. Advocacy for CSA adoption could be a necessary condition for environmental protection through the reduction of GHG emissions (Israel MA *et al.*, 2020).

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