“Enhancing Policy Intervention for Forest Fire Management in Indonesia to Reduce Greenhouse Gas Emissions

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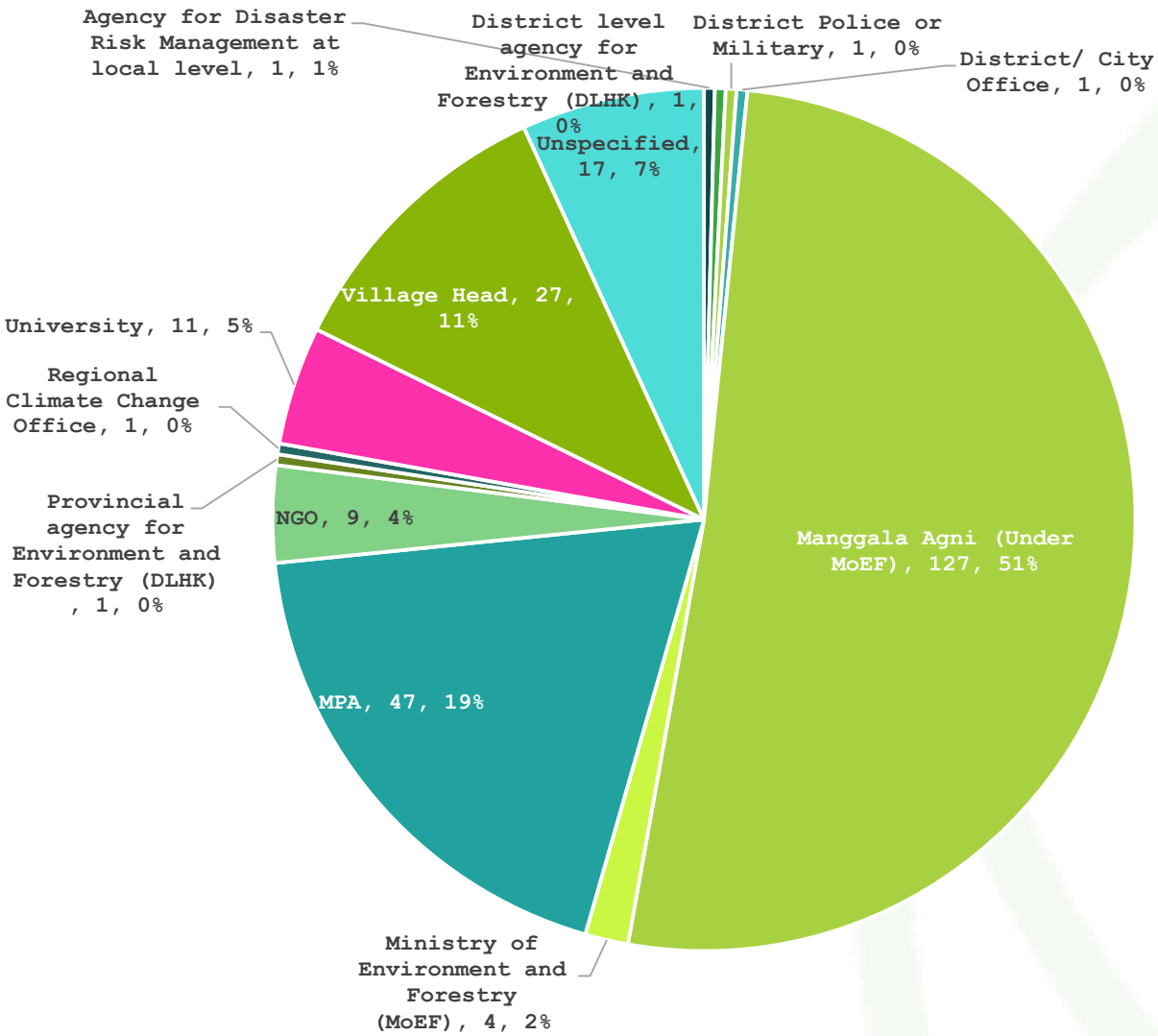
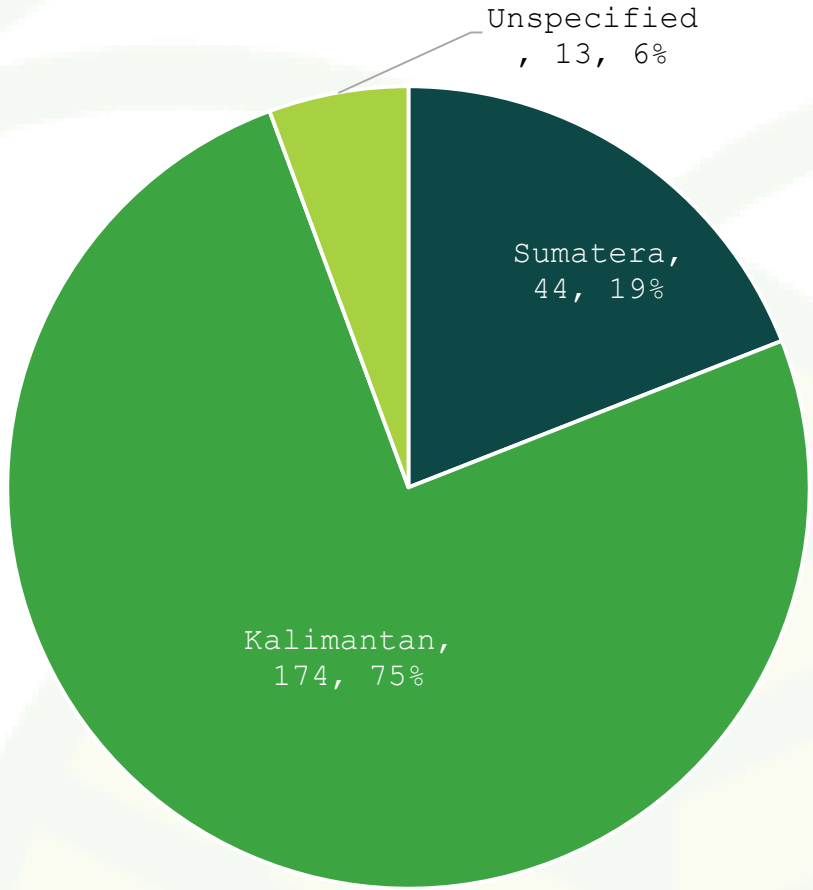
FIRES IN INDONESIA

Key challenges and significant events

1. Fires is still continue to occur, either by the community or by corporations
2. It is necessary to find a way out for the community not to burn but still be able to cultivate their land without burning
3. The government still needs a scientific base in producing its policies
4. It is necessary to increase capacity through both national and international cooperation in the process of controlling forest and land fires
5. Fire control is no longer just dealing with how to control it, but rather how to reduce the greenhouse gas emissions it produces
6. The need for scientific based to reduce greenhouse gas due to fires for intervention

Who did the survey?

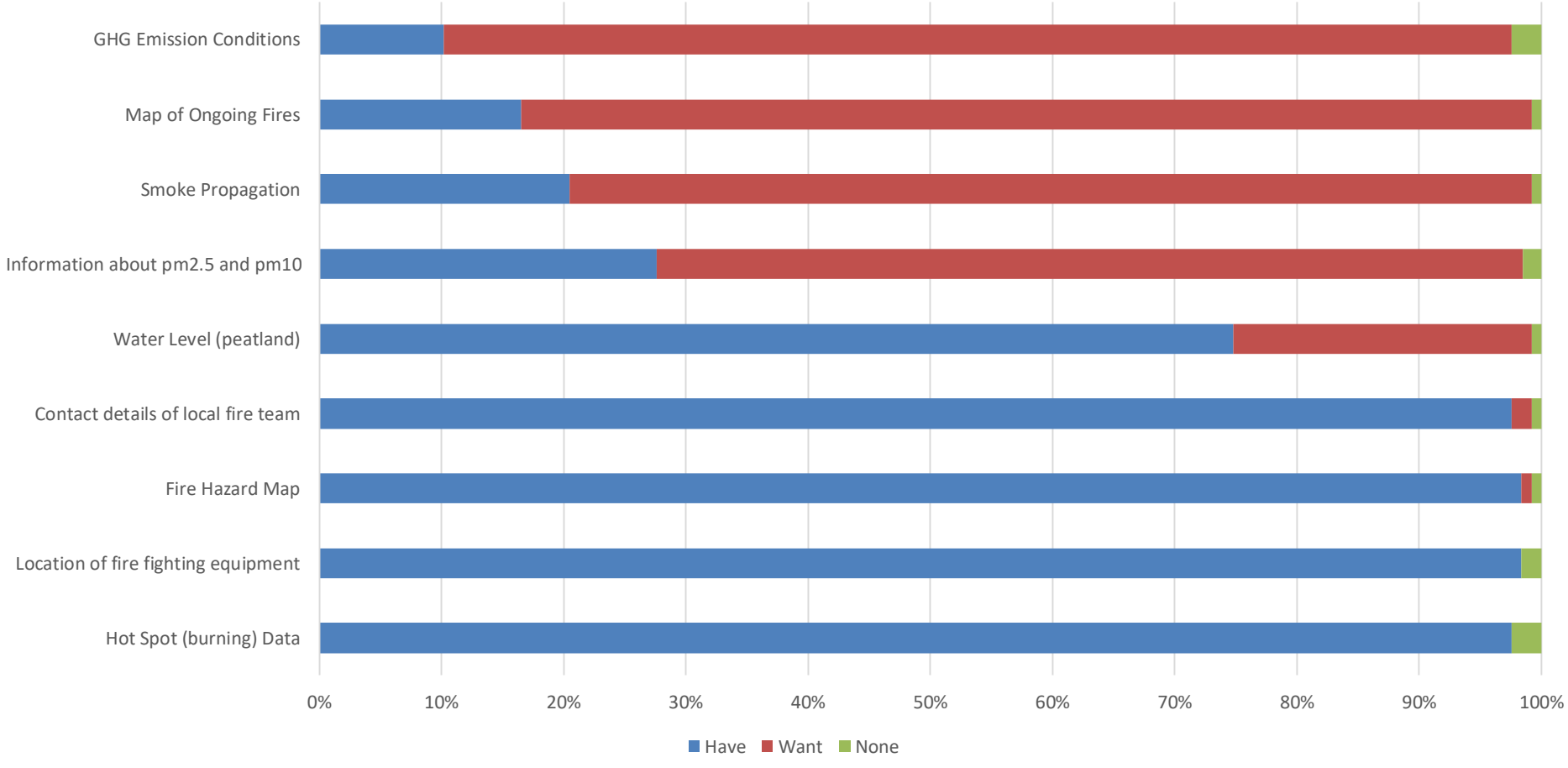




N = 248

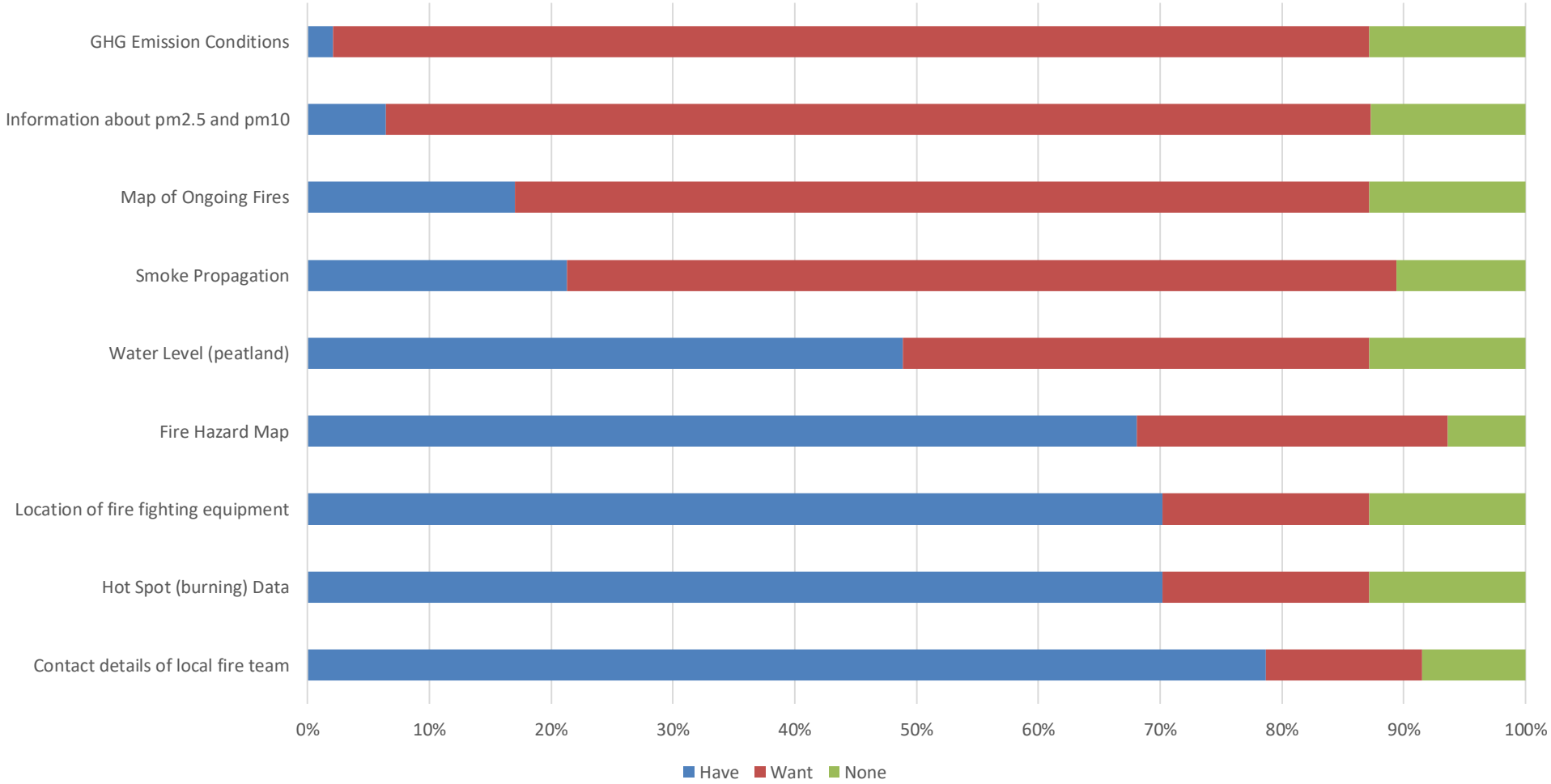
Access to Resources and Information

Manggala Agni (Under MoEF)



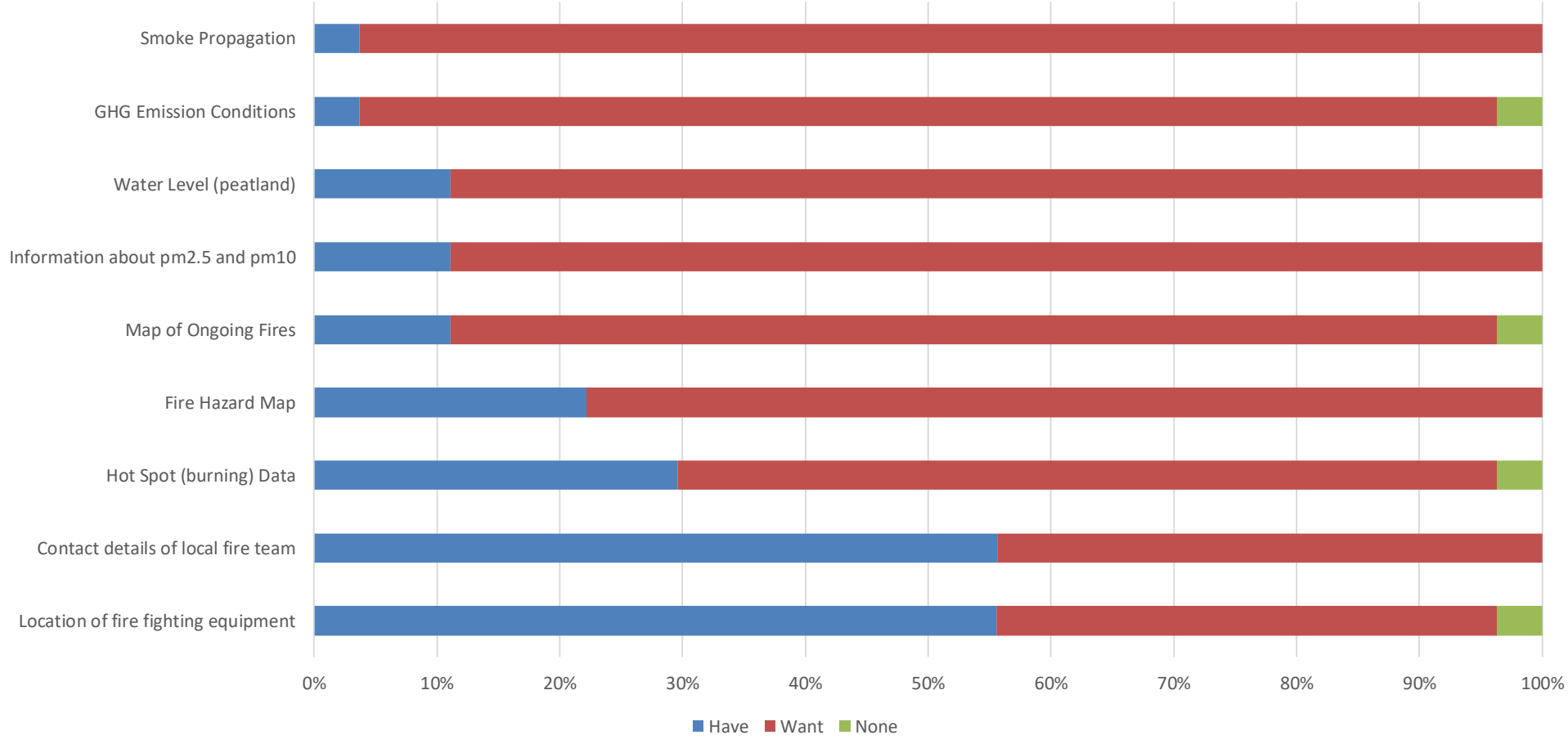
The **Manggala Agni** want access to **GHG Emission Conditions, Map of Ongoing Fires** and **Smoke Propagation** most, and already have access to **Hot Spot (burning) data, Location of fire fighting equipment** and **Fire Hazard Map.**

MPA



The **MPA** want access to **GHG Emission Conditions, pm2.5 and pm10,** and **Map of Ongoing Fires,** and already have access to **Contact details of local fire team** and **Hot Spot (burning) data.**

Village Head



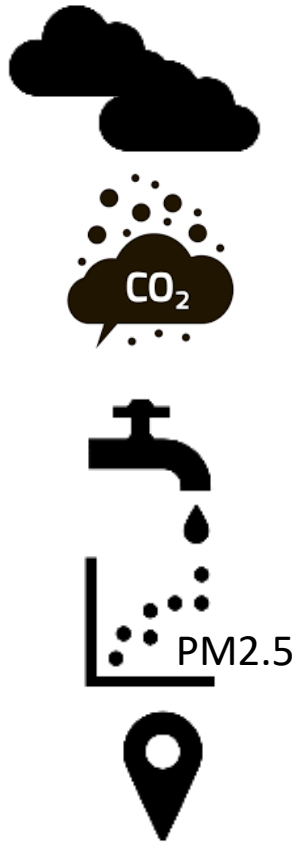
The **Village Head** want access to **Smoke Propagation, GHG Emission Conditions** and **Water Level (peatland)** most. Only 55% have access to, **Location of fire fighting equipment** and **Contact details of local fire team.**

What Information People Want

Maggala Agni

MPA

Village Head

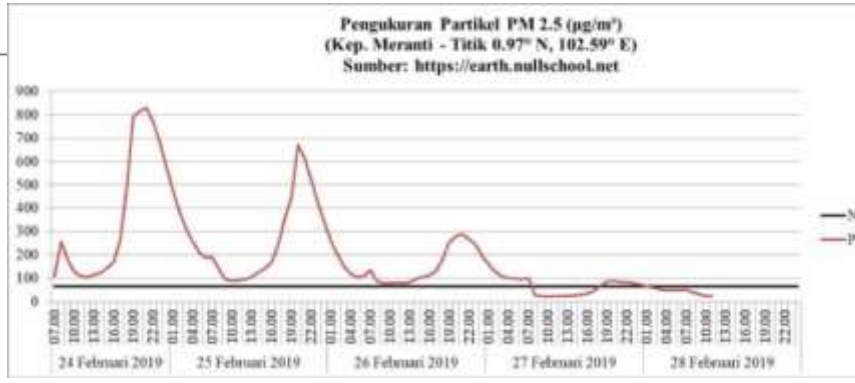


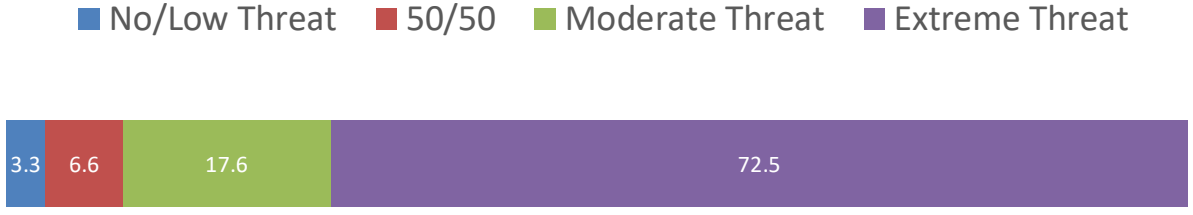
The **Manggala Agni want access to** GHG Emission Conditions, Map of Ongoing Fires, Smoke Propagation and pm2.5 & pm10 information.

The **MPA want access to** GHG Emission Conditions, pm2.5 & pm10 information, Map of Ongoing Fires, Smoke Propagation and

Receiving Information

PM2.5

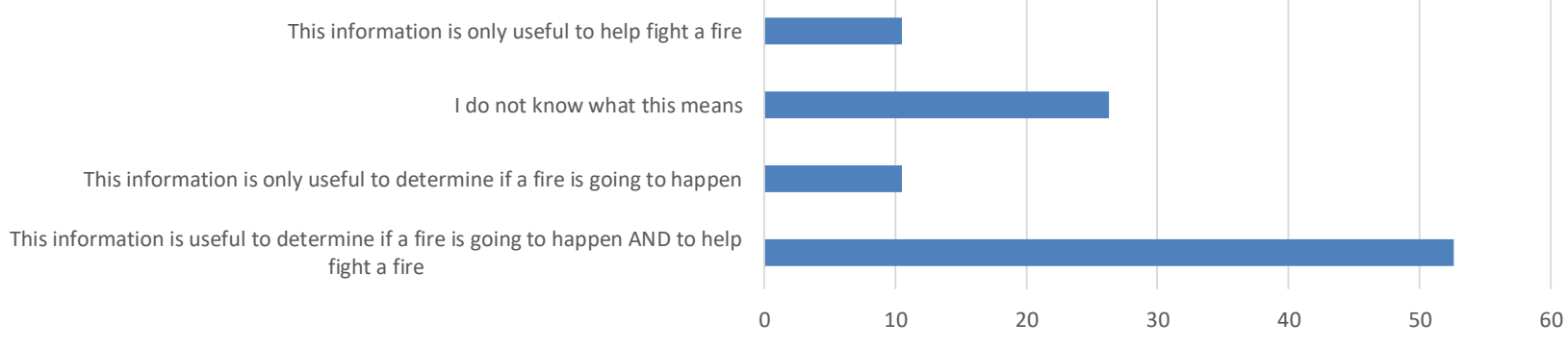




78%

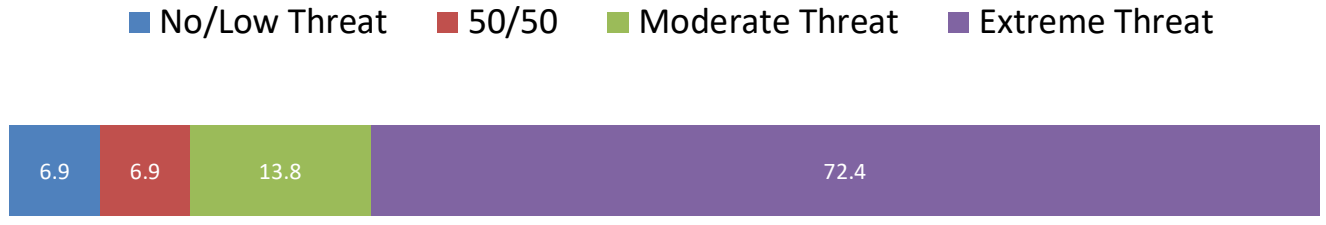
22%

The PM2.5 levels between 24 and 26 Feb 2019 were likely to be normal daily fluctuations in pollution levels.



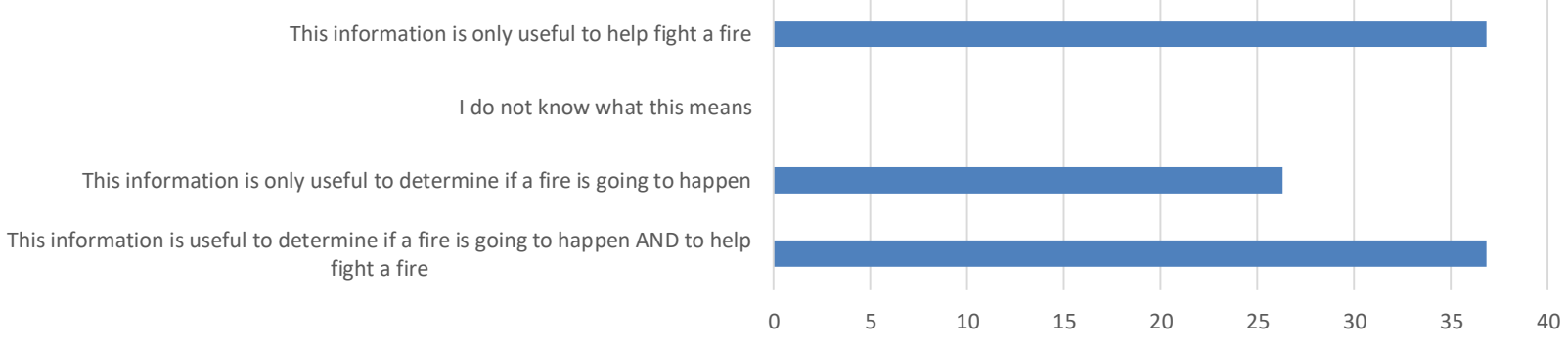
8TH INTERNATIONAL WILDLAND FIRE CONFERENCE

HotSpot

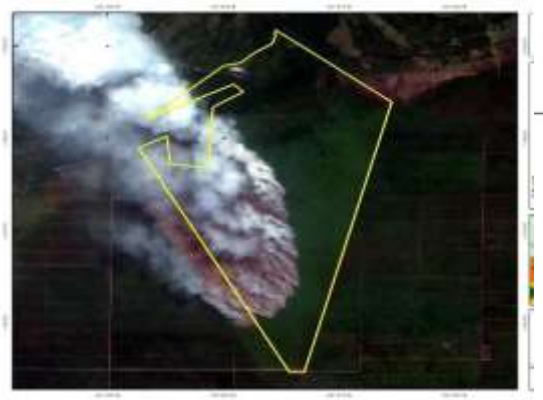


64% *The hotspot indicates there was a fire burning*

32% *The hotspot indicates there was a fire but was not as serious as other areas.*



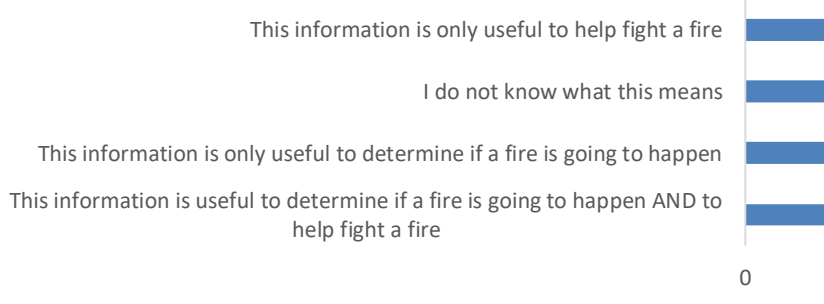
Satellite



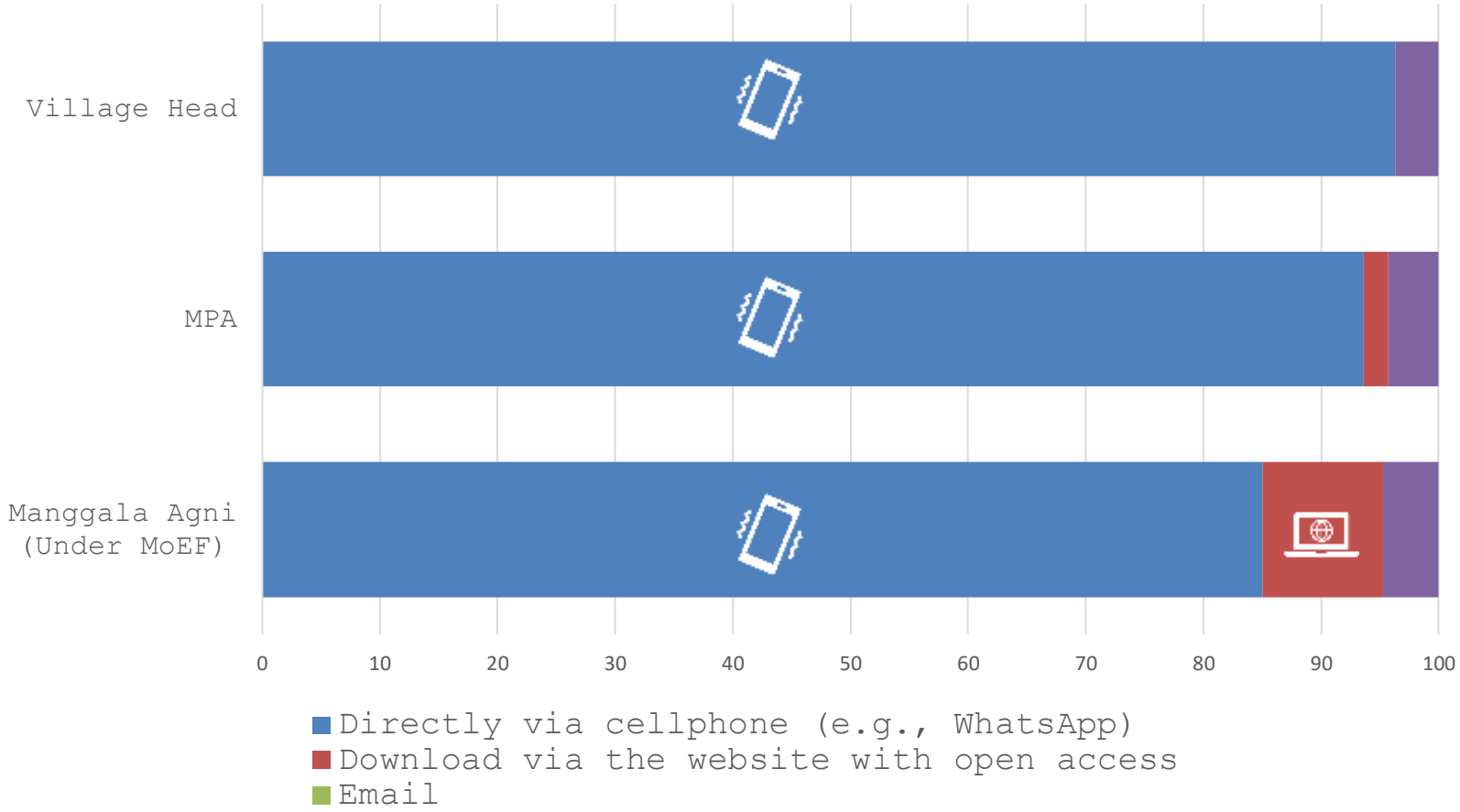
48% *There were more clouds on 3rd Mar 2020. I should check PM2.5 to confirm if the fire had been put out on 3rd Mar.*

65% *The fires that started on 1st Mar 2020 grew bigger on 2nd Mar 2020.*

32-38% *The fire produced more smoke on 1st Mar 2020 / 2nd Mar 2020 / 3rd Mar 2020.*



How do people want to receive information?



Other:

Announcement

Websites. But it can send general and specific notification via email.

Application

Special Applications that can be accessed anytime and anywhere

Commander of the team/share in the district forest and land fire group

MPA Society

The majority of people want to receive information directly via cellphone

How to Communicate Information

- Focus on providing REGULAR information on:
    - GHG emissions
    - PM2.5/10
    - Maps of ongoing fires – hotspot and thermal
    - Smoke propagation
    - Water levels

- Provide data daily or before fire breaks out
    - For example, send more regular updates in high risk or emergency

- Communicate survey data on what data they want to avoid people taking the data for granted or ignoring it
    - "*81% of MPA surveyed wanted data on PM2.5 levels so we have provided it to help you better fight fires in your province*"
    - Creates reciprocity

- Provide data via cell phone over website

How to Communicate Information

PM2.5 Levels

- When communicating PM2.5 etc. levels be sure to highlight when it is above normal fluctuations
- Supplement visual information with explanations or educate stakeholders on its meaning - consider an alternative name or brief sub title (for example "*air particle pollution level*")
- Draw similarities with known factors – i.e. pm2.5 level is the equivalent of smoking 5 cigarettes (note: make sure this is something **surprising** that will inspire action)

Fine Fuel Moisture

- Supplement map with explanations or educate stakeholders on its meaning – e.g. "*red fine fuel moisture code means that there are highly flammable particles in the air from pollution, increasing the spread of forest fires. Very high probability a fire starts.*"

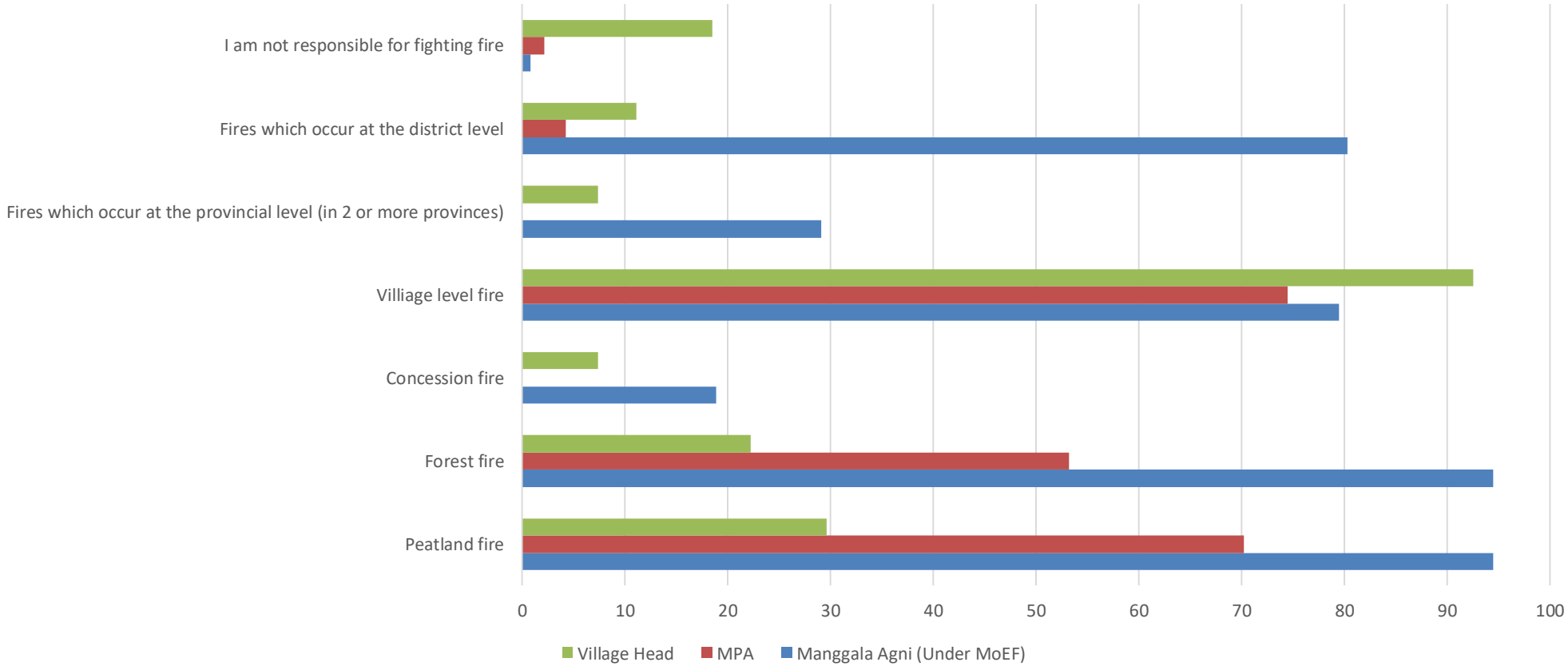
Satellite smoke images

- Create clear link between smoke and next action, such as checking PM2.5 levels to confirm if images are of fire or cloud cover

Thermal images

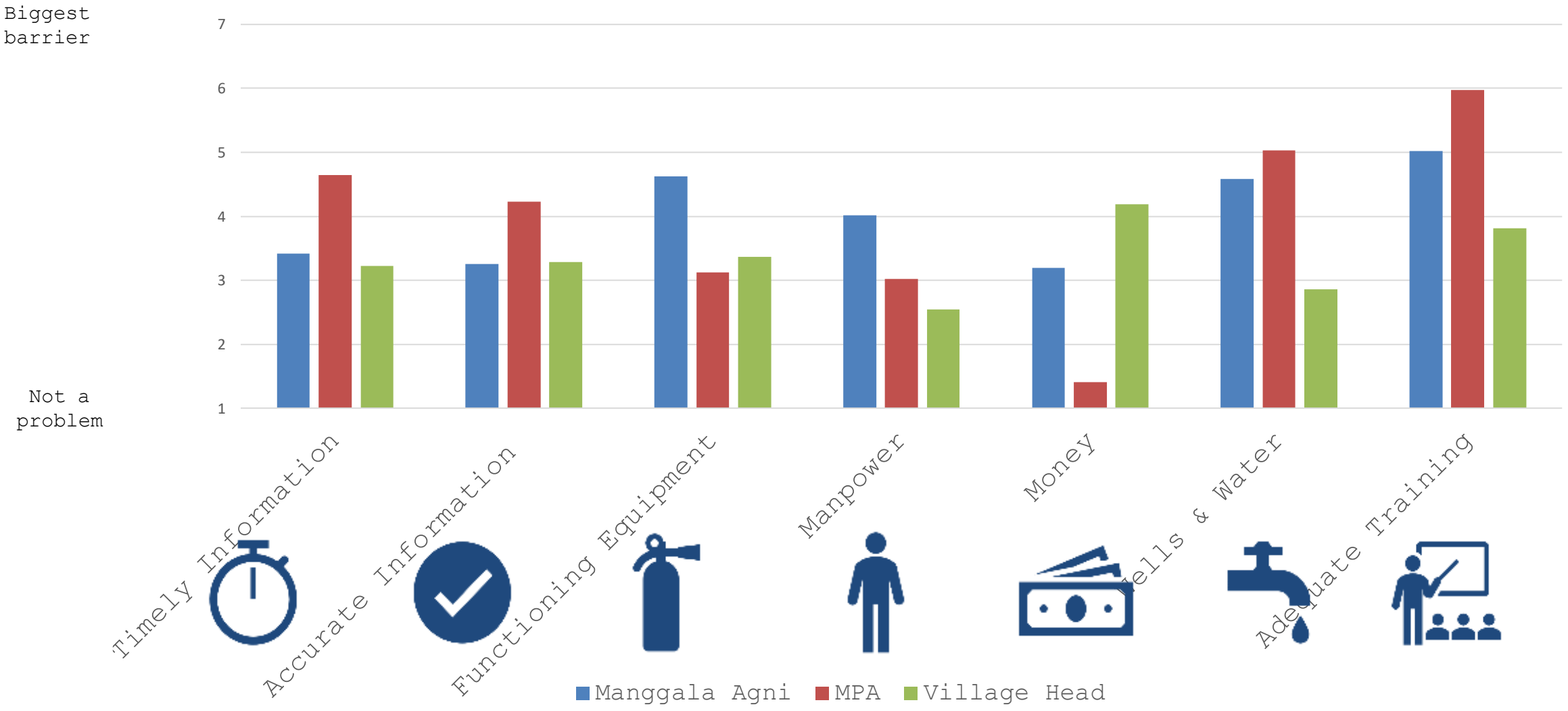
- Help people know how to read the image and what is considered 'typical' cloud cover

What types of fire do stakeholders feel responsible for?



There is an imbalance in the types of fires stakeholders feel responsible for, with many claiming responsibility for village level fires, but few claiming responsibility for concession fires.

What are the key barriers stakeholders face?



Intervention Concepts

SMS Alert System

From the research, there is good justification for the implementation of a communications infrastructure which allows key stakeholders to receive timely reminders and updates.

This infrastructure would allow you to access relevant stakeholders with targeted information in two ways;

1. Providing regular updates and reminders of fire prevention behaviours
2. Providing fire alerts and allocations of responsibility to prompt extinguishing behaviour

Automated SMS Alert System

The fastest and most efficient way to have an SMS alert system is by using an automated system, or a bot. This reduces human error and limits the amount of input needed.

How does it work?

Using a centralised system, text messages are automatically triggered based on 'rules' that have been set up in advance.

e.g. Every Friday, a pre-prepared text is sent to all Manggala Agni

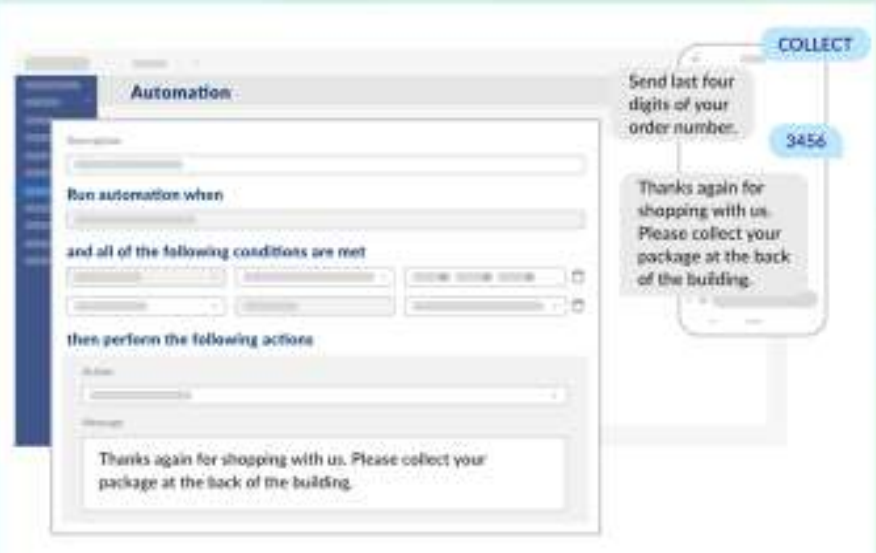
e.g. When someone texts 'FIRE' to the dedicated number, the bot texts back "Where is the fire located?".

How do we set it up?

This is easily set up and managed through a paid software.

Some feasible options are:

- Keap
- Botsify
- Infobip



Regular Updates

The aim of the regular updates is to:

- Provide information about fire risk status
- Prompt stakeholders to review data and for this to become a habit
- Prompt stakeholders to partake in mitigation behaviours proportionate to the risk level.
- Motivate stakeholders to uphold their responsibility to fight fires

Messages should include:

- Personalisation (names/areas/job titles)
- Call to action

Message Variation:

- Call to action (fire risk status linked)
- Motivational e.g. What other people are doing or how their actions can protect community/ environment
- Timely/ holiday relavent

Every Friday AM

MPA

Hello [name],

It's **Fire-Check Friday**! [Area] has been rated as low fire risk. Log on to your account here to review the key data updates.

Did you know, in a recent survey, almost all of your fire prevention colleagues in Sumatra and Kalimantan recognised you, the MPA, as most responsible for extinguishing fires!

Thank you for your continued commitment to a Clean Air Indonesia.

Village Head

Hello [name],

It's **Fire-Check Friday**! [Area] has been rated as low fire risk. Log on to your account here to review the key data updates.

Remember this week to arrange a training for your Fire Fighters on 'Interpreting Fire Data'. If you need assistance with this, please contact [mobile]

Thank you for your continued commitment to a Clean Air Indonesia.

Manggala Agni

Hello [name],

It's **Fire-Check Friday**! [Area] has been rated as HIGH fire risk. Log on to your account here to review the key data updates.

Remember this week to:
- Share information about water sources with fire fighters
- Share fire risk data with media

Thank you for your continued commitment to a Clean Air Indonesia.

Community SMS Report Hotline

The aim of the hotline is to:

- Collect information about fire events in the local area in a way which is:
  - Easy
  - Fast
  - Anonymous
- Increase sense of responsibility for preventing fires as a community

Fire Communication/ Allocation

The aim of the fire notification is to:

- Providing stakeholders with instant notifications about fire events in their area
- Reducing diffusion of responsibility
- Providing people with the appropriate information they need to fight the fire
- Providing stakeholders with an opportunity to seek assistance with fire fighting

Personalisation

Hello [name],

At [time] there was a fire hotspot detected in your area at [coordinates?], it has been evaluated as a **[small]** fire. For further information about the fire access the data here. — Information

The MoEF have assigned you and your team to extinguish it, please assemble your team and depart ASAP. — Make them feel accountable

The nearest water source to this destination is: [location] — Information about potential barriers

Confirm that you will attend the fire by responding to this text with a 'Y'. — Increase commitment

For assistance fighting the fire at any time, respond to this message with an 'A'. — Allow to easily ask for help

Website Information Sharing

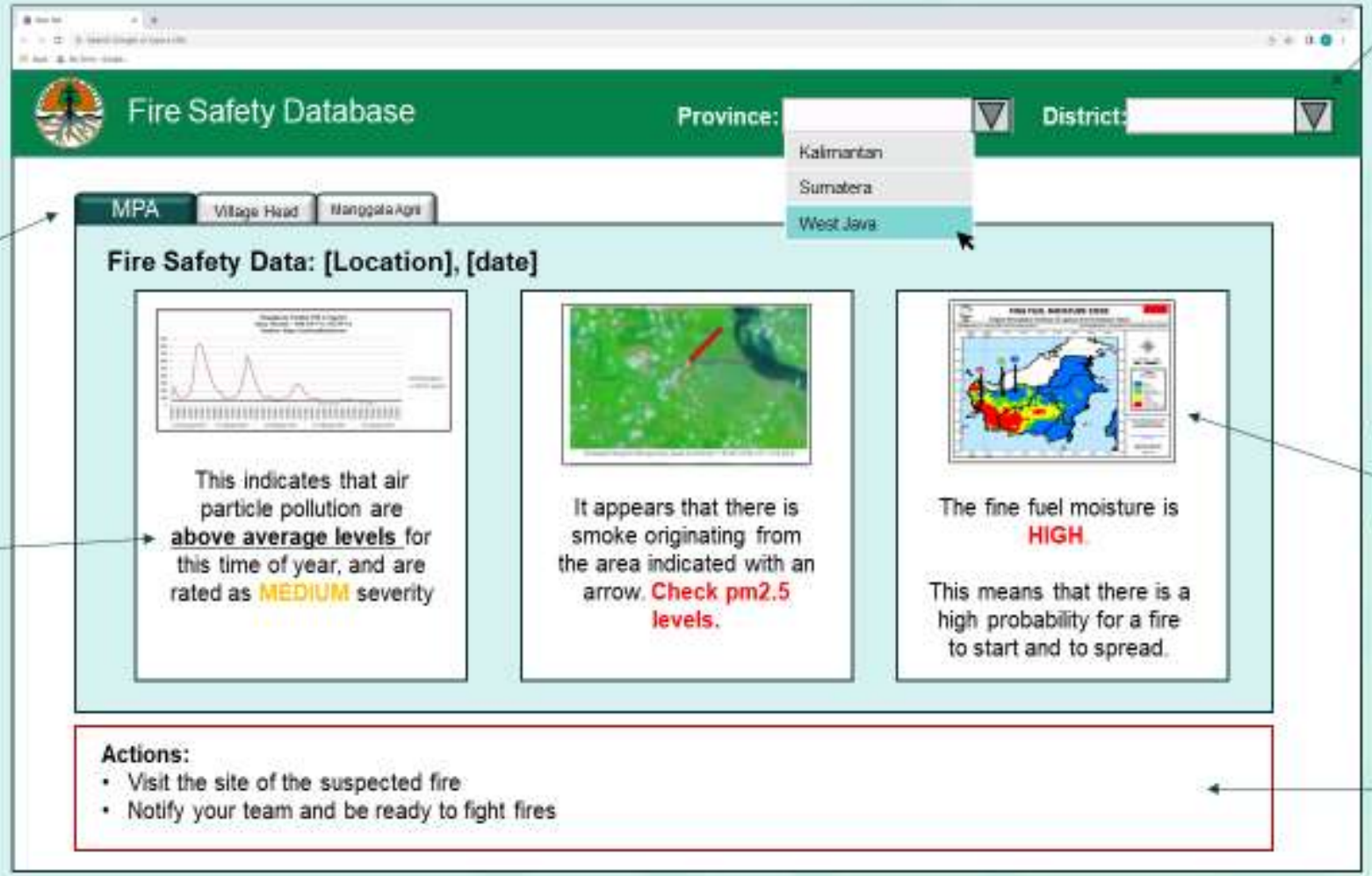
Make it easy for people to find their location

Allow users to toggle to stakeholder specific frames

Give useful and simple interpretations of data

Show data which is most relevant to stakeholders

Give stakeholder and risk status specific actions



Public Campaign

You could even include the names or photos of local fire fighters as a part of the campaign material

Behavioural Rationale

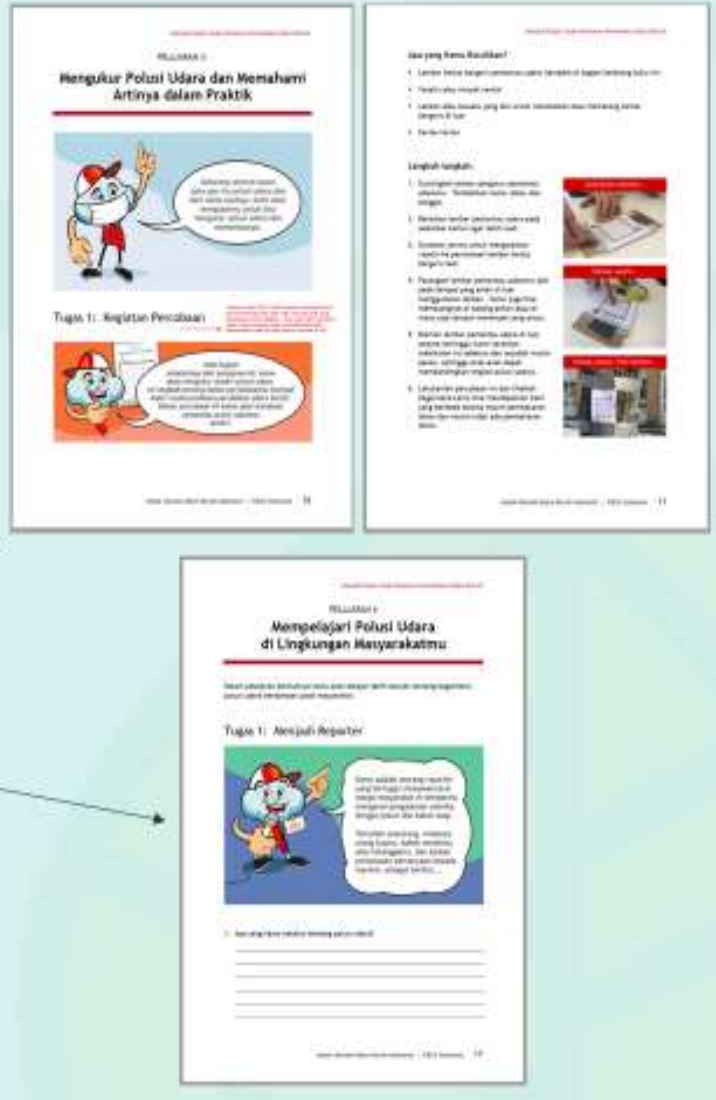
- Increase association between identity and fire fighting behaviour
- Increase salience of norms of fire extinguishing
- Imbue a sense of reward/ gratification which appeals to intrinsic motivation
- Increases accountability/ recognition if names or photos are used

School Engagement

The school based intervention running with FIELD aims to engage children as the intervention messengers.

Using a combination of approaches such as:

- Citizen science experiments using DIY air pollution monitors to demonstrate the local impact of burning
- Interviews with family members to understand their experiences of haze and burning in the past, and how it has changed over time.



CONCLUSION

- Based on the results of research through the survey, it can be seen that there are weaknesses in responding quickly to fires by those who directly deal with fires that occur as experienced by the Manggala Agni Fire Brigade, MPA, and Village heads.
- The research results confirm to have focus on providing regular information on: GHG emissions, PM2.5/10, Maps of ongoing fires – hotspot and thermal, smoke propagation, water levels, daily data or before fire breaks out, provide data via cell phone over website and good communication.
- In order to Overcoming Barriers, then it could be anticipated by providing firefighting training and skill material, training on extinguishing skills, health & safety information and Implementation Intentions for barriers.