AHP DISASTER READY REPORT: TRADITIONAL KNOWLEDGE

Tadahadi Bay, 2018.

Prepared by: Kayleen Fanega, Project Officer, Solomon Islands Meteorological Services

Acknowledgments

This report was compiled by the Solomon Islands Meteorological Services (SIMS) climate section that have been implementing a Traditional Knowledge project with support and seed funding from the Government of Australia through Bureau of Meteorology, Australia with additional funding support from the Solomon Islands Government which has enabled data collection field trips.

Solomon Islands Meteorological Service would like to kindly acknowledge and thank the World Vision Solomon Islands, for involving them in their Australian Humanitarian Project (AHP) and the communities; Tadahadi, Wango, Manitawanuhi, Manihuki for allowing the traditional knowledge (TK) survey to be conducted in their community.

Acronyms

AHP: Australian Humanitarian Project

BoM -Bureau of Meteorology

MOU- Memorandum of Understanding

TK- Traditional Knowledge

SIMS- Solomon Islands Meteorological Services

VDCRC- Village Disaster Climate Risk Committee

WVSI- World Vision Solomon Islands

Contents

Introduction

1.1: Introduction:

This report provides background for a survey conducted in 4 communities in Makira Province in Solomon Islands during 15th to 30st October 2018. The survey was undertaken to assess the traditional indicators of the community and how they use it in terms of early warning. In this report, a brief description of the physical and geographical locations of the study sites will be highlighted. The background information is provided to understand the vulnerability of the communities and why it was chosen for the project. This report also briefs on the past and background information of the TK project.

1.2: Project Background Information

The Solomon Islands Meteorological Service (SIMS) began a project in 2014 to collect and document Traditional Knowledge (TK) relating to traditional ways of monitoring and predicating weather and climate. These first three pilots in Solomon Islands were;

1. Ganua'alu - Weather Coast, Guadalcanal,
2. Olomburi - Kwaio, Malaita
3. Nukufero - Russell Islands, Central Province.

However, after the completion of these 3 pilot sites no funds were available to continue with data gathering visits. Therefore, Solomon Islands Meteorological Service (SIMS) and Bureau of Meteorology Australia (BoM) formed an memorandum of understanding (MOU) to collaborate with World Vision Solomon Islands (WVSI) in their Early Warning and Response Australian Humanitarian Project (AHP) project in 4 pilot sites namely; Tadahadi, Wango, Manitawanuhi, Manihuki. This enabled the project officer of the TK project to go under the wings of World Vision and incorporate the TK survey and gather data.

1.3 Overarching Objectives

The overall objectives of this project are to use Traditional Knowledge (TK) in the Solomon Islands for seasonal weather and climate forecast applications with the aim to:

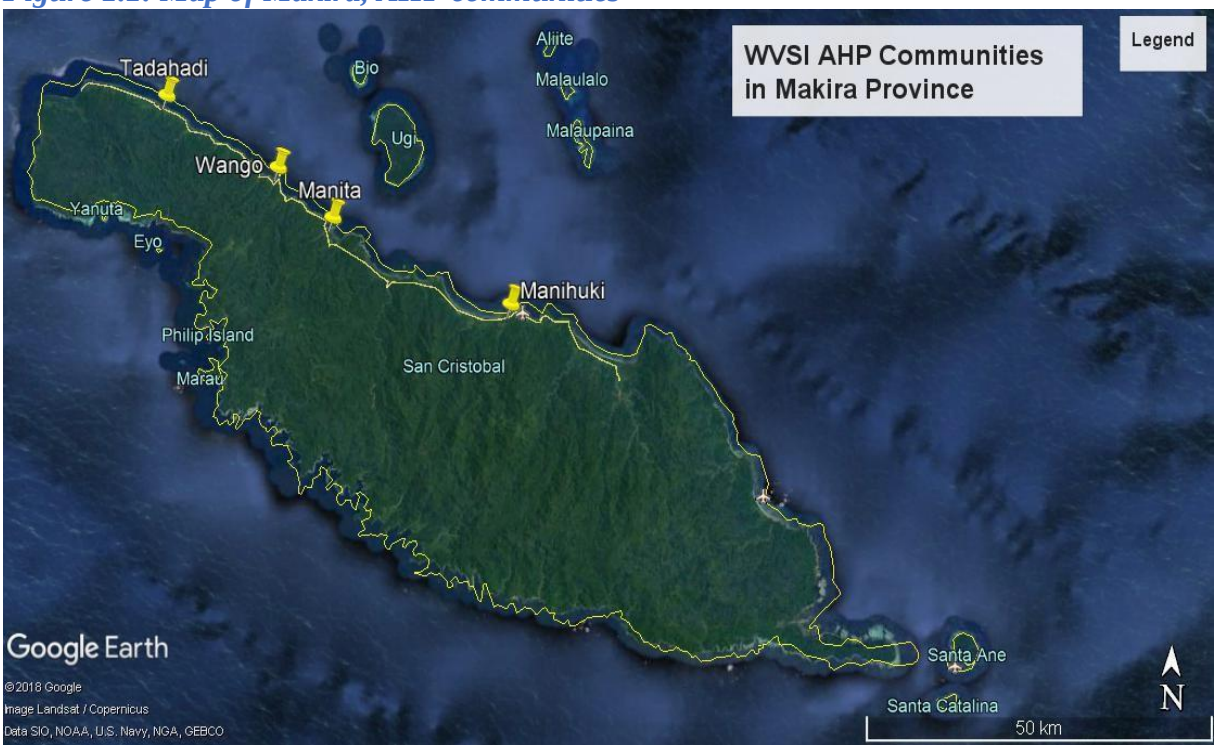
1. Increase user uptake of meteorological forecast services in remote areas.
2. Improve disaster early warning.
3. Enhance community independence and resilience to climate change and variability.
4. Promote and coordinate systematic documentation of traditional climate and weather knowledge for posterity.
5. Cultural revival and promoting the value of traditional knowledge.
6. Strengthen and enhance Met Service localised climate forecasts.

1.4: Field Trip Goals

- Record and document stories of traditional methods for predicting weather and climate in particular specific environmental indicators people monitor to predict approaching weather or seasonal changes.
- Increase community awareness around natural disasters and the value of Traditional Knowledge in maintaining community resilience.
- Promote the services of SIMS generally.
- Record non-climate and weather specific traditional knowledge stories to be archived for posterity.
- Capture stories, photos and footage of older people to be archived for posterity and to be edited into a short clip to promote the project and give back to the community.

Therefore to achieve the aims and goals, the project officer of SIMS, World vision Solomon Islands travelled to Makira, under the funds of World Vision Solomon Islands for two weeks to document stories about traditional climate and weather prediction methods from communities with a focus on interviewing senior community members. Since, the traditional project is an ongoing project, the team will continue with the monitoring process in 2019.

Figure 1.1: Map of Makira, AHP communities



Manihuki, Manitawanuhi, Wango, Tadahadi

The AHP Project communities located near the coastal road west of Kirakira, with the furthest, Tadahadi, being about 3 hours' drive from Kirakira.

Total population of 1,203 in the 4 communities, 242 HH

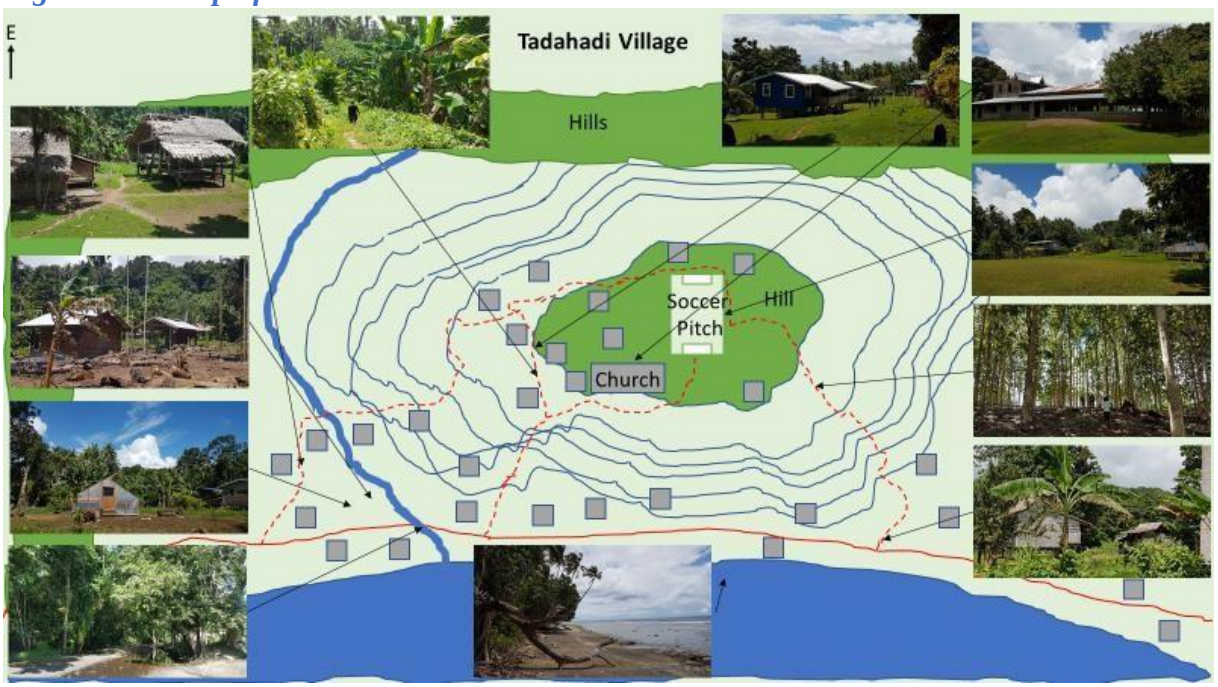
1.3: Study sites descriptions

Community Name	Total Population	Description
Tadahadi	177	Tadahadi Village is located 67 km from Kirakira the capital of Makira Province. The main village is located on top of a hill whilst several houses are located around the hill side. Their main source of income is cocoa while gardening is more for subsistence. There is no school or clinic located in the village but there is a school and clinic about thirty minutes' walk from the village.
Wango	380	Wango Village is located 60 km from Kirakira the capital of Makira Province. The village is located along the coast with a total of 73 households. There is a clinic located in the village and a primary school up on the hill about 0.5 km from the village. Their main source of income is also cocoa.
Manitawaniuhi	460	Manitawaniuhi Village is 49 km from Kirakira the capital of Makira Province. The village is also located near the coast with a clinic and primary school available in the village. The village is located between 2 rivers thus making it highly vulnerable to flooding.
Manihuki	186	Manihuki Village is 7 km from Kirakira the capital of Makira Province. It has a primary and the village people attend to Kirakira Hospital for their medical needs. This village is located along the coast and is highly vulnerable to the rising sea level.

For the four project communities their main source of income is cocoa and with the increasing heavy rainfalls their cocoa plantations are becoming highly vulnerable of being washed away or become water logged. The four communities since they are located along the same locations the hazards that they experience is common with the main hazard being heavy rain and flooding while tsunami is a threat for Tadahadi and Wango because of being located further west of Makira Island. For Manihuki community the sea level rise is clearly visible with coastal erosion occurring and worsening during bad weather. The people in the project communities are very well aware of the changing climate and the effects it is posing to their communities and their livelihoods.

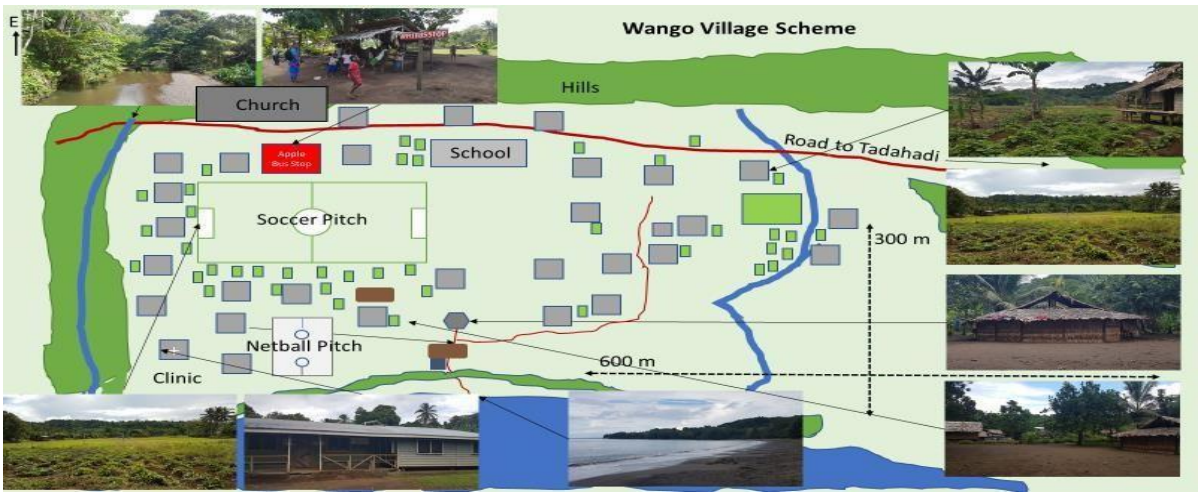
1.3.1: Tadahadi

Figure 1.2 : Map of Tadahadi



1.3.2: Wango

Figure 1.3: Map of Wango

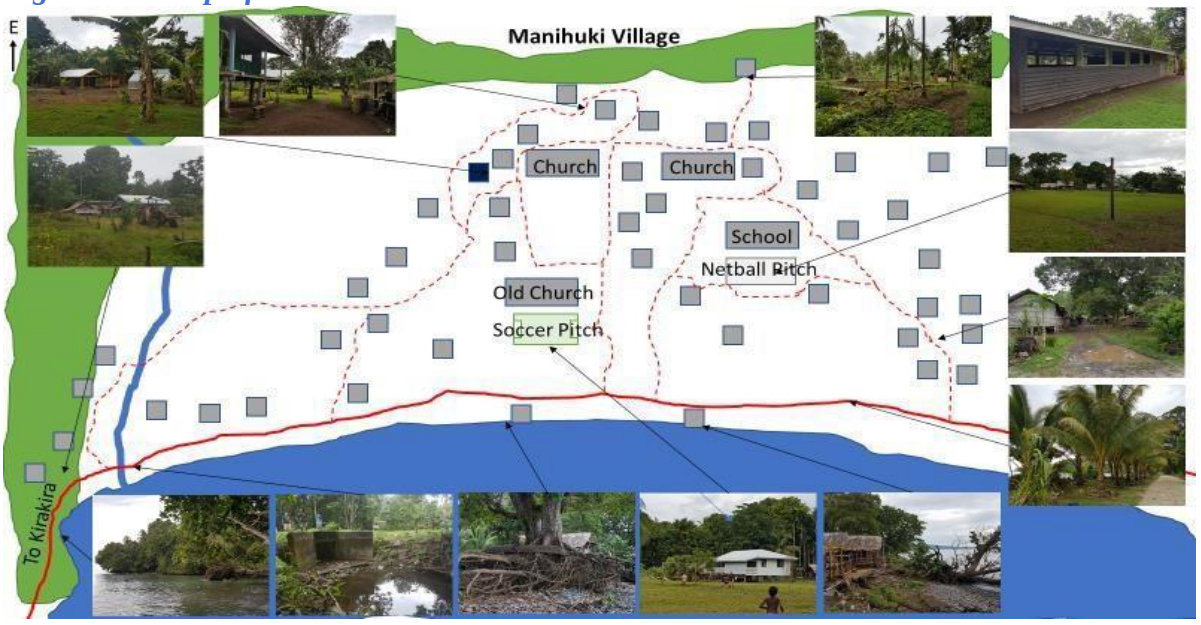


1.3.3: Manita wanuhi

Figure 1.4: Map of Manitawanuhi

1.3.4: Manihuki

Figure 1.5: Map of Manuhuki



2.0: Research methods

2.1: Study design and participants

The research adopts a qualitative approach to obtain primary data. The traditional survey was conducted from 15th to 20th October 2018. The SIMS project officer along with the World Vision AHP team spent two weeks in Makira, spending at least two days each in each community. A total of 36 individuals from 36 different households participated in the study. The team consisted of the PO plus a translator (1 in each respective communities) to translate the vernacular since most elderly do not speak the pidgin language.

Figure 2.1: Kayleen Fanega with Elizabeth (translator for Wango Village) Crossing River to go to a household in Wango 2018.

2.1.1: Primary Data Collection

The study utilized 3 research techniques to obtain primary data. These included: snowballing, face to face interviews and field observations.

Snowballing is a technique for finding research subjects. After completing their interview, a subject gives the researcher the name of another community member who they would recommend as a participant, who in turn provides the name of a third, and so on *(Atkinson & Flint, 2001*). The snowballing technique was used in this study because it was much easier and faster to identify community individuals with relevant personal experience and knowledge, compared to random sampling.

The face to face interviews allow for both verbal and nonverbal sources of data to be gathered. The researcher in this case can directly observe the participants' facial expressions, gestures, and other para-verbal communications that may enrich the meaning of the spoken words *(Carr & Worth, 2001).*

Lastly, field observation was used to gain insight into the livelihoods of the communities of study, and directly observe the physical impacts of climate change that are relevant to each community.

2.1.1.1: *Identifying participants through snowballing technique*

Before the survey was conducted, community leaders or committees from the VDRC from the four communities: Tadahadi, Wango, Manita and Manihuki were requested to identify people who had vast traditional knowledge and experience in forecasting weather using TK. All identified participants provided by the community leaders were inherently elders with maximal knowledge and experience within the community. These participants then initiated the snowballing process of directing the researcher to other appropriate community members, with the potential secondary participants they specified being cross checked with a list of pre-identified study participants. This method was suitable for communities because the community members knew each other.

2.1.1.2 Face to face in-depth interviews

The in-depth interviews documented the changes observed and experiences of 38 participants due to their traditional indicators of forecasting. The interviews were driven by an open-ended (appendix 1) questionnaire. Open-ended questions invited participants to talk about their personal experiences, observations, and adaptation techniques in a story telling form.

Since some participants were illiterate, the oral component in this method was convenient. Furthermore, more information was gathered from face to face interviews because the researcher could ask additional, unscripted questions.

The interviews had to be conducted at a time and location of convenience for the participants, which was usually in the mornings or evenings when they were not engaged in their daily activities. They had to be conducted in an informal setting where the participants would feel comfortable. The names of participants were kept confidential, in accordance with the consent form that was issued at the start.

2.1.1.3: Field visit and observation

Field observations were carried out to identify the traditional indicators of the locals In each community, they had different indicators, however most indicators could not be found as they were only seen in deep in the forest of far out in the sea. A digital camera captured photographs of relevant indicators that were accessible to the project officer during the short time of visit. A voice recorder was also used to capture the stories of the participants during field visits.

2.2: Data organization and analysis

Questionnaires were used in the face to face interviews and responses were recorded via audio recorder and later transcribed and inputted into the traditional knowledge (TK) database that is located in the SIMS office. The process of the TK project process is in figure 2.2. The collection of data is in its primary stage, thus SIMs would go back to the AHP communities for monitoring of indicators.

Figure 2.2: Process of collection data for TK

3.0: Results and Discussion Results

The results include a descriptive analysis of the AHP communities' perception on traditional indicators. It has 4 parts:

- TK for weather and climate forecasts.
- The state, timing and behaviour of the TK indicator
- How reliable the TK indicator is.
- How participants get and use weather and climate forecasts.

3.1: Characteristics of the study subjects

Table 3.1 shows the demographic characteristics of the study participants by location.

Table 3.1: Household characterises.

Gender				
Community	Female	Men		Total
Tadahadi	10	1		11
Wango	5	7		12
Manitawanuhi	6	5		11
Manihuki	1	1		2
		Total		**36**
age				
Community	**31-40**	**41-50**	**51-70**	**70>**
Tadahadi	2	2	6	1
Wango			11	3
Manitawanuhi		1	7	3
Manihuki				2
	2	**3**	**24**	**9**
total			**36**	

As seen in table 3.1, Tadahadi has more females than men. The participants selected and were available were 10 female and 1 male. Most of them ranged from the ages 51- 60 years and had only one participant more than 70 years old. As for Wango, the overall elderly participants were 12 in total (5 women and 7 men). Wango had more elderly people than the other AHP communities. Most of the participants were aged 51- 70 and only 3 were more than 70. In Manitawanuhi, the participants were 6 men and 5 women and were also in the

range of 51- 70 year. While in Manihuki, only 2 participants with high knowledge on TK were available, 1 male and 1 female, both in their 70s. The reason for having elderly as key informants was they were the keepers of traditional knowledge. However, findings suggest that many communities have already lost their traditional knowledge on weather and climate. This is prior to the fact that many keepers of knowledge have no confidence to pass it on to another person. Modernisation also plays a major impact and the younger generations are not keen in learning the old custom and traditions but would rather focus on media and modern lifestyle.

Figure 3.1 : Kayleen Fanega conducting interview with Evalyn , Tadahadi 2018

3.2: TK for weather and climate forecasts.

Table 3.2 Traditional indicators for AHP communities

Object	***Action***	***Outcome***
	Tadahadi indicators	
Rooster	when the rooster crows at night 8 pm - 10 pm it indicates rain	Rain
Stars	If there are many stars at night and the sky is clear it indicates fine weather for next day. when there are	Fine and rain

	no stars at night or less stars are seen at night it means it will rain next day	
Frigate birds	when a group of frigate birds are flying onto the sky it means there is a storm coming after 2 - 3 days or after 1 week	Storm
Perpere	perepere (bird in the bush, usually black in colour and a bit bigger than vele bird) can indicate rain if it cries	Rain
Dark clouds	If black clouds are above the ocean (near the horizon) it indicates that there will be rough seas and bad weather soon (rain/strong winds) - starting of wet season	Rain
Red clouds	When there are some orange /reddish clouds during sunset there will be fine weather the next day	Fine
Vines (betel nut)	If the leaf dies , from all the sun it indicates rain will come soon	Rain
Dolphins	girio (dolphins) when 3 to 4 dolphins swim closely along the shore/coast/reef it indicates rough seas will happen on that day and for 3 - 4 days after	Rough seas
Eagle bird	if the eagle bird (pau) cries anytime during wet season (rainy) it means dry season will happen either the next day or 2 days to come	Dry season
	Wango indicators	
Basau (small fish)	if basau is seen along the shore it means bad weather is coming , this is because basau lives in the deep but it comes ashore when rough sea will happen	Rough seas
crabs	poporai (mud crabs) come in fine weather but after it is sighted it means high tides will happen will happen after 1 month	High tides
Heron (Pau)	pau (heron found in the bush, brown has a mouth alike a heron and has long legs) if it cries it means that it will rain	Rain
Rooster	if rooster crows at night or wrong time it means rain (3 am or 10 pm -12 pm)	Rain
Black clouds	if dark clouds are near the bush it means that the rain will cause rivers to flood and rain will drop 2-3 hours but it will flood for few day s	Rain and flood
Sea worm (ogu)	after the harvesting of the sea worms (1 week) later there will be rough seas	1 week later rough seas.
Dogs	when dogs and chickens crows and howls any time of the day or night and run like crazy it means earthquake	Earthquake
	Manuhuki indicators	
Dark clouds	if dark clouds are near the bush it means that the	Rain and flood

	rain will cause rivers to flood and rain will drop 2-3 hours but it will flood for few day s	
Red clouds	When there are some orange /reddish clouds during sunset there will be fine weather the next day	Fine weather
Frigate birds	when a group of frigate birds are flying onto the sky it means there is a storm coming after 2 - 3 days or after 1 week	Storm
Bottlenose dolphin	girio (dolphins) when 3 to 4 dolphins swim closely along the shore/coast/reef it indicates rough seas will happen on that day and for 3 - 4 days after	Rough seas
Stars	if there are many stars at night and the sky is clear it indicates fine weather for next day. when there are no stars at night or less stars are seen at night it means it will rain next day	Fine and rain
	Manitawanuhi indicators	
Frigate birds	when a group of frigate birds are flying onto the sky it means there is a storm coming after 2 - 3 days or after 1 week	Storm
Dark clouds	if dark clouds are near the bush it means that the rain will cause rivers to flood and rain will drop 2-3 hours but it will flood for few day s	Rain and flood
dolphin	girio (dolphins) when 3 to 4 dolphins swim closely along the shore/coast/reef it indicates rough seas will happen on that day and for 3 - 4 days after	Rough seas

The table above shows the indicators used by each community and what weather it forecasts. Though there are a number of indicators and they vary from place to place there are common indicators that are used in all 4 communities such as: the frigate birds, dark clouds and dolphin. These three indicators are still used in each communities and most participants stated they are very reliable (refer to table).

Figure 3.2: A traditional indicator that predicts rain (rooster).

3.3: The state, timing and behaviour of the TK indicator

Though the indicators are considered reliable to the communities, it does not predict the strength, and the time or duration on how long such events or weather will go on for. Participants have also observed changes in the behaviour. For instance: sometimes when the rooster crows it might be excited and predict weather.

John Taro from Wango explains:

"Sometimes kokorako ya cry hem must be happy happy, sometimes hem cry because someone die within the community and sometimes hem cry because ba hem rain, so mefala seleva try for find out what na sign ya mean"

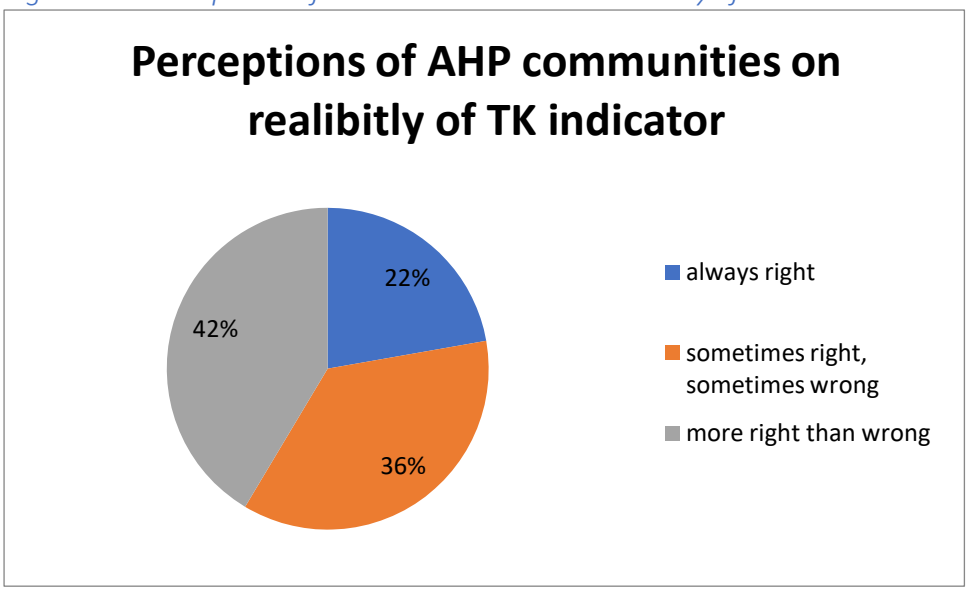
Translated as

"Sometimes the rooster crows because he is excited, sometimes he cries because it is also a bearer of bad news and sometimes it cry's as a sign that it will rain soon. Therefore we try to figure out what the sign means ourselves"

3.4: How reliable the TK indicator is.

The indicators are reliable but they can portray different signs and messages, especially if they are animal indicators.

Figure 3.3: Perceptions of AHP communities on reliability of TK indicator



Community members stated that though traditional indicators are used there are some challenges to it. Twenty two percent of all community members stated that it is always right and TK indicators forecasting comes true, 36% explained that sometimes it is right, sometimes it is wrong. They emphasised that due to climate change, sometimes the behaviour of astronomical indicators like moon and stars as well as atmospherically indicators such as dark clouds do not happen as predicted. For instance:

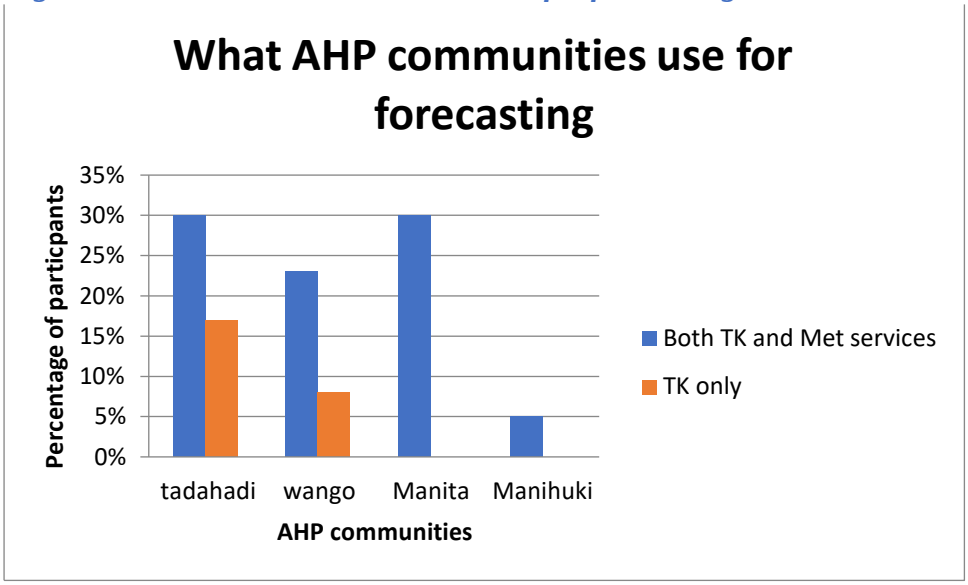
"When there are many stars in the sky at night, the next day is not fine, but dull" Augastine, Manitanuhi community member explains.

The majority however suggests that most of the TK indicators are more right than wrong, therefore they continue using it to predict weather. However, due to such challenges, community members of the 4 AHP communities are merging TK with science and also rely on met service messages for weather updates and information.

3.5: How participants get and use weather and climate forecasts

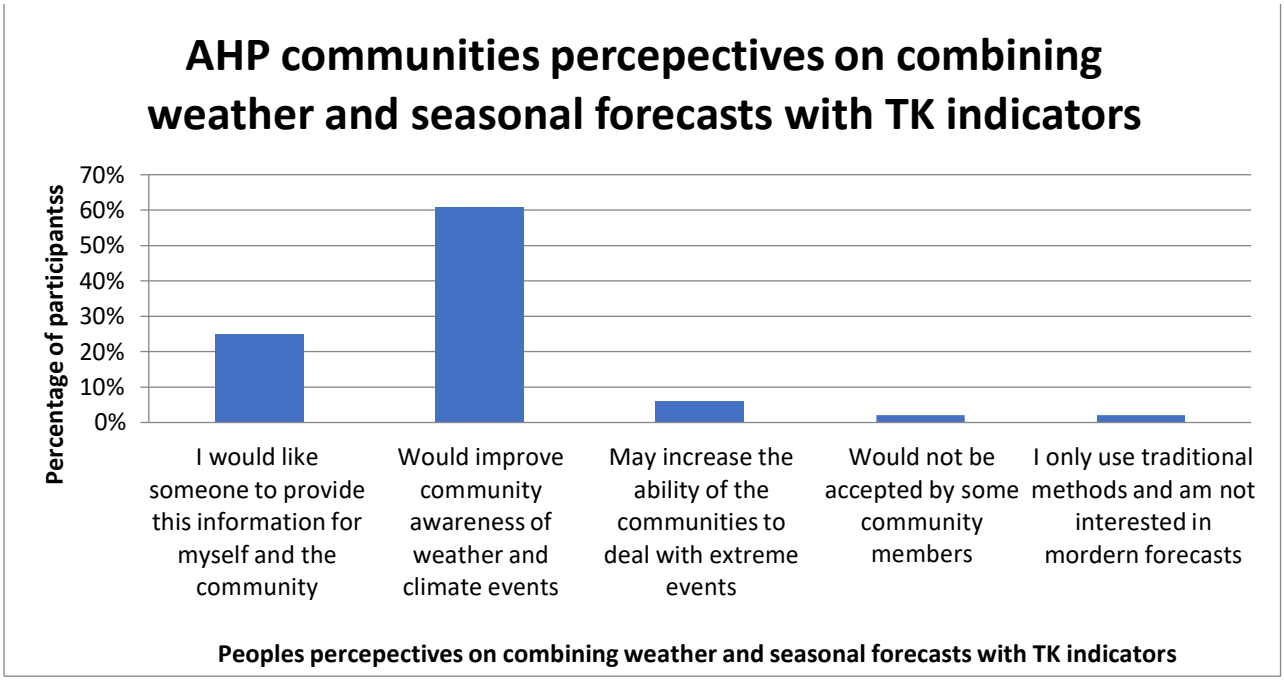
In all 4 communities, most of the participants stated that they use traditional indicators and met services. It is stated that they use TK for most of their daily activities such as planning travels, planting and fishing while met services on early warnings been issued through the radio is used during wet season and bad weather. However those that do not own a radio often catch the message through verbally through neighbours or by calling the met service toll free line 933.

Figure 3.4: What AHP communities use for forecasting.



From the figure 3.4 and information gathered, participants use both Traditional Knowledge (TK) and Met services, Tadahadi (30%), Wango (23%), Manitawanuhui (30%) and Manihuki (5%). Communities have stated that they use the met services mostly during the cyclone season or wet season. However, most do not own radios, thus early warning issued by the met service are spread verbally.

Figure 3.5: AHP communities' perspectives on combining weather and seasonal forecasts with TK indicators.



From figure 3.5, the graph outlines the perspectives on the AHP communities' perspectives are on combining weather and seasonal forecasts with TK indicators. From the graph majority (67%) stated by combining of these two methods, it would improve community awareness and climate events. Twenty five percent (25%) on the other hand stated they wanted someone to provide information for them and their community because it was not available at the moment. Six percent (6%) stated it may help increase the ability of the communities to deal with extreme events while some (2%) were hesitant and stated that such combination would not be accepted by the community members and they only prefer to use traditional methods and not modern forecasts.

Figure 3.6: Project officer, Kayleen Fanega conducting discussion with women in Manitawanuhui on perceptions on combining modern and traditional indicators.

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4.0: Conclusion

The Makira baseline survey was well received by the community. The Project Officer along with the World Vision AHP staff was able to build a relationship of trust and establish good community relations. Thirty-six surveys with men and women were conducted and qualitative data was gathered. Photos and voice recordings were also taken during the field trip and would be entered into the database. Seasonal calendars would be made after the field work would be in place. Similarly, to the existing communities, the feedback was positive, and people were supportive and willing to answer questions on the survey. The next trip is to conduct a FGD TK survey in order for the communities to make their traditional weather calendar and do training for monitoring of indicators.

In conclusion, there were 4 major key findings in the TK survey.and recommendations for any future monitoring activities.

4.1 Key Findings from TK survey

1. Each community have traditional indicators; however, they differ from place to place. It was found that the most traditional knowledge indicators and TK informants were from the community farthest from the Kira Kira weather station. TK indicators and key informants with vast traditional knowledge decreased in communities that are closer to station.

2. Traditional indicators are still used until this day, and locals usually use that instead of using formal early warning messages such as radios, since most of the participants do not own radios. However, findings also show that most of the knowledge is lost and only some elderly people know traditional indicators.

3. The most common indicators used in all four communities was: rooster, black clouds, frigate birds and stars. Usually these indicators are to predict forecasting for short periods of time and not for long periods of time. For instance: the rooster crowing at odd hours of the night, mostly 10 pm to 12 am usually indicates rain for next day or for few hours' time. Black clouds indicate rain in a few hours' time while group of frigate birds flying overhead simply means cyclone is coming soon (probably 3 days to 1 week time). A lot of stars on the other hand indicate fine weather next day.

4. Although indicators are used; sometimes it varies and only has a 50 to 80% chance of accuracy. Meaning sometimes it does come true, sometimes it doesn't. However, all participants have stated that the frigate bird sign is always accurate and cyclones and bad weather do happen after the group of frigate birds are sighted.

4.2: Lessons learnt

1 There were not a lot of people who had knowledge on TK, most of the elderly had passed on, and thus, not many TK stories were gathered.

2 Key informants are mostly elderly thus do not have the strength to walk to community gathering thus PO would have to do household surveys**.**

3 There is no previous record on traditional knowledge on weather and climate both at community level. Urbanisation has potential impacts on the young generation to western values which has caused the loss of interest in traditional base knowledge on weather and climate.

4.3: Recommendations

1. More time should be allocated to do household surveys to document stories since, most of the time spend was walking from House to house

2. Some Key informants are illiterate and may not understand pidgin thus a translator as well and someone to show houses using the snowball technique was needed.

3. Plans can be changed thus, a program for any training or workshop needs to be flexible.

References

Atkinson,R. & Flint, J. (2001). Accessing hidden and hard- to-reach populations: Snowball research strategies. *Social research update, 33(1), 1-4.*

Carr, E. C., & Worth, A. (2001). The use of the telephone interview for research. *NT research, 6(1), 511-524.*

Annex

Film and Photo Consent and Release Form

Without expectation of compensation or other remuneration, now or in the future, I hereby give my consent to Solomon Islands Meteorological Services (SIMS) and its affiliates and agents, to use my image and likeness and/or any interview statements from me in its publications, advertising or other media activities (including the Internet unless otherwise stated). This consent includes, but is not limited to:

(a) Permission to interview, film, photograph, tape, or otherwise make a video reproduction of me and/or record my voice;

(b) Permission to use my name; and

(c) Permission to use quotes from the interview(s) (or excerpts of such quotes), the film, photograph(s), tape(s) or reproduction(s) of me, and/or recording of my voice, in part or in whole, in its publications, in newspapers, magazines and other print media, on television, radio and electronic media (including the Internet unless otherwise stated), in theatrical media and/or in mailings for educational and awareness.

Neither SIMS nor SIMS affiliates or agents will seek to profit in any way from the use of your image, likeness, voice and/ or interview statements. Applications of products developed will be solely for the promotion of the Traditional Knowledge project.

This consent is given in perpetuity, and does not require prior approval by me.

Name: _____

Signature:_____

Address/ village: _____

_____

Date: _____

The below signed parent or legal guardian of the above-named minor child hereby consents to and gives permission to the above on behalf of such minor child.

Signature of Parent
or Legal Guardian: _____ Print Name: _____
_____

I do <u>not</u> give permission for my image or voice to be displayed on the internet ☐

Please tick the box if applicable.

N.B. If the information given is sensitive or the individual does not want their image or voice to be displayed publically the individual should not sign this document.

Traditional Knowledge Survey

DATABASE RECORD #:	
FORM VERSION #:	1.0

PLEASE NOTE: The Project Information and Protocol form must be provided and a statement of prior informed consent completed and signed by the participant before commencing interview!

INTERVIEW / MEETING INFORMATION (please write down or circle where possible):						
Date (d/m/y):			**Time:**		am	pm
Place of Interview:	Village:		Province:		Island:	
Interview Language:	Pidgin	English	Other (write here):			
~~Extra Records:~~	~~Audio~~	~~Video~~	~~Photo~~	~~None~~	Other (write here):	
INTERVIEWER / OBSERVER INFORMATION:						
Name of Interviewer:			**Contact Details:**			
PARTICIPANT INFORMATION:						
Participant's Name:					Male	Female
Position in Community:			**What tribe do they belong to:**			
Age Group:	< 20	21-30	31-40	41-50	51-70	> 70
First Language:	Pidgin	English	Other (write here):			
Where is their Home:	Village:		Province:		Island:	
~~Contact Details:~~						
TRADITIONAL KNOWLEDGE (TK) LOCATION INFORMATION AND ACCESS:						
Where is this TK story found?	Around Participant's Home	**If not, please specify where?**	Village(s):	Province(s):	Island(s):	
~~Who is allowed access to your TK story?~~	LOW TABU: ~~Public~~ – everyone	MEDIUM TABU: ~~Managers,~~ Public with permission	HIGH TABU: ~~Project~~ Managers Only	**~~Are there any other access Restrictions?~~ Circle: Yes / No**	Gender: ……. Other:	Religion: …….

…….

Part 1: Traditional Knowledge (TK) indicators for weather and climate forecasts

1.1 NARRATIVE: Record the story linking the traditional knowledge indicator (object & action) to weather or climate

(Object: what it is; Action: what it does relative to weather or climate? *E.g., the mango tree will produce lots of fruit (object) that covers the entire tree about three months before the rainy season begins (action).*

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1.2 INDICATOR(S): Please sort the TK story according to the type of OBJECT (living: Plant or Animal or non-living: Atmospheric or Astronomical) and ACTION (events and behaviours) related to weather and climate.

Interviewer: *This survey form is designed to record one TK indicator at a time. If the participant would like to tell you about more than one indicator, then you must fill out extra survey forms.*

<table>
<tr><th colspan="2">OBJECT Write all names</th><th colspan="4">What ACTION (please circle /write)?</th></tr>
<tr><td colspan="2" rowspan="2">PLANT:</td><td>Fruiting</td><td>Flowering</td><td>Wilting</td><td>Other:</td></tr>
<tr><td colspan="4">Details:</td></tr>
<tr><td colspan="2" rowspan="2">ANIMAL:</td><td>Presence/ Absence</td><td>Behaviour:</td><td>-flying
-nesting
-swarms
-excited</td><td>Other:</td></tr>
<tr><td colspan="4">Details:</td></tr>
<tr><td colspan="2" rowspan="2">ATMOSPHERIC:</td><td>Cloud formation</td><td>Wind: direction / strength /</td><td>Temp.</td><td>Other:</td></tr>
<tr><td colspan="4">Details:</td></tr>
<tr><td colspan="2" rowspan="2">ASTRONOMICAL:</td><td>Ring</td><td>Star formation</td><td>Moon: - new / full</td><td>Other:</td></tr>
<tr><td colspan="4">Details:</td></tr>
<tr><td colspan="6">OTHER:</td></tr>
</table>

The state, timing and behaviour of the TK indicator

2.1 INDICATOR(S): How can you tell (i.e., measure and / or decide) what state the TK indicator is in?

(*e.g., describe the TIMING or BEHAVIOUR and if it's FRUITING or FLOWERING, state the amount of fruiting and flowering and exactly what is meant by EARLY, LATE, HEAVY or other terms you used. If it relates to LOCATION of bird or turtle nest, for example, name which bird or turtle and exactly where on the beach or what part of the tree? Similarly when you say a bird is HIGH in the sky, compare it to other things*).

Please describe in as much detail as possible and compare the indicator to other things or periods:

……

……

……

……

……

2.2 TIMING and BEHAVIOUR: How often do you use the TK Indicator for predicting weather or climate events (circle all appropriate)?

NEVER | N PAST, BUT NOT NOW | CURRENTLY, BUT NOT IN PAST | NOT OFTEN| OFTEN | ALWAYS

Add explanation:…….....

2.3 TIMING and BEHAVIOUR: If you currently use the TK indicator, when do you observe it (*circle one or more*)?

- Season: **WET | DRY | ALL YEAR ROUND**
- Month(s): **JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC**

Add explanation: ……...

2.4 TIMING and BEHAVIOUR: Have you noticed a CHANGE in the TIMING of the TK indicator (If yes, circle earlier or later than usual and provide details)? *(e.g., the indicator always appeared in January, but now is appearing two months earlier in November)*

YES | NO CHANGE | UNKNOWN

If YES	**How many days, weeks, months or years? – Be as exact as possible.**
EARLIER than usual **or** **LATER than usual**	

Add explanation:

……

2.5 TIMING and BEHAVIOUR: If yes, when in the past was the TK indicator seen? **N/A (SKIP)** | **NOT SURE**

- Season: **WET | DRY | ALL YEAR ROUND**

- Month: **JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC**

Add explanation:

……

2.6 TIMING and BEHAVIOUR: Have you noticed a CHANGE in the BEHAVIOUR of the TK indicator?

(e.g., the indicator used to behave this way, but its behaviour has now changed)

YES | **NO CHANGE (SKIP)** | **UNKNOWN**

If YES	**How has the behaviour changed? – Be as accurate as possible.**
What was it before?	
What is it now?	

Add explanation:

…….

Expected Outcomes Related to Weather and Climate

3.1 OUTCOME TYPE: Please circle or write down which weather or climate event the TK indicator predicts?

Tropical Cyclone	**Storm**	**Wind**	**Rain**	**Drought**	**Floods**	**Air Temp ***	**Sea Temp ***	**Dry Season**	**Wet Season**	**Fine / Sunny Calm & Clear**
Other (Write down any others):										

**Temp refers to how cold or hot the air or sea temperature is predicted to be.*

Add explanation for selected or other events described above: *(e.g., no flying fish means rougher seas*).

……
…..

3.2 OUTCOME TIME DELAY: How long does it take between seeing the indicator and the expected outcome in question **3.1**?

(e.g., 7 days after *a bird was seen on 15 May a storm should come*).

UNKNOWN

TIME DELAY (write down how long, please be as accurate as possible)

Add explanation: …….....

3.3 DURATION OF OUTCOME: Does the TK indicator allow you to predict how long (days/ months/ season) the weather or climate event will last for? (e.g., *a certain bird seen today means that a storm lasting around 3 days will be coming*) **YES | NO | UNKNOWN**

DURATION of weather or climate event (write down how long, please be accurate)

Add explanation: …….....

3.4 AMOUNT: Does the TK indicator allow you to predict how many weather or climate events there are likely to be?

(e.g., a certain bird seen today means that several more cyclones than usual will be on the way)

YES | NO | UNKNOWN

If yes, please circle how much less, usual or more than usual the numbers of events are likely to be

(*e.g., if more cyclones are expected select higher, for a lot more select much higher*)

AMOUNT of weather or climate events?				
MUCH LESS	**LESS**	**USUAL (typical)**	**MORE**	**MUCH MORE**

Does it tell you how many exactly? **YES:** Write down the number …… **| NO | UNKNOWN**

If YES	**How many days, weeks, months or years? – Be as specific as possible.**

EARLIER than usual **or** **LATER than usual**	

3.5 TIMING: Does the TK indicator allow you to predict if the weather or climate event will be coming earlier or later than is usually the case? *(e.g., a bird seen today means that a cyclone which usually comes during November – March will now come in October)*

YES | NO | UNKNOWN

Add explanation: …….....

3.6 STRENGTH: Does the TK indicator allow you to predict how strong (severe) a weather or climate event is likely to be? *(e.g., heavy flowering of mango trees means that cyclone season will be much worse than usual)*

YES | NO | UNKNOWN

If yes, please circle if the weather or climate event is likely to be much less or less severe than usual.

(*e.g., if an indicator predicts that a coming storm or cyclone season will be much weaker than usual*).

STRENGTH (Severity) of weather and climate event				
MUCH WEAKER	**WEAKER**	**USUAL STRENGTH (typical)**	**STRONGER**	**MUCH STRONGER**

Add explanation:

…….....

3.7 SEA CONDITIONS: If the expected outcome is related to the sea**,** does it allow you to predict sea's conditions?

(e.g., if there are no flying fish to be caught means that sea conditions will be much rougher than usual).

YES | NO | UNKNOWN

If yes, please circle if conditions are likely to be calmer or rougher than normal

(*e.g., if an indicator predicts that sea conditions will be much rougher than usual, circle extremely rough, if only a bit rougher than usual circle rougher*).

SEA CONDITIONS (calm / rough)				
VERY CALM (FLAT)	**CALMER**	**USUAL CONDITIONS**	**ROUGHER**	**EXTREMELY ROUGH**

Add explanation: ……

3.8 SEA TIDE and WAVE HEIGHT: If the TK predicted event is related to the sea, does the TK indicator allow you to predict tide and / or wave heights? *(e.g., a crab seen today means that the waves are likely to be much lower than usual)*

YES | NO | UNKNOWN

If yes, please circle if tide and / or wave heights are likely to be lower or higher than usual

(e.g., if an indicator predicts that tides or wave height will be much lower than usual, circle much lower).

SEA TIDE AND / OR WAVE HEIGHT				
MUCH LOWER	**LOWER**	**USUAL HEIGHT**	**HIGHER**	**MUCH HIGHER**

Add explanation: ……

3.9 SEA TEMPERATURE: If the expected outcome is related to the sea**,** does it allow you to predict sea's temperature? *(e.g., if a lot of a certain fish are around then sea temperatures will be much colder than usual).*

YES | NO | UNKNOWN

If yes, please circle if sea temperatures are likely to be typical, or colder or hotter than usual

SEA TEMPERATURE

MUCH COLDER	**COLDER than usual**	**USUAL TEMPERATURE**	**HOTTER than usual**	**MUCH HOTTER**

Add explanation: …….....

How reliable is the TK indicator?

4.1 CURRENT RELIABILITY: How reliable would you say the TK indicator is for weather or climate forecasts?

Please circle how much less or more reliable than usual the indicator is

(*e.g., if predictions are sometimes right and sometimes wrong then circle that box).*

CURRENT RELIABILITY				
ALWAYS WRONG	**MORE WRONG THAN RIGHT**	**SOMETIMES WRONG & SOMETIMES RIGHT**	**MORE RIGHT THAN WRONG**	**ALWAYS RIGHT**

Add explanation:…….....
...

4.2 PAST RELIABILITY: Has the TK indicator become LESS or MORE reliable than in the past?

YES | **NO** | **UNKNOWN** If yes, please circle the statement that shows how much less or more reliable it was in the past:

PAST RELIABILITY				
ALWAYS WRONG	**MORE WRONG THAN RIGHT**	**SOMETIMES WRONG & SOMETIMES RIGHT**	**MORE RIGHT THAN WRONG**	**ALWAYS RIGHT**

Add explanation:

…….....

Other TK indicator users and sources?

5.1 USE OF TRADITIONAL KNOWLEDGE: Who else uses the TK indicator you described and how can they be contacted? *(e.g., person in another Village and Island or another group in the city)*

Who:	
Contact details:	

Add explanation:

…….....

5.2 SPATIAL USAGE: Is the TK indicator used elsewhere, in different villages or islands?

YES | **NO** | **UNKNOWN** If yes, where?

Write down all known Villages:	
All known Islands:	
All known provinces:	

Add explanation:

…….....

5.3 SPATIAL USAGE: If yes, how do you know the TK indicator is being used in other places? *e.g., someone told you, you read it or observed it yourself*

Write down how you know:	

Add explanation:

…….....

5.4 USE OF TRADITIONAL KNOWLEDGE: What else, other than weather and climate forecasting, is the TK indicator used for? *(e.g., farming, planting crops, fishing, culturally or other)*

Write down its other uses:	

Add explanation:

……

5.5 TRADITIONAL KNOWLEDGE RECORDS: Are there any places or people where you know other historical TK information is held or recorded? *(e.g., historical records: written, video, books, photos, reports, observations, elder in another village)*

Type of record:	
Held by whom:	
Held where / Contact details:	

Add explanation: …….....

5.6 DATA RECORDS: Do you know of any biological data records, especially over several years?

(*e.g., time series data of tree flowering or fruiting or animal and plant locations*).

Type of information:	
Held by whom:	
Held where / Contact details:	

Add explanation:

…….....

Part 2: How do you get and use weather and climate forecasts?

6.1 FORECAST SOURCES: Please circle below what source(s) you use for weather and climate forecasts:

None – I don't use forecasts	**TK only**	**Met service forecasts only**	**Both TK & Met service forecasts**

List others (please write the name and any other details):

(a) Local Newspaper:

…….

(b) Television:

……..

(c) Radio:

……..

(d) Other sources:

……..

6.2 OTHER FORECAST USES: Write down all the things you use seasonal weather and climate forecasts for *(e.g., hazard warning – floods, cyclones, tide and wave information, farming, fishing, other uses):*

……..

……

6.3 How regularly do you use seasonal climate forecasts (circle all those that apply below)?

NEVER | SOMETIMES | OFTEN | ALWAYS | DRY SEASONS | WET SEASONS | TROPICAL CYCLONE SEASONS

Any others (please write down):

……

6.4 What are your views on combining modern weather and seasonal forecasts with traditional indicators (please circle all that are valid):

(a) Is something that I try and do myself and I do not need this information from the government

(b) I would like someone to provide this information to myself and my community.

(c) Would improve community awareness of weather and climate events

(d) May increase the ability of the communities to deal with extreme events

(e) Would not be accepted by some community members

(f) Would make no difference to how my community deals with weather and climate events

(g) I only use traditional methods and am not interested in modern forecasts

ADDITIONAL COMMENTS: Please add any additional comments:

……
……

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……

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……

……
……