SMCN-2016-111 Pacific Soils

Final Review

Ben Macdonald

The team

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Kabuati Nakabuta, Kiribati

Aleni Uelese, SROS

GOVERNMENT OF TONGA
MINISTRY OF AGRICULTURE & FOOD, FORESTS AND FISHERIES

Vunivesi Minoneti, Tonga

Ami Sharma, Fiji

The team

Jen Kelly CSIRO, Objective 1 Barriers

Ellen Iramu SPC, Objective 1 & 3 Barriers and Outreach, Testing

Gibson Susumu SPC, Objective 1 Barriers and Outreach, Testing

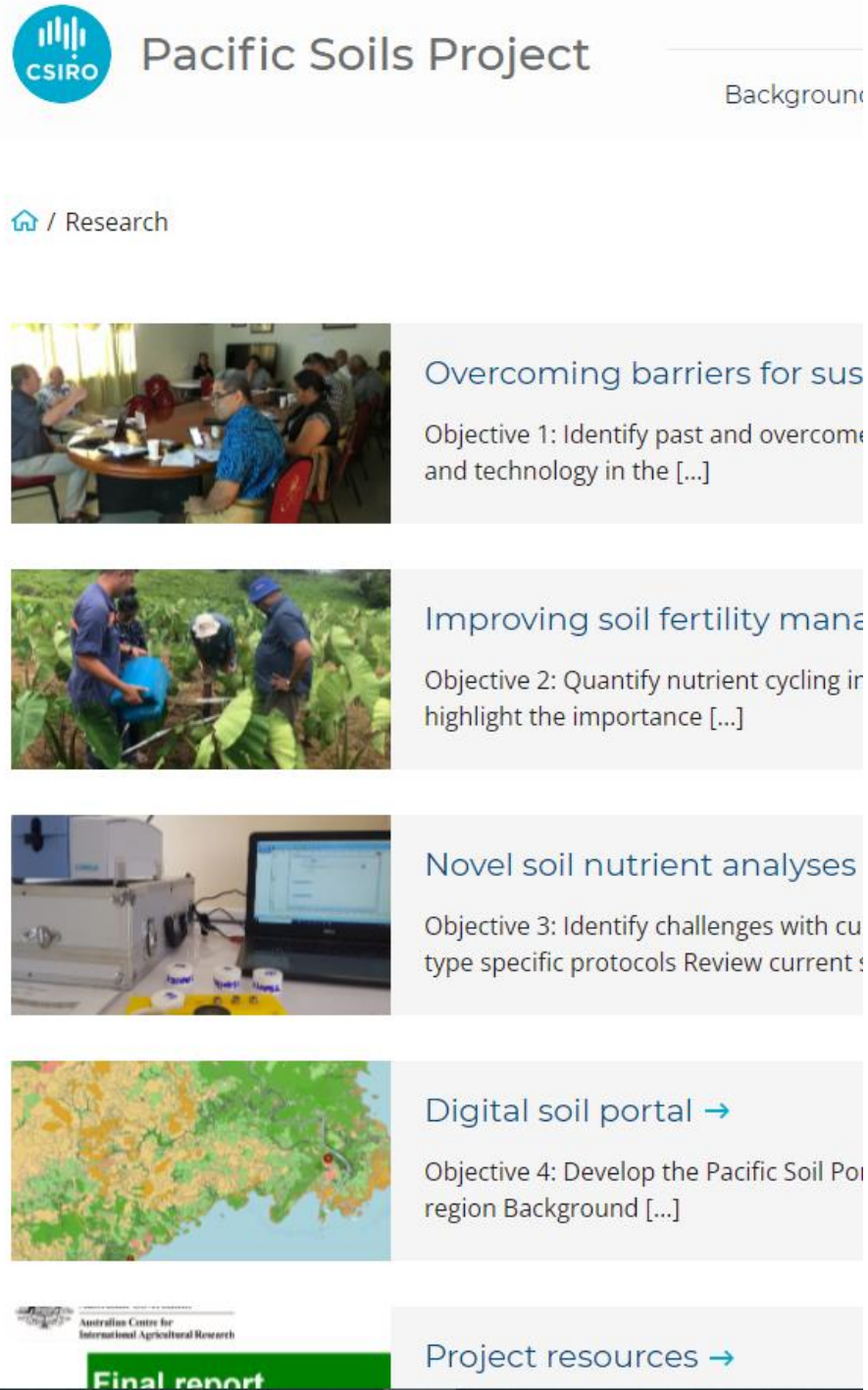
Mike Webb CSIRO, Objective 2 Nutrient Budgeting

Dio Antille CSIRO, Objective 2Nutrient Budgeting

Uta Stockmann CSIRO, Objective 3 Proximal Sensing

James Barringer MWLC, Objective 4 Pacific Soil Portal

James Quilty ACIAR, SLAM RPM



Project Resources

- Project website [Research – Pacific Soils Project (csiro.au)]
  - Overview of the results
  - Project documentation
  - Interviews and statements

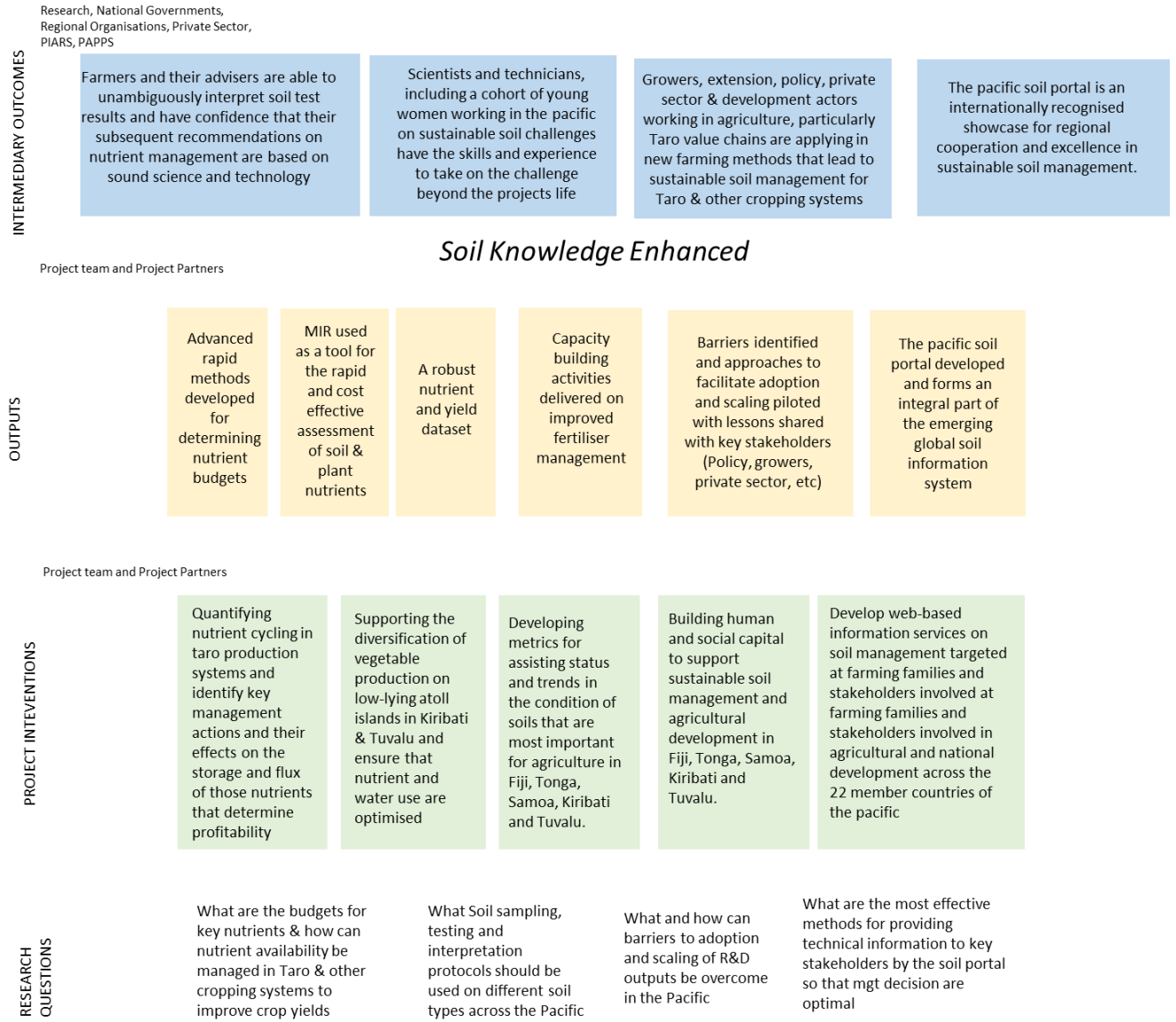
Dr Siosiua Halavatau

- *"the interim report - really good one……I will be running an adaptation training for FAO KJWA with emphasis on soils next week - will include SOC and improved nutrient and water use"*

Project Aim

To improve soil knowledge for the development of sustainable intensification of agriculture and resilience to future challenges.

Impact Pathway



The unknown unknowns

- **Disease**
  - COVID-19 Dec 2019-…….
  - Measles Outbreak Samoa 2019
- **Weather**
  - Cyclone Gita 2017-2018 Cat 5 Fiji, Tonga, Samoa
  - Cyclone Harold 2019-20 Cat 5 Fiji/Tonga
  - Cyclone Yasa 2020-21 Cat 5 Fiji
- **Organisational**
  - Constitutional crisis Samoa 2020
  - Flight cancellations
  - Staff turn-over
  - Restructuring
  - Intra-agency issues
  - Lab renovations

Approved changes to the activity tables

- ***Objective 1:*** *Identify past and current barriers R&D outputs.*

No.	Activity	Covid-19 Response	Final Activity
1.1	Identify barriers, incentives and opportunities.	Completed before COVID-19	Map of actors completed
1.2	Engage key stakeholders at the country level in a discussion about options / pilots for interventions to overcome barriers to adoption identified in the diagnostic study	Partners in country are being sourced and contracted.	Approximately 775 people participated in face-to-face trainings and workshops. An addition 72 people participated in three (3) National Workshops to share lessons and raise awareness and knowledge about soil health and better soil management policies and practices, including fertiliser in Tonga. *Two more national workshops are planned before the end of the project to share lessons and raise awareness and knowledge about soil health and better soil management policies and practices – one in Samoa and one in Fiji.*
1.3	Engage with key stakeholders at the regional level in a discussion about options / pilots for interventions to overcome barriers to adoption identified in the diagnostic study about the policy	Policy briefs are being developed in partnership with SPC to engage key policy makers at the regional level, e.g: Pacific Ag Week.	Presentation at Regional workshops and HOAFs

Approved changes to the activity tables

- ***Objective 2:*** *To quantify nutrient cycling in island agricultural and taro production systems and undertake field trials to highlight the importance of budgeting for soil fertility management and increasing yield*

No.	Activity	Covid-19 Response	**Final Activity**
2.1	Calculate supra-national scale soil nutrient balances for Fiji, Tonga, Kiribati, Tuvalu, and Samoa.	Completed. Extension being developed. We are currently writing up a manuscript for publication.	Delivered
2.2-	In Fiji (volcanic) and Tonga (raised atoll with volcanic ash) (main sites) ~3 plots will be selected within 2 soils types and detailed nutrient budget undertaken (yrs1-4).	COVID-19 has meant the local teams have had to setup and run the field trials independently. Fiji and Tonga have successfully completed the fields trials and our planning the next phase.	COVID-19 has meant the local teams have had to setup and run the field trials independently. This seems to have worked
2.3	In Samoa (volcanic) and Kiribati and Tuvalu (atolls) (satellite sites) 3 plots will be selected on 1 soil type (3 locations total) and a detailed nutrient budget undertaken (yrs1-4)	Continuing as planned. We are trying to get in touch with our in-country partners in Tuvalu via SPC. Note on top of COVID-19 our project staff have been transferred from MAF to SROS. We will need to explore how to enable the smooth flow of project funds.	Samoa-Field trials partial completed final taro crop sprayed out by accident Kiribati-Field trials in North Tarawa completed *Tuvalu-Field trials not completed focus on extension and soil survey, sample are transiting quarantine with a million Amazon packages*
2.4	Calculate nutrient constraints for each soil type using data collected Activities 2.1-2.4. PC; Kiribati, Samoa and Tuvalu	In progress. Tuvalu may need to be replanned and work solely on food cubes.	1. Nutrient budgets calculated Fiji and Tonga, single crop in Samoa and Kiribati

Approved changes to the activity tables

- ***Objective 2:*** *To quantify nutrient cycling in island agricultural and taro production systems and undertake field trials to highlight the importance of budgeting for soil fertility management and increasing yield*

No.	Activity	Covid-19 Response	**Final Activity**
2.5	Measure water flux and nutrient losses	COVID-19 has prevented the team from undertaking follow up workshops on the procedure to measure losses. Fiji, Tuvalu and Samoa need further training.	Assessments made in Fiji, Tonga, Tuvalu and Kiribati. On-line training links to viafarm. Chameleon sensors were not robust enough
2.6	Calculate nutrient constraints for each soil type using data collected Activities 2.1-2.4. PC; Fiji and Tonga;	Samples at lab in Australia and being analysed	COVID-19 Lab Closure. Samples will begin to get analysed shortly. Partially completed. Wrapping up by Jan-Feb.
2.7	Research extension to farmers, extension, and policy makers	This planned activity has been refocused to be consolidated and coordinated with the planned extension and advisory activities under objective 3. A virtual training and extension plan currently being developed.	Local extension agents contracted in Tonga, Samoa (USP), MOA and SPC completed the training in Fiji post lock down.
2.8	Assess the epidemiology of the root rot diseases based on O'Sullivan (2010) or soil ecological processes as a function of soil type and farming practice.	Discontinued prior to COVID-19 outbreak	No students interested in exploring this research topic 
2.9	Assess the current taro yield gap and impact of climate change on a range of soil types. *PC*	Discontinued prior to COVID-19 outbreak	No students interested in exploring this research topic 

Approved changes to the activity tables

- ***Objective 3:*** *To quantify nutrient cycling in island agricultural and taro production systems and undertake field trials to highlight the importance of budgeting for soil fertility management and increasing yield*

No.	Activity	Covid-19 Response	**Final Activity**
3.1	Review current soil sampling, testing and interpretation protocols used in Pacific Islands.	Sub-contracting delays.	Completed
3.2	Utilise MIR to make rapid assessment of calcareous and volcanic soil fertility	Hands-on refresher training in good practice of soil specimen preparation for MIR spectral characterization, MIR instrument performance over time, and soil spectral inference in the MIR range is currently realised in a virtual form. To enable better/sustained virtual connections with the team at the lab in Fiji, we are currently organising a mobile wi-fi hotspot for the team to use.	Completed for the volcanic islands Currently waiting for the arrival of samples from Tuvalu.
3.3	Measurement of gross soil biological function	Discontinued	Discontinued
3.4	Research extension to farmers, extension, and policy makers.	A virtual training and extension plan has been developed.	Contracted extension agents completed the training

Approved changes to the activity tables

- ***Objective 4:*** *Develop the Pacific Soil Portal to enable sustainable soil management in the farming systems of the region*

No.	Activity	Covid-19 Response	**Final Activity**
4.1	Establish Portal Governance and Management	Since Covid has stopped any prospect of arranging governance meetings - attempting virtual governance interactions via video-conference or email votes – so far engagement has been very limited. Plan to use local team members to provide in-country face-to-face support to achieve more effective engagement.	Complete
4.2	Capture system requirements and capability of participating PICTs	Unaffected	Complete
4.3	Develop the web-interface and supporting ICT infrastructure to deliver the agreed web-services via the Pacific Soil Portal	Unaffected	Complete
4.4	Research extension to farmers, extension, and policy makers.	(see 4.10)	Complete
4.5	Data Capture and Harmonize existing soil and land resource information for the Pacific Soil Portal	Unaffected	Complete

Approved changes to the activity tables

- ***Objective 4:*** *Develop the Pacific Soil Portal to enable sustainable soil management in the farming systems of the region*

No.	Activity	Covid-19 Response	**Final Activity**
4.6	Soil Portal - Web Development	While still being hosted by MWLR in New Zealand final pre-launch fixes and improvements are largely unaffected by Covid-19.	Complete
4.7	Host Setup	Impacted both by covid impact on governance around hosting decisions, and also directly by inability to meet face-to-face with hosts to assess technical (capability) and resourcing issues.	Complete
4.8	Engage in user testing and feedback to assess the efficacy of information products supplied via the Pacific Soil Portal, final testing and launch. PC	Portal launch decisions impacted by governance as above.	Complete
4.9	Prepare a technical development plan that outlines future modules for the Pacific Soil Portal	Possibly some impact on survey responses and feedback from users.	Complete
4.10	General communication and extension	Likely to be impacted to some degree and rely more on in-country support.	Complete

Resilient and flexible

- Despite the challenges all project members continued delivering the original or modified project objectives
- Field trials were continued, results reported
- New soil survey program developed for Tuvalu

Three headed coconut tree, Tongatapu

Project Interventions

Obj.2 Nutrients	Obj.3 Testing	Obj.1 Solutions	Obj.4 Soil Portal
Quantifying nutrient cycling in taro production systems and identify key management actions and their effects on the storage and flux of those nutrients that determine profitability	Supporting the diversification of vegetable production on low-lying atoll islands in Kiribati & Tuvalu and ensure that nutrient and water use are optimised	Developing metrics for assisting status and trends in the condition of soils that are most important for agriculture in Fiji, Tonga, Samoa, Kiribati and Tuvalu.	Building human and social capital to support sustainable soil management and agricultural development in Fiji, Tonga, Samoa, Kiribati and Tuvalu.	Develop web-based information services on soil management targeted at farming families and stakeholders involved at farming families and stakeholders involved in agricultural and national development across the 22 member countries of the pacific

Field trials and outreach

- Field trials in Samoa, Kiribati, Tonga and Fiji
- Intensive soil sampling program in Tuvalu and Tonga
- Dr Soils Day
- HOAFs
- FAO and PSP

Staff impact

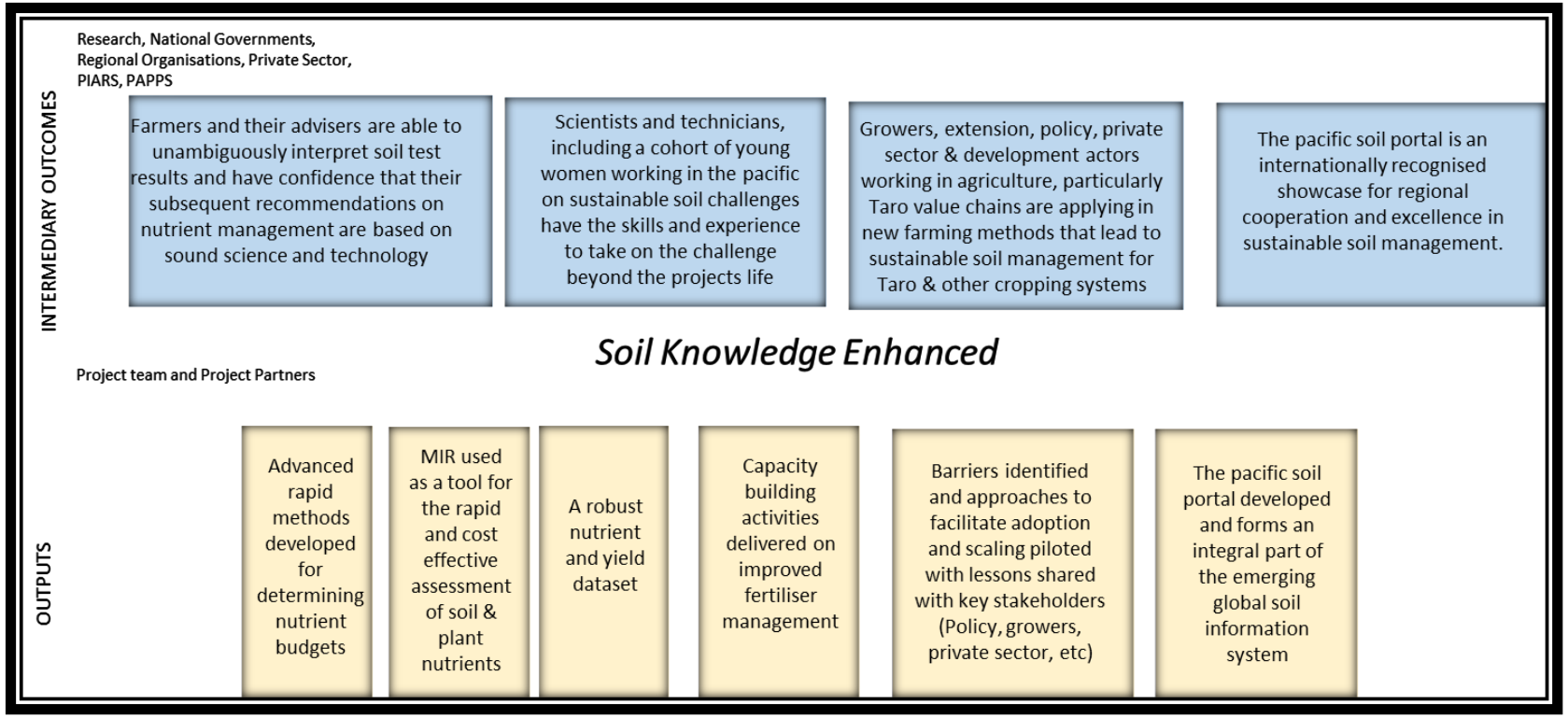
- Project management
- Soil sampling and nutrient analysis
- Communication
- Data analysis
- Fiji: MIR and associate data analysis
- Portal and soil information

Training

- Pre-COVID
  - MIR training
  - Nutrient Budgeting
  - Sampling
  - Extension
- Post-COVID
  - Initial plan was on-line training
    - This was not going to achieve impact
  - On-review this was modified to F2F training
    - Tonga-Siua Halavatua
    - Fiji-Ellen Iramu and Ami Sharma
    - Samoa- Abdul Kader (USP)
  - Atolls- “online” meetings and in-country extension

Project outcomes and outputs

- Outputs delivered
  - Taro NPK and watermelon relationship
  - MIR
  - Portal built
- Outcomes
  - Importance of soils testing and nutrient management
  - Capacity build
  - Portal and soil information recognised @ HOAFs
  - Improved water management and compost nutrients



Today

	Canberra	New Zealand/Fiji
Introduction Ben Macdonald	11:00-11:15	13:00-13:15
Obj 1 Barriers Ellen Iramu/Jennifer Kelly	11:20:-11:40	13:20-13:40
Obj 2 Field trials Mike Webb and Dio Antille	11:40-12:20	13:40-14:20
Break		
Obj 3 Rapid Sensing Ellen Iramu/Uta Stockmann/ Ben Macdonald	12:40 -13:00	14:40-15:00
Obj 4 Pacific Soil Portal James Barringer	13:00-13:20	15:00-15:20
Conclusions and Recommendations	13:20-13:35	15:20-15:35
Discussion	13:35-14:00	15:35-16:00

Next Week

- In country partner discussion
- Setup up meeting venue and invites