

INSTITUTE OF APPLIED SCIENCES
THE UNIVERSITY OF THE SOUTH PACIFIC

Cuvu Waste Management Workshop Report, Cuvu Village, 13-14
September, 2005.

IAS ENVIRONMENTAL STUDIES REPORT NUMBER: 170

By

Dumaru, P & Rupeni S & Michael and Batiri Hughes.

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**REPORT OF THE WASTE MANAGEMENT
FOR CUVU TIKINA**

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S. Rupeni
M. MacMillan
B. Hughes**

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- Rt. Tevita Makutu Volavola, Cuvu, whose enthusiasm, vision inspired the workshop
- Dr. William Aalbersberg, Institute of Applied Science and Intergrated Coastal Management for providing funds for the workshop

Presenters:

- Paul 'Paula Clark – Peace Corps Volunteer, Tikina Cuvu
- Alyson 'Alisi' Venti - Peace Corp Volunteer, Tikina Komave
- Pita Vatucawaqa – Koro Vunisinu, Rewa
- Iliki Bolawaqatabu – Koro Tagaqa, Baravi
- Michael 'Maikeli' McMillan – Peace Corps Volunteer, Nadroga-Navosa
- Patrick 'Vetero' Carmody – Peace Corps Volunteer, Nadroga-Navosa Beekeeper
- Assoc and Provincial Administrator's Office
- Kimberly Coleman – Peace Corps Volunteer, Ministry of Agriculture
- Batiri Tahaman Hughes – Institute of Applies Science, Integrated Coastal Management
- Sukulu Rupeni – Institute of Applied Science
- Erami Seavula, Nadroga-Navosa Provincial Office, Integrated Coastal Management.

1.0 INTRODUCTION

The Cuvu Waste Management Workshop was held from the 13th – 14th of September, 2005 in the village of Cuvu. Participants included representatives from the seven villages in the *Tikina* of Cuvu and a few from Tikina Wai. The purpose of the workshop was to enhance the capacity of local communities in the Tikina to better manage their own waste. The workshop was planned and coordinated by the Peace Corps Volunteers in the Coral Coast Area with support from the Nadroga/Navosa Provincial Office and the Institute of Applied Science (IAS). This initiative is part of the Integrated Coastal Management Project which is hosted by IAS. The workshop was conducted in response to a request from Cuvu Tikina. About 40 participants attended each workshop day (Refer to Appendix A for Participants List).

2.0 WORKSHOP OBJECTIVES

The workshop was conducted with the following objectives:

- i. To raise awareness on waste management concerns in the area and how to address them
- ii. To train community members from the seven villages in the Cuvu Tikina to better manage their waste.

3.0 EXPECTED OUTCOMES

- i. One person from each of the 7 villages of Cuvu Tikina to be trained regarding sewage, rubbish, pigs, compost such that they become resident 'experts'
- ii. After, they will:
 - educate their fellow villagers, formally &/or informally
 - offer advice to local decision-makers
 - positively influence, serve as role-models
 - instigate environmental improvements
 - maintain 2-way contact with ICM
 - maintain contact with *each other*, sharing information, providing mutual support

4.0 OUTLINE OF DAILY PROCEEDINGS

DAY ONE: TUESDAY 13 SEPTEMBER, 2005

4.1. Fijian Protocol

Sevusevu was presented by Pita Vatucawaqa on behalf of the Peace Corps Volunteers and IAS staff.

4.2 Opening Prayer

A devotion and prayer was conducted by the *Vakatawa* of Cuvu.

4.3 Introduction to workshop

Erami Seavula gave a brief background to the workshop. He explained how a similar workshop had been conducted in Votua, Baravi, in 26 – 27, Jan. 2005

Pita Vatucawaqa went through the agenda with the participants. He then explained that 90 percent of the coral along the Coral Coast was dead and the purpose of the workshop was to address this problem. He explained that the coral damage in the Coral Coast was due to the release of water from toilets, kitchens and piggeries from the local villages and hence there was a need to address ways of avoiding this pollution flow into the sea.

Participants and facilitators then introduced themselves followed by an agreement on the workshop ground rules.

4.4 Ecology

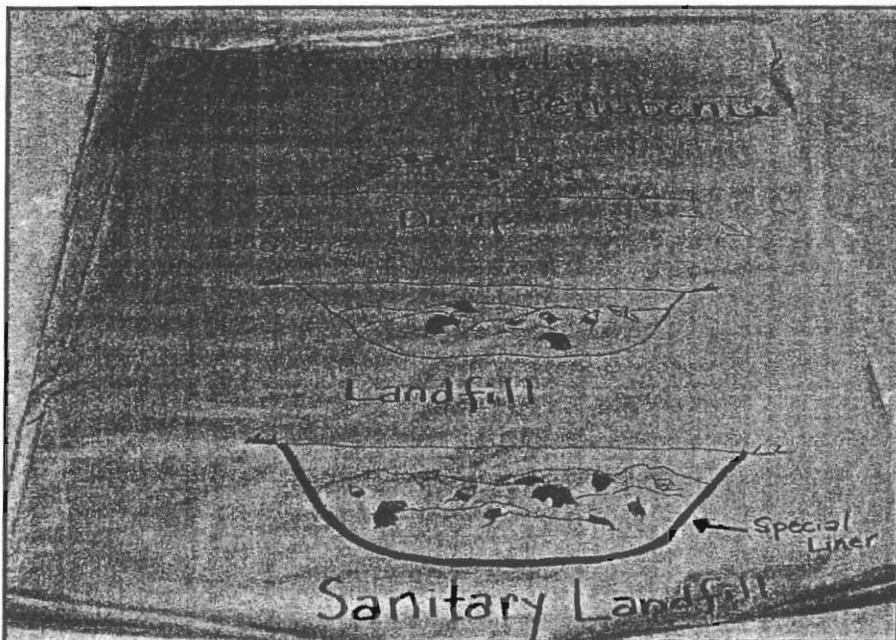
The workshop topics began with a discussion on Ecology. Paul Clark introduced the ecology concept of which the hydrological, carbon and oxygen cycles were described. The cycle as it relates to human interaction with the environment was also presented. Paul's presentation is contained in Appendix B.

4.5. Rubbish

Patrick Carmody addressed some issues relating to rubbish and current management practices of waste in Fiji. He discussed how some current waste management practices are polluting the environment and highlighted the importance of composting to addressing this problem. His presentation can be found on Appendix C.

Alyson Venti then presented on current waste disposal practices in Cuvu Tikina. Most household waste in this area is collected and disposed in the municipal dump site. She explained the three main types of municipal waste disposal. These were – dumps, landfills and sanitary landfills using the diagram in *Figure 1* below.

Figure 1: 3 Main Types of Waste Disposal Sites



The following points were made on the three waste disposal site types:

- Dump:*
- current waste disposal method in Fiji
 - waste is dumped above ground level, visible and releases bad smell
 - leachate seeps through the ground
- Landfill:*
- waste disposal in a hollow area below ground level
 - not visible and bad smell is contained
 - leachate seeps through ground
- Sanitary Landfill*
- waste disposal in a hollow area below ground level
 - not visible and bad smell contained
 - the bottom of hollow area is covered with lining to stop Leachate seeping into the environment
 - the best of the three types of waste disposal methods, but is expensive to construct and operate.

The negative impacts of rubbish burning on the environment were also discussed. In particular, the release of particulates such as carbon monoxide, toxics, sulfur, nitrates and CFCs (particularly from burning plastic) into the atmosphere was discussed. Using a diagram, Alyson described how rubbish burning reduces the protective cover of the ozone layer, allowing the entry of ultraviolet light into the atmosphere.

Alyson also discussed ways of improving waste management practices by introducing and describing the system of reducing, reusing and recycling waste (3Rs)

4.6 Composting

The concepts of composting was explained and the types of waste that can be composted were specified. There included vegetable peelings, green waste, used tea, coffee, egg shells. Dry compost waste that were required for a good compost included grass clippings, leaves and coconut husks. Waste types that should not be put into a compost included meat, fish, seafood, cheese, milk, oil metals, glass, plastic and diapers. The regular covering of general compost waste by dried leaves/grass was particularly emphasized.

Alyson and Pita then discussed composting activities currently being practiced in the villages of Komave and Vunisinu.

Following these discussions participants were led outside where Pita and Alyson demonstrated how to construct and maintain a household compost.

Figure 2: Alyson and Pita at the Compost Building Demonstration



4.7 Group Work

Sukulu led a group activity whereby participants were divided into six groups. Each group was given two waste types such as food scraps, paper, plastics, metals, batteries, etc. Facilitators were then each given a diagram of different waste disposal methods (i.e. incineration, rubbish bin, coastal dumping, recycling, composting, etc) and the groups were asked to choose which method was the most appropriate way of disposing the type of waste they had. The aim of the exercise was to get participants to think about the best method of disposing different waste types. This was also, as a way of revising previous sessions. A key point of the exercise was that waste can potentially be minimized and diverted from the municipal dump.

4.8 Piggery Waste

Michael McMillan Facilitated this session in which he and Kim Coleman discussed the current practices and environmental implications of piggery waste disposal. Some key issues highlighted in the presentation were:

- pigs are an integral part of Fijian culture;
- a significant number of piggeries along the Coral Coast are near the sea or along the coast line;
- most waste from piggeries is directly washed into the sea; and

- pig waste is estimated to contribute about 40 percent of nitrates reaching the reef along the coral coast.

Kim and Michael then explained various ways of reducing the coastline pollution from piggery waste. One such measure is to spread sixteen inches of sawdust over the pen floor and to continuously add a fresh layer to absorb the pig waste. The sawdust must also be mixed every 3 days to enhance the composting process. After a period of six months the used sawdust is then scraped out and used as compost. Michael then presented a case study from Nasau Youth Camp (National Youth Training Centre) where this method was being implemented. He also informed participants that sawdust was being provided for free from Fiji Pine, Lautoka.

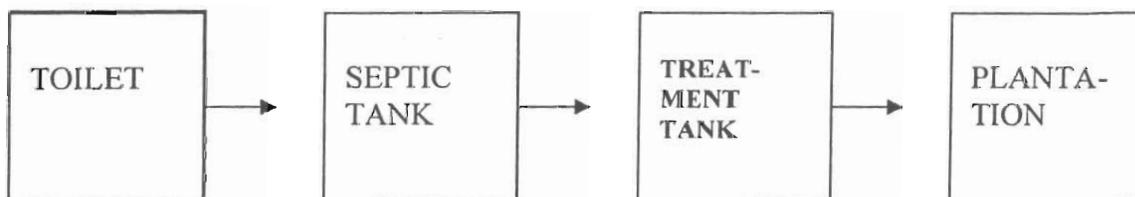
Alyson also participated in this session by demonstrating the difference between waste water containing suspended solids and that with leachate. She showed two jars filled with liquid. One had suspended solids (soil) while the other contained diluted cordial. She poured the contents of each bottle into another empty bottle. Cotton was stuffed in the neck of the empty bottle, acting as a filter. The bottle with suspended solids came out clear after passing through the filter while the bottle with diluted cordial remained a similar colour. The point made in this demonstration was that certain nutrients in black and grey water such as nitrates, phosphate and sulphate cannot be filtered by the soil and hence flows in the sea enhancing algae growth at a rate detrimental to marine life.

4.9 Wetland

Alyson began this session by first reviewing the issues covered in Day 1. The nature and source of grey and black water was reviewed and ways of avoiding its flow into the reefs was discussed. The concept and uses of a wetland was then explained. She describe the steps in setting up a wetland for household greywater and then showed pictures of a number of wetlands that had been established in Komave.

The figure below shows the process of managing black water from the toilet as presented by Alyson.

Figure 3: Black Water Treatment Process



Participants were then taken to one of the village houses to watch a demonstration by Pita and Alyson on how to build a wetland. The wetland developed in the demonstration catered for the pilot household's grey water only.

Figure 3: Wetland Building Demonstration



4.10 Compost Toilet

The concept, purpose and design of a compost toilet was presented by Alyson and Pita. This presentation looked at a compost toilet design that used 'wheely bins' with a double vault. Pictures of compost toilets in Tagaqe, Komave, and Vunisinu were shown to participants upon which discussions relating to design and construction practicalities were conducted. The presentation was followed by a compost toilet building demonstration lead by Alisi and Pita. A double vault compost toilet was demonstrated with the used concrete blocks and timber.

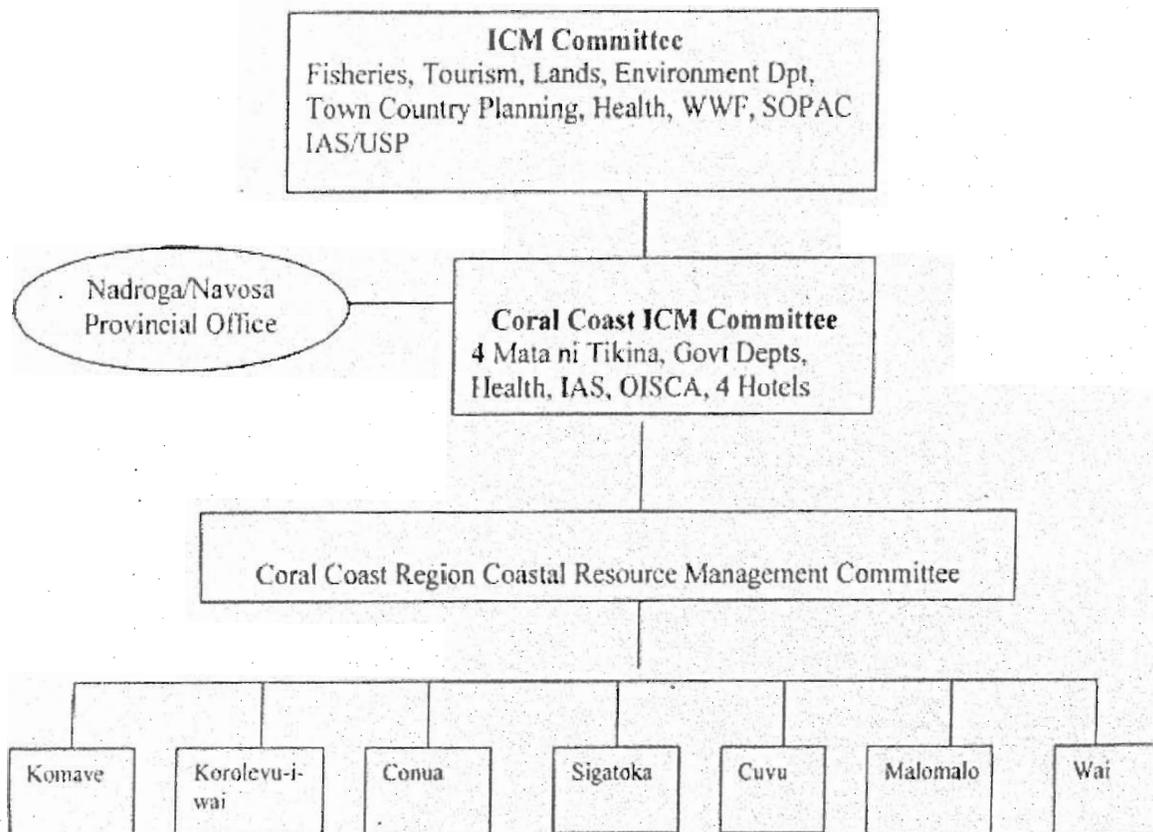
Alisi and Pita then led further discussions on compost toilet management. This was followed by Iliki Bolawaqatabu's presentation on a compost toilet he build inside the Korolevu-i-wai District/Administration Office. This was supported by photographs.

A final recap was then made of the topics covered at the workshop.

4.11 ICM Project

Batiri gave a presentation informing participants about the Integrated Coastal Management projects of which the workshop was part of. The ICM structure and linkages with the current training workshop was explained using the figure shown below.

Figure 4: Integrated Coastal Management Structure



4.12 Village Action Plans for Waste Management

The final part of the workshop was the facilitation of the development of village action plans for waste management. Most action plans stated the following activities:

- setting up a village environmental committee
- each house to have its own compost
- separation and recycling of waste that can be recycled; develop household wetlands for grey water;
- encourage village members to reduce the use of plastic bags

(Refer to Appendix D for Action Plans).

Figure 5: Village Action Plan Presentation



4.13 Graduation and Closing

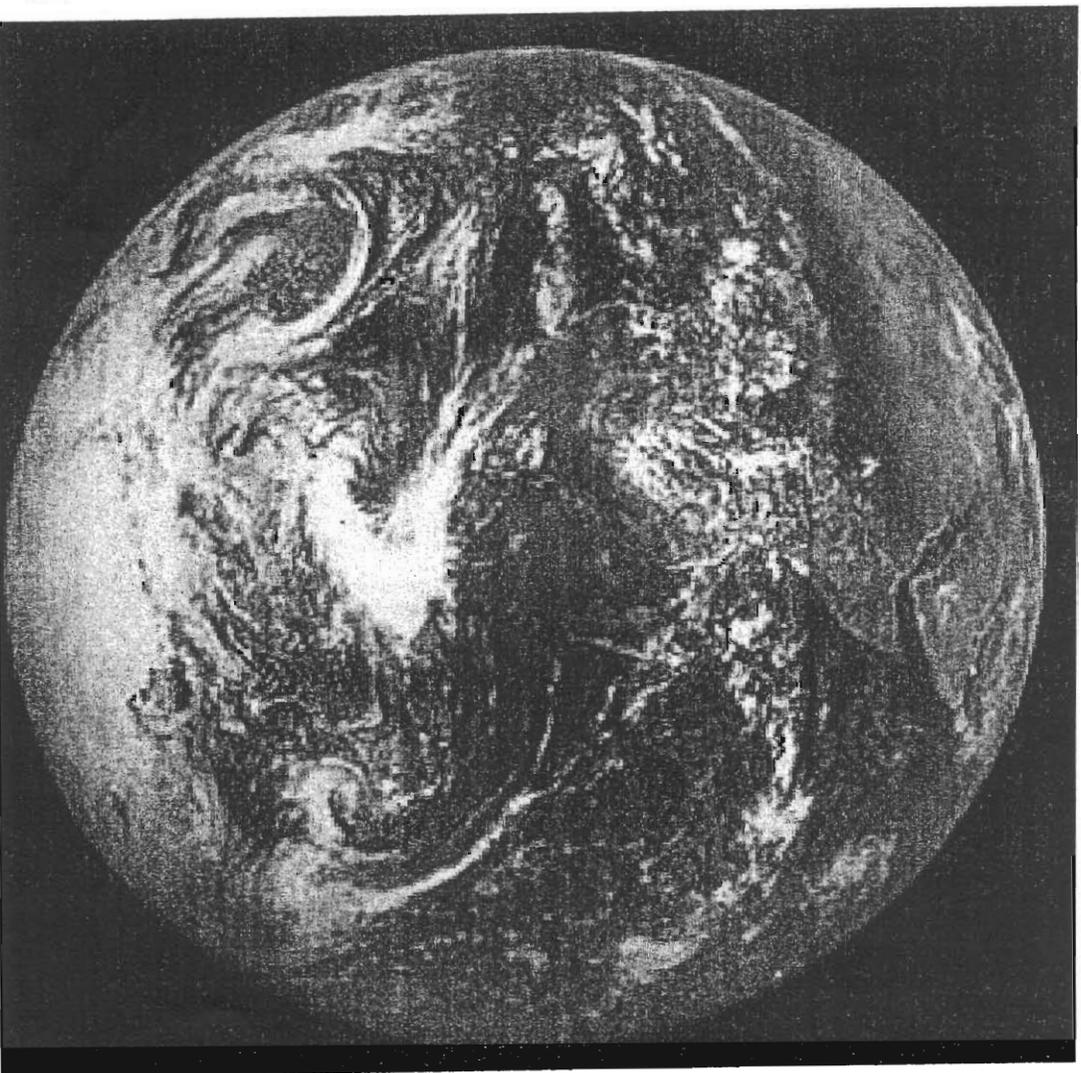
Mun Reddy, Engineer at the Shangri-La Fijian Resort, delivered the Closing Address, and presented certificates to the graduates.

Appendix A: Participant List

NAME	VILLAGE	WORK	ATTENDANCE	
			Day 1	Day 2
1. Naomi Rogoira	Yadua			
2. Meresimani K	Voua			
3. Tuinayau K.	Yadua			
4. Jonetani G.	Cuvu	Turaga ni Koro		
5. Kelevi Cauduadua	Navuevu	Turaga ni Koro		
6. Titilia Vokili	Navuevu			
7. Epi Satavu	Navuevu			
8. Aseri Namali	Navuevu			
9. Yoga Naicker	Cuvu College	Geography Teacher		
10. Netani Vuase	Volivoli	Turaga ni Koro		
11. Manoa Loyawa	Hanahana	Turaga ni Koro		
12. Taito Weleilakeba	Cuvu District School	Head Teacher		
13. Manaini	Rukurukulevu			
14. Nanise Nodrakoro	Tore			
15. Virisela Neceisi	Cuvu			
16. Timoci Volavola	Cuvu			
17. Josaiia Navuniwai	Cuvu	Mata ni Tikina		
18. Tomasa Turagakece	Cuvu	Mata ni Tabagone		
19. Seruwaia Ole	Voua			
20. Miriama Nabokaka	Voua			
21. Saula Deku	Voua			
22. Sisi Cokoibusa	Cuvu			
23. Viliame Gavoka	Sila			
24. Aise Tuinavulevule	Rukurukulevu			
25. Kavekini Sivoi	Yako			
26. Tomasi Kini	Yako			
27. Jonacani Batirua	Yako			
28. Jona Vatusevu	Yako			
29. Jona Dilo	Yako			
30. Jonetani Tuiyala	Yako			
31. Isikia Ugeuqe	Yako			
32. Jonacani Batirua	Yako			
33. Alesi Buloudigi	Nadrourmai			
34. Tamarisi Vakalagi	Nadrourmai			
35. Nanise Natoma	Lomawai			
36. Sunia Vuniyayawa	Nabila			
37. Siteri Toge	Rukurukulevu		√	
38. Unaisi Lotawa	Rukurukulevu		√	
39. Kelera Nava	Navutu		√	
40. Senimelia Schrader	Hanahana		√	
42. Apislaome Rokomatu	Navuevu			√
43. Kitione P	Navutu			√
44. Kaleveti	Voua			√
45. Iliesa Takubu	Kubuna			√
46. Kinisimere Tavailagi	Toire			√
47. Kitione Nacewa	Navutu			√
48. Iliki Bolawaqata	Tagaqa			√

Appendix B: Paul Clark Presentation

ECOTOLOGY



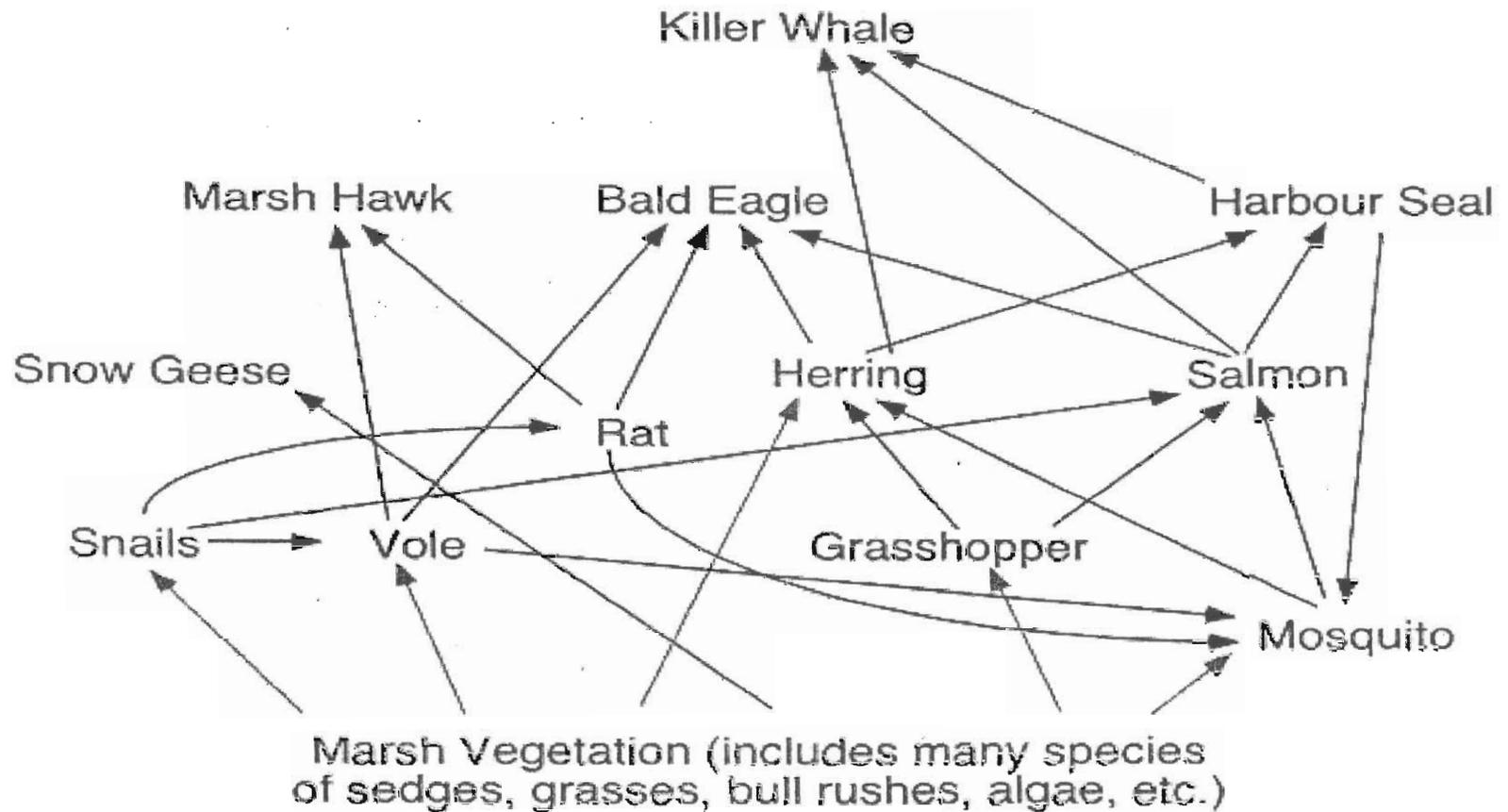
Paul Clark
Peace Corps
Cuvu Village

13 SEP 2005

NA KENA I BALEBALE NA VOSA “ECOLOGY”

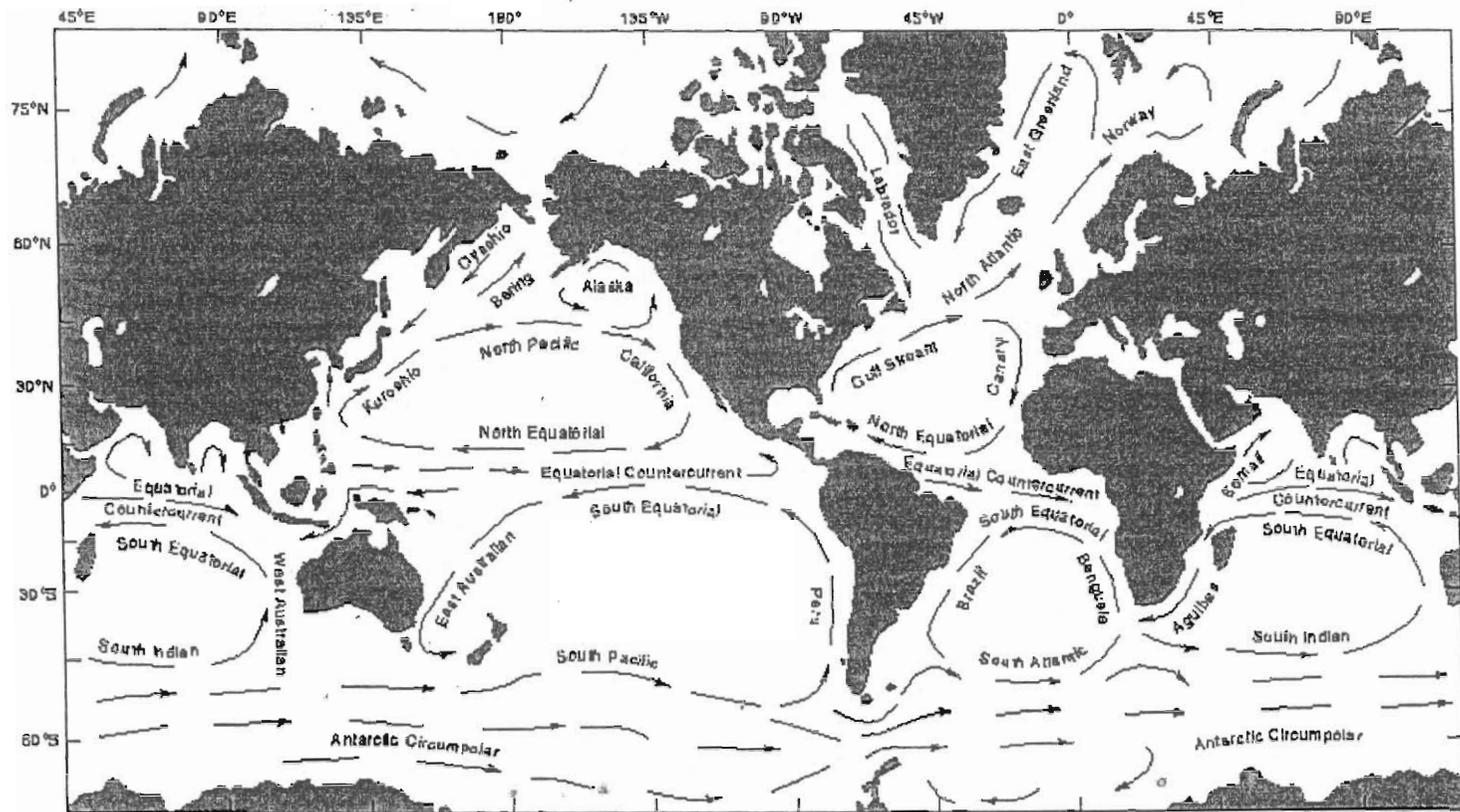
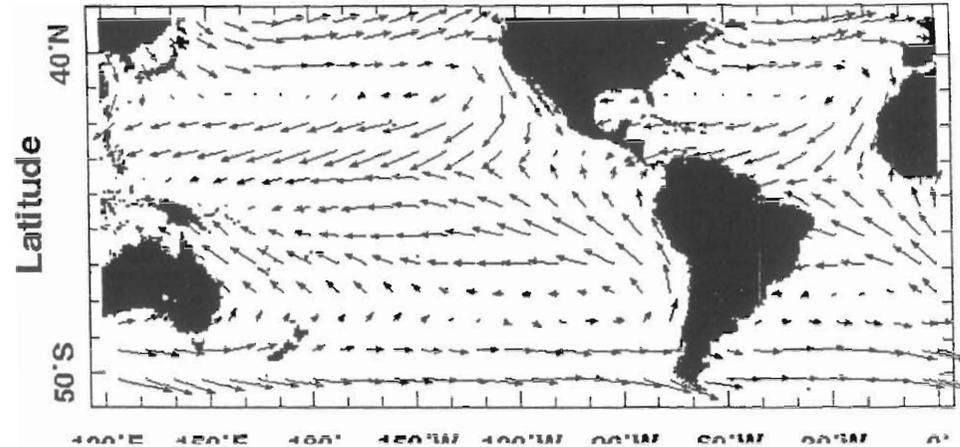
- NA NODA VEIMALIWAI KEI NA VEIKA KECE E WAVOLITI KEDA ENA I TUVATUVA NI KALOU
- NA KENA VAKALESUI NA:
 - WAI
 - CARBON, NITROGEN, OXYGEN (CAGI)

NA NODA I TOVO KEI NA NODA VEIMALIWAI KEI NA VEIKA BULA KECEGA



Na benu ni veika bula e vakalesui vakatotolo ena tuvatuva ni Kalou
(Na benu sa yaco me na kana ni dua tale na manumanu)

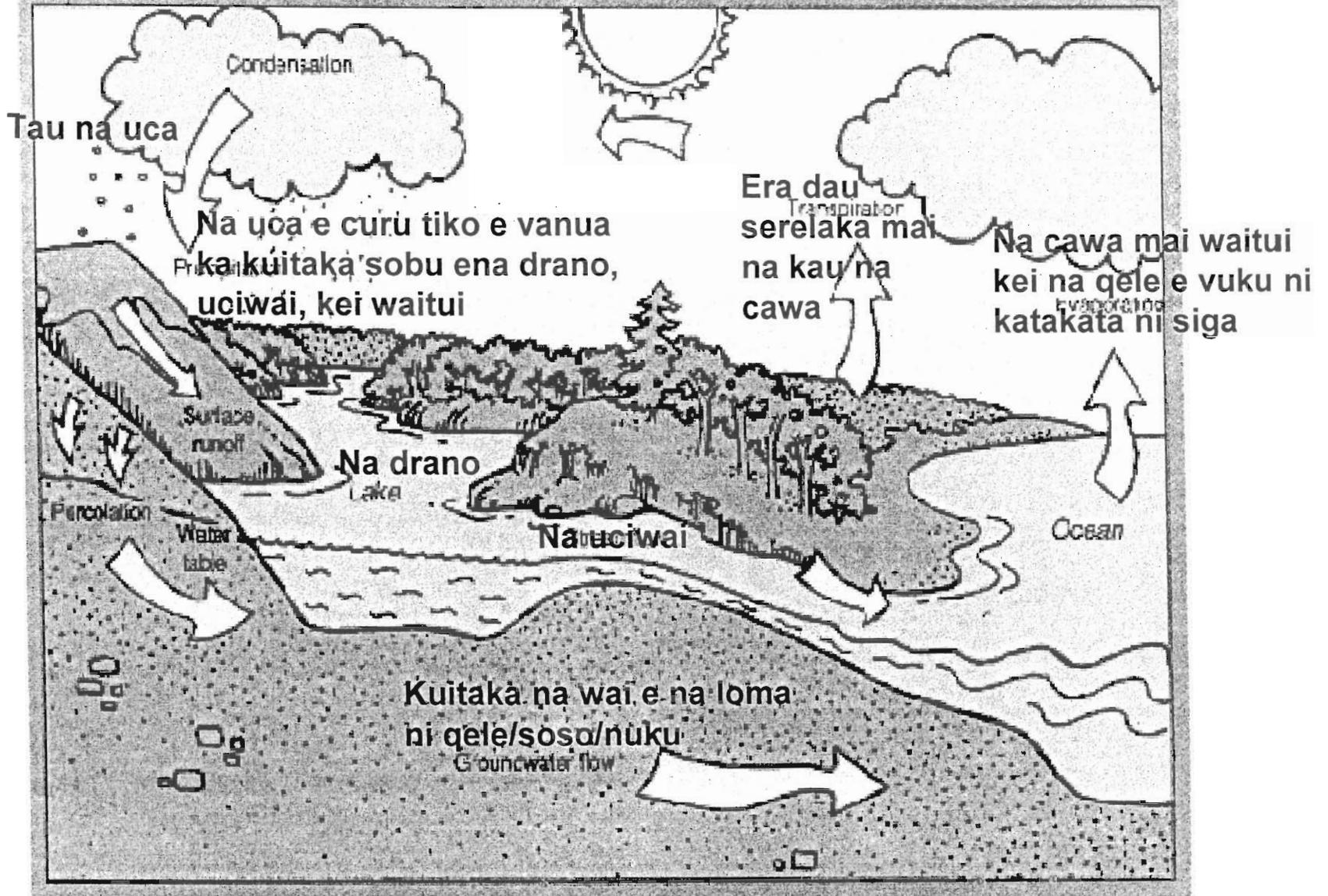
NA KUI NI WAITUI LEVU

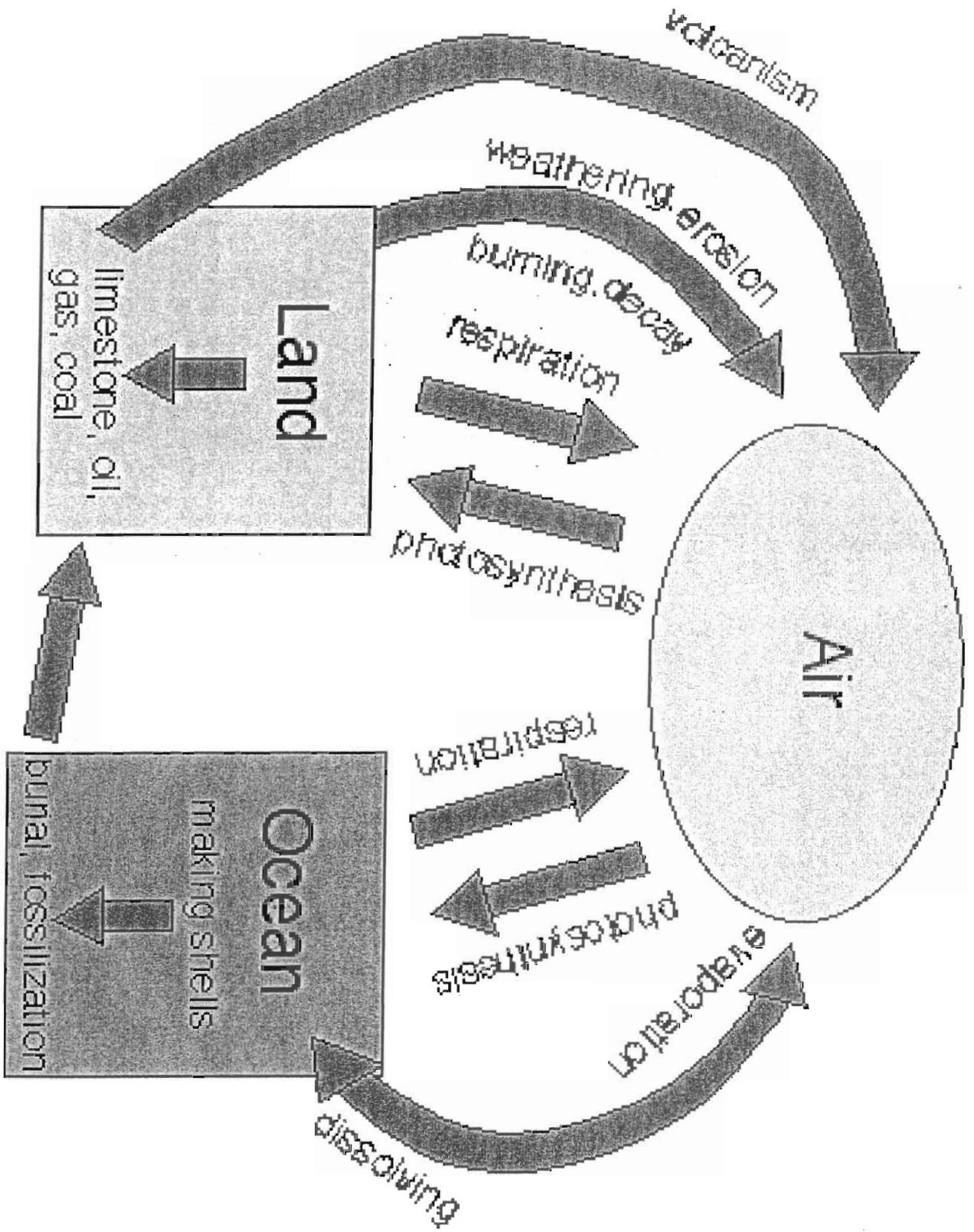


NA KENA VAKALESUI NA WAI

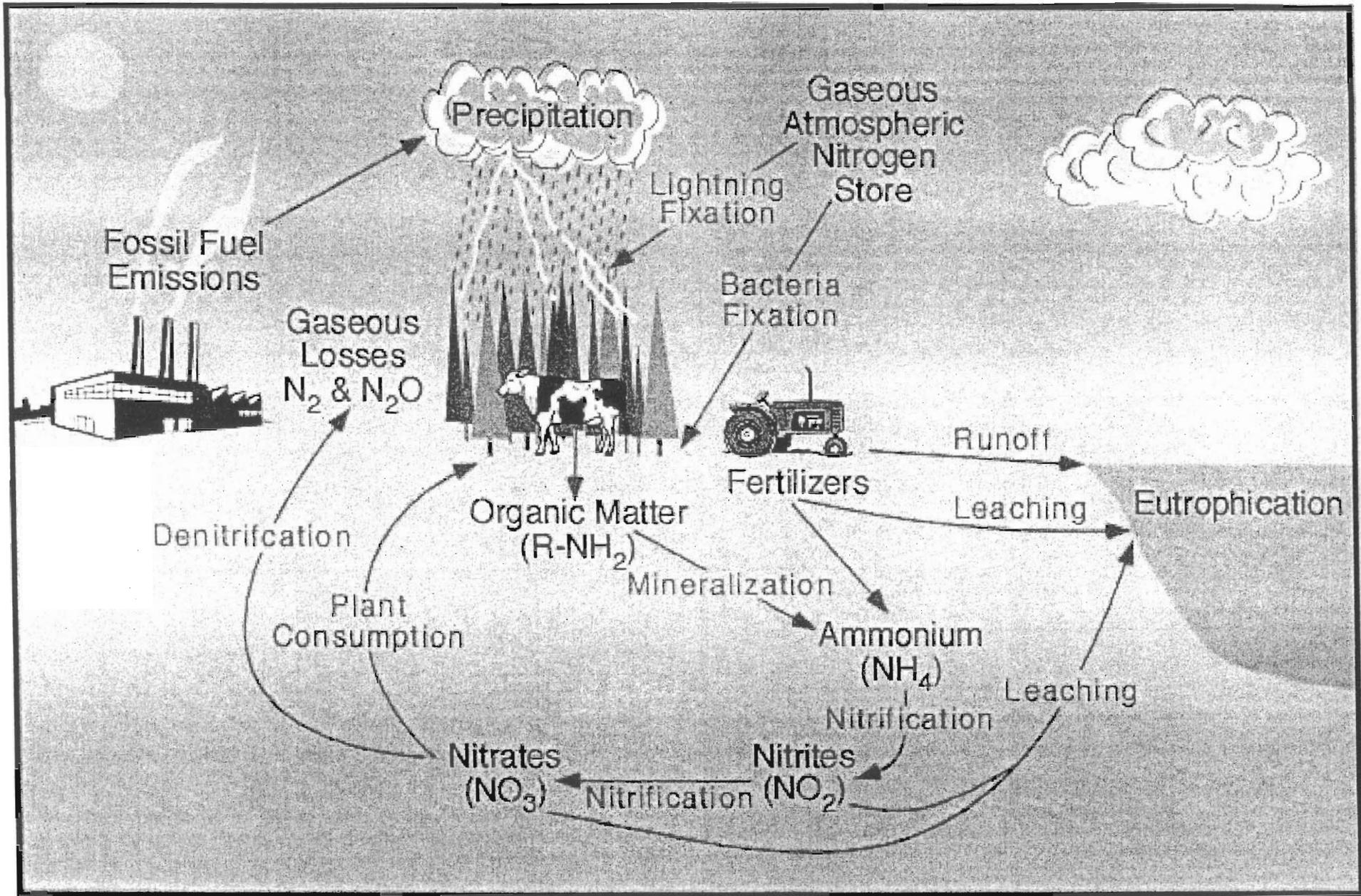
Figure 1

The hydrologic cycle



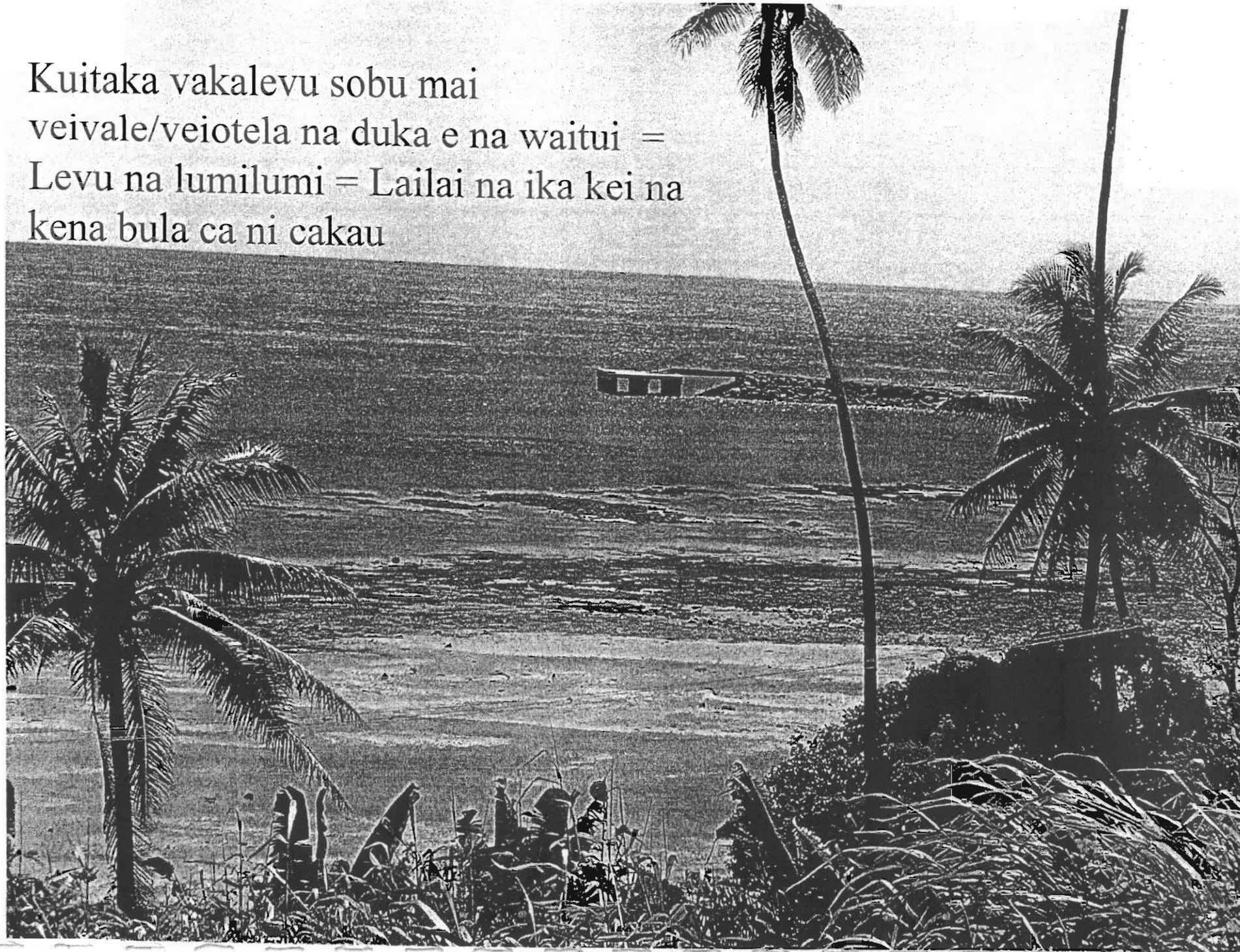


The carbon cycle on Earth



NA KENA VAKALESUI NA NITROGEN

Kuitaka vakalevu sobu mai
veivale/veiotela na duka e na waitui =
Levu na lumilumi = Lailai na ika kei na
kena bula ca ni cakau





Appendix C: Patrick Camody Presentation

Composting



BANU ni KANA kei na lemu TEITEI

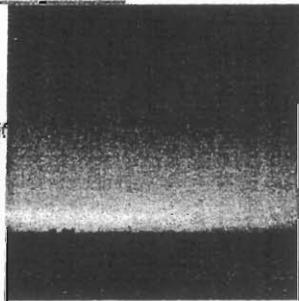
Kalou kei keda Yaubula

- God made the plants, the animals, and he made us.
- Our environment is gift from God



Kalou kei keda Yaubula

- It would be a sin to waste such a nice gift
- Fiji is your gift!



Kalou kei keda Yaubula

- God is so smart he made this incredible cycle
- God made us very smart too!



Na Cava na COMPOST?

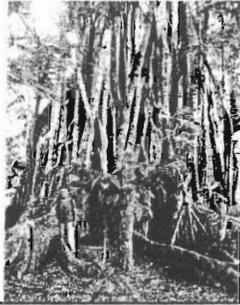
- Composting changes "banu ni kana" into soil that can be used in gardens.
- It uses God's intended system.

Compost: Baleta?

- Good for the environment, your gift
- Good for the village
- Good for Fiji!
- Good for the children

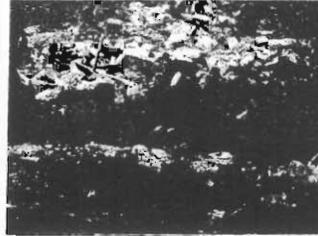
Vakavinakataka na Yaubula

- Use what we already have to improve our gardens and flowerbeds
- Not wasting a gift from God



Vakavinakataka na Koro

- Decrease the trash around the village
- Better soil for your gardens
- Better plants in the garden!



Vakavinakataka na



- Less trash goes to the dump
- The dump in Suva is huge!

Children

The environment belongs to our children and grandchildren

Teach children how to save Fiji while they are young

Composting is a great way to make them aware of the environment



Composting: How?

- Composting is easy!!!
- Put food scraps into a bin outside your house- or a community bin



Composting: How?

- Once a week, stir the bin with a pitchfork
- When it breaks down, put it on your garden
- Teamwork!



What to Compost?

- If it comes from a plant, put it in the bin!
- If it comes from an animal, feed it to the pigs!

What to Compost?



From the plants.....?

- Throw it in the bin!

What to Compost?

- From the animals?
- Feed it to the pigs!



Sa Oti na Compost...

- Na teitei vinaka
- Senikau vinaka!
- Tomata levu!

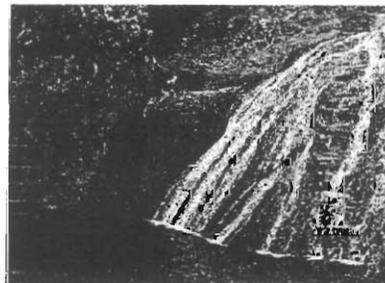


Finally...

It's not too late!!!

- America is beyond repair, but :
- FIJI IS STILL A BEAUTIFUL, CLEAN COUNTRY...
- It's up to us to keep it that way!

Vina Va'Levu!!!



Let's Enjoy the

Appendix D: Village Action Plans

Yadua na Koro

1. Me dua na komiti ni tiko bulabula ka me lewena ko: Turaga ni Koro, daunivakasala, vunivola (Tui), vakatawa, liuliu ni soqosoqo ni marama (Naomi),
2. Bose me vakayacori e na veiyakavi ni Tusiti, Matai ni bose me vakayacori e na 20 ni siga ni Seviteba, e na 7:30, e na Vale ni Soqo
3. Vakavulici na taukei ni vuaka na kena vakayagataki ena kena vakayagataki na sawdust kei na wetland
4. Me yadua na compost e na veivale
5. Me recycle taki na benu
6. Me tara e dua na wetland ni wai ca mai na vale ni sili
7. Me tara e dua na wetland ni septic tank

Navuevu Koro

1. Wasei na benu
 - tavaya, kava, benu ni kakana
 - compost na veivalevle (loma ni rua na macawa)
 - Me kerei e dua na taga ni tavaya me maroroi ni tavaya (recycle)
2. Me kerei na cauravou lewe ni komiti me ra veivuke e na tara ni wetland.

Tore Koro

1. Vakasavui na i tukutuku ni vuli e na soqoni va koro
2. Me ra tuberi na komiti ni tiko bulabula e na kena vakadewataki na i tukutuku
3. Me tekivu qaravi na i tuvatuva ni veiqaravi
4. me tuvani e dua na i tuvatuva ni "Clean Up Campaign" (matasawa, loma ni koro, yasa ni gaunisala, gaunisala ni qiqi)
5. Me ra vakaitavi na taba gone

Voua

1. Me vakatuci e dua na komiti vou e na bose vakoro ka me ra wili vata kei ira na komiti ni tiko bulabula
2. Turaga ni koro Kalaveti Molilevu (Tabusoro 6520332)
3. Me vakatuci e na siga ni bose ni koro e na siga Moniti (19.9.05). Nai naki: Me valesui tale mai na vi kwa e ra va mareqesisia o kora tu tai
4. Rubbishi (3 Rs)
5. Me maroroi vinaka na benu mai na bai ni vore
6. Me ra yadua na compost kei na wetland na vei vale
7. Me dua na compost toilet e Voua

3. Me tekivu ni qaravi na i tuvatuva
4. Me liu mada na vakasavasavataki (koro, bili ni koro, yasa ni gaunisala)
5. Tuvatuva ni tolu na vula:
 - Compost bin (2 na vale dua na compost bin)
 - Wetland – dua na matavuvale
 - 2006 – tomani tiko ga na tuvatuva oqo

Raviravi Koro

1. Committee meetint – 23/9/05
2. Educate the people of Raviravi
 - meeting/tiko bulabula/tiko/koro
 - talk to your friends
 - sharing on kava ceremony

- c) Recycle bags for villagers
- d) Introduce sawdust to piggeries
- e) Marine taboos
- f) Wetland

Tikina-Wai

1. Vakalesui na I tukutuku ni vuli e na koro (6 na koro e na neimami tikina)
2. Tuvatuva ni ono na vula
 - Sasamaki kei na tomitomi
 - Me ra yadua na compost na veivale
 - Me ya lima na compost toilet na veikoro
 - Me ra vakauqeti na leweni koro me ra teikauvakalevu
 - Recycling – vuaka bai me vakasawdust – wetland
 - Vakauqeti na lewe ni koro me ra vakayagataka na compost
 - Tovolea me vakaveiwekanitaki na neimami qoliqoli – vanua – wai (levu na vuli me qaravi)
 - Kerekere me dua tale na neimami Peace Corp – levu na vakadidike me Qaravi
 - Me dua na komiti ni waste management e na tikina-i-wai

Rukurukulevu

1. dua na komiti me sagai
2. Komiti me cakacaka vata taka na kena lalawataki me vakavatukanataki na veika sa mai vulici
3. vaka lesui ni tukutuku ni vuli ki na koro
4. Me vakalailaitaki na benu vakaca e loma ni koro
 - a. Plastic bag, bottles
 - b. Kava ni kakana
5. Compost
 - a. yadua na veivale (keirau)
 - b. yadua na vei mataqali
6. Kava ni benu (3R)
7. Wetland
8. Compost Toilet

Cuvu

1. Wasewase ni benu e na veivuvale (3R)
2. Me vakalailaitaki se kua sara ni vakayagataki na plastic
3. Yadua na compost kei na wetland na vei vale
4. Me rua na vale me yadua na compost
5. Vakadeitaki vakavinaka na veika e vulici
6. Me toki taki e na dua na vanua matau na bai ni vore
7. Me vakayagataki na sawdust e na bai ni vuaka.
8. Na vakaduri ni benu e loma ni koro
9. Na vakaduri ni dua na komiti ni koro me qarava na waste management (etc)

10. Me sikovi na veivanua e so na qaravi tiko mai na vei koro – compost pile and wetland

Sigatoka

1. Wetland – Valenisili/savasava
2. Bainivore – va sawdust
3. Maroroi ni benu (3 R)