

PACC-PNG Pilot Demonstration

The PNG-PACC pilot project is in the Food Security focal area and is to be a groundwater-based irrigation farming scheme. The implementing agency, the Department of Agriculture and Livestock (DAL) developed the Food Security Policy in the 1990s which cover the farming areas of soil and water management, including irrigation. It undertook irrigation systems on the Markham plains of Morobe which utilized surface water unlike PACC's Kivori scheme which is to use groundwater. This is because here are no large permanent rivers within the Kivori area. In the face of climate change and its ever-threatening adverse effects made much more so by its unpredictability and the vulnerability of man as conditioned by his socio-economic status, Guidelines are needed to ensure that whatever interventions are being considered will be the most appropriate to be undertaken.

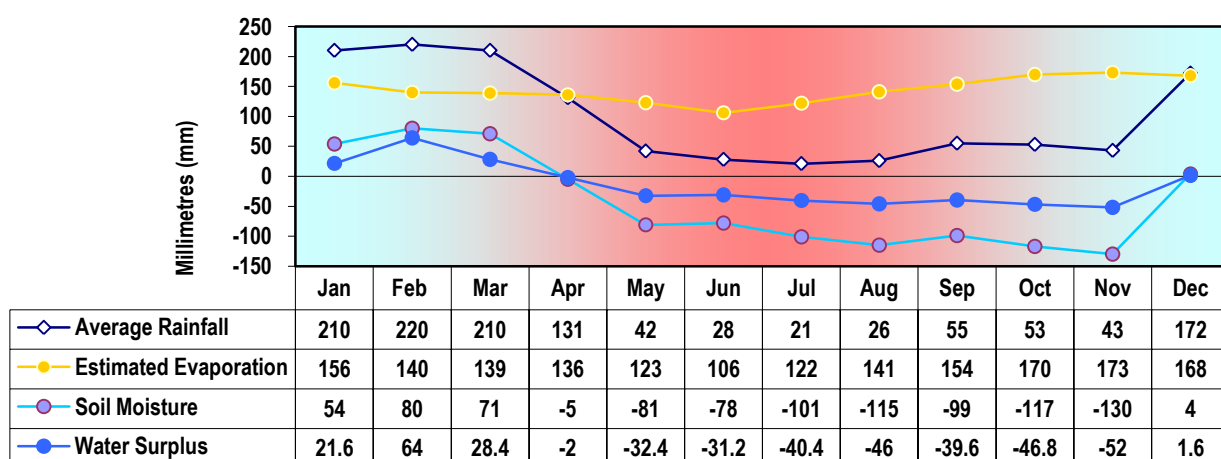
PNG-PACC's pilot demonstration project involves designing an irrigation system that draws directly from the more sustainable ground \ subsurface water aquifers to help PNG villagers within a drought-prone region farm the year throughout; thereby adapting to drought situations that are being worsened by climate change.

The site is situated within the lowland dry sub-humid region of the Central Province, which is characterized by an alternating dry and wet weather periods that take up two equal parts of every year. Climate change has definitely exacerbated the negative impacts so much so that this region was, for instance, declared a state of emergency during the 1997 El Nino drought showed up to one million people affected by that drought and its ensuing food shortages. Large numbers of people heavily reliant on subsistence gardens were reported to have deserted villages in search of food.

Practical guidance will be provided as PACC intervention in the design of these underground irrigation networks – due to mainly coarse (sandy \ gravelly) sediments \ soils which are subject to severe moisture stress.

Figure 1 below is a water balance model to show the critical soil moisture deficit experienced throughout the Kivori villages every year.

Fig.1. Water Balance Model of the Proposed Project Site - Kivori



- **Community engagement, consultation and training processes**

The Kivori community has been informed of PACC since 2006 after the initial Country Consultation with SPREP. They were then formally informed through a visit in 2007 by the current RPM during

the Project Planning Workshop in October of that year. Since then, the willingness and support of this village community to participate in this project is undeniable and overwhelming.

The Kivori PACC Committee which was formed in 2009 after the community learnt that the current NC was in Samoa for the Inception Workshop. In 2010, having heard of the first PACC funds disbursed to PNG, the Kivori PACC Committee sprang into action making available an used Health Centre (which the villagers themselves built) to be the Kivori PACC Field Base. In June and July of last year, two (2) plans for the Official Opening and Ground-breaking Ceremony had to be aborted because the Office of Climate Change and Environment Sustainability could not make available the PACC money that had been sent into its accounts. It built two platforms within the Field Base grounds in preparation for beginning activity.



The two platforms in this picture - roofed one in the background were both built in July of last year in purposefully for the Ground-breaking Ceremony. They, with the Kivori Health Centre (the permanent building) were given by the villagers to the project (PACC) and make up the Kivori PACC Field Base).

It is on record that should another use be made of this building (Health Centre), a house will be built for PACC in no time.

This successful community engagement resulted in a very successful undertaking of the SEA-PACC in February this year.

- **Assessment results (SEA-PACC and/or other V&A or Risk assessments)**

Assessments during the February 2011 Kivori SEA-PACC, which also comprised a Vulnerability and Adaptation component, revealed that the people of Kivori are definitely marginalised by the impacts of climate change and are extremely vulnerable.

Kivori people are so vulnerable because they have long-term prevalent issues of socio-economic nature. In general their food security is dependent on the food gardens or other cash crops. The

Kivorians sell mostly garden produce and hence the impacts of climate change limiting their garden productivity and production is critical to their survival.

- **Adaptation planning – selection and design of adaptation measures and actions chosen to be carried out by the PACC project.**

This will have to be progressed from firstly (i) capturing the lessons learned from the SEA as the first activity of implementation of PACC in PNG, to (ii) the documentation of the guidelines and manuals for irrigation farming under a climate (change) – constrained area.

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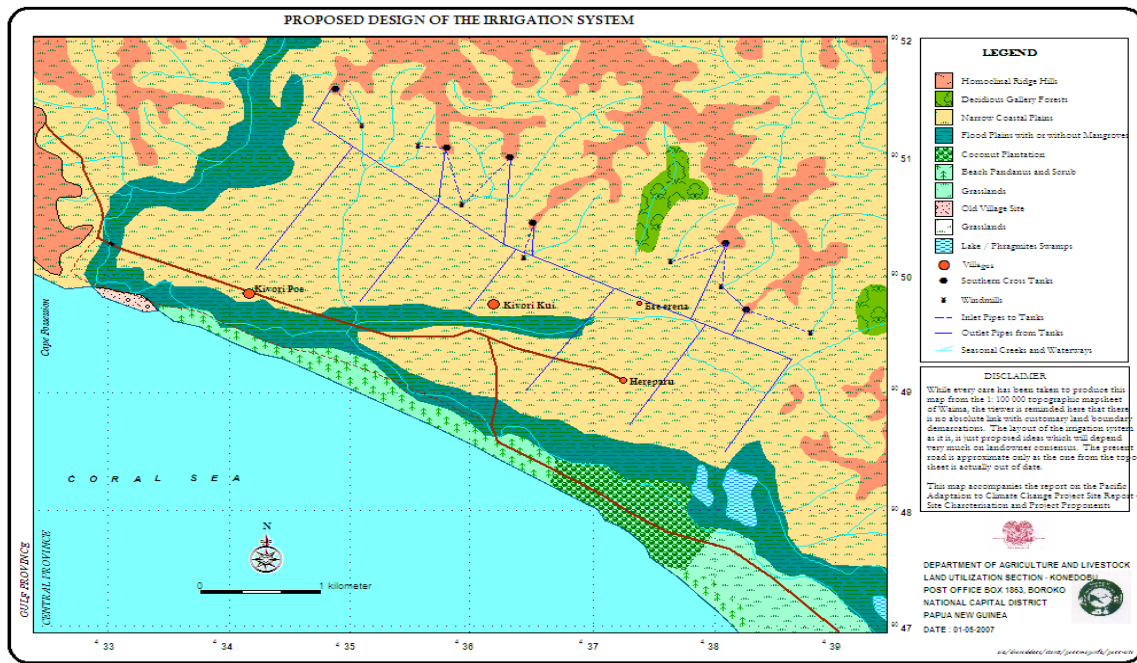
Practical guidance will be provided as PACC intervention in the design of these underground irrigation networks – due to mainly coarse (sandy \ gravelly) sediments \ soils – providing more sustainable adequate soil moisture status that will enable people to farm the whole year through - thus developing resilience in their food production systems, (thereby) reducing their vulnerability to food insecurity and reinforcing their adaptive capacity under current drought situations and future rainfall regimes.

Lessons learned and ensuing technology evolving under this project will be captured in the form of Guidelines and Manuals for use in communities elsewhere within PNG or abroad that experience similar adverse climate change impacts

The design of the irrigation system to be used at Kivori will be undertaken by the irrigation expert who will be engaged after the land and water resources assessments of Kivori (which have been planned for this Quarter) have been conducted and the necessary reports compiled.

In general, the system considered now is of a low-cost infrastructure which basically comprises of a network of channels laid out using the slopes and contours to utilize gravitational flow. It is considered that the networks will be laid at a certain depth within the plough layer or rooting zone as the soils are significantly sandy and hence free draining or have high permeability rates.

Fig2. Proposed Irrigation Scheme used in this pilot demonstration project's Concept Document in 2006. This is just a proposed system used to market the project at that time but it helped to market the project and still provides the means by which project management can provide guidance to the



- **Tools you used to arrive at that decision, the main design considerations as the result of the planning**

Tools Used:

- 1) Available Reports on the land resources \ environment of Kivori – eg. CSIRO, DAL
- 2) Local knowledge of the area
- 3) Technical knowledge of the soils and water resources
- 4) Knowledge of the climate characteristics of Kivori

The issues arising out of the assessments using these tools have been further reinforced by the recent

- 5) Socio-economic assessment of Kivori

Moreover, one of the major considerations, reinforced as a priority strategizing and planning influence by findings in the SEA-PACC, is that of providing the enabling environment for increased income generation. For this, the plans for natural resources development related to the PACC Kivori project will assess and focus on the kind that will cover not only agro-industry but fisheries – marine and inland – and other natural resources. This – identifying and facilitating enabling environments aimed at increasing income generating opportunities – has become a major planned activity apart from the irrigation farming scheme.

The enabling institutional requirements include the incorporation of Kivori Farmers' Cooperative. PACC has resolved that it will not just make irrigation farming available so that the Kivori villagers can continue as subsistence farmers, these villagers have to get into agri-business because they are too well they need money for all sorts of things and mere subsistence farming will not provide them this.

The PNG PACC NC has had discussions with the KPC and the ward councillor to take up some of the issues to the Kairuku Local Level Government and the local MP to whom a list of proposed projects in a whole range of sectors has been submitted. Some of these agenda include proposed new roads

and upgrading of existing ones, improved support for full stocking and use of the health centre, as well as those dealing with the problematic education situation within Kivori.

PACC-PNG's current work plan and hence its budget is all geared towards activity on the pilot project. In summary, the sequence of activities is:

- Development of the Guidelines
- Conduct of Gender Issues at Kivori
- Land resources surveys
- Groundwater resources surveys
- Detailed Contour survey of Kivori Pilot Site
- Mapping of land resources – landform, soils – with particular focus on physical properties and soil moisture budgets, slopes, etc
- Irrigation System Selection
- Design of Irrigation system
- Laying system on the Site

The development of the Guidelines, Gender Studies, detailed contour levelling, and hydrogeology studies will be outsourced to consultants for whom the TORs are being finalized. The detailed soil survey and mapping will be conducted by the Land Use Section of the DAL.

PACC-PNG is quite late in its implementation but given the required resources – which in this case is specifically funding – it is keen to fast-track implementation of the pilot project.

PACC-PNG has yet to provide the irrigation scheme to facilitate the much-publicised all-year round farming but there is no doubt whatsoever that this intervention will instil resilience into the agriculture production or farming system and improve adaptive capacity in the food security issue.

The DAL's preparations to date, and for which it is awaiting the release of funds can be seen in some of the land resources maps it has developed for the pilot project site which are shown below. The availability of these maps will assist greatly in short field surveys than otherwise would be.

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- **Lessons learnt – from the assessment and the demonstration.**

From PACC in PNG our lessons learnt are mostly related to the SEA-PACC we conducted at the beginning of this year.