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## **Cooking and Eating Quality of Promising Rice Varieties for Cultivation in Papua New Guinea**

Rice as a crop, as well as a foodstuff, was introduced to PNG late in the nineteenth century and has already become an accepted and a preferred part of the diet of locals. Although rice is produced at several locations in the country, domestic production hardly meets the requirement with up to only one percent of the total PNG demand. Non-availability of suitable varieties (with superior agrobotanical and physicochemical traits) and lack of agronomic information have been pin-pointed as two of the several constraints for domestic rice production. NARI has accepted these areas of research as national challenges and has already selected some of the superior lines for further trial and possible release for general cultivation.



Taste panel at NARI HQ lead by NARI Director-General, Valentine Kambori (left), and watching on to join in is Director Research, Dr. Naihuwo Ahai (right)

The variety Tai Chung Sen (TCS) 10 has been well established in the country due to its high yield and adaptive nature to both irrigated and dryland fields and is an accepted good taster. Unfortunately, this variety has been found susceptible to shattering and Brown Plant Hopper (BPH).

Fortunately, well-concerted efforts to breed modern ecosystems-oriented High Yielding Varieties (HYV) of rice, initiated by DAL during 1990-1996, have been rewarded with the selection of superior varieties. A set comprising six selections namely NR1, NR 2, NR 4, NR 13, NR 15 and N6- 94 are tolerant to both shattering and BPH attack.

This prompted NARI to test them against commercially available rices like Trukai, TCS 10 and Roots Rice for taste preference, appearance quality parameters (colour, glossiness, grain separation) and eating quality (flavour, texture). Once these results are complete, the final selection of promising varieties will be done by taking into consideration their agrobotanical characteristics. Varieties possessing overall good traits (agrobotanical and physicochemical) will be released for general cultivation. Two of the varieties, namely NR (NARI RICE) 1 and NR 15 possess good agrobotanical and

physicochemical characteristics and thus were selected for organoleptic and sensory quality tests.

The Rice and Grain Programme based at NARI Bubia conducted a series of taste panels to compare NR 1 and NR 15 against Trukai, Roots Rice and TCS 10. Cooking and sensory qualities were also evaluated. Final data are yet to be analysed but preliminary results indicate that NR 15 is one of the most preferred varieties under study.

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## **NARI, QDPI, ICRISAT and Trukai Farms Join Hands to Improve Peanut Production in Papua New Guinea**

PNG used to be an exporter of peanuts, but in recent years the export industry has ceased while, at the same time, small-scale peanut production for local markets has flourished. There has been very little research on peanuts in PNG since the 1980s and no new varieties have been introduced in recent years. However, pure seed of varieties selected and released in the 1970s is no longer available. Indications are that there is strong demand for confectionery nuts in the export market, which PNG is in a position to meet if the right varieties and production techniques are used. At the same time, small scale domestic market producers would benefit from access to seed of good quality varieties adapted to PNG conditions.

ACIAR has recently agreed to support a new project entitled 'Improving yield and economic viability of peanut production in PNG and Australia using integrated management and modelling approaches<sup>TM</sup>'. The project is expected to commence officially in July 2002, and is expected to receive ACIAR funding of nearly Australian \$ 400,000.

The project has three main objectives:

- ❑ to generate information on peanut production, post-harvest storage, utilisation, marketing systems and extent of aflatoxin contamination in the major peanut growing areas of PNG;
- ❑ to use a crop-modelling approach and field experiments to develop and implement improved varietal and management approaches for economically sustainable peanut production; and
- ❑ to develop a farm economic management software package to provide the Australian peanut industry with improved capacity to explore economic consequences associated with production and resource management risk in peanut farming systems.

Project partners are the Queensland Department of Primary Industry (QDPI), the International Centre for Research in the Semi-Arid Tropics (ICRISAT), Trukai Farms and NARI. QDPI is represented by staff from their peanut research centre at Kingaroy and brings expertise in peanut varieties, crop-weather modelling and the economics of peanut production. ICRISAT will contribute seed of peanut varieties with desirable attributes such as large kernel size and disease resistance available from their extensive breeding programme. The first batch of seed from ICRISAT is already being multiplied at Trukai<sup>TM</sup>'s Cleanwater Farm in the Markham Valley. Trukai<sup>TM</sup>'s interest is in reviving the once-flourishing peanut export industry in the Markham Valley.

The main activities planned for PNG are:

- ❑ Survey of peanut growing areas to collect data on peanut production practices and constraints to production;
- ❑ Survey of PNG peanuts sold in local markets to assess aflatoxin risks;
- ❑ Introduction and testing of new peanut varieties in the Markham Valley, Gazelle Peninsula and Eastern Highlands;

- ❑ Analysis of rainfall data in different locations to identify optimal planting dates for peanuts;
- ❑ Trials on improved agronomic practices for peanut production;
- ❑ Dissemination of information on improved production practices and varieties; and
- ❑ Multiplication and distribution of seed of varieties selected by the project.

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## **Poultry Feeding Systems Research**

The NARI Livestock Programme has succeeded in gaining approval from ACIAR for an A\$ 400,000 three year project on Poultry Feeding Systems in PNG. This follows identification of the

cost and availability of feeds as the main constraints to further development of smallholder broiler chicken production serving local markets in the provinces. The Australian partner in this research is the South Australian Research and Development Institute, Pig and Poultry production Institute, while the local partners for outreach and extension are the Morobe and Madang Provincial Governments, the Salvation Army Agricultural Development Programme in the Eastern Highlands and the Lae Feed Mills (Associated Mills - Goodman Fielder).

The Australians are involved in research into lower intensity and outdoor feeding systems for broilers, using crop residues and pasture legumes, because of serious concerns about the health and welfare of intensively fed broilers as well as the costs of production.

The project will establish at Labu an international standard facility for the evaluation of feedstuffs using live birds which can be broilers, layer chickens or ducks. A range of feeds abundant in PNG will be evaluated and promising rations formulated for both on-station and on-farm testing and demonstration. Rations will include those that can be put together by farmers on-site as well as alternatives for the Feed Mills. The project has a large component of working with farmers and provincial extension officers, including on-farm trials, training workshops and the production of extension materials. Current poultry raising practices, farmer attitudes and economic factors will be surveyed to obtain baseline data and there will be follow-up surveys to assess uptake of new technology and the impact of the project.

The project leader in NARI will be the Principal Scientist Dr. Pika Kohun and he will be assisted by other members of the Labu team and NARI economists. The starting date is expected to be July of this year.

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## **Highlands RRDAC Meeting**

The Second Highlands Regional Research and Development Advisory Committee (RRDAC) meeting was held on 6 March 2002 at the Hagen Airport Motel, Mt. Hagen. A total of 22 people participated in this meeting comprising 10 members, five observers and seven facilitators.

During the meeting, the committee reviewed the resolutions from the previous meeting and NARI™s responses to them. The committee was also briefed on the on-going research projects which are currently being carried out in the highlands region. Research results on the World Bank Drought Response Project and the integrated pest management (IPM) project were presented.

Research plans and priorities for the highlands region were discussed. Research Programme Leader of Aiyura presented some suggested research priorities for consideration by RRDAC members. The meeting also discussed the setting up of an Information Centre in Mt Hagen.

The meeting concluded with the formulation of nine resolutions for NARI™s consideration and response before next year™s highlands RRDAC meeting to be held during the first quarter of 2003. The resolutions are:

- That NARI produce a leaflet that explains in simple English what NARI is and does and is translated into Pidgin. A report on progress or draft copy to be presented at the next RRDAC meeting.
- That one two days meeting be held annually and each organisation should investigate cost sharing for the second day. The meeting should be held during the first quarter of each year.
- That RRDAC member organisations explore possibilities of collaborating with NARI in conducting research such as on-farm trials, surveys or conducting field days. Mechanisms of collaboration to be determined between NARI and collaborating RRDAC members and by the nature of the research activity envisaged.
- That NARI provide incentives to attract skilled scientific staff to work in the highlands region.
- That NARI consider adaptive research in Post Harvest technology in collaboration with commercial interests and other organisations.
- That NARI consider promoting the conservation of traditional varieties of crops that are propagated by seeds and consider commercial arrangements for production of open pollinated seeds are produced in PNG.
- That RRDAC members, other organisations and NARI collaborate in planning and conducting farmer field days.
- That NARI initiate research in livestock issues, particularly animal feeds and nutrition, and breed improvement in the highlands. NARI should consult with LDC and others to determine specific livestock research issues.
- That NARI collaborate with other agricultural organisations and institutions in the production and dissemination of extension information suitable for farmers.

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## Staff Comings and Goings

**Sim Sar** is now back at Bubia and resumed as Research Programme Leader in February 2002. He will also oversee the Fruit Fly Project.

**Roy Masamdu** is now the Research Programme Leader for the Rice and Grain Programme.

**Jimmy Risimeri** will now be responsible for Peanut, Sago, SPYN and Yam Nutrition Projects.

**Dr. R.D. Ghodake** is on recreation leave from 4 March to 14 April 2002.

**Jacob Kiara** joined NARI as the Research Programme Leader for the Highlands Programme, Aiyura. Mr Kiara was formerly Director of the Coffee Research Institute.

**Solomon Balagawi** left for studies in Australia.

**Kud Sitango** is now the agronomist at the High Altitude Programme, Kandep.

**Norah Omot** returned from studies and is now based at NARI HQ as Agricultural Economist.

**Kua Guman** is now the caretaker Resource Manager for Aiyura.

**Bridgit Sowa** joined NARI HQ as receptionist.

**Tom Okpul** left NARI to take up a job with the Vudal University.

**Janine Conway** (ACNARS) has gone finish as of 22 March 2002. *NARI Nius* wishes Janine well in her future endeavours.

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## NARI, ACNARS and DED NARI, Sign MOA on Cooperation

The National Agricultural Research Institute (NARI), the Australian Contribution to National Agricultural Research System (ACNARS) Project and the German

Development Service (DED) signed a Memorandum of Agreement (MOA) which acknowledges the working relationship in the development of an appropriate and effective agricultural research system in PNG. The MOA between the partner organisations was signed on 27 November 2001 at the Melanesian Hotel, Lae.

This MOA is based on the existing contracts and agreements between the respective governments of Papua New Guinea, Australia and the Republic of Germany. The MOA will serve as a complement to those agreements to further facilitate the co-operation between the three partners.

During the signing, ACNARS and DED acknowledged NARI™s mission statement, goals and objectives outlined in its Corporate Plan 2000 - 2004 and will share its aims to assist NARI in the development of its capacity to conduct applied and adaptive, cost-effective and environmentally sound agricultural research.



Signing the MOA at the Melanesian Hotel, Lae are (L to R, seated): Dr Luiz Rahalho, Resident Representative of DED; Valentine Kambori, NARI Director-General; and Dr. Ian Grant, Team Leader of the ACNARS Project. Looking on (standing) is Dr. N. Ahai, Director Research, NARI

Under this agreement, joint activities and programmes will be carried out mainly in the development of integrated crop management strategies, the outreach and liaison system and economics programme, but can be extended to other activities. It is hoped that these activities and programmes will be developed and implemented by the three parties in close cooperation and consultation. ACNARS and DED will ensure they jointly support specific NARI activities and programmes and will provide complementary assistance so as to optimise the benefit for NARI. DED will continue to provide personnel assistance to NARI subject to DED Programme requirements and availability of suitable personnel.

The three parties have agreed to hold regular meetings to ensure that consultation and coordination of the activities occur as intended and agreed upon.

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## **Plant Protection Workshop**

### **Economic Importance**

The National Agricultural Research Institute (NARI) organised a workshop to review current research activities in Crop Protection in the agricultural sector in PNG. This was the first workshop devoted to crop protection in PNG since the establishment of NARI in 1997. The workshop was a timely opportunity to review research on crop protection issues related to food and alternative cash crops and prioritise future crop protection work on these crops. The workshop brought together specialists and interested organisations working in the field of Crop Protection in Papua New Guinea. Representatives from the National Agricultural Quarantine and Inspection Authority (NAQIA), University of Papua New Guinea, University of Technology, University of Vudal, Cocoa and Coconut Research Institute (CCRI), Coffee Research Institute (CRI), Oil Palm Research Association (OPRA) and Ramu Sugar Ltd attended.



Participants in the workshop pose for a group photo outside the Melanesian Hotel

The workshop had two main aims. Firstly the workshop allowed researchers to present the findings of recent work in the field of crop protection. Secondly the workshop ranked insects, diseases and weeds of economic importance, and reviewed recommendations for the management and control of important pests and diseases (see ranking list). A risk list for exotic pests, diseases and weeds of quarantine importance was also developed by the workshop.

Issues that were addressed in the workshop included:

- Current research in crop protection;
- Pest control recommendations;
- Ranking of pests in order of economic importance;
- Prioritization of research needs in crop protection; and
- Potential quarantine pests.



The workshop was held at the Melanesian Hotel, Lae, from 12 to 14th February 2002. The workshop was opened by NARI Director General Valentine Kambori and also featured the launching of Professor Ray Kumar™s book ,Insect Pests of Agriculture in Papua New Guinea™. Visiting Australian scientist Bruce French demonstrated an electronic database on pests of PNG food crops. Over 30 papers were presented at the workshop, and a full day working session was included to review pest control recommendations, develop pest priority ranking for major food and alternative cash crops, and prepare lists of quarantine pests posing a threat to production of these crops.

### Ranking of Insect Pests, Diseases and Weeds of Economic Importance

Participants took part in an exercise to rank the most serious PNG pests, diseases and weeds. The top six pests/diseases/weeds were:

**1. Taro beetles**

(*Papuana* spp)

**2. Fruit flies**

(*Bactrocera* and *Dacus* spp)

**3. Nut grass**

(*Cyperus rotundus*)

**4. Anthracnose**

(*Colletotrichum gloeosporoides*)

**5. Cocoa black pod**

(*Phytophthora palmivora*)

**6. Sweet potato weevil**

(*Cylas formicarius*)



The results of this ranking exercise were conveyed to SPC by Roy Masamdu and will be considered in allocation of funds and resources from the Pacific Plant Protection Service.

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## **News in Brief**

### **Oribius Weevil Project to go Ahead**

A new project on biology and control of Oribius weevil is to go ahead with ACIAR funding. Oribius weevils are a major pest of citrus, coffee and vegetables in the highlands of PNG. They are indigenous to PNG and knowledge of pest biology and control is limited. The project will study pest biology and taxonomy and attempt to estimate crop losses caused by Oribius weevils. Ways of controlling the pest using insecticides and IPM approaches will be investigated.

### **Banana CD Available**

INIBAP has issued a new CD entitled **MusaDoc 2001**. The CD contains a mass of information on bananas and plantains, including INIBAP databases on plant genetic resources and research literature, proceedings of meetings and workshops, and the latest issues of **Infomusa** and **Musalogue**. Also on the CD are INIBAP **Factsheets** on banana pests and diseases. The CD is available free from INIBAP ([www.inibap.org](http://www.inibap.org)) and copies have recently been received by NARI. For further information contact Ipul Powaseu at NARI Bubia or Geoff Wiles at NARI HQ.

### **Chromolaena Weed Project Extended**

The ACIAR project on biological control of Chromolaena weed (*Chromolaena odorata*) has recently been extended for a further three years. The project will now run till December 2004. In October 2001 a major infestation of Chromolaena in New Ireland was confirmed, extending from near Kavieng to about 90 km beyond Namatanai. The weed was also recently found in Bougainville. Two biological control agents have already been introduced and it is planned to introduce and release two more agents between now and the end of the project. For more information on the weed contact Warea Orapa or Ingu Bofeng at Labu (Tel 475 1066 or 475 1071).

### **Vanilla Information Bulletin Update**

An update or Addendum to NARI Information Bulletin No 1 on vanilla has recently been issued. The Addendum contains new information on adaptation of planifolia and Tahitian vanilla and additional details on processing and curing recommendations. If you already have the bulletin and would like a copy of the Addendum please let us know and we will mail it to you free of charge. It can also be sent as an email attachment for those with access to email. Contact James Laraki at NARI Publications (Telephone 472 1751 or email: [james.laraki@global.net.pg](mailto:james.laraki@global.net.pg)).

### **Taro Beetle Management**

ACIAR has recently approved funding to continue studies on taro beetle management in PNG and Fiji. The project will involve NARI, Fiji Ministry of Agriculture and Land Resettlement, CSIRO and SPC. Project activities will explore and confirm safe and sustainable control measures for taro beetles for the region. Studies will be concentrating on biological control using Metarhizium fungi and the baculovirus of rhinoceros beetles, chemical control, cultural management practices and creating quarantine awareness in countries and areas where the beetles are absent.

### **11th Regional Technical Meeting on Plant Protection**

The 11th Regional Technical Meeting on Plant Protection organised by the Secretariat of the Pacific Community™s Plant Protection Service (PPS) was held in Nadi, Fiji, from 25 February - 7 March 2002. The meeting comprised Senior Technical Officers in Plant Protection and Quarantine organisations from the 22 Pacific Island Countries and Territories (PICTs). The annual technical work programme for SPC PPS staff for 2002 was discussed and approved during the meeting. The meeting was divided into sessions with various aspects of plant protection being discussed separately. The

sessions were divided into: country reports, Pacific pest list database, Fruit Fly Technical Committee meeting, Taro Beetle Technical Committee meeting, Pest Management in the Pacific (PMP) Technical Committee meeting, Pacific Plant Protection Organization (PPPO) Executive Committee meeting, EU Pacific Plant Protection Planning meeting, Strengthening Plant Pathology in the Pacific (PPP), Development of Weed Management strategies for the Pacific, the bio-control component of Integrated Pest Management in the Pacific and the Pacific Plant Protection Extension Services. Roy Masamdu (NARI) and Elijah Philemon (NAQIA) represented PNG. The work programmes for the Taro Beetle Management and the Regional Fruit Fly Projects in which NARI is involved were discussed in detail. PNG (NAQIA) is a member of the executive committee of the PPPO. SPC is supporting Pacific Island Countries through the PMP and PPP projects by providing technical and equipment support to strengthen quarantine and plant protection activities in PICTs. The PMP project is funded by NZODA and AusAID, while PPP is funded by the European Union for Pacific ACP countries.

### **Gender Awareness Training**

Gender refers to the roles of men, women, male child and female child in a given society. The concept of gender is used to describe the various roles and responsibilities that society defines for women and for men. NARI appreciates that greater contribution to agricultural research and development can take place when gender is considered in the work place. Thus the institute (NARI) has organised a series of Gender Awareness Training sessions for its staff of the various programmes and at the institute's Head Office for its staff to understand how gender understanding can be applied in their jobs. The gender training has been conducted by the National Research Institute (NRI) funded by the ACNARS Project. Mrs Margaret Vatnabar and Mr Bona Eko of NRI conducted the gender awareness training at all NARI programmes (Aiyura, Bubia/Labu, Keravat, Laloki/Kilakila and NARI head office).

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### **Low Cost Irrigation Systems**

Dr Sergie Bang (Team Leader of the World Bank Funded Drought Response Project based at NARI Aiyura) travelled to India to observe low cost irrigation systems in September 2001. This trip was undertaken as part of Component Two of the project, which aims to develop suitable technologies to improve soil water management for farmers in dry areas. Dr. K.P.C. Rao of ICRISAT in Hyderabad - India, the consultant to the project, coordinated the trip.

During the 1997 drought, rural farmers could not grow food crops due to their inability to irrigate. Towards the end of the drought, about 40 % of people in PNG were starving. In non-drought years, production drops in the months following the dry months of July - August.



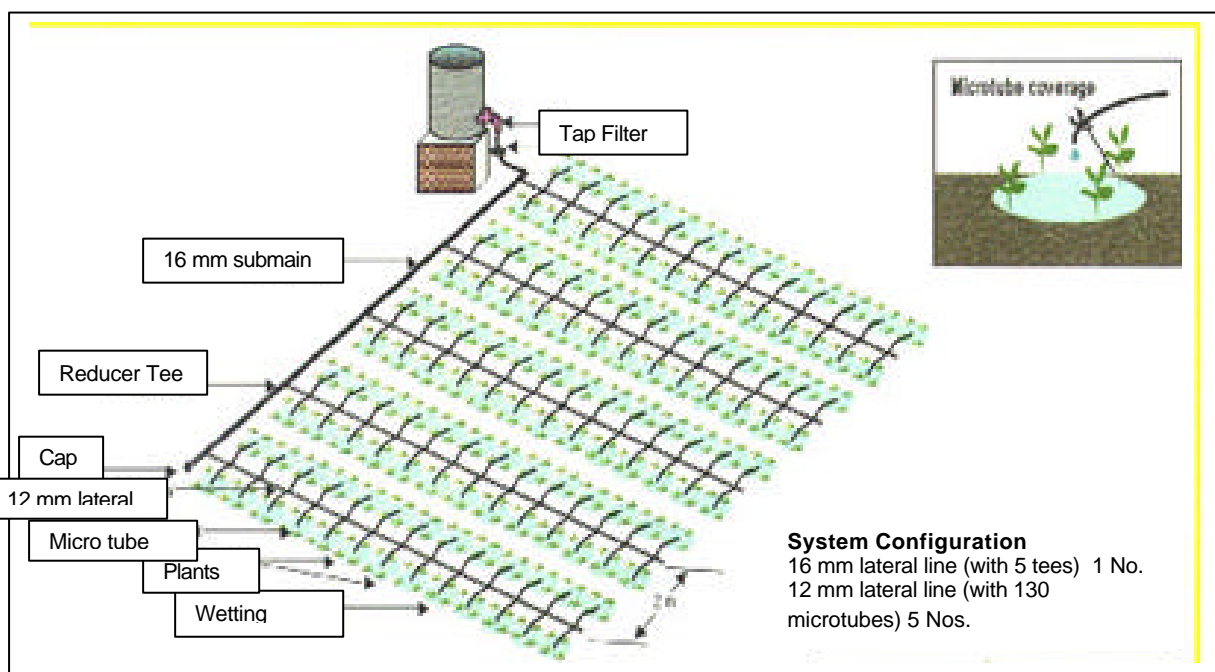
Two low cost water pumps were observed in Bangalore, India. They are the Rope & Washer Pump and the Treadle Pump. The advantages of these pumps are that they are cheap, can be operated manually with ease and they can be manufactured within PNG. They have proved successful with rural farmers in many dry parts of India. The ex-India price is K110 for the Rope & Washer and K140 for the Treadle pump.

**A woman pedaling a Treadle pump The Drum Kit Drip System**

The reticulation system recommended is the drip system because it is efficient and can be obtained from dealers within PNG. The essential parts are the sub main, laterals and micro tubes, which cost about K300. In all, it would cost a PNG farmer approximately K1, 000 to set up an irrigation system to cover a minimum area of 120 square meters.

The objective is to get farmers in PNG acquainted with these sustainable water-lifting devices. It is planned to import five prototypes each of the Rope & Washer and Treadle Pumps for demonstration purposes. Following the demonstrations, the pumps will be built locally and set up in the gardens of commercial vegetable growers. FPDC will assist in identification of vegetable growers to take part in pump demonstration.

The commercial vegetable growers will be innovators of this technology because they need water during the dry months to sustain production and they have the money to pay for it. It is suggested that FPDC as the development agent will promote this technology. At the same time local entrepreneurs will be encouraged to manufacture the pumps so that expertise is developed in country.



### The Drum Kit Drip System

The Drum Kit is most useful for small commercial vegetable gardens. It can irrigate 520 plants with just one drum (of 200 litre capacity) of water.

The drum kit consists of 130 tiny 1 mm diameter pipes called microtubes, fitted to 5 rows of 12 mm diameter pipes called laterals. The laterals are connected to a drum of water by a 16 mm diameter pipe called sub-main. All the pipes are pre-fitted and packed in a small box. An ideal area for drum kit irrigation is about 120 m<sup>2</sup>.

## NARI Officer attends Ultra-dry Seed Storage Course

Joel Waramboi, Cadet Scientist with the Rice and Grain Programme based at NARI Bubia, attended a week long course on Ultra-dry Seed Storage for Germplasm Conservation at the Institute of Crop Germplasm Resources (ICGR) of the Chinese Academy of Agricultural Sciences (CAAS) in Beijing, China, from 12 - 16 November 2001. The course was organised by the FAO, IPGRI and the ICGR. Other participants came from Thailand, Vietnam, South Korea, Philippines, Mongolia, and Myanmar but the bulk of them were Chinese nationals representing various organisations throughout China. The objective of the course was to show the participants the concepts and

principles involved in the use and optimization of ultra-dry and seed storage technology to increase seed longevity and viability. The course focussed mainly on grain crops like peanut, soybean, pea, corn, rice, bean and wheat.

Seed drying by sun, shade or heated air is the most important operation necessary to reduce the moisture content (MC) to very low levels, but how dry should the seed be for prolonged storage? More recently, the concept of ultra-dry, which is nothing but a further reduction in the MC of the seed through the use of saturated salt solutions or silica gel, has widely been used in countries like China, India, USA and others. To complement this technology, appropriate storage practices are used to control the moisture, relative humidity and storage temperatures. With the use of UDS technology, the MC is reduced drastically to very low levels, thereby increasing seed longevity and viability. Also seed germination percentage and vigour increases because physiological and microbiological effects are discouraged. Seeds stored at ambient conditions tend to absorb moisture which promotes germination when you do not need them, whereas ultra-dried seeds remain dormant and viable for many years so you do not have to worry about regenerating them until needed.

Healthy germination from high quality seed



The humid environmental condition in PNG does not favour our normal seed drying and storage practices and Mr Waramboi feels that PNG has to adopt such technologies (UDS) for maximum benefits. Many farmers experience poor germination rates in PNG because of poor storage facilities which do not favour seed longevity and viability.

The 1997/98 drought is a classic example where most crops were destroyed and it was difficult to obtain seeds and other forms of planting material. Therefore, such facilities and crop genebanks should be considered to meet such circumstances.

## Spice News

(This is continued from from NARI Nius Volume 4 Number 3)

### Chili

World imports rose from 153,310 tonnes in 1994 to 190,233 tonnes in 1998. Major importers were the European Union, USA and various Asian countries. Major suppliers of the European market include Morocco, Hungary, Zimbabwe, India and South Africa. Average prices are shown in the following table. Prices were fairly stable, ranging from \$ 1.45 to 1.97 per kilogram.

**Table 1. Chili Import prices (US \$/kg): 1994 - 1998**

Year	Price
1994	1.45
1995	1.97
1996	1.91
1997	1.87
1998	1.74

PNG has attempted to export chili in the past, especially the birdseye type, but has faced problems competing on quality. The crop is easy to grow, but harvesting is very labour intensive, and prices paid to growers have generally not been attractive. Production is still continuing, especially in areas where prospects for major export crops are poor.

## Ginger

The size of the ginger market is difficult to quantify because of the different forms of the product exported, which are often lumped together in available trade data. The major forms of ginger traded are dried ginger, fresh ginger and preserved ginger. Only dried ginger is classified as a spice. The largest markets are USA and United Kingdom. Other European Union countries and Japan are also major importers. Combined EU and US imports rose from 26,293 to 28,649 tonnes between 1994 and 1996. Total world imports (1998) were estimated at 121,648 tonnes, worth US \$ 110.7 million, but this figure may include some fresh ginger and ginger preserved in brine. The latest import data are shown in the following table. Imports have continued to rise steadily. The average price of imports in 1999 was \$ 1287 per tonne.

**Table 1. Ginger imports to European Union and USA: 1998 - 1999**

	European Union		USA		Total	
	Qty (t)	US \$ ,000	Qty (t)	US \$ ,000	Qty (t)	US \$000
1998	21,058	28,089	14,036	16,446	35,094	44,535
1999	20,892	29,458	15,580	17,488	36,472	46,946

Costa Rica and Brazil mostly supply ginger to the fresh market. China, India and Thailand were the main suppliers of ginger to the spice trade. PNG exported ginger in the past but no longer does so. The Fijian ginger industry is struggling to compete with producers in Asia and South America. Australian ginger has recently developed a reputation for quality and is becoming competitive on the world market.

## Technical Tips and Contributions

There has never been a complete census of livestock in Papua New Guinea. Best available estimates of the numbers of animals and the total annual production in 2001 by domestic species are given in Table 1.

### Livestock Numbers and Production in Papua New Guinea

**Table 1. Livestock numbers and production**

Species	Component	Number	Production
Pigs 27,000 t	Village	1.8 million	
	Commercial	23,500	1,000 t
Cattle	Large scale ranch	63,000	2,300 t
	Smallholder	17,000	600 t
Sheep	Smallholder	15,000	54 t
Goats	Smallholder	20,000	72 t
Swamp Buffalo	80% feral	4,000	
Chickens	Commercial Broilers		17,500 t frozen
	Broilers live sales		6,000 t carcass
	Commercial layers	200,000 hens	54 million eggs
	Village	1.5 million	1,858 t carcass 6 million eggs
Muscovy ducks	Household	10,000	-
Rabbits	Household	15,000	112 t

The data are industry estimates (cattle, commercial poultry, commercial pigs) (see Vincent and Low 2000) or those of I. McL. Grant (rabbits) and the author. Numbers have been rounded to avoid any spurious suggestions of accuracy.

Numbers of village pigs and poultry and smallholder sheep and goats can be estimated using up to three different sets of information. A survey of indigenous agriculture was conducted by the Australian Administration in 1961-62 (Walters 1963). The numbers of pigs and chickens per 100 persons in the surveyed villages can be extrapolated using rural population data from the 1980, 1990 or 2000 population census and assuming 1962 levels of ownership. During each census, rural householders were asked whether or not they owned pigs, poultry, sheep, goats or cattle. Although there are difficulties in using the census data, for example the problem of multiple ownership of animals, the numbers of animals can be estimated from the numbers of owners, aggregated on a provincial or regional basis, and assumed herd or flock sizes. The third set of data is a listing of the ratio of pigs to people recorded at various locations in Papua New Guinea and analysed by Bourke (1999). An expanded listing was subsequently made available in Hide (2001). Again using census data it is possible to estimate total pig numbers on a regional basis. Hide (2001) has now produced a comprehensive discussion of all the available information on pig numbers, distribution and ownership. While all estimates rely upon population census data, the several methods of calculation for the four species produce livestock population estimates of the same order of magnitude for each species. Use of these data with respect to village chicken populations can be seen in Quartermain (2000). Assumptions used in the estimation of village pig and chicken and smallholder sheep and goat meat production are given in Quartermain (2001). For both sheep and goats, the estimates rest on an assumed 30 percent annual offtake for consumption and a 12 kg carcass. The corresponding assumptions for village pigs are a 50 percent offtake and a 30 kg carcass. For village poultry it is assumed that a hen produces 70 eggs per year of which 30 are available for consumption. Incubation of the other 40 eggs results in 12 surviving chicks to grow into replacement pullets or be consumed. A standing flock has 66 pullets for every 100 hens. Hence a 1.5 million bird flock has 204,000 hens, 135,000 pullets and 1,161,000 young birds being raised to eat. Actual meat bird output from this flock is 2,322,000 birds at a carcass weight of 0.8 kg. Consumed egg production is 6,120,000.

The live bird broiler production is based on hatchery sales of 130,000 day-old chicks per week and a 1.0 kg carcass weight. Rabbit meat output is based on 4000 does, 20 offspring per doe and a carcass weight of 1.4 kg.

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**By A.R. Quartermain**

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## FORUM

We would like to hear from you. In this column, we will be publishing your letters (views, opinion, etc.) in regard to any issues that are published in NARI NIUS or other relevant agricultural research issues that you wish to express. In this issue, we are publishing your letters, email and fax messages requesting NARI publications and other information..

### ***Inquiring for Information***

*I write to inquire about information involving work done by your organisation. I am a final year student in Communication for Development and I am currently on Industrial Training with the Community Affairs Department, Oil Search Limited until May when I return to the University. Information that I wish to enquire about concern the role of your organisation and the different aspects of the agriculture industry it serves. In addition, I wish to inquire more about how your organisation administers community relation work, liaison work and information dissemination. Please supply me with information concerning these areas your organisation engages in. I would also appreciate if you also supplied me with other information, which may be of importance for me and a further addition to acknowledge about your organisation.*

*Thank you for your help.*

*Simeon Namunu*

*Language and Communication*

*Department*

*Private Mail Bag*

*Unitech*

**Lae**

*Morobe Province*

### ***An Approach to the Presentation of Research Project Results***

*For my mentoring of the Livestock Programme cadets on presentation of their research results I thought of an approach that might be helpful to scientists in other programmes. Having given the reasons for the research and the objectives, outlined the methodology and presented the analysed data, it seems to me that there are three key questions to be answered:*

- 1. What did we do to the animals (plants, soils)? We need to be clear about the real challenge imposed or opportunity given to our subjects.*
- 2. What was the response to the challenge or opportunity by the subjects?*
- 3. What were the consequences? This is the the "so what?" question posed in the form CE The subjects responded in this or that way; so what? Maybe they grew faster but why, and what does this mean in reference to the production system?*

*The answers to these questions form the core of the Discussion section of a presentation, along with comparisons with the results of work done earlier or elsewhere. From these considerations we can proceed to draw and present some Conclusions and make any Recommendations arising from the work.*

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## **Geographic Information Systems (GIS) Training for Oro DPI Staff**

A training course on the use of Geographic Information Systems (GIS) was held at the GIS section of NARI HQ from 3 -7 November 2001. The course is part of NARI™s endeavour to provide technology for planning for sustainable development and disseminate sound information to Papua New Guinea. Mr. Watlangus Zaccheus (Statistician) and Mr. Peter Sent (Extension Officer) with the Oro Provincial DPI were the participants as the course was organised at the Oro DPI™s request.

The course was designed to train potential users of the two major databases, the Papua New Guinea Resource Information System (PNGRIS) and Mapping Agriculture Systems Project (MASP), and the Geographic Information Systems (GIS) ArcView version 3.1 through which these databases can be exploited, analysed and manipulated for particular queries or applications. The objectives of the training were to: introduce the participants to the PNGRIS and MASP databases and their applications; understand constraints and limitations; and learn basic keys and commands in ArcView.

The course included both theory and practical sessions on GIS and the databases. The course covered topics in the functions and fundamentals of GIS, the general information and the type of data used in a typical GIS, and the background, data structure, definitions and codes used in the databases. Several hands-on exercises were designed to complement the theory in this training programme. Hence practical sessions were undertaken to map and do manipulations on the databases using GIS.

As a prerequisite for the training course, all participants should be computer literate. The two participants had not being exposed to computers but they were able to understand the databases and basic concepts and functions of a GIS. Especially, the scale level, data sources and the techniques used to capture the data. Other related issues concerning the data limitations were highlighted during the training.

In addition, the trainees were able to complete the mapping and GIS exercises offered during the course. These included the creation of maps using the mapping (cartographic) elements and the maps produced using the tools provided in the GIS.

The other activity in this course included the use of EndNote, a computer program that is used to store, input and access bibliographic information. This was complemented with the Papua New Guinea Agriculture Bibliography (PNG AgBib), which is a bibliographic database of the country. This is an important information source for references or literature reviews.

Oro DPI is acknowledged for undertaking the initiative and funding the course for its officers to attend. The NARI GIS Unit has also set up GIS Databases at the Oro DPI Office after the course and the two participants are expected to apply their knowledge gained during the training.

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## **NARI PUBLICATIONS**

1. Proceedings of the NARI Poultry Workshop. NARI Proceedings Series, Proceedings No. 1. March 2000.

2. Prospects for Vanilla Development in Papua New Guinea. Proceedings of a Farmer/Researcher/Marketer Workshop: NARI Proceedings Series, Proceedings No. 2, September 2000.
3. Focus for Agricultural Research in Papua New Guinea, NARI Conference Paper Series, Conference Paper No. 1, December 2000.
4. How to Produce Homemade Pesticides, NARI Extension Series, Extension Booklet No.1, February 2001.
5. Descriptive List of Selected Sweet Potato Varieties for Lowland Conditions. NARI Extension Series, Extension Booklet No. 2, March 2001.
6. Description of Selected Sweet Potato Varieties for Lowland Conditions: Selection as of December 1998. NARI Technical Bulletin Series, Technical Bulletin No. 1, May 2001.
7. Efficient Propagation Techniques for Taro Multiplication. NARI Extension Booklet Series, Booklet No. 3, June 2001.
8. Towards an Integrated Cabbage Pest Management Strategy for the Wet Lowlands of Papua New Guinea. NARI Technical Bulletin Series, Technical Bulletin No. 2, July 2001.
9. Vanilla. NARI Information Bulletin Series, Information Bulletin No.1, August 2001.
10. Distribution and Management of Siam Weed in Papua New Guinea. NARI Conference Paper Series, Conference Paper No. 2, November 2001.
11. Current Status of Pesticide Use in PNG. NARI Conference Paper Series, Conference Paper No. 3. December 2001.
12. NARI Recommended Taro Hybrids. NARI Extension Booklet Series, Booklet No. BUB 01, December 2001.
13. Improved Taro Varieties with Resistance to Taro Leaf Blight for PNG farmers. NARI Technical Bulletin Series, Technical Bulletin No. 3. February 2002. New

## Up and Coming

1. NARI Council Meeting, 30 April 2002.
2. NARI Open Day at Bubia, Lae, 4 May 2002. Contact Sim Sar on 475 1033.
3. Drought Contingency Planning Workshop: Farm Level Contingency Plans, 7 - 9 May 2002. Contact Sergie Bang on 737 3500 or email: wbd frost@global.net.pg.
4. PNG Fruit Fly Project Review, 21 - 23 May 2002. Contact Sim Sar on 475 1033.

## Bubia Seminar Series 2002

<b>19 April</b>	Smallholder Rice cultivation in Waria valley of Morobe sub-district - <b>Ewa K. Ososo.</b>
<b>17 May</b>	Beef quality difference between straight bred and crossbred cattle - <b>Dr P. Kohun</b>
<b>Date to be confirmed confirmed</b>	Ducks as a potential livestock species for rural and peri-urban smallholder farmers - <b>Saun Ignatius</b>
<b>Dates to be confirmed</b>	Strategies in Revenue Generation activities - Vanilla experience - <b>E. Guaf and C. Gwabu</b>
<b>Dates to be confirmed</b>	Mechanisms of insect resistance to pesticides - <b>D. Putulan</b>
<b>Dates to be confirmed</b>	Standards for NARI Publications - <b>M. Singh</b>

The venue is Bubia conference room. All welcome

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