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Christmas Message

Associate Prof. Mohammed Umar HOS SAFT and Director IRETA

2014 has been a successful year for Alafua Campus as it has been for USP itself. All staff at Alafua worked hard and I am indeed thankful to all of them for the great effort. I could not say this for last year as we needed positive changes to our thinking, commitment and performance to achieve the result we desired. With the year ending in high note we all can celebrate our festive season with pride and satisfaction.

2015 is just next month and the consolation for us all is that we can start the new year with the same enthusiasm, vigour and motivation as we have concluded 2014. God willing, 2015 will be just as rewarding for us if we continue to love and do what we need to do.

I wish everyone (families, friends and colleagues) who has been associated with Alafua in one way or another the very best for the festive season and a rewarding New Year.



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The Head of SAFT Report

It has been a challenging year for the School of Agriculture and Food Technology (SAFT) based in Alafua, Samoa. Despite the record rise in the number of Agriculture students, the school tried to cope with the limited resources - both human and facilities. Two teaching staff members left and this left a void in the academic team but we still managed well.

2014 saw a big leap in SAFT student intake. Students enrolled in the face-to-face mode pursuing Agriculture reached 181 in the first semester which is significantly higher from last year. Second semester enrolment is even higher. This year saw a record number of Post Graduate students at SAFT.

The challenges faced by SAFT and ways to resolve issues surrounding its operation are translated into the SAFT Self-review report which will be presented to the Program Review Committee early next year. The document compiled baseline information about SAFT in the last 5 years and detailed some of the necessary strategies to further uplift the quality of its curriculum and total profile in teaching and research.

The biggest highlight of the year for SAFT is the opportunity to participate in the 3rd Small Island Developing States Conference held in Samoa. SAFT hosted the parallel event "Agricultural Research for Sustainable Development and Intensification in Small Island Developing Countries" on the 2nd of September 2014 at the USP Alafua Campus. The event showcased the school's completed and ongoing researches undertaken by staff and students with funding mainly from the USP Faculty Grant, Graduate Student Assistance ship and the Australian Centre for International Agricultural Research (ACIAR).

Another milestone in SAFT's regional and community engagement priority area is the signing of the Memorandum of Understanding with the various institutions one of which is the Ministry of Agriculture and Fisheries of Samoa. This MOU is intended to strengthen the exchange or attachment of researchers, faculty staff and students, undertake joint research or projects of mutual interest provide technical assistance, consultancy, and training; and joint sponsorship of symposia, seminars and conferences on themes of mutual interest.

This year also saw a number of learning support sessions provided to the staff and students which enhanced their teaching and learning capabilities including 20 weeks farm practical experience.

There are 14 research publications produced by staff this year which are submitted to various journals. These research outputs are proofs of SAFT's enhanced research profile. Some of these researches were presented in international conferences like the International Horticultural Congress held in Brisbane in August 2014.

To conclude, it was a fruitful year for SAFT and we intend to work harder to provide the Pacific Region what it needs to attain the countries' targets on food security, climate change resilience and increased rural income.

Looking forward to working with most of you again, in whatever means, in the year to come! Thank you very much.



From the staff and students of SAFT, we wish you a **MERRY CHRISTMAS** and a **PROSPEROUS NEW YEAR!**

Hopes are up to maximise value chains in root and tuber crops in the Pacific

The International Society for Tropical Root Crops - Pacific Branch (ISTRCP-PB) and the Institute for Research, Extension and Training In Agriculture (IRETA) organised the Workshop to Maximise Value Chains in Root and Tuber Crops in The Pacific. The workshop was held in Nadi, Fiji from the 17th to the 21st November 2014. The workshop was made possible through funding from the Technical Centre for Agricultural and Rural Cooperation (CTA).

The workshop is a sequel to the successful training/workshop on Policy Development for Root and Tuber Crop Value Chains in the Pacific also organised by ISTRCP and IRETA last year. It capitalises the conclusion from last year's workshop of providing support for the continued development of food processing and value-adding in root and tuber crops in the region.

Around 27 participants, resource persons, and facilitators gathered in the 5-day workshop. The participants came from Cook Islands, Fiji, Papua New Guinea, Samoa, Tonga, and Vanuatu. The involvement of the private sector in the workshop provided inputs into the current status of value chains from the farm gate to the selling, processing and export points in the main South Pacific Island countries. It also allowed discussions to extend to identifying constraints and possible opportunities for the maximisation of value chains in these countries.



A significant amount of time was spent on coming up with recommendations on where the future government and private sector efforts should be concentrated in the future to maximise benefits to the producers, processors, traders and exporters. This is the main output of the workshop. Proceedings of the workshop will be produced and published next year.

The IRETA Director's Report



In partnership with SAFT, IRETA undertook a number of innovations within the Livestock Farm to enhance the school's teaching and research capabilities. This year began the extension of the sheep stock to a new location. While this new sheep house will be used by students entirely for sheep research, it would also serve as the stud or breeding herd for the Alafua sheep farm.

Focus this year was also given to the improvement of the weaning rate of piglets in the farrowing house. Nursery boxes were constructed and placed in each farrowing pen. Each nursery box was provided with a light bulb as a source of light and heat for new born piglets. As a result, pre-weaning mortality was reduced significantly. Students were able to carry out research on both pre-weaned and weaned piglets as the farm was able to provide them with the number of animals required. Pig sales from January to October also increased compared to the same period last year.

Student researches were done in poultry, pigs and sheep. The livestock farm was able to provide the required number of animals for each group. However, weaning pig pens and sheep pens were not sufficient to cater for the required number of replications.

The livestock farm will be working towards providing more space for students' research projects next year. This will include the reorganisation of the current resources to meet our students' research needs in the pig and sheep houses. We are also seeing the completion of our Ruminant Livestock Research and Learning Unit. The new farm is equipped with a waste management system that flushes sheep manure into an existing septic tank, which will be upgraded to collect methane gas.

On the training side, IRETA acted as Secretariat to the ISTRC -Pacific Branch organised "Workshop on Maximising Value Chains in Root and Tuber Crops in the Pacific. It gathered producers, processors, traders, manufacturers, exporters and experts from around the Pacific to interact with key senior staff of the various Ministries of Agriculture in the region. The aim is to maximise value chains and provide opportunities for supporting and developing new root and tuber crop-based industries in the Pacific.

The challenges that we have to put up in running the Livestock Farm with very limited resources provided us with the motivation to find means to optimise resources and aim for better productivity and output to improve farm revenue. The egg production and the stock numbers have stabilised. The income generated from the farm is reinvested to improve the farm further.

USP SAFT sealed ties with the MAF of Samoa

Through the initiative of SAFT Senior Lecturer Dr. Danilo Guinto and MAF's Consultant Dr. Seuseu Tauati, the Memorandum of Understanding between the two institutions came into fruition. This is an outcome of the collaboration the two institutions had while collaboratively implementing the Taro Soil Health Project in Samoa funded by ACIAR through the Secretariat of the Pacific Communities..

The agreement was signed publicly by the Hon. Le Mamea Ropati Mualia of the Ministry of Agriculture and Fisheries of Samoa during the Agricultural Show in Savai'i on the 23rd of October 2014 in the presence of Associate Professor Mohammed Umar of SAFT representing the USP. Both heads agreed to the provisions contained in the MOU highlighted by the sharing of knowledge and skills in research activities. The MOU seeks to enhance the research capability and profile of both institutions. The partnership is highly regarded by staff of both institutions as a step towards extensive linkages of USP as a regional agricultural campus with member countries who need assistance on their agricultural agenda.

USP Alafua celebrates another year of success

To culminate the yearend academic period of USP Alafua for 2014, a total of 78 students proudly marched in their graduation gowns to receive their diplomas and certificates. The degrees achieved by the graduands were conferred by the USP's Chancellor His Excellency Sir Iakoba Taeaia Italeli, Governor General of Tuvalu. Also in attendance to witness the graduation ceremony held on the 12th December 2014 at the EFKS Hall in Mulinu'u, Samoa is Lady Koling Italeli.

A total of 78 students graduated in various degrees offered by the Faculty of Business and Economics and the Faculty of Science, Technology and Environment. USP's Vice-Chancellor and President Professor Rajesh Chandra reiterated the significance of the day. "The graduation ceremony is the most significant and meaningful occasion in the University's calendar for our graduands, and I warmly welcome everyone. Thank you for coming to share in this memorable and joyous occasion to honour our students on their achievements," he said. He also pointed out the greater number of females in this batch of graduates which indicates a growing gender equality in the Pacific.

Professor Chandra also emphasised the improvements made by the School of Agriculture and Food Technology in the last few years. "Samoa therefore plays an important regional role, and could play an even bigger role in educating students from fellow Pacific countries, especially in the field of Agriculture," he further said.

The hall was filled with families and friends of the graduates with parents holding their chins up in pride as they witness their sons and daughters march to get their hard-earned diplomas and certificates. According to Professor Chandra, it is a time of mixed emotions for the graduates - , happiness and relief that they have achieved their goals but with some sense of sadness as they will be bidding farewell to the many friends that they have made during their University days.

The many achievements of USP Alafua Campus were also highlighted during the ceremony particularly the record rise in the number of students enrolled with an overall increase of 13% from 2013 to 2014, the strengthened academic capability and improved research profile of its staff to undertake research. Professor Chandra concluded by mentioning that USP is seeing very positive results with developments in Samoa, both in relation to what is happening at Alafua and in its overall relationship with the Government and people of Samoa. He also acknowledged the co-operation and strong support of the Prime Minister, the Honourable Minister of Education and the Government of Samoa.



Minister of Education and the Government of Samoa.



Survey of nematodes in taro soils of Samoa confirmed good soil health

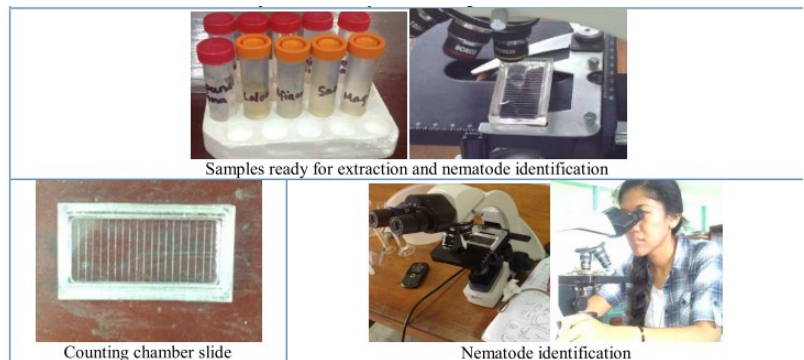
The higher number of free-living nematodes over the parasitic nematodes in the soils of both Upolu and Savai'i Islands proved that the presence of nematodes in Samoan soils should not be a major concern on the quality of taro grown in these soils. This was the findings from a research conducted by Dolly Autufuga under the able supervision of Dr. Danilo Guinto, Soil Science expert of SAFT. The study was done in collaboration with the Ministry of Agriculture and Fisheries of Samoa as part of the ACIAR funded Taro Soil Health Program managed by Dr. Guinto.



The plant parasitic nematodes identified were *Helicotylenchus*, *Rotylenchus*, *Pratylenchus*, *Meloidogyne* and *Xiphenema*. Free-living nematode identified were *Rhabditae*, *Tylenchus* and *Tripyla*.

Meloidogyne spp. which is of concern to taro growth and exportation was found low in number therefore it is not truly of concern. High number of free-living nematodes and low number of *Meloidogyne* genus found in the soil samples suggest that the soils of Samoa are healthy and good for taro plantations. It also suggests that there is very low threat of bio-security risks to the exportation of taro.

Poor correlation of nematode counts with some of the physical and chemical soil indicators suggest that these soil properties cannot be used to predict the population of nematode in the soil. There is no substitute to the tedious extraction, counting and identification of nematodes in the soils. However, further studies are recommended on this aspect.



Samples ready for extraction and nematode identification

Counting chamber slide

Nematode identification

Nesting space improved egg quality in laying hens

Nesting space has an impact on the quality of eggs produced by laying hens according to a study conducted by Robert Haru and John Paul Alasia under the supervision of Dr. Siaka Diarra, Monogastric specialist of SAFT. Results of the study showed lesser eggs on the floor, lesser dirty and cracked eggs with more nesting space (lesser number of hens in a nest box).

The study, however, did not show significant effects on egg production in terms of egg weight and hen day production. Further studies are recommended to prove or disprove these claims and to establish the optimum nesting space that will produce more and better quality eggs. However, more resources are required to undertake further research.



Damage of rose beetle on pele reduced with fertilizer application

Pele, *Abelmoschus manihot* is a very nutritious leafy vegetable that is most commonly eaten in the Pacific island countries. However, The plant is prone to insect attack so SAFT students, Jeffline Tasale & Patricia J Allanson, thought of investigating the feeding behaviour and damage caused by the Rose Beetle *Adoretus versutus* on the plant. This is their student research in partial fulfilment of their Bachelor's degree in Agriculture. They are ably supervised by Dr. Rashmi Kant, Entomologist, of SAFT.

Results of their investigation showed that most damage inflicted by *A. versutus* on pele leaves was seen in the no fertilizer plot. It was also found out that the round to slightly lobed with green stem and green leaves variety of pele is more susceptible to rose beetle feeding than the round to slightly lobed with red stem and green leaves and the deeply lobed and palmate leaves with red stem and green leaves. The rose beetle also preferred older leaves in both fertilizer and no fertilizer plots. It was recommended to undertake further studies to confirm the reliability of the results with more sample size.



Rose beetle feeding on Pele leaf at the early hours of the night at USP Crop Farm

Snail meat - a potential replacement for fish meal in laying hen's diet in Samoa



The replacement of snail meal for fish meal as a protein source for poultry layers were carried out for 8 weeks at the IRETA Animal Farm at Alafua Campus of USP. The study was conducted by SAFT students Jemaryn Prema Tanhimana and Patrick Lela under the supervision of Dr. Siaka Diarra and Dr. Rashmi Kant. Results show that snail meal can replace 100% of fish meal in the layer diets without any adverse effects on the performance of the laying hens. This reduced the feed cost and has environmental implications of controlling the prevalence of snails which oftentimes cause severe crop damage.



Fully replacing fish meal with snail meal resulted in no significant difference in final weight, hen-day production, feed intake, egg weight, egg mass, feed conversion ratio and percent shell.



Results of assessment of the health status of Samoan taro soils reported

As part of the ACIAR-funded Taro Soil Health Project implemented collaboratively by USP SAFT and Samoa's MAF, 40 soils from both islands of Samoa were assessed to determine suitability to growing taro. The assessment was conducted by Linton John Dauara, Edmond Walasi and Simon Lauga, SAFT students, as part of their student research project. Dr. Danilo Guinto, Senior Lecturer in Soil Science and Project Manager of the Taro Soil Health Project, supervised the research.

The collected top soils are moderately acidic (pH 5.53) with High levels of organic C and total N (11.3% and 1.02%, respectively) which can be attributed to the fact that long-term cultivation by machinery has not occurred in Samoa. However, P levels tend to be low (10 mg/kg) and can potentially be a limiting nutrient for taro in the long term.

Exchangeable Ca and Mg are both high but exchangeable K levels are only medium and given the high uptake of taro for this nutrient, this could be another nutrient element that may limit production in the future. Micronutrient levels (Cu, Fe, Mn and Zn) of soils are generally very high so deficiencies are unlikely.

Biochemically, the level of anaerobically mineralizable nitrogen (32.7 mg/kg), labile carbon (1310 mg/kg) and fluorescein diacetate activity (153 mg/kg) are high which indicates high microbial activities occurring. This has significant implications on the high fertility status of Samoan soils which allows farmers to practice traditional mixed cropping without the use of mechanical tillage.

The soil health status of Samoan soils is in good condition as microbial decomposers continue to receive high energy flow in the soil system, consequently promoting better soil health condition provided proper management practices are implemented. The traditional mixed cropping tends to be a favourable farming system that causes less soil disturbance.



Figure 4: Distilled supernatant is titrated for ammonium concentration.



Figure 5: Soil samples are being incubated for AMN analysis.



Figure 6: Distillation machine used to analyse 20 ml of supernatant collected (AMN analysis).



Figure 7: Chemical analysis using the atomic absorption spectrophotometer.



Figure 8: Preparation of soil samples for chemical analysis.



Figure 9: Centrifuging soil samples for biochemical analysis.

Mucuna seen to suppress the population of plant parasitic nematodes

In a research conducted by Ruta Fou to determine the influence of mucuna rates on nematode population, soil biochemical properties, early taro growth and biomass production in Samoa, it was found out that heavy application of mucuna green manure can suppress the population of plant parasitic nematodes associated with taro, and when combined with phytosanitary practices, it can contribute to a cleaner pathway for taro exportation.



Adding high rates of mucuna green manure into the soil also helps increase early taro growth parameters, biomass and taro corm yield. The benefits of legume mucuna crops in crop rotation have been long recognized and were attributed primarily to its nitrogen contribution to subsequent crops. The level of beneficial nematodes was not significantly increased by adding more mucuna green manure while it causes the level of plant parasitic nematodes to be reduced.

The major plant parasitic nematode genera identified were *Meloidogyne*, *Helicotylenchus*, *Tylenchorhynchus*, *Rotylenchus*, *Xiphinema* and *Raopholus*. Free-living nematodes genera identified were *Wilsonema*, *Monochus*, *Prismatolaimus* and *Apelenchus*.



Plant height



Leaf Area



Leaf length

The research was conducted as part of the ACIAR-funded Taro Soil Health Project in Samoa under the supervision of Dr. Danilo Guinto, Senior Lecturer in Soil Science and Manager of the said project.

Castration of piglets with anaesthesia improved growth of piglets

Piglets were found to gain more weight when castrated with anaesthesia. Even without anaesthesia, weight gain was still significantly higher than the un-castrated animals. The higher weight gain in piglets castrated with anaesthesia was attributed to reduced stress as a result of reduced post-castration pain. This has animal welfare implications.

However, where anaesthesia is difficult to come by as the case may be in most South Pacific countries, slaughter of pigs at early age for meat is recommended as at this age boar taint is not pronounced. Further studies on the age of piglets at castration, anaesthesia type and dosage are however, recommended.

The study was conducted by Sione Kohinoa under the supervision of Dr. Siaka Diarra, Senior Lecturer in Animal Science, of SAFT .



Enzyme supplementation of local feeds proved effective for pigs in Samoa

A research conducted by Fijian students Jope Matata, Alena Muaniwaqa and Marica Talemailagi showed promising effects on the utilisation of spent grain-copra meal based diets of growing pigs in Samoa in terms of lower production cost and better meat quality. Sensory evaluation showed preference for meat from pigs fed with local feeds over that fed with commercial feeds.

Despite higher change in weight owing to higher daily feed intake, the pigs fed with commercial feeds have lesser efficiency in using feed compared to those fed with local feeds. Enzyme supplementation increased the ability of pigs fed with local feeds to significantly gain weight compared with using local feed only.



The implications on lower production cost and healthier carcass (lower fat content) are areas which need to be expounded from the initial results of this study. The students recommended further studies on the level of inclusion of the local ingredients, level of enzyme supplementation and enzyme types. Dr. Siaka Diarra, the Monogastric expert at SAFT who ably supervised these students, intends to undertake more intensive studies in these areas.

Changing vine direction can improve tuber production of yams

SAFT students Tu'usolo Tonga and Eniselika Taani Matalave under the supervision of Mr. Falaniko Aмоса, Lecturer in Crop Science, tested the traditional knowledge of changing the direction of yam vines during its growing stage. Results indicate that yams trained to grow on the opposite direction produced more tubers compared to the vines that grew in any direction. It is believed that changing the vine direction produced some kind of shock to the plants that induced it to produce more tubers.

This growing technique used traditionally by farmers has not been documented scientifically elsewhere. It is highly recommended that further research be done to confirm the results obtained in this study.



News Bits

Boost to agriculture

FIJI now has a 2020 Agriculture Sector Policy Agenda which policy makers hope will modernise the agricultural sector.

The policy is said to be the first of its kind in our nation's history.

Ministry of Agriculture permanent secretary Ropate Ligairi said the policy placed great emphasis on adaptive and applied researches.

He said the new policy agenda would not only modernise Fiji's agriculture sector but also promote the livelihoods of farmers and facilitate better processing and marketing linkages.

"The underlying goal is to establish a diversified, economically and environmentally-sustainable agriculture economy in Fiji," Mr Ligairi said.

He said five strategies had been identified to address problems in the agriculture sector.

Adding on, he said they hoped to improve the delivery of agriculture support services in the country.

"Over the years, there has been a significant change in the expectations of science and technology and innovations, from increasing crop and livestock productivity to creating competitive, responsive and dynamic agriculture that directly contributes to the millennium development goals."

Mr Ligairi said there was a need to seek greater understanding of alternative pathways for rural economic growth. *(Atasa Moceituba, Fiji Times Online)*



Growing coffee at Aleisa

Amituana'i Lacy Betham agrees that Samoa - particularly Aleisa - has the best soils and weather for growing coffee. He and his wife Ane run Aleisa Coffee, a 56-acre plantation growing mainly Arabica coffee. "About 40 acres of our property is just coffee trees," he said. "I'd say there are about 12,000 trees."

Since returning to Samoa in 1994, the couple decided to restart the old family business. "My father grew coffee and I picked up the necessary skills growing up."

And he believes Samoa should be promoting sundried exports like coffee, copra and cocoa. "I don't know why New Zealand does it but every year they make it even harder for Samoa to export anything to that country. Exporting dried tree crops like copra, coffee and cocoa bypasses those stringent quarantine policies. Besides, Samoa coffee is disease-free."

During peak harvests from June to September, the couple hires about 30 workers from Leauva'a to pick the coffee beans. "They are usually families we worked with before. We pay them \$1 a kilo. Some families can pick up to 800 kilos a week which is good money."

The beans are sundried and churned on-site. It is then packed in 50-package bags and sold for \$38 tala each at stores around Upolu. "It's a good quality coffee. Last season we produced around 22 tonnes of coffee. It's good business. There are many ways for farmers to survive in Samoa." *(Tupuola Terry Tavita, Savali News)*



Samoan talo export demand 'unprecedented'

Samoan talo is taking over the New Zealand market.

"I don't have any figures but you see it at the dairy every day," says Afioga Leasi Tommy Scanlan, Samoa's High Commissioner in Wellington.

"They are now mostly selling only the Samoan talo. I know the Fijian talo is having bio-problems and I also heard the Tongan talo is in trouble."

Leasi's observations is backed up by the Crop Station at Nu'u who are finding themselves increasingly understaffed with both a jump in the demand for talo from New Zealand and a marked increase in the number of talo exporters who are coming onboard.

"We now have interests from New Zealand who want to partner us in importing talo to New Zealand," says Crops assistant chief executive Misa Konelio.

"That's on top of more people here who are coming to us to arrange containers of talo to send to New Zealand. We are increasingly finding ourselves short of needed staff to meet this jump in demand. Especially as packing talo containers is not a function of our station. It should be the exporters' responsibility, but we do it because we need to meet the export market."

Just 10 days into November, Misa says they have orders from New Zealand for 11 talo containers this month.

"We are expecting a lot more orders in the next few days."

The demand boom has also coincided with a jump in the price of talo. Up 20 percent from just two months ago.

"In August, talo was being exported for just \$34 per 20-kilogram bag to the farmer. Now it's up to \$42 talo with an expectation for a further increase in the next few weeks. It is a very good price for farmers."

And more farmers are going into talo.



Packing talo at the Atele warehouse

"We have over 700 talo farmers in our registry now. Both big and small farmers. There are many more farmers we know who are not registered with the ministry.

What we are particularly happy with is the response from new farmers to the scheme. It's not only the big farmers who are supplying the containers now but also the small-scale ones. Whether it's just ten or twenty bags from them (small farmers), we are more than happy to receive them. It is in line with what we are trying to promote. To encourage all farmers to grow talo."

Misa is confident that there is enough talo in the country to sustain any immediate increase in talo export demand. (*Tupuola Terry Tavita, Savali News*)

News Bits

Agriculture week opens in Savaii

Savaii farmers came out in full force at the Salelologa Market yesterday to mark Agriculture Week and also to commemorate World Food Day in Samoa.



Minister Le Mamea Ropati delivering the keynote address

In his keynote address, Agriculture and Fisheries Minister, Le Mamea Tuiletufuga Ropati Mualia said that this year's show is designed to complement the theme of the recent United National Small Islands Development Conference hosted by Samoa in August.

"Partnership, partnership, partnership is the message that your government is preaching to our farmers," he said.

"Like the successful Samoa Pathway SIDS event, without genuine and durable partnerships between you the farmers, your families, communities, country and your government, you will find it difficult to succeed in your endeavours.

"You must foster an open partnership relationship with our Ministry so that you receive the necessary help."

"Cement a close partnership within your families to gain their support before branching

out to your communities and country. Support your colleagues and work as a unit."

WORLD FOOD DAY

Acknowledging the importance of World Food Day in Samoa, Le Mamea noted that one of the main reasons behind the show is to highlight that agriculture and fisheries are corner stones to the food security of any country.

"Agriculture and fisheries is the source of food and it is therefore a source of life," he said.

"As they say in India - no farmer, no future. And I strongly believe that the same can be said of food- no farmer, no food.



Professor Gavin Wall of FAO delivering

"This is indeed a fact of life.

"I wish congratulate and thank all farmers and fishers of of course Samoa for your invaluable contributions in meeting the food needs of our people."

Over 100 farmers from around the big island competed in two separate competitions during the two-day annual show.

The first is a competition for farm and fishery conservation areas, which have been inspected by a team of officials throughout the last two months, and the second category is individual agricultural products.

(Nanai Laveitiga Tuiletufuga, Savali News)



Tropical sheep on show at Salelologa