

# Span



## IRETA



SPAN Vol. 40, No. 5 May 2015 ISSN 1015 - 950



University of the South Pacific  
School of Agriculture and Food Technology



Healthy soils for a  
healthy life



2015  
International  
Year of Soils

## Welcome Address by the Associated Professor, Mohammed Umar, Head of School of Agriculture and Food Technology and Director, IRETA

**O**n 24 April 2013, the 146th FAO council endorsed the request from the Kingdom of Thailand for the proclamation of the International Year of Soils in 2015.



The IYS is a platform to raise awareness of the importance of sustainable soil management, as the basis for food systems, fuel and fibre production, essential ecosystem functions and better adaptation to climate change for present and future generations.

During the IYS, it is expected that communities and institutions will plan a series of events for a range of audiences throughout the year, such as the program prepared and organized by students of AG124 Course under the guidance and encouragement of Prof. Tulin.

The soil quality and productivity is what constitutes good soil health. Plants sustain us for food, medicines, housing materials, clothing, and fuel; enrich our lives with their beauty, fragrance, fascinating habits, as well as raw materials to make products as diverse as nutritious drinks to jewellery.

It's the soil that supports the evergreen and deciduous trees that live for centuries are extremely important in producing much of the oxygen we breathe to sustain life. Their living biomass is the primary engine drawing all the major systems that make earth habitable and is critical to carbon, nitrogen and water cycle. Humans have destroyed half of world's forests'. All these plants grow on soil.

Some observations made on soils that are worth thinking about:

We need healthy soils to achieve food and nutrition security to fight climate change and enjoy a healthy life. Soils contribute to the foundation of vegetation and agriculture. Soils host at least a quarter of world's biodiversity. Finally, soil is a silent ally in food production we must protect it.

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## USP Alafua Celebrates the International Year of Soils

**W**hat a way to celebrate the international year of soils. AG124 students with their Senior Soil Science lecturer Prof. Anabella Tulin, performed the importance of soils through plays, music and dances. The program started with a keynote address from the Head of School of Agriculture, Food and Technology, Mohammed Umar followed by a talk from the coordinator herself, Prof. Tulin about soils and its importance.

First group to perform were Samoan students, performing a dance about the "Ocean". This dance displayed the formation of land through tectonic plates. It also showed how sand, silt and clay are formed and what happens when tectonic plates collide against each other which will result in a tsunami.

The second group consisted of Fijian and Tongan students. Acting a skit displaying the mountain and what happens when deforestation is taken place. They provided the solutions to the deforestation problem and how to avoid it.

Students from Solomon Islands and Vanuatu performed a play about the lowlands. In this play they showcased the different nutrients, both macro and micronutrients and their different functions. Their story displayed the impacts of deforestation and soil erosion to these soil nutrients and also presented solutions to these problems. They ended with a song and a traditional island dance.

Last group to perform were also from Samoa, performing a skit on the importance of Mangroves. They also showcased the impact of cutting down mangroves and what we can do to protect mangroves. They finished off with a small video of the group members filming themselves at a mangrove area and encouraging the audience to protect and keep our mangrove areas clean.

The students then invited the Head of School of Agriculture, Food and Technology, Mohammed Umar and Senior lecturers that were present to join the students in singing "We are the world" by Michael Jackson.

The program then ended with a film titled "Symphony of Soils".

The audience was crowded with students as they watched and enjoyed the wonderful dances and plays prepared by the AG124 students.



*AG124 Students performing*



## International Year of Soils: Asia regional soil partnership promoted

**S**oil is the basis for food, feed, fuel and fibre production and for many critical ecological services,” Hiroyuki Konuma, FAO Assistant Director-General and Regional Representative for Asia and the Pacific, said in opening remarks to the Representatives and scientists from 19 countries in Asia, who are examining best practices and common challenges they face in protecting and managing the region’s soils - the very foundation for food production relied on by billions of people. “Soil is the reservoir for at least a quarter of global biodiversity, yet the critical importance of soil to our daily lives is often overlooked.”

Indeed, soils play a key role in the supply of clean water and resilience to floods and droughts. Plant and animal life depend on primary nutrient cycling through soil processes and the largest store of terrestrial carbon is in the soil - its preservation may contribute to climate change mitigation.

However, in Asia, as in other regions of the world, soil degradation has become a serious problem and the degradation is occurring - even escalating - at a time when the region needs soil more than ever. The area of productive soil is limited in relation to current technologies and is under increasing pressure of intensification and competing uses for cropping, forestry, pasture/rangeland and bio-energy, to satisfy the demands of the growing population for food, energy production, settlement and infrastructure, raw materials extraction.

“Most of the arable land in our region is already fully utilized, yet by 2050, in order to meet the needs of an additional two billion inhabitants of our planet, we will need to increase food production by at least 60 percent. In order to do that, we must sustainably manage and protect our soils,” Konuma pointed out. **“There is an anonymous saying that ‘whatever mankind does, even when we produce the most marvelous art work, we depend on a few drops of water and 10 centimeters of soil’,”** he added.

The participants in the FAO-sponsored consultation belong to the Asia Soil Partnership (ASP), formed in 2012. The ASP, along with other Regional Soil Partnerships, aims to endorse a regional plan of actions.

The year 2015 has been recognized as International Year of Soils to raise awareness about soils, sometimes referred to as our “silent ally” and the need to sustainably manage and protect soils worldwide. The Asian Soil Partnership Consultation Workshop on Sustainable Management and Protection of Soil Resources took place on the 13<sup>th</sup> to 15<sup>th</sup> of May in Bangkok, Thailand.

[\(www.fao.org/asiapacific/news/detail-events/en/c/286561/\)](http://www.fao.org/asiapacific/news/detail-events/en/c/286561/)





# The 11th FAO Meeting in PNG

**T**he 11<sup>th</sup> FAO Meeting of the Southwest Pacific Ministers for Agriculture was recently held in Port Moresby, Papua New Guinea at the Gateway Hotel. The theme for the meeting was “Climate Smart Agriculture”.

The meeting was attended by Ministers from Cook Islands, Fiji, Kiribati, Niue, Papua New Guinea, Samoa, Solomon Islands, Tonga and Vanuatu, and Heads of Delegation from Australia and New Zealand. Representatives from Kokonut Industri Koperasin, Kokosiga, the Morobe Provincial Administration, the International Fund for Agriculture Development, the Pacific Island Farmer Organization Network, Pacific Islands Trade and Invest (PT&I), the Asian Pacific Coconut Community, the technical Centre for Agricultural and Rural Cooperation (CTA), the Secretariat of the Pacific Community (SPC), the University of the South Pacific (USP), the World Bank (WB), and the Codex Alimentarius Commission, attended as observers.

## FAO Pacific Country Program Framework 2013-2017 Mid-term Review

The meeting noted the report on the mid-term review of the FAO Pacific Country Programming Framework (CPF) 2013-2017 and acknowledged the value and relevance of FAO technical assistance. It supported the recommendations on the proposed refinements to the Pacific CPF 2013-17, and emphasized the benefit of further decentralization within the Pacific, and that this process would help improve communication with Southwest Pacific (SWP) members and implementation of projects.

The meeting also noted the importance of partnering with regional and international organizations in order to improve the impact of FAO’s work, and build on the comparative advantages of potential partners. They agreed that enhancing the capacity of the Sub-region Office for the Pacific Islands (SAP) would help improve the accountability of the CPF program.



## Priorities for FAO in the Pacific in 2016-2017

The meeting stressed the importance of FAO strengthening its partnership with regional organizations in order to effectively address the growing complexity of problems associated with the region’s agriculture, fisheries and forests.

Furthermore, it also noted the serious challenges associated with managing coastal and inshore fisheries and further acknowledged the links between Non-communicable Diseases, food quality and agriculture.



## Theme: Climate Smart Agriculture

The meeting acknowledged the comprehensive study by SPC in the recent publication of the book on the “Vulnerability of Pacific Island Agriculture and Forestry to Climate Change”, specifically on traditional food staples, export commodities, horticultural crops and spices, livestock, native and plantation forests. Impacts from climate change on agriculture and food security will continue over time and strengthening production and processing of food crops will be an important element of adaptation efforts. A “climate and economically smart” agriculture approach is crucial to enhance the production and consumption of traditional staple foods. Addressing issues such as soil health, biodiversity, agroforestry, and promoting integration of sound traditional practices into commercial production are required.

## Norms and standards related to food and agriculture in the Pacific

Noting the importance of Codex and International Plant Protection Convention (IPPC) standards and related texts for the food and agriculture sectors in the Pacific, and highlighting the need to continue efforts towards the harmonization of national standards based on the standards of the Codex and IPPC. The meeting agreed on the value of a strategic approach through which common interests in Codex and IPPC can be addressed by the region on a coordinated manner. The use and enhancement of existing regional coordination mechanisms, in particular the FAO/WHO Coordinating Committee for North America and the Southwest Pacific (CCNASWP) and Pacific Plant Protection Organization (PPPO) was seen as critical in this endeavor. The meeting requested FAO, in partnership with other stakeholders, to seek the necessary resources to facilitate the implementation of relevant activities identified in the Strategic Plan for CCNASWP 2014-2019, and priority needs under PPPO Business Plan to further the regional approach. They also supported the need to identify long-term funding for the operation of the PPPO.

# The 11th FAO Meeting in PNG

**Summary of key discussion points from the information papers and the technical paper “Improving Domestic Market Linkage: Policies to improve agriculture sector competitiveness in the Pacific”**

The meeting recognized the importance of domestic markets, including tourism, and noted the need to improve the delivery of low-interest loan products to the rural sector. FAO was encouraged to work with international financial institutions and other technical partners, to increase the delivery of loan capital in support of these activities.

Identifying the need to improve the competitiveness of SWP members to supply niche markets; but noted that there had not been substantial progress towards the negotiation of additional market access opportunities. It also sought clarification on the funding of the Pacific Regional Initiative. FAO advised that this initiative was currently delivered through the Pacific Technical Cooperation Program (TCP) and Regular Program allocations, and that no additional funds had been allocated.



## South-South Cooperation amongst Pacific Island Countries

The meeting agreed on the importance of South-South Cooperation (SSC) for the region; and identified a preference for facilitating further exchanges specifically between SWP members. It further agreed that an assessment of needs and capacity to provide technical assistance would be beneficial.

It also noted that there were other regional processes in place that should be taken into account when facilitating SSC.

## Concept note for a Pacific week of Agriculture

The meeting noted and endorsed the concept of a biennial Pacific Week of Agriculture (PWA) and for FAO and SPC to work with CTA and other stakeholders to develop a detailed approach to the organization of the event, and to provide an update at the Ministers of Agriculture and Forestry meetings in September 2015.

It also accepted the offer from Vanuatu to host the first PWA in 2017, subject to the MoAF meeting endorsing the proposed PWA. The meeting agreed for Cook Islands, Fiji, Kiribati, Niue, Samoa, Solomon Islands, Tonga and Vanuatu to be part of the PWA planning committee that is to be established to organize the first PWA.



## Venue for the next meeting

The meeting accepted the offer from the Government of Vanuatu to host the Twelfth Meeting of FAO Southwest Pacific Ministers for Agriculture in conjunction with the Pacific Week of Agriculture.

**SAFT STAFF**  
*Presentation*

## Enhancement of the growth, yield and quality of root crops and vegetables through macro and micronutrients fertilization

Presenting on the topic “Enhancement of the growth, yield and quality of root crops and vegetables through macro and micronutrients fertilization” was the presentation by the Senior Soil Science Lecturer, Professor Anabella Tulin.



Prof. Anabella Tulin

The seminar presented various studies on the effects of macro and micronutrients on the productivity (growth and yield), profitability, and quality of root crops such as purple yam (*Dioscorea alata*), sweet potato (*Ipomoea batatas*), and vegetables such as tomato (*Lycopersicon esculentum*), pechay (*Brassica napus*) and cabbage (*Brassica oleracea*).



Blossom rot in Tomatoes

Most of the results were taken from the findings of various research projects conducted by the author in pot experiments (i.e., sweet potato and pechay) and field experiments (i.e., purple yam, purple sweet potato, cabbage and tomato).

The use of protected cultivation for tomato was presented in comparison with the normal production in the field.

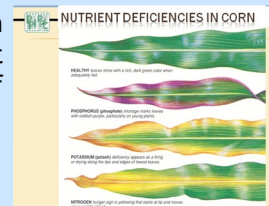
In all the studies that were presented, different combinations of macro and micronutrient were used to determine the levels of nutrients that would enhance productivity, profitability and quality.



Results showed that for purple yam and purple sweet potato, growth was greatly enhanced by the addition of macro and micronutrient fertilizers. This is evident in the production of bigger leaves and longer vines. In terms of profitability, results showed that the application of higher levels of macro and micronutrient fertilizers significantly affected the yield of purple yam.



Different combinations of nitrogen, phosphate, and potassium and their effects on yields and income was discussed and it will be evident from the result studies that plant nutrition and proper fertilization play an important role in improving yield of crops.



These are necessary in attaining food security, especially in areas that face the problem of land deterioration due to declining soil fertility. Establishing the right combinations of both macro and micronutrients is therefore vital in more efficient and sustainable crop production.

USP Seminar Series  
May 28, 2015

Enhancement of the Growth, Yield and Quality of Root crops and Vegetables through Macro and Micronutrients Fertilization

Dr. Anabella B. Tulin



## Predatory Mites (predators)

**M**ites are not insects; they are more closely related to spiders. Adult mites have four pairs of legs, like spiders, and two body parts, rather than the insect's three.

Mites can approach prey in areas not reachable by chemical sprays and can be found in areas of spider mite and thrips infestation.



*Predatory mite feeding on western flower thrips larva*

Adults appear to be very small, about 1/32 inch with teardrop shaped, and orange-red, tan or brown in color and are fast moving insects. The nymphs look like the adults but only smaller.

Greenhouse crops field crops are usually affected by spider mites or thrips and pests attacked are spider mite eggs, larvae, nymphs, and adult thrips, fungus gnats, small insects and their eggs.

### So what are Predatory Mites?



*Adult predatory mite with spider mite eggs*

Predatory Mites are among the most successful bio-control agents. Their numbers can be very high on crops that produce a lot of pollen, such as sweet pepper, fruit trees, and sweet corn.

Reducing use of insecticide sprays may also encourage predatory mite populations.



*Top: Minibell peppers*

*Bottom: Mango Tree*

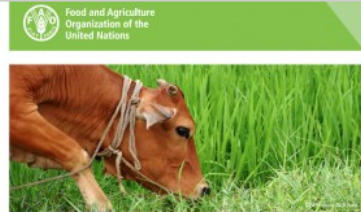
Predators are beneficial insects that attack, kill, or consume a wide variety of common pests. Males, females, immature, and adults may all be predatory. Predators include lacewings, flies, spiders, beetles, true bugs, and predatory mites.

*(Natural Enemies of Crop Pests in Hawai'i, University of Hawaii at Manoa)*



# Soils are the foundation for vegetation

**H**ealthy soils are crucial for ensuring the continued growth of natural and managed vegetation, providing feed, fibre, fuel, medicinal products and other ecosystem services such as climate regulation and oxygen production.



**Soils are the foundation for vegetation**  
which is cultivated or managed for feed, fibre, fuel and medicinal products



**H**ealthy soils are crucial for ensuring the continued growth of natural and managed vegetation, providing feed, fibre, fuel, medicinal products and other ecosystem services such as climate regulation and oxygen production. Soils and vegetation have a reciprocal relationship. Fertile soil encourages plant growth by providing plants with nutrients, acting as a water holding tank, and serving as the substrate to which plants anchor their roots. In return, vegetation, tree cover and forests prevent soil degradation and desertification by stabilizing the soil, maintaining water and nutrient cycling, and reducing water and wind erosion. As global economic growth and demographic shifts increase the demand for vegetation, animal feed and vegetation by-products such as wood, soils are put under tremendous pressure and their risk of degradation increases greatly. Managing vegetation sustainably—whether in forests, pastures or grasslands—will boost its benefits, including timber, fodder and food, in a way meets society's needs while conserving and maintaining the soil for the benefit of present and future generations. The sustainable use of goods and services from vegetation and the development of agroforestry systems and crop-livestock systems also have the potential to contribute to poverty reduction, making the rural poor less vulnerable to the impacts of land degradation and desertification.

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## Key challenges

Soil degradation is in many cases the direct result of poor soil management. The consequent decline in vegetation and its products such as feed, fibre, fuel and medicinal products has an adverse effect on soil productivity, human and livestock health, and economic activities. Conversely, vegetation cover, particularly dense and healthy vegetation, protects soil from erosion agents such as wind and water and can improve its productivity. A large portion of the population depends on vegetation for their livelihoods: about 80 percent of people in the developing world use non-wood forest products for health and nutritional needs and for income. Furthermore, an estimated 2.6 billion people worldwide are dependent on wood fuel, including charcoal, for cooking and heating. The livestock sector is by far the single largest user of land by humans. Grazing occupies 26 percent of the earth's terrestrial surface, while feed crop production requires about a third of all arable land. Expansion of grazing land for livestock is a key factor in deforestation, especially in Latin America: some 70 percent of previously forested land in the Amazon is used as pasture, and feed crops cover a large part of the remainder. About 70 percent of all grazing land in dry areas is considered degraded, mostly due to poor grazing practices. Sustainable management of pastures, forests and other vegetated land is therefore essential for preserving soils and consequently supporting rural livelihoods, maintaining livestock production, promoting the growth of vegetation and ensuring current and future use of raw materials.

## FAO in action

FAO has implemented a number of projects related to sustainable production and better soil management. In Burkina Faso, FAO assisted groups of farmers in five farming communities in the moist Savannah zone to enhance their crop-livestock systems through conservation agriculture practices, including crop diversification, using an innovative farmer discovery process, to bring about agricultural intensification and improvement in livelihoods. In Central African countries, FAO is working to improve food security in the sub-region by promoting the use and regulation of Non-Wood Forest Products (NWFP). While, in Asia and the Pacific, FAO is combating deforestation and degradation by promoting Assisted Natural Regeneration (ANR), a process of regenerating degraded grassland and shrub vegetation by protecting and nurturing mother trees and their wildlings.

([www.fao.org/soils-2015/news/news-detail/en/c/2872991](http://www.fao.org/soils-2015/news/news-detail/en/c/2872991))



# SAFT Student Research Findings Seminars

Last group of AG383 students presented their research project findings on May 25th 2015. Students came well prepared with their presentations and eager to present their findings to the audience. A total of 10 groups presented and the audience consisted of Senior Lecturers, supervisors, staff members and students. Senior lecturers advised on the different projects presented and gave wonderful feedback to the findings. They thanked the students for the well prepared presentation, and encouraged the students to work on effectively analyzing their projects through relevant statistical analysis. Wishes of good luck were said and hope to complete their AG383 Research Projects before this year ends.



1<sup>st</sup> presenters: George Mae and Paul Sukulu “Feeding preference of Giant African Snail (*Achatina fulica*) on selected crops in Samoa”, supervised by Dr. Rashmi Kant.

2<sup>nd</sup> presenters: Ravitesh Chand, Ashneel Prasad and Vinash Singh “Analysing economic performance of sugarcane farmers in Northern Division of Fiji”, supervised by Dr. Jagdish Bhati.

3<sup>rd</sup> presenters: Taufa Fainga’anuku and Ta’ufofo’ou Maloni “Gastrointestinal parasite level in sheep in Samoa”, supervised by Dr. Poasa Tabuaciri.

4<sup>th</sup> presenters: Kalesi Rauluni, Taina Buiquica and Adi Alanieta Ratuva-kalevulevu “Physiological adaptability of Fiji sheep in the humid tropics”, supervised by Dr. Poasa Tabuaciri.

5<sup>th</sup> presenters: Abdul Faiyaz, Praneel Kumar and Satish Prasad “Effects of different mulching in the growth, yield and weed infestation on the cultivation of Chinese cabbage”, under the supervision of Mr. Falaniko Amosa.

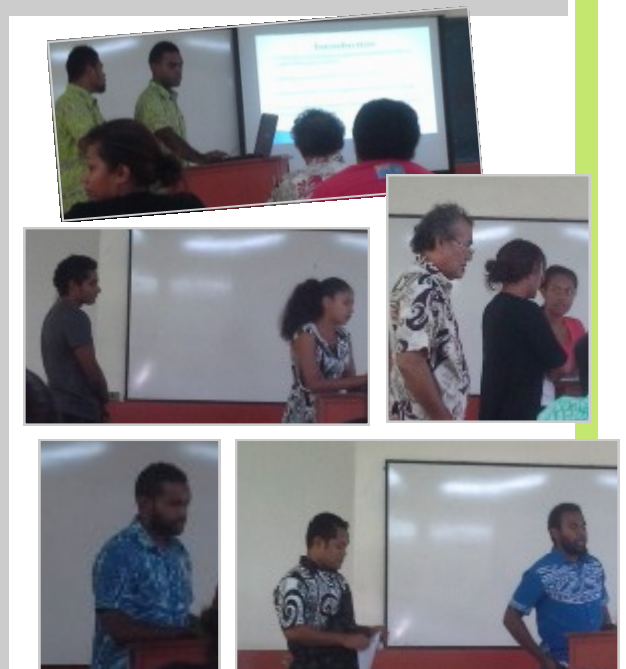
6<sup>th</sup> presenters: Aviuta Gucake and Aisake Dradra “Effects of supplementation on the performance of ewes and lambs (Barbadoe Blackbelly x Wiltshire) from birth to weaning under grazing conditions”, supervised by Dr. Poasa Tabuaciri.

7<sup>th</sup> presenters: Clara Moceyawa and Railala Peniasi “Effects of pre-slaughter handling on beef meat quality”, supervised by Dr. Poasa Tabuaciri.

8<sup>th</sup> presenters: Kavnil Reddy and Cynthia Tilley “Response to tomato plant to various rates of sheep manure application on Alafua soil series”, supervised by Mr. Falaniko Amosa.

9<sup>th</sup> presenters: Romuluse Nakiola “Effect of L-dopa and ammonium treatments on root-knot nematodes”, supervised by Prof. Anabella Tulin.

10<sup>th</sup> presenters: Samuel Hone and Ernest Liu “Slippery cabbage shoot borer damage assessment in the three selected varieties of Pele (*Abelmoschus manihot* L.) in Samoa”, under the supervision of Dr. Rashmi Kant.



# What's on Campus!

## Cultural and Kava Ceremony Night

**S**tudent of Alafua Campus from all the different Pacific islands joined together in displaying and performing their islands traditional ava ceremonies and cultural dances.

The night was crowded with students and some of the staff members that came to watch the students perform.

Students wore traditional attire representing the different islands that they come from.

This was the first activity of its kind in Alafua campus and all the students enjoyed it.



*Students performing cultural dances and traditional kava ceremony*

## Farewell Social

**T**he last activity of the semester, having fun one last time and saying goodbye to students who will be finishing this first quarter of the year, was all that the farewell social was about.

The students were excited to celebrate with friends as they head to final exams but will sadly miss those who will be returning home for good. The Social night was enjoyed by all, as they enjoyed the food and the program prepared by the Student Association committee.



*USPSA Executive Members*



## New Model to improve cane yield

**S**UGARCANE farming experts from New Zealand have established a new model of farming method that could help increase yield for export.

Three Dimension (3D) Fiji Ltd regional manager Waka Naivalu said sugar yield in Fiji was very low compared with world statistics but providing the right type of techniques, production levels should increase.

And this is what the company aims to do in model sugarcane farms in the Nadroga Navosa province.

“We intend to provide the Government a mechanism to increase production not only via machinery but by introducing new techniques in the overall value chain including farmer education, growing, harvesting and transportation,” he said.

“The province can produce 900,000 tons in five years”.

“This will be a commercial model and we need to be well aware of that.” (*Repeka Nasiko, Fiji Times Online*)



## App for farmers

NEWS  
BITS

**F**ARMERS with smart phones or tablets can easily access the new mobile app on Pacific pests and pathogens.

The app is available free online to access the pest fact sheets, which can be used in the field for initial pest diagnosis and treatment.

Ministry of Agriculture acting director Research Dr Apaitia Macanawai said the “app can help both if they know the pest and if they don’t”.

“Access to fact sheets may be a tool to help the farmer diagnose the threat. The app gives the farmer all the information to treat the damaged crop instantly,” Mr Macanawai said.

He said if there was no way of saving the crop, the steps should help prevent the problem occurring in the future. (*Vuniwaqa Bola-Bari, Fiji Times Online*)

## Rise in CO<sub>2</sub> could restrict growing days for crops

NEWS  
BITS

**T**he positive consequences of climate change may not be so positive. Although plants in the colder regions are expected to thrive as average global temperatures rise, even this benefit could be limited.

Some tropical regions could lose up to 200 growing days a year, and more than two billion rural people could see their hopes wither on the vine or in the field. Even in temperate zones, there will be limits to extra growth.

Plants quicken, blossom and ripen as a response to moisture, warmth and the length of daylight. Global warming will clearly change the temperatures and influence the patterns of precipitation, but it won't make any difference to the available hours of sunlight at any point on the globe.

"Those that think climate change will benefit plants need to see the light, literally and figuratively," says Camilo Mora, lead author of the report and assistant professor in the Department of Geography at the University of Hawai'i".

For the first time across a major forest region, we have real data showing that biome shift has started. Glenn Juday, professor of forest ecology at the University Of Alaska Fairbanks School Of Natural Resources

"Furthermore, we can see that this negative effect exists regardless of whether or not the plants' growth increases, and even if fertilizer is added," says Johan Uddling, a plant physiologist at Gothenburg, and a co-author of the report. "This is unexpected and new."

In the same week, a team of scientists at the University of Alaska Fairbanks produced evidence that climate change has already begun to alter the forests of the far north.

They report in the journal *Forest Ecology and Management* that in the interior of Alaska, already at the optimum temperature range for white spruce, tree growth slowed as summer temperatures rose.



*Farmers are harvesting peanut trees in Chiangmai, Thailand*

In Western Alaska, once at the low end of the ideal temperature range for the same species, trees are now growing more rapidly.

"This is not a scenario model, or a might, or a maybe. The boreal forest in Interior Alaska is very near dying from unsuitably warm temperatures. The area in Western Alaska where the forest transitions to tundra is now the productive heart of the boreal forest." (<http://www.eco-business.com/news/rise-in-co2-could-restrict-growing-days-for-crops/>)