

AGRICULTURAL
EXPERIMENT
STATION
COLLEGE OF MICRONESIA-FSM
YAP CAMPUS

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Focus on



Climate-smart agriculture seeks to increase sustainable productivity, strengthen farmers' resilience, reduce agriculture's greenhouse gas emissions and increase carbon sequestration.

Read more...

Info Graphics Courtesy: FAO

AgKnowledge

Quarterly Newsletter

CLIMATE SMART AGRICULTURE

Sustainable agriculture is now a universal concern as the link between food security and climate change becomes increasingly complicated and apparent. Pacific islanders, who live in the most vulnerable landscapes, suffer most from changes in climate patterns and shrinking natural resources are in urgent need of sustainable agriculture technologies.

Overcoming poverty while ensuring food security to a growing population requires the intensification of food production systems but in a sustainable way. Agriculture must adapt in order to meet the related challenges of achieving food security and responding to climate change. This calls for the adoption of practices that reduce the effect of agricul-

ture on the climate currently referred to as agriculture's climate footprint. Climate-smart agriculture could be the solution.

Climate-smart agriculture is a method to position the agriculture sector as a solution to major challenges, in other words to be part of the solution and not part of

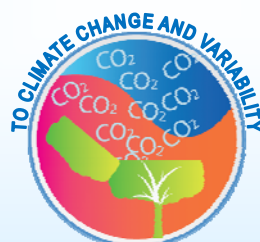
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SUSTAINABLY INCREASES



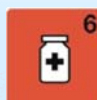
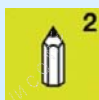
STRENGTHENS RESILIENCE



REDUCES AGRICULTURE'S
CONTRIBUTION



ENHANCES THE ACHIEVEMENT OF NATIONAL DEVELOPMENT GOALS





SEAVEG 2012

AVRDC - The World Vegetable Center in partnership with Thailand's Department of Agriculture (DOA), Vegetable Science International Network (VEGINET), the Horticultural Science Society of Thailand (HSST), the Taiwan Ministry of Foreign Affairs (MOFA) and the Association of Southeast Asian Nations (ASEAN), through the ASEAN AVRDC Research Network (AARNET), successfully hosted the Regional Symposium "High Value Vegetables in Southeast Asia: Production, Supply and Demand (SEAVEG2012)" from 24-26 January 2012 in Chiang Mai, Thailand. About 205 participants from 23 countries attended this three-day event. Dr. Muru attended this symposium and presented a paper on "Climate-smart small scale vegetable production practices in a challenging tropical island environment" in session 3 on 'Vegetables for Sustainable Development.

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the problem (see *Info graphics*). It is a science-based approach to increase crop productivity under challenging environmental conditions. Climate-smart agriculture seeks to increase sustainable productivity, strengthen farmers' resilience, reduce agriculture's greenhouse gas emissions and increase carbon sequestration. In subsistence agriculture-based smallholder systems this innovative approach is not only important for food security but also for poverty reduction.

Agriculture as part of the solution

Pacific island communities are under the greatest threat from climate change, but they could also play a

major role in addressing it. It is possible for agriculture to actually sequester or absorb carbon into the soil rather than emitting it. This can be done without the trade off of productivity and yields. It is possible to have higher yields, more carbon in the soil and greater resilience to droughts and heat. This is called the 'triple win': interventions that would increase yields (poverty reduction and food security), make yields more resilient in the face of extremes (adaptation), and make the farm a solution to the climate change problem rather than part of the problem (mitigation). The triple wins require a package of interventions that are locality specific in their application. This is the basis of

climate-smart agriculture.

Pacific islanders have practiced some form of climate-smart agriculture since time immemorial. Traditional agroforestry practices, conservation agriculture and integrated farming systems essentially fall in this category. However, increased outreach and education efforts are needed to build the community capacity to support their adoption and address knowledge gaps (read Outreach Project news below).

Soon, Yap AES will embark on a Hatch Project to explore more climate-smart techniques to enhance food security in the Federated States of Micronesia.

Outreach and Assistance to Socially Disadvantaged Population in Yap

The threat of climate variability has caused concern among scientists as crop growth could be severely affected by changes in key climate variables such as rainfall and temperature. The crop production environment in Yap is a mixture of conditions that varies with season and location. Climatic changes influence the severity of environmental

stress imposed on vegetable crops. Yap farmers already face challenging soil conditions (about 23 percent of Yap is covered by non-arable volcanic soils). In addition, increasing temperatures, erratic rainfall and more intense tropical typhoon activities are the major limiting factors in sustaining vegetable productivity in the island. Extreme climatic con-

ditions also impact soil fertility and increase soil erosion. The response of crops to extreme climate variables depends on the type of crops, the stage of growth and the length and severity of the stress factor. Environmental interactions may make the stress response of plants more complex or influence the degree of impact of climate variables.

The Intergovernmental Panel on Climate Change (IPCC) has already projected potential impacts of climate change on agricultural production and food security in small islands. Being landless and poor, the displaced ethnic atoll communities are among the most disadvantaged and vulnerable groups. They require a strategy to adapt to extreme climate variables and develop and maintain a sustainable crop production system for survival.

Since 2005, a range of outreach and technical assistance programs have been provided to the vulnerable neighboring island populations residing on Yap. These efforts are made to enhance their ability to identify the constraints of volcanic soils for crop production and implement corrective measures to restore and maintain the soil productivity. Our extension programs primarily focus on sound volcanic soil management and training on vegetable gardening using climate-smart alternate crop production systems.

A collage of home gardens



Vegetables shipped from the United States or elsewhere are often beyond the food budget of the vulnerable population due to high shipping costs. However, this population desperately needs the nutritional value of fresh vegetables. Lack of nutrient-rich vegetable intake is one of the prime reasons for the high incidence of nutrition related disorders, including vitamin A deficiency and iron deficiency related anemia in the State. Malnutrition is primarily a “hidden hunger” that severely stunts human potential due to lack of vital proteins and micronutrients such as vitamins or minerals. Smallholder vegetable production has a vital role to play in overcoming this situation. Vegetables are the best resource for overcoming micronutrient deficiencies providing smallholder farmers with much higher income and more jobs than staple crops. Improving vegetable production is thus critical to food security and poverty reduction, and attainment of Millennium Development Goals.

Over these years, our program

helped 68 participants directly and over 400 clients indirectly to learn and adopt techniques to establish vegetable gardens. We observed that the outreach program fostered creativity and personal ingenuity and increased motivation of community members.

More importantly, vegetable gardening activities have become a catalyst for many outside the settlements. Vegetables that were once beyond the family food menu of the displaced population

now supplement their traditional diet of root crops and fish, thus making it rich in nutrients and vitamins. Our outreach effort demonstrated the ‘social value of scientific knowledge’

and we continue promoting the whole idea of democratizing vegetable gardening by letting everyone participate in food production without adding any pressure to the fragile environment.

“Improving vegetable production is crucial to food security and poverty reduction, and attainment of Millennium Development Goals”

Small Farm Outreach Project was funded by National Institute of Food and Agriculture, US Department of Agriculture (Award #: 2006-51200-03594) and Office of Advocacy and Outreach, US Department of Agriculture (Award #: 59-2501-10-008).

Bitter Melon: A Sweet Remedy for Diabetics

Bitter melon (also called bitter gourd or balsam pear) is one of the most popular vegetables in Southeast Asia. Originally a native to Asia, it is now cultivated in tropical and subtropical regions around the globe for its edible fruits. The fruit is low in sodium and is a good source of vitamin A, thiamin (vitamin B1), riboflavin (vitamin B2), pantothenic acid (vitamin B5), vitamin B6, vitamin C, dietary fiber, folate, iron, magnesium, potassium, zinc and manganese.

Bitter melon has been used in Asian traditional medicine systems for a long time for several ailments, including blood disorders, stomach ailments and diabetes. The medicinal value of bitter melon in the treatment of infectious diseases and diabetes is attracting the attention of scientists worldwide. Recently scientists isolated four promising bioactive components from bitter melon fruits. These four compounds appear to activate enzyme AMPK (5' adenosine monophosphate-activated protein kinase), an enzyme that is responsible for regulating metabolism and transporting glucose from the blood into the cells.

People with type 2 diabetes have an impaired ability to convert the sugar in their blood into energy in their muscles. This is partly because they don't produce enough insulin, and partly because their fat and muscle cells do not use insulin effectively, a phenomenon known as 'insulin resistance.' Exercise activates AMPK in muscle, which in turn mediates the movement of glucose transporters to the cell surface, a very important step in the uptake of glucose from the circulation into tissues in the body. This is a major reason that exercise is recommended as part of the normal treatment program for people with type 2 diabetes. The four compounds isolated from bitter melon perform a very similar action to that of exercise, in that they activate AMPK. Isolating these compounds could lead to medications that someday could control obesity and type 2



diabetes.

Estimated Glycemic Load (eGL) after consumption (1 cup (1/2"

Glycemic load is a way of expressing a food or meal's effect on blood-sugar levels. A typical target for total eGL is 100 or less per day. If you have diabetes or metabolic syndrome, you might want to aim a little lower. If you are not overweight and are physically active, a little higher is acceptable. As a rule of thumb, most nutritional experts consider GLs below 10 to be 'low' and GLs above 20 to be 'high.' Because GL is related to the food's effect on blood sugar, low GL meals are often recommended for diabetic control and weight loss.

pieces, about 93g) of bitter melon fruit is 1, which makes it ideal for diabetics.

Today, diabetes is one of the most serious health threats in the Federated States of Micronesia. Reports indicate that it is now the main cause of death in Kosrae, the number two cause of death in Pohnpei, and the number three cause of death in Chuuk. It is rampant in other parts of Micronesia as well. Apart from the deaths it causes, the disease has crippled and blinded many islanders. To guard against this disease, consider taking the following steps.

- Recognize the symptoms: increased thirst, frequent urination, loss of weight, loss of sensation in hands or feet.
- Get blood sugar level tested at the hospital or clinic to see if you have the condition.
- Get some exercise each day, even light exercise like walking or vegetable gardening.
- Watch your diet: ease off food high in fat, salt and sugar. Consume fruits and vegetables including bitter melon every day.

Earlier, Yap AES successfully conducted field trials of bitter melon. Please contact us for seeds suitable for island climate and its cultivation practices.

Note: Consult your physician regularly. Blood glucose levels should be checked more often to determine the effectiveness of any supplement or diet.

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