

# Sustainability in Agriculture to meet the challenges of the new Millennium

*From the Dean's Desk*

## Example of Integrated Farming - A sustainable farming system

- 1 Early growth of grapes and first corn crop + chickens in farm - (chicken droppings a good source of organic fertilizer)
- 2 Near first harvesting
- 3 Harvested field before second crop planting
- 4 Second corn crop and continued growth of grapes. Crop residues incorporated into the soil for new maize cropping cycle
- 5 Lush and very good growth of corn and grapes



Increasing concerns today are about food – its availability, cost and related health and environmental issues. Agriculture, has as a result, once again been thrust into the harsh glare of public scrutiny.

The OECD-FAO -Agricultural Outlook 2007-2016 attributes the current hike in world market prices for many agricultural commodities mainly to factors of a temporary nature, such as drought related supply shortfalls and low stocks. However the report also cautions that increased feedstock demand for bio-fuel production and the reduction of surpluses due to past policy reforms, may keep prices above historical levels for the next 10 years. This will be of particular concern for net food importing developing countries as well as the urban poor. This is already in evidence today with the recent concerns on the availability of rice supplies, a major food commodity for most in the Asian region.

A pioneer in the study of the economic impact of global warming, William Cline, states that with increases in world food demand from higher population and incomes and the likelihood of a sizable diversion of agricultural land to production of bio-fuels instead of food, he anticipates a relatively tight race between global agricultural supply and demand by late this century, which will be further exacerbated by damages due to global warming. He projected that overall agricultural productivity for the entire world would decline by between 3 and 16 percent by 2080 as a consequence of global warming and that it is likely to continue to deepen in the following century in the face of still greater warming and due to increased insect pests, severe drought and scarcity of water, changes that are likely to accompany climate change. The future prospects of Agriculture, food and the environment are thus in great jeopardy - an extremely ominous message for the prospects of our continued existence.

The scenario is thus set. While right now we still produce more than we need, with world population growing steadily, and the climate changing and evolving adversely, the day may not be so far away when our total food yields may not feed the world. Signs of this have already begun to make its presence felt. Not surprisingly, Agriculturists have, in consequence, been placed at the receiving end of criticism from many quarters. Not only have they been accused of causing damage to the environment, through non judicious use of pesticides and fertilizers, allowing livestock and crop wastes to pollute

the environment, unkind to the welfare of animals; but also for causing erosion, loss of bio-diversity and other equally damaging acts which are wrecking havoc on our environment, ecosystems and quality of life in general.

The environmental cost of agriculture cannot be denied. The levels of nitrogen run-off are still very high in some countries and the concern about the toxic effects of some pesticides on human health is real. New agricultural practices to boost productivity, have also led to a decline in biodiversity, wildlife habitats as well as wetlands among other problems and agriculture is also using increasingly more water. In the meantime Genetically Engineered Crops, touted to be higher yielding, are also suspect with regards to their impacts on the environment and human health. In many instances the sum total of agricultural practices has led to very serious environmental and related health and other problems.

On the other hand, agriculturists also play a huge role in greening the environment, providing idyllic landscapes and green spaces, controlling the flow of water to avoid floods and droughts and also, most importantly, help to feed the ever increasing world population. Concerted efforts taken over the past years in the field of agriculture have yielded some marked improvements. Since the mid-1980s, there has been a decrease in both nitrogen and pesticide use in many countries and an associated improvement in water quality. Farming practices that enhances the environment have also been increasingly adopted which among other things is helping to reduce CO2 emissions, enhance the greenhouse sink function of agriculture as well reduce risks of flooding and provide wildlife habitats and other environmental enhancements. Agriculture has also registered steady output growth through productivity improvements over the past decades in the wake of growing concerns about sufficiency of food supplies for the ever growing world populace. Overall world agricultural output has increased utilizing less land and less labour while prices of food has also generally fallen annually.

Despite the continued criticisms leveled at agriculturists it must be stated that clearly it is not in the best interest of agriculturists to wreck havoc on the very resources on which their livelihoods depend. They are however faced with a dilemma. On the one hand there is the

continuous need for a constant supply of affordable food of reasonable quality, and on the other, the call for the production process to be both environmental and animal friendly. Production to meet the needs of an ever increasing population has to be balanced with the need to conserve natural resources and to protect the environment so that it will continue to exist and be productive in the years to come. Achieving such a balance is by no means easy and gives rise to serious concerns about the role and practice of agriculture and the consequent implications for the future of the world we live in.

In general Malaysia may not have faced any major problems in food sustainability in the past. This may not prevail in the future given the global situation. In 2006, Malaysia's food imports were estimated at RM19.9 billion while exports totalled RM11.4 billion, indicating that a deficit in local production already exists. This deficit has been attributed mainly to substantial imports, among others, of dairy products and cereals which are not produced in the country. In the wake of this, Malaysia faces a potentially dangerous scenario if rice production continues to remain low as the world price of rice is increasing alongside increased demand and stockpiling by other countries. The country's own rice production experienced negative growth (-6.78%) in the 3rd quarter of 2007. The Agriculture sector is also estimated to have sustained huge losses to the tune of RM50mil after floods hit paddy fields, vegetable and aquaculture farms and livestock around the country. Increasing self-sufficiency in food production and lowering food imports is beginning to face greater challenges due to unpredictable climatic conditions and rising cost of oil, feed, fertiliser, pesticides and even labour.

The challenge is thus clear, both for the nation and the world. With world population projected to increase from 6 billion to 7.5 billion by 2020, producing enough food to meet demand while preserving the environment and responding to public expectations will put enormous pressure on resources and agriculture practices. Part of the solution can be found in the choice of farming systems adopted - and there are a great many varieties to choose from. Whether intensive, extensive; conventional, organic or even traditional - the terms are often not well-defined and mean different things in different regions. Increasing numbers of farmers and other agriculturists today, urged on by a pervading sense of urgency, have begun to incorporate integrated and innovative approaches of their own interpretation into their individual enterprises in search of a balance. Meanwhile, in the fields of research and development, the quest to solve the dilemma of conflicting goals appears to be in the concept which has been termed "Sustainable Agriculture".

'Sustainable Agriculture' - is a term itself that has many connotations and definitions depending on the region and usage but the general terms accepted state that Sustainable Agriculture pursues three main goals: economic efficiency, environmental quality and social responsibility. Economic efficiency in terms of meeting the increasing global demand for food at the lowest cost while at the same time satisfying the demand for improved environmental performance through reduction of pollution resulting from agricultural practices, conservation of the natural resource base and generating environmental benefits; all achieved in socially acceptable ways. The accrued benefits will include increase in farmers' education and skills, preservation of animal welfare and last but certainly not least, ensuring that working the land will provide an acceptable level of income not only today but for generations to come.

Due to wide ranging concerns about the environmental impacts of agriculture, the health of communities and the profitability of farming operations in the country University Malaysia Sabah (UMS) took the bold step of setting up the School of Sustainable Agriculture in 2006. The School of Sustainable Agriculture aims to create regionally and nationally recognized models for Sustainable Agriculture through its research, teaching and public outreach programs. It envisages a fresh new approach to meet the changing needs of agriculture, to produce agriculturists equipped with the necessary skills, know-how and technology to efficiently handle the challenges of agriculture in the new millennium.

The School of Sustainable Agriculture (SSA) aims to evolve farming practices to be profitable, protect environmental quality and provide consumers with affordable, high-quality products, while enhancing the quality of life for farmers and rural communities. Its objective is to provide leadership and support for scientific research



and education in agriculture and to evolve agro based systems which will be economically viable, conserve natural resources and biodiversity and enhance the quality of life in agricultural communities. The school will serve students, farmers, farm workers, researchers, educators, policy makers, industry professionals, consumers, and related stakeholder communities across the nation. It aims to be a leading centre of higher education, research and extension in sustainable agriculture, contributing towards the nation's human capital development, advancement of knowledge, technology and wealth through promotion of sustainable and environmental friendly agriculture practices.

The SSA in UMS was established with three mandates: to provide education and contribute to human capital development, research and dissemination of information through publications and provision of extension services in sustainable agriculture to stakeholders. This need-based centre is designed to fulfill among other things Malaysia's Third National Agriculture Policy, Sabah's Second Agriculture Policy, the Ninth Malaysia Plan and the goals of the Sabah Development Corridor strategic plan.

At present the School is working towards coordinating and enhancing research, teaching and education outreach efforts in the area of sustainable agriculture led by a multidisciplinary team of researchers, educators, and students from various backgrounds. The team as a whole is working towards developing solutions for agricultural enterprise profitability, output quality and environmental sustainability. The team also encourages frequent discussions, collaboration on projects with practitioners in the field, new initiatives, funding opportunities, joint educational and research activities and sharing of resources. Specialists within the team address the needs for specific projects and education programs. We are confident that these research and outreach efforts of the School will impact several agriculture enterprises in Sabah, including oil palm, rice, orchids, livestock, horticulture, and in the near future marine fish aquaculture and seaweeds.

Currently, to increase the resource base of knowledge specialists of the future, the School of Sustainable Agriculture offers academic programs in major areas of agricultural practice which include:

1. Crop Production
2. Horticulture and Landscape
3. Livestock Production

The research focus of the School is wide ranging and currently encompasses the areas related to their academic programs as well other agriculture related research which includes among others policy implications, contract farming management, poverty alleviation, agriculture economics, agriculture technology and extension research.

The programs in the School of Sustainable Agriculture are meant to equip its graduates the skills to rationalize, plan, formulate and implement sustainable agricultural practices. Their exposure to the 'hands-on' learning environment in the School is designed to build on and sharpen their practical skills and to challenge them to innovate and adapt current field practices in the face of the fresh challenges which frequently arise. The programs in the School of Sustainable Agriculture in UMS presents a crucial input in the process of developing the skills needed by the new leaders in the field of Agriculture which continues to throw up new challenges every day.