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Rainforestation farming to rehabilitate marginal uplands: history of its development

Victor B. Asio[1*]

ABSTRACT

Rainforestation Farming is a concept of rehabilitating degraded lands or restoring forests using native tree species. It was developed by Josef Margraf and Paciencia P. Milan of the Applied Tropical Ecology Project (Philippine-German Environmental Research Program), carried out by the Visayas State College of Agriculture (ViSCA) and funded by the German Agency for Technical Cooperation (GTZ) from 1989 to 1999. In 2004, Rainforestation Farming was adopted as a national strategy by the Philippine Department of Environment and Natural Resources (DENR). After about 27 years, the concept has received wide acceptance by government and non-government organizations as well as the scientific community. The Institute of Tropical Ecology and Environmental Management (ITEEM), established in 1999, has been tasked to spearhead the promotion and dissemination of the concept to different parts of the country.

Keywords: Rainforestation Farming, degraded lands, reforestation, native tree species

INTRODUCTION

The strategy of planting local tree species to rehabilitate degraded or marginal uplands has now become widely accepted in the Philippines, especially after it was adopted as a national strategy by the Department of Environment and Natural Resources (DENR). In the last decade, there has been an increased interest in the concept by government and non-government organizations, researchers and land owners. There has also been an increase in published materials about the concept-some of which, unfortunately, contain inaccurate information about its concept and history.

The Rainforestation Farming concept was one of the major outputs of the highly successful Applied Tropical Ecology Project, a bilateral project implemented by the Visayas State College of Agriculture or ViSCA (now VSU) in collaboration with the University of Hohenheim and funded by the German Agency for Technical Cooperation (GTZ) from 1989 to 1999.

[1]Department of Soil Science, Visayas State University, Visca, Baybay City, Leyte

***Corresponding Author.** Address: Department of Soil Science, Visayas State University, Visca, Baybay City, Leyte; Email: vbasio@vsu.edu.ph
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The purpose of this article is to contribute to the better understanding of the concept and to give due recognition to its originators, Josef Margarf and Paciencia P. Milan, as well as some key players during the development of the concept who until now have not been properly acknowledged in publications on rainforestation.

THE CONCEPT

Rainforestation Farming or Rainforestation is a concept of rehabilitating marginal upland and degraded lands or restoring forests using local or native forest tree species. It is based on the hypothesis that an ecosystem is more sustainable when its physical structure and species composition are closer to the local rainforest (Margraf & Milan 1996a). Thus, Rainforestation focuses on the use of local forest tree species. In field trials during the early stage of its development, more than 100 local tree species were tested for their suitability for use in the Rainforestation Farming (Margraf & Milan 1996a & 1996b). Figure 1 presents an idealized sketch of a successful Rainforestation farm.

The cultivation of native tropical forest tree species is not entirely new. In fact, one of the best examples is the Bogor Botanical Garden in Indonesia (established by the Dutch in 1815) which boasts a rich collection of mostly native forest trees and other tropical plants. Josef Margraf, the main author of the rainforestation concept, mentioned to this writer sometime in 1993 that he was impressed by the famous garden which is a clear demonstration that indigenous rain forest tree species can indeed be cultivated.

The earliest concept paper of the Rainforestation Farming was presented by the authors in workshops and seminars in 1992 (eg, Milan & Margraf 1992) and an improved version was published in the peer-reviewed journal Annals of Tropical Research in 1994 (Milan & Margraf 1994). Two years later, a chapter on the rainforestation concept appeared in the international book Dipterocarp Forest Ecosystems: Towards Sustainable Management (Margraf & Milan 1996a). Then, the first edition of the farmers' guide on the Rainforestation Farming was published in 1996 (Margraf & Milan 1996b).

Figure 1. An idealized sketch of rainforestation about 15 years after its establishment (sketch by Rolito Dumalag)

The first demonstration sites for the concept (initially called Closed Canopy and High Diversity Farming System) in Mt. Pangasugan (VSU Campus), Cienda, and Punta, Baybay, Leyte were established starting in 1992. During the early iteration of the concept, spacing and line planting of the trees (including some fast-growing exotic tree species) were considered but were then abandoned by J. Margraf; because as he always stressed, "nature does not plant trees in straight lines". Thus, he strongly advocated the random planting of the native trees to simulate a real rainforest, hence the name Rainforestation (Figure 2). This random planting has thus become a fundamental principle behind the Rainforestation. *It distinguishes a mere plantation of indigenous trees from a true rainforestation farm*. According to the entropy law, the random distribution of tree species should mean more ecosystem stability.

In recent years, Rainforestation has been promoted as a strategy to rehabilitate degraded lands in order to restore the tropical rainforests. In 2004, it was adopted as a national strategy when the Philippine Department of Environment and Natural Resources (DENR) Secretary Elisea G. Gozun, through a Memorandum Circular 2004-06 ordered the integration of Rainforestation Farming strategy in the development of open areas and denuded forests to promote biodiversity conservation and sustainable development in protected areas and other appropriate forest lands.

Figure 2. Photo of the first demonstration site in Mt Pangasugan about 10 years after establishment. Note the random arrangement of the trees.

In 2006, the follow-up and monitoring research project funded by GTZ entitled "Rainforestation Farming:Alternative for Biodiversity Conservation and Forest Restoration" by Milan PP, Ceniza MJ, Asio VB, Bulayog SB and Napiza M was recognized by the Commission on Higher Education (CHED) as the Best Higher Education Institutes (HEI) Research Program. The project provided a comprehensive scientific evidence that the concept was ecologically and

economically feasible and now ready for wide-scale dissemination (Milan et al 2004).

THE CRITICISMS

From day one, the concept has met severe and, often times, unfair criticisms. The earliest criticism especially from some colleagues in the forestry department at ViSCA, was that the proponents of the concept were not forest scientists or vegetation scientists and thus did not have the expertise to conceptualize a forest restoration strategy. Now, it can be told that such criticism was not valid.

Another criticism from the agronomists was the use of crops under the "close canopy" demonstration site, in that agronomic crops generally require full sunlight to produce yield. As a result, the field staff tried to use fruit trees but this was not very successful as well since the forest trees have the natural tendency to grow tall and cover the fruit trees below. Agroforestry specialists that visited the demonstration sites also consider the planting of crops and fruit trees in between forest trees as "just another variant of agroforestry".

Many forest science experts still generally consider the assisted natural regeneration (ANR) as a better strategy to rehabilitate degraded lands because of its greater potential to rehabilitate vast areas of lands at a minimal cost.

Lastly, there are those who think that many landowners are only interested to adopt Rainforestation in order to plant hardwood native trees which they could harvest and earn high profits from, in the future. The fact that a few of the original demonstration sites for the concept have already been harvested by the landowners tends to support this apprehension. Thus, some people doubt whether this will eventually lead to long-term forest rehabilitation in the country.

THE AUTHORS

The Rainforestation concept was developed in 1992 by Josef Margraf (born: 03 April 1953, died: 26 January 2010), the Project Manager of the ViSCA-GTZ Applied Tropical Ecology Project from 1989 to 1999 (Figure 3). J. Margraf was born in Bayern Germany, studied biology at the University of Hohenheim in Stuttgart and later specialized in tropical agro-ecology in the same university. He spent years in Ifugao, Northern Luzon conducting his dissertation on the ecology of the Banaue rice terraces under the supervision of the renowned agro-ecologist Werner Koch. He obtained his doctorate degree (Dr.sc.agr.) from the University of Hohenheim in 1985.

Figure 3. Dr. Margraf and his wife in China (Photo source:newnordicsavesplants.wordpress.com)

J. Margraf was a soft-spoken, friendly and kind person. He was a brilliant thinker who loved to discuss with anyone his ecological ideas. A genuine ecologist, he would sometimes sleep overnight below the canopy of a giant ficus tree (locally called balete) in Mt Pangasugan, in order to observe the insect diversity. In his pastime, he loved playing classical guitar and reading books. In the 1980s, he founded the publishing house Verlag Josef Margraf, which in later years became Margraf Publishers Verlagsgesellschaft GmbH. In 1997, after about 9 years at ViSCA, he left for another GTZ project titled Tropical Forest Ecosystems Management in Yunnan, China, where he eventually married the Chinese journalist Mingou Li (in 2000) with whom he had two daughters, Linda and Vanda. In China, he continued his passion of rainforest conservation at a much larger scale and with much more success. In September 2010, he was posthumously awarded the "Green Hero of China".

The co-author of the concept was the Filipino counterpart of the ViSCA-GTZ Applied Tropical Ecology Project, Paciencia P. Milan, a renowned biologist, outstanding research manager and passionate environmentalist, who later became the 4th president of ViSCA (renamed Leyte State University & Visayas State University) (Figure 4). P. Milan earned her PhD in Biology from Bowling Green State University, USA in 1985 and her MS and BS degrees in 1977 and 1967, respectively, from the University of San Carlos in Cebu City. Primarily for developing and promoting the Rainforestation technology, she was awarded the Hugh Greenwood Environmental Science Award by the National Academy of Science and Technology of the Philippines. It was due to her outstanding advocacy that the Rainforestation concept was adopted as a national reforestation strategy by the Department of Environment and Natural Resources in 2004 through the Memorandum Circular 2004-06.

Figure 4. Dr. Paciencia P. Milan

THE KEY CONTRIBUTORS

The VSU faculty who have made important contributions to the development of the Rainforestation concept were: Ma. Juliet C. Ceniza (entomology), Salome B. Bulayog (environmental economics) and modesty aside, this writer too. J. Ceniza and her students conducted studies on the arthropod abundance and diversity in the Rainforestation sites (eg, Ceniza 1995, Ceniza & Milan 1997). S. Bulayog did the economic valuation of trees in the Rainforestation sites and marketing study of Rainforestation farm products. The soil science and geo-ecology group of this writer conducted the characterization and periodic monitoring of the soils in the Rainforestation sites (eg, Asio 1996, Jahn & Asio 1998, Asio et al 1998, Asio & Milan 2002, Susaya & Asio 2005, Asio et al 2006, Sueta et al 2007, Batistel & Asio 2008).

The thesis researches conducted by the graduate and undergraduate members of the above-mentioned soil science and geo-ecology research group, particularly those by Matthias Daub, Annette Goeltenbot and Katrin Zoefel from Hohenheim and Berlin as well as Cheryl Batistel, Jasmine Aragon, Hazel Buenafe, Juvia Sueta and Cherylon Herzano from VSU, proved that the soil quality generally improved under the Rainforestation and that the leaf litter of the indigenous tree species decomposed at a slower rate compared to those of the exotic species. The slow decomposition minimizes nutrient loss from the forest floor and ensures a continuous supply of nutrients to the growing trees.

The development of the concept also benefitted from several research collaborators from Germany. The project collaborator Werner Koch and several of his students from the University of Hohenheim conducted various studies in Leyte to evaluate the impact and suitability of the concept (eg, Engler 1992, Klee 1992, Spatz 1992, Grueninger 1993, Widman 1994, Ceniza 1995, Schuetz 1996, Dargantes 1996). In addition, A. Neuberger (geography), Carsten Marohn (agro-ecology),

Christian Müller-Edzards (forest science), Gerhard Langenberger(forestry /vegetation science) and Sabine Zikele (soil science) conducted theses in Leyte whose findings supported the Rainforestation concept (Mueller-Edzards 1994, Zikeli 1998, Neuberger 2005, Langenberger 2006, Marohn 2007).

Among the German graduate students, Peter Balzer had perhaps the biggest input to the concept as he was the one who conducted several trials on spacing and arrangement of trees in the demonstration site in Mt. Pangasugan from 1994 to 1996. He also prepared the initial list of sun-demanding and shade-loving local forest tree species suitable for use in the concept (Balzer 1994, see also tables in Margraf & Milan 1996a & 1996b).

A non-technical field staff of the Applied Tropical Ecology Project who deserves a special mention was Antonio "Tony" Fernandez from Patag village near the VSU campus. A former shifting cultivator and wildlife hunter, Tony knew almost every tree in the forest by heart. His indigenous knowledge about the forest was crucial to the success of wildlings collection and tree seedlings propagation in support of the Rainforestation Farming.

THE PROMOTION AND DISSEMINATION

Friedhelm Goeltenboth and Andreas Schulte deserve recognition for enhancing the international profile of the Rainforestation concept through their scientific publications, particularly journal papers and books. Claus Peter Hutter of Euronatur provided funding for various promotion and dissemination efforts of VSU. The Haribon Foundation also supported several dissemination and training activities. In the last few years, the Environmental Leadership and Training Initiative (ELTI) of Yale University's School of Forestry and Environmental Studies has become an active partner of VSU in the promotion of Rainforestation Farming.

As planned during its establishment in 1999, the ITEEM (originally called Institute of Tropical Ecology or ITE), has assumed the lead role in the promotion and dissemination of the concept to different parts of the country under its past and current directors: Buenaventura B. Dargantes, Ma. Juliet C. Ceniza, Humberto Montes and Marlito Bande.

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