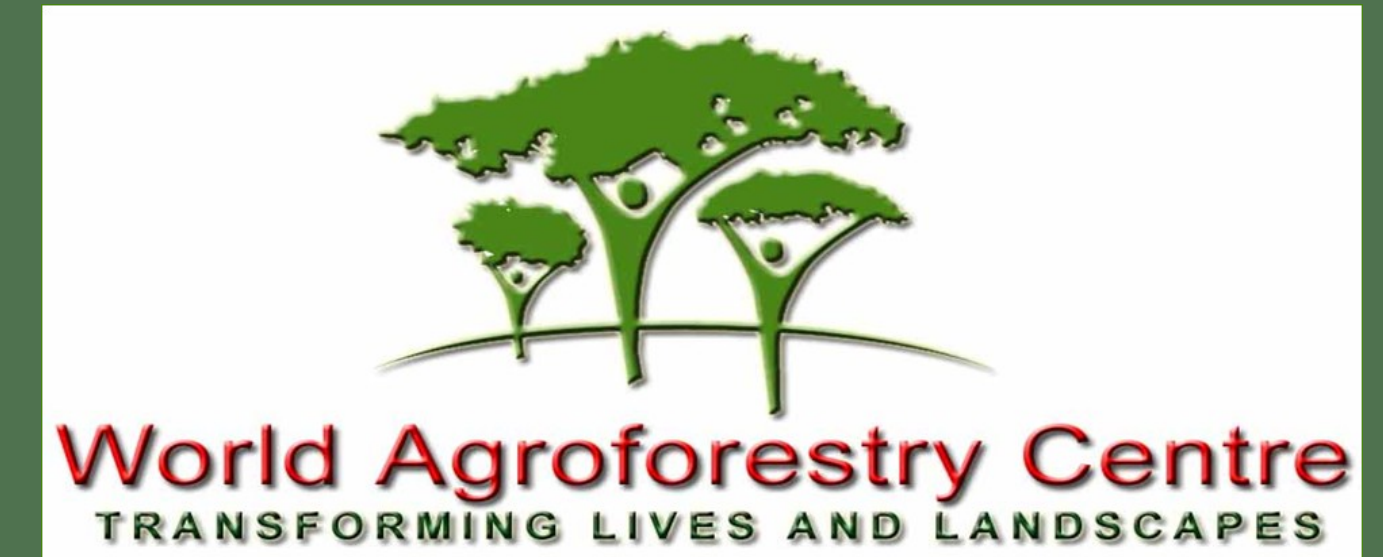


Smallholder Rubber Agroforestry System in Mindanao, Philippines; A Village Approach to Climate Change Mitigation

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DESCRIPTION

Rubber Agroforestry System (RAS), the deliberate integration of rubber trees with agricultural crops and or livestock, is considered a viable upland farming option for smallholders. It optimizes aboveground resources (space and light) and optimizes use of vertical and horizontal belowground resources (space, water and nutrients). The system sustains farmers' income by using multi-canopy hedgerow systems which conserves soil, water and nutrients, as well as sustains environmental services, particularly carbon sequestration.

Planting of annual crops such as upland rice, corn and vegetables in between rubber trees will provide income for the rubber farmers during the first 5 to 6 years before rubber tapping begins. Shaded interrows under mature rubber could be fully exploited with planting shade-tolerant species. The rubber trees can also be widely spaced at 22 to 30 meters between rows to provide ample space for the growth of agricultural crops for daily subsistence and commercial purposes. Latex-timber clones of rubber can provide additional income to farmers through harvesting timber when tapping starts to decline and becomes uneconomical at about 35 years.

IMPACTS

A total of 79 Claveria Landcare Association (CLCA) smallholder farmers in Claveria, Misamis Oriental have adopted RAS totaling 101 hectares. Some have already benefited by earning a monthly farm income of Php 12,000 to 36,000 from the rubber alone. Associated crops, such as maize, upland rice, vegetables, fruit and timber trees, coffee, banana, fodder grasses and legumes, also provided them with additional short, medium and long-term sources of subsistence and income. Moreover, RAS enabled smallholders to adapt to the impacts of climate change. Soil erosion as a result of runoff from heavy rains and strong winds is prevented through RAS. Rubber trees penetrate deep into the soil layer for anchorage. Annual and cover crops hold soils at the surface. Just like any timber hedgerow system, RAS reduces soil loss by 55 times than traditional up and down the slope cultivation. This leads to conservation of soil fertility that could have been lost through erosion. The potential for rubber trees to sequester carbon is also meaningful with values ranging from 35 to 75 t carbon (depending on the planting distance used) per hectare in 30 years.

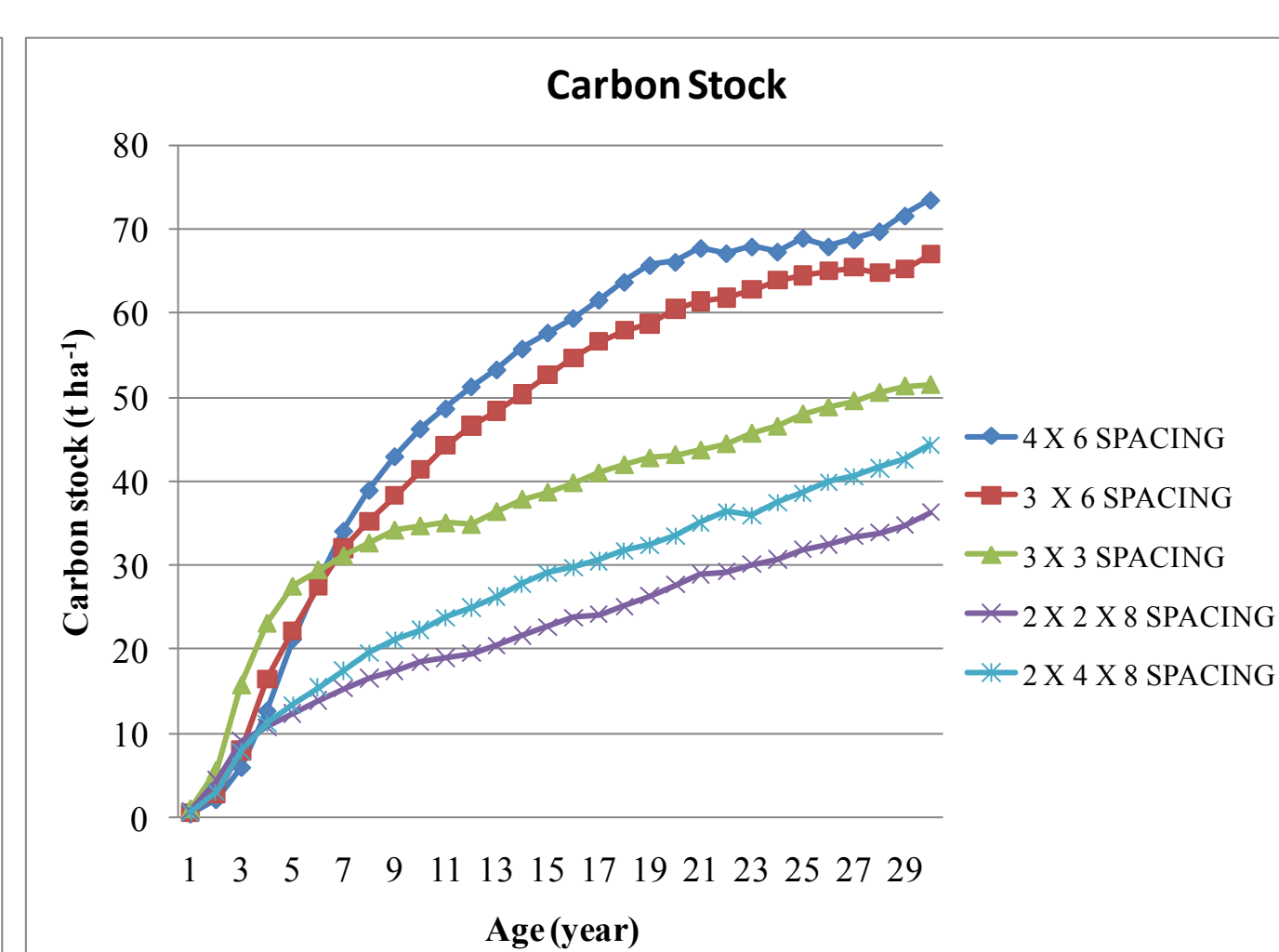
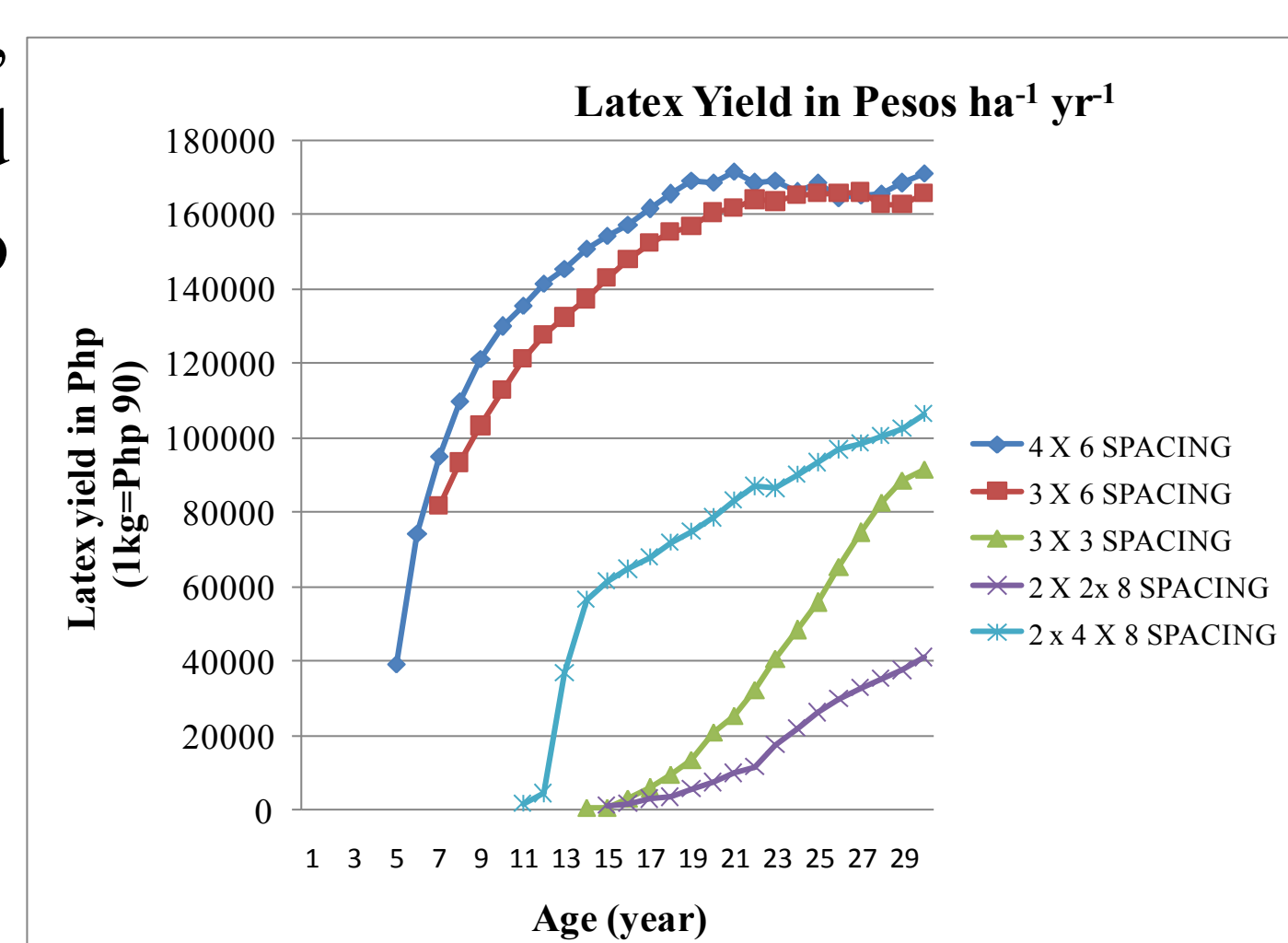
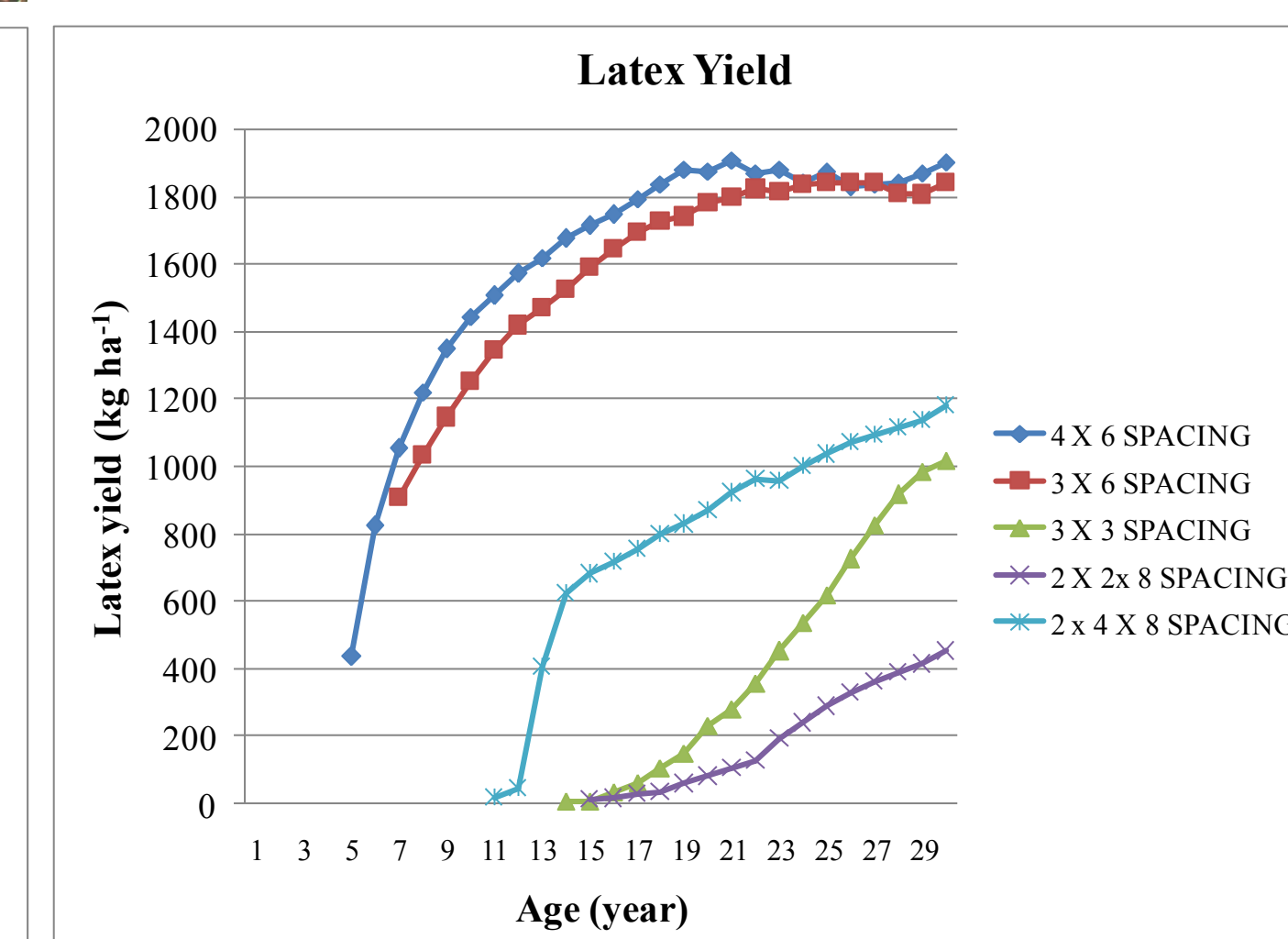
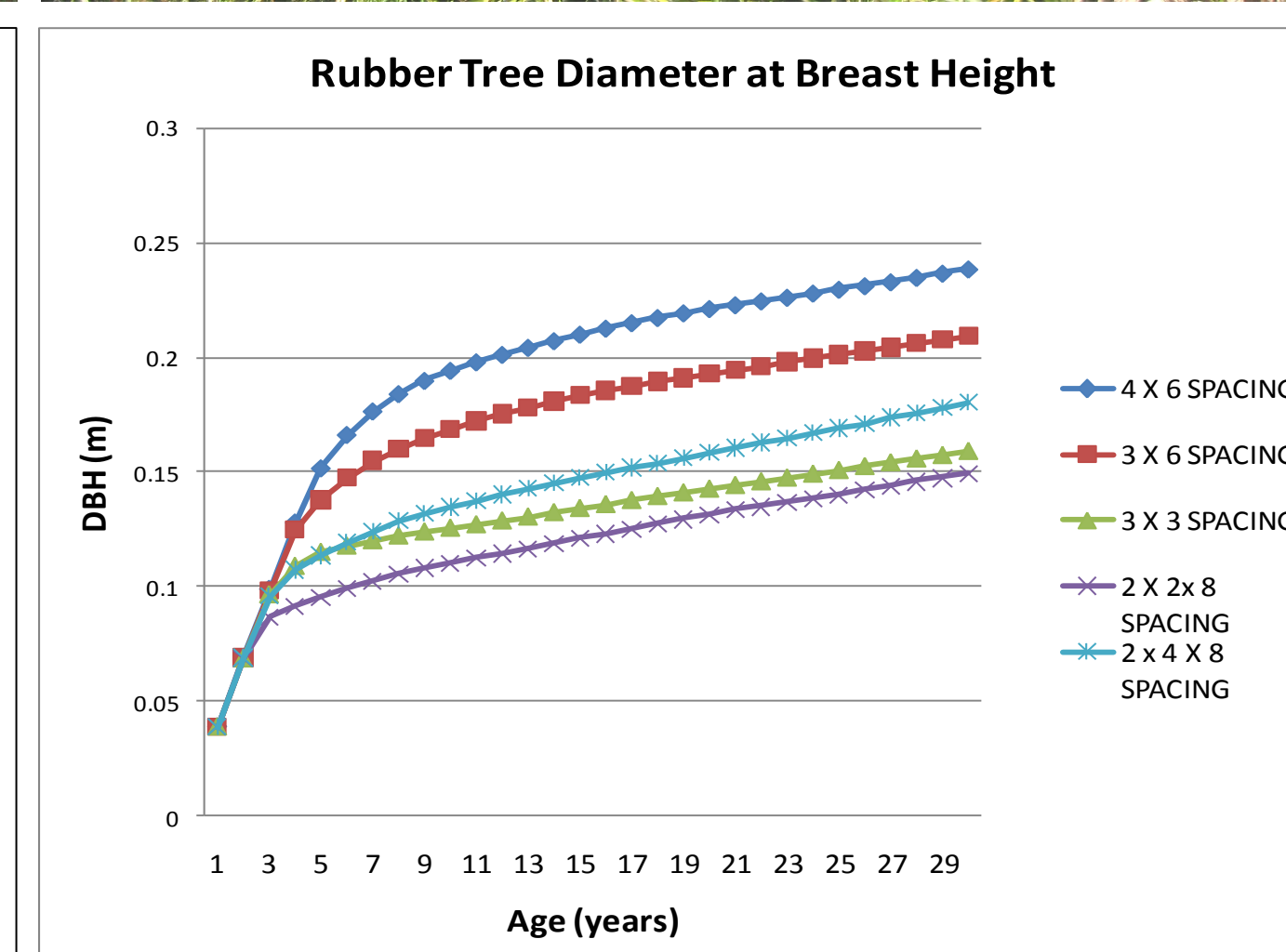
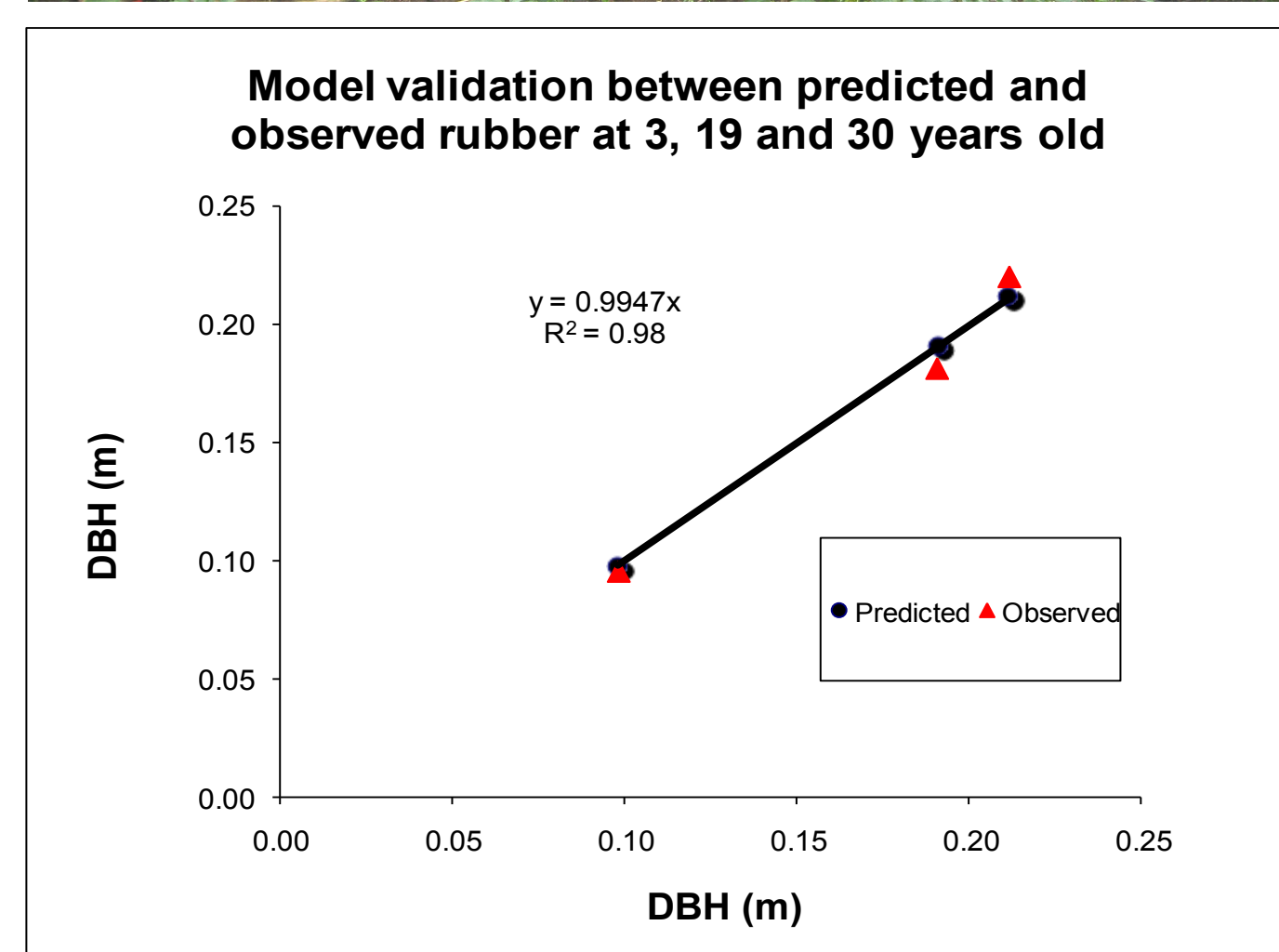
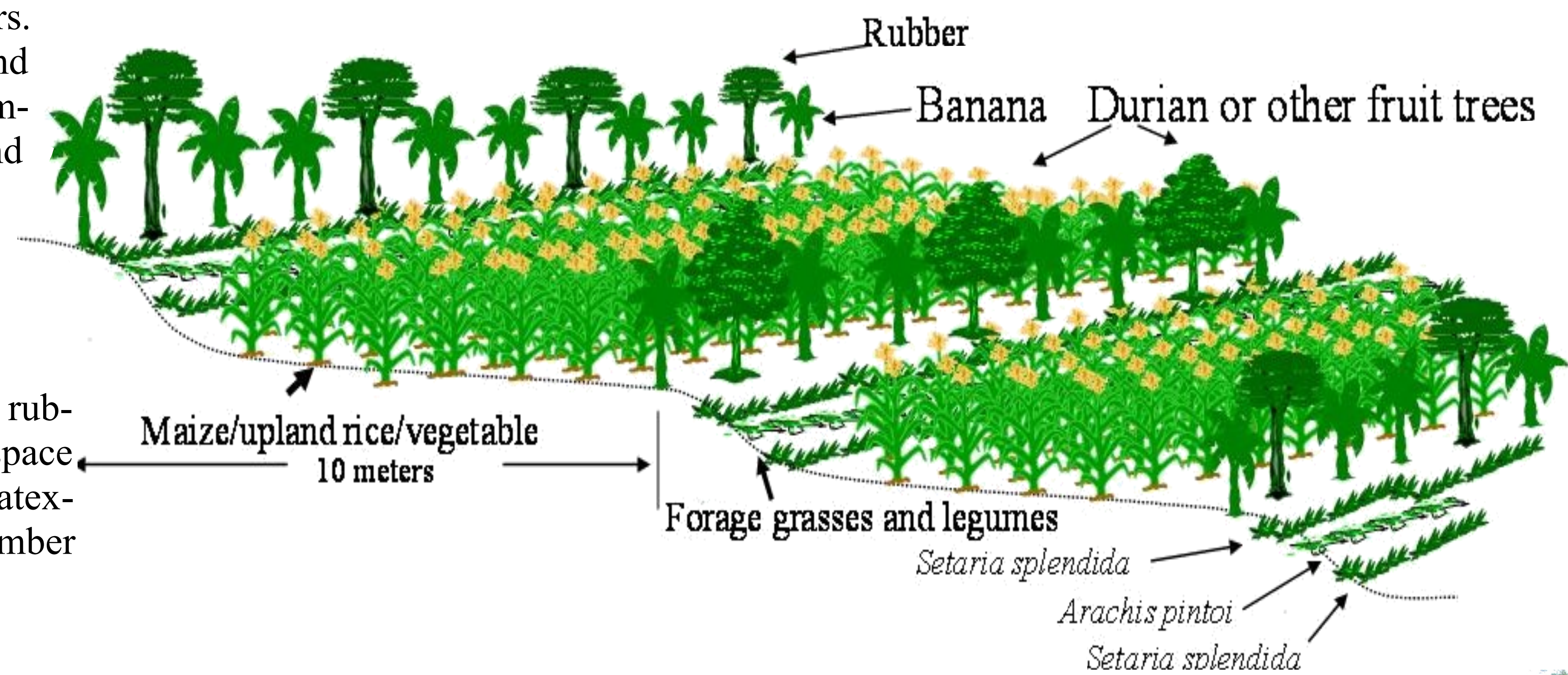
SUSTAINABILITY

The RAS options vary from extensive systems requiring less input and investment to more intensive with relatively higher cost for establishment. The options are flexible and can be adapted to meet local context and opportunities. Natural rubber production is currently short by 20,000-30,000 t to meet domestic demand. Annually, the said demand is increasing by 15-20% as a result of the growing population. The Philippines need to establish at least 20,571 hectares of rubber plantation just to meet this domestic demand. This situation creates a good market opportunity for smallholder farmers to obtain substantial amounts of income from RAS. Moreover, the world markets' 0.31MMT of deficit in natural rubber production and through the General Agreement on Tariffs and Trade (GATT) creates a global market opportunity for RAS farmers. RAS is economically feasible and sustainable due to low cost production while providing food in every farmers table before, during and after the start of tapping year. With increasing number of farmers adopting RAS, the Local Government of Claveria provided training funds for farmers living in the upper watershed of the Municipality, while the World Agroforestry Centre (ICRAF) provided budded and non-budded rubber seedlings for farmers' budwood and rubber nurseries.

ADOPTABILITY

Practicing RAS is simple and is applicable and adoptable to smallholder farmers. From March 2008 until May 2009 alone, there has been a 33% increase in the number of RAS adoptors and 61% increase in area planted to rubber mixed with annual crops having a total of 79 RAS farmer adoptors and 101 hectares used for RAS. Series of RAS training have been conducted in Claveria, Misamis Oriental, Malitbog, Bukidnon, NED, South Cotabato and Palembang, Maguindanao to scale-up adoption.

Rubber agroforestry system (RAS) on slopes



Locations, elevations and different clones of established Budwood Garden (BWG) and nurseries in Claveria, Misamis Oriental, Philippines

Locations	Elevation	Number of Established BWG	Clones	Number of established nurseries
Lower Claveria	< 500 masl	11	RRIM 600, USM 1	11
Middle Claveria	500-750 masl	7	RRIM 600, USM1, PB 260, PB 330	7
Upper Claveria	> 750 masl	6	PB 260, PB 330	6
Tabuk barangays (Cabulig watershed)	400-1200 masl	11	PB 260, PB 330, RRIM 600, USM 1	11

Effect of different hedgerow system types on annual soil loss

Hedgerow system	Soil loss (t ha ⁻¹)
Grasses	2.20 c
Forage legumes	9.80 c
Shrubs	5.70 c
Trees	6.50 c
Contour cultivation	40.0 b
Traditional cultivation (up and down the slope)	350.0 a
Tolerable rate	12.0

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