



IMPROVING COCOA PRODUCTIVITY AND QUALITY: CONTRIBUTING FACTORS

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Malaysian Cocoa Board B**

At Abidjan Cote D'Ivoire

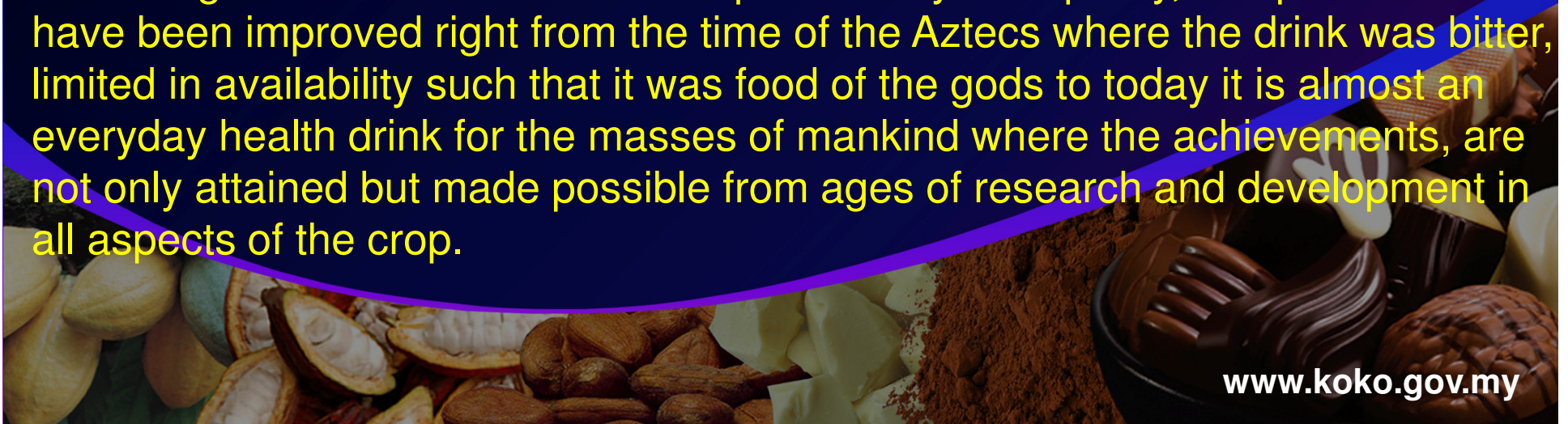
**on
19 - 23 Nov, 2012**

Introduction

- Productivity refers to the amount of output per unit of input (labor, equipment, and capital) and would be a measure of the efficiency of production; which in most cases is evaluated economically. Productivity can also be a ratio of an output to the input required to produce it; the higher the ratio the better is the productivity.

Quality is an essential distinctive characteristic, property, or attribute; a measure of excellence or a state of being. In everyday life, over the ages man has been improving the productivity and quality in every aspect related to him, especially the quality of life.

This brings us to our issue on cocoa productivity and quality, 2 aspects that have been improved right from the time of the Aztecs where the drink was bitter, limited in availability such that it was food of the gods to today it is almost an everyday health drink for the masses of mankind where the achievements, are not only attained but made possible from ages of research and development in all aspects of the crop.



Factors

Factors from the beginning are more likely to be inherent, in Malaysia or any cocoa producing country; Upstream, of prime importance would be to look into all the characteristics of breeding that would bring about maximum exploitation possible with the inputs leading to our aspects of productivity and quality. These are the basic sciences and with nature interaction (Genetic X Environment) which is exhibited phenotypically, enables one to continuously select the best trait expressed. From research organisations, some of the basic relevant aspects are:

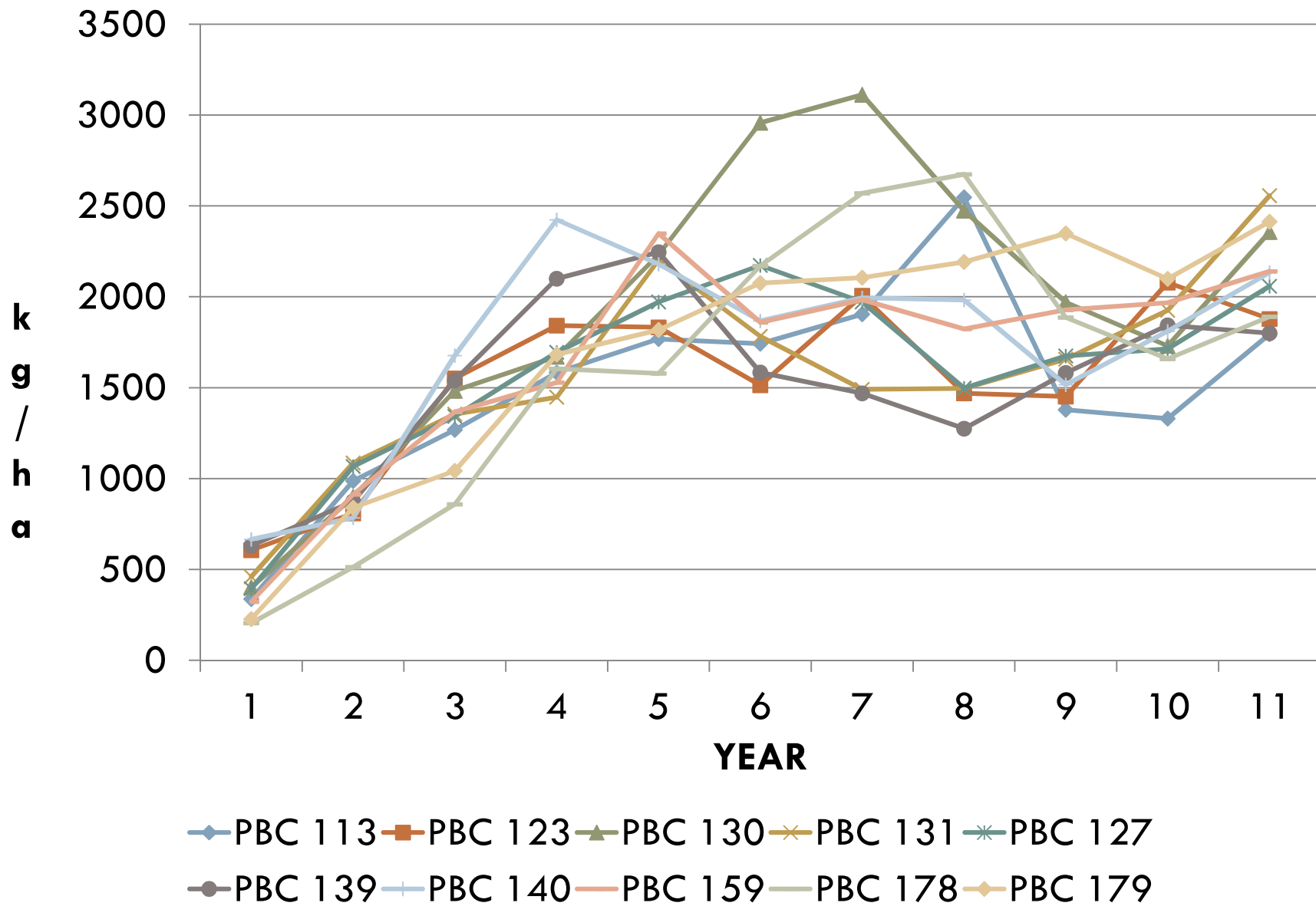
- 1) Selection of cocoa beans large in size with each bean weight $\geq 1.0\text{g}$
- 2) Tree selection with high pod production, a baseline today of > 100 pods/year.
- 3) Number of beans/pod; within the 35 region for good bean size and weight.
- 4) The shell content of around 10% and lowered to the smallest possible.
- 5) Trees yield early and consistently high production for a duration of ≥ 30 years.
- 6) Trees can be shaped and architecture for easy work, such as up-right and access for harvesting of pods without jeopardising production.
- 7) Selection for resistance to pests and diseases.
- 8) The chemical composition where health related chemicals are given due emphasis such as procyanidins, cyanidins of polyphenols are sought for.
- 9) The butterfat and powder composition/ratios related to the industry needs, consumers' demands, economical affects and crucially prevailing prices.

Table 1. DRY BEAN YIELDS OF PBC CLONES AT HMPB PRANG BESAR RESEARCH STATION, KAJANG, SELANGOR (1980s)

CLONE	1Y	2Y	3Y	4Y	5Y	6Y	7Y	8Y	9Y	10Y	11Y
PBC 113	337	987	1268	1583	1767	1742	1904	2547	1379	1330	1794
PBC 123	606	808	1552	1842	1833	1513	2007	1469	1451	2078	1879
PBC 130	402	899	1483	1671	2232	2958	3112	2474	1970	1730	2357
PBC 131	460	1086	1354	1448	2203	1782	1490	1496	1657	1925	2556
PBC 127	394	1066	1342	1694	1971	2173	1972	1498	1674	1714	2058
PBC 139	630	874	1540	2100	2246	1584	1469	1275	1581	1843	1800
PBC 140	665	784	1677	2424	2179	1868	1995	1982	1516	1811	2134
PBC 159	322	913	1366	1529	2348	1860	1984	1823	1928	1967	2140
PBC 178	204	512	858	1604	1579	2170	2570	2674	1886	1658	1890
PBC 179	226	840	1042	1683	1817	2075	2106	2192	2348	2098	2414
MEAN	425	877	1348	1758	2018	1973	2061	1943	1739	1815	2102
HYBRID	252	446	688	1012	1085	968	958	891	820	798	904

Source: Chong, CF. (1987). Characteristics of Prang Besar Cocoa Clones. SASS Seminar Palm Kernel Utilization and Recent Advances in Cocoa Cultivation. 11-13 June 1987, Tawau Sabah.

DRY BEAN YIELDS OF PBC CLONES

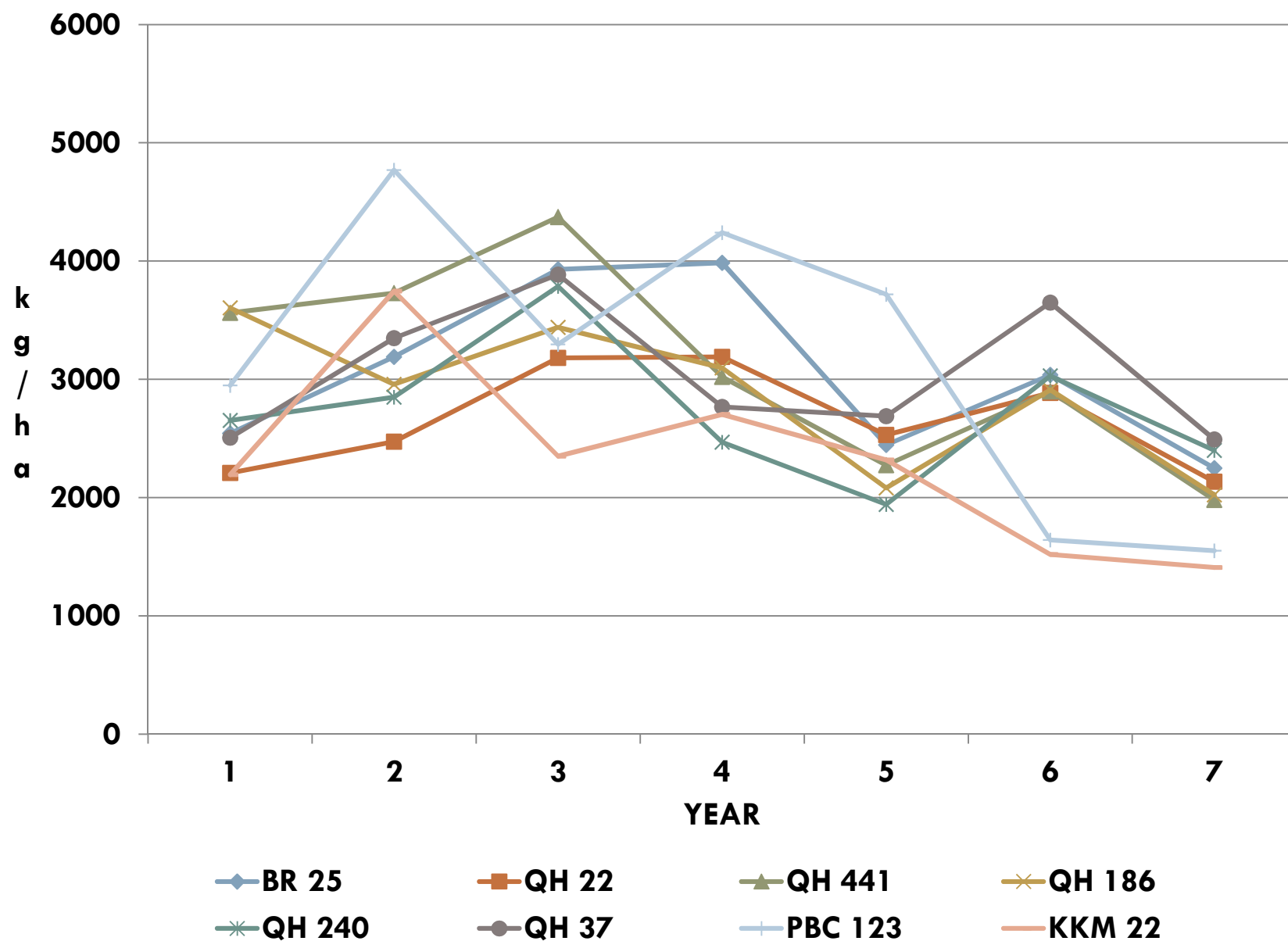


YIELD PERFORMANCE OF SOME OF THE DOA SABAH RECOMMENDED CLONES AT AGRICULTURE RESEARCH STATION, QUOIN HILL TAWAU SABAH (1990-2000)

CLONE	DRIED BEAN YIELD (kg/ha)							
	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	MEAN
BR 25	2543	3189	3930	3986	2445	3038	2249	3054
QH 22	2209	2473	3182	3190	2530	2886	2134	2658
QH 441	3561	3729	4371	3020	2274	2897	1981	3119
QH 186	3604	2958	3440	3096	2082	2910	2022	2873
QH 240	2652	2850	3786	2468	1943	3030	2399	2733
QH 37	2507	3348	3885	2767	2689	3649	2493	3048
PBC 123	2948	4770	3295	4240	3719	1643	1552	3167
KKM 22	2194	3746	2351	2704	2319	1520	1410	2321

Source: DOA Sabah Annual Research Progress Report, 1996 and 1998.

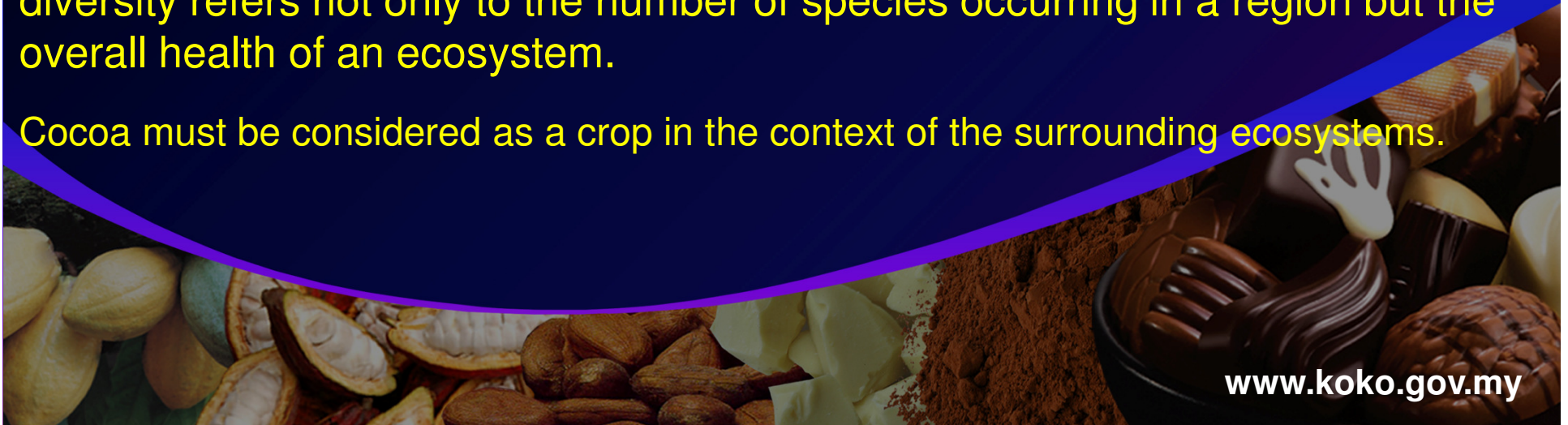
DRIED BEAN YIELD OF DOA SABAH RECOMMENDED CLONES AGAINST CONTROL CLONES (KKM22 and PBC 123)



The chain from farm to table; more apt to consumers are steps of improvement on cocoa bean processing and diversification of cocoa attributes and uses that is attached an economic value. Today's globalisation and the vast utilisation of cocoa from food, pharmaceuticals, therapeutics, nutraceuticals to health aims is in reality a globalisation with ICT making the world borderless.

Cocoa cultivation primarily is a smallholder's crop; farmed by approximately 5-6 million small-scale farmers around the world. Small farmers' decisions are never uniform and there is a considerable variety in farm type within a region. In regions with diverse cocoa agro-forests, there will be farms with their shade approaching the selective shade model. In areas of highly traditional cocoa farming, the farms would be densely shaded. Many had found difficulty in classifying "sustainable models" of cocoa production and this is further compounded when cocoa's biodiversity impacts are examined. Biological diversity refers not only to the number of species occurring in a region but the overall health of an ecosystem.

Cocoa must be considered as a crop in the context of the surrounding ecosystems.



Regional land uses need to be surveyed and/or planned to understand the impacts of any particular cultivation model's overall ecological impact. Smallholder cocoa has the potential to be both an agent of ecosystem fragmentation and protection. Some landscapes, such as Côte d'Ivoire's lowland tropics, have been fragmented to such an extent that there is very little natural forest canopy and thus ecosystem-level biodiversity remains doubtful. However in neighbouring Ghana, the cocoa farms bordering Kakum National Park are being collectively managed to form a critical buffer zone to maintain the integrity of the park's forest ecosystem.

A truly sustainable world cocoa economy will result in more reliable and higher incomes of cocoa farmers; with transition costs; that will be borne by users and/or the end consumers, with investments being made in both cocoa producing and cocoa consuming countries. Moving towards a sustainable world cocoa economy will involve actions by both producers and users of cocoa, their governments and by others in the value chain. Progress can be achieved by consensus amongst key stakeholders on the issues; and develop a road-map to articulate the vision of a sustainable world cocoa economy and to agree on a plan of action towards that goal.

Proposed indicators for cocoa to be assessed and considered “sustainable” includes the establishment of codes of conduct in terms of good agricultural, commercial and industrial practices, and may, or may not, include the need for product traceability throughout the value chain. The aim to reach consensus should be to have minimum acceptable standards for cocoa production and processing, which can subsequently and continuously be improved upon and define indicators for their measurement. The opportunity for all stakeholders in the cocoa sector to share ideas and experiences will be more meaningful. Of importance is to build a consensus on defining the concept, the model, criteria, indicators and the ways to achieve a sustainable world cocoa economy through a participatory and comprehensive approach.

The continued advancement in science and technology will have an influence over improving productivity and quality and more recent applications include ecological based systems and approach in management to ensure diversity and precision production. The possibility of achieving reliable high quality yield with low inputs has been evaluated from epi-genetics of cocoa plants and the desire to have minimal use of pesticides and fertilizers targeting minimal growth and production stress with optimum farming practice.



Cocoa Development Program For Farmers (PPTK)



Farmer Nursery Development Program



Nursery
Mr. Nasaruddin Abdullah
Sarikei, Sarawak

Nursery
(Mr. Teo Chun Hon)
Kg. Damak, Jerantut, Pahang



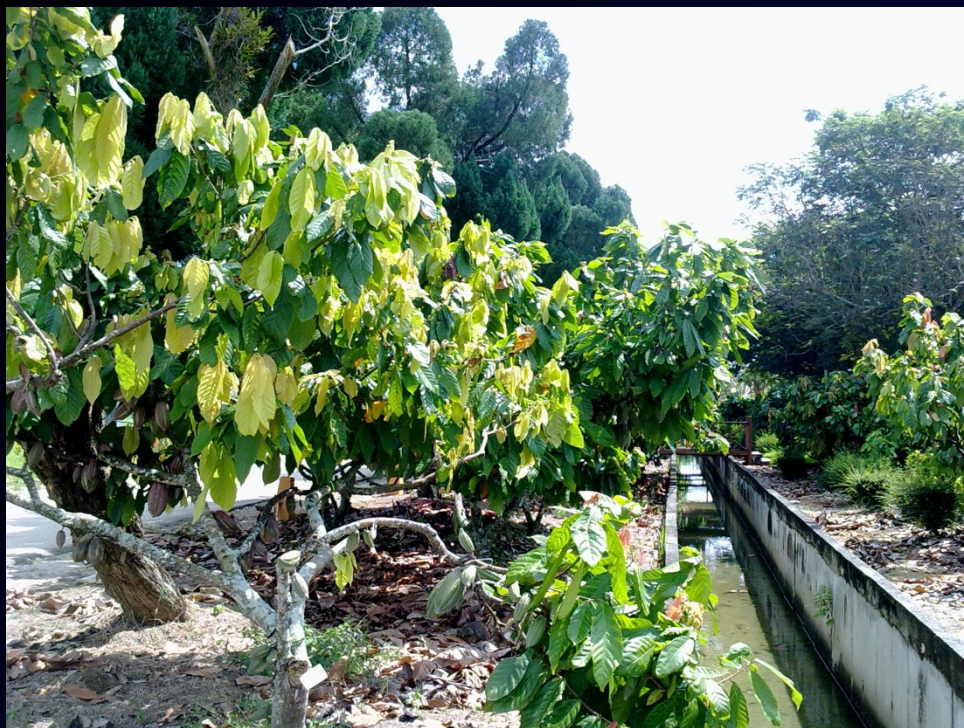
Processing Centres for farmers Program (Wet Bean Fermentation & drying Centres)



**PPK Kg. Togop Darat
(Mr. Kemboung Luntau),
Ranau**

**Mini PPK Pulau Sebatik
(Mr. Sarulla Mamma),
Tawau**





2010



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In 2012



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Cocoa(Yr)	input /ha/yr (RM)		Gred	Wt (KG)	Gross (RM)	Net (RM)
2006	Agric inputs	2,500.00				
2007	Agric inputs	1,000.00				
2008	Agric inputs	1,000.00	SMC 1	300	2,100	Subs
2009	Agric inputs	1,000.00	SMC 1	700	4,500	Subs
2010	Agric inputs	1,000.00	SMC 1	1,200	7,800	Subs
2011	Agric inputs	3,600.00	SMC 1	2,627.00	21,312.97	17,772.97

fertiliser	price (rm)	(monthly)	Applications/yr	Amt/tree/month	Amt/tree/yr	cost/tree/yr
24 bags	3,600	2 bag	12 times	100 gram	1200gram	RM 3.60



INCOME OF MRS MANJA ANAK NYALING FROM 1Ha COCOA PLANTING YEAR 2011

No. of workers:	2
Year planted:	2006
Matured trees:	863
Trees yet to mature:	265
Gross income:	RM21312,97
Input costs:	RM3,600.00
Net income/ha/yr:	RM17,772,97
Ave. monthly income:	RM1531.00
Ave. yield /ha/year: $1000/863 \times 2627$	3,044.00 kg/yr.



No.	Date	Invoice No.	Grade (SMC)	Wt. (Kg)	Price (RM/Kg)	Total (RM)
1	18.01.2011	A263816	SMC1	127.05	8.30	1,054.51
2	28.02.2011	A245504	SMC1	199.40	9.20	1,834.48
3	21.05.2011	-	-	93.40	6.30	399.40
4	23.05.2011	A245304	SMC1	535.85	8.40	4,501.14
5	13.06.2011	A246309	SMC1	371.10	8.50	3,154.35
6	11.07.2011	A246319	SMC1	464.75	9.00	4,182.75
7	22.08.2011	A244681	SMC1	215.15	8.65	1,861.05
8	01.11.2011	A248263	SMC1	244.20	7.70	1,880.34
9	05.12.2011	A248273	SMC1	376.15	6.50	2,444.95
TOTAL				2,627.05		21,312.97



QH1346



PBC 128



Klon MCBC1



KKM25



Domestic Market Support Services Program

Objective

1. Assist marketing of farmers' dry beans at Int. prices
2. Farmers paid according to grade and quality
3. Raise Farm income

2010 - achievement

Services provided to farmers 83% in Peninsular, 75% in Sabah dan 33% in Sarawak.

Quantity purchased 100.6 tan in Ranau, Sabah; 16.4 tan in Perak & Machang, Semenanjung ; 8.4 tan in Serian & Sg Asap, Sarawak.

Total bean purchased 125.4 ton valued at RM1.1 million.



Domestic Market Support Services Program

**Price “BEFORE” AND “AFTER” PROGRAM
IN RANAU FROM 8-10 DEC. 2009
(PROGRAM first implementation in Malaysia)**

Area	Price before program (RM@kg)	Price after Program (RM@kg)	Price Difference (RM@kg)
RANAU	4.00-6.00	9.60 (08 Dis 2009) 10.10 (09 Dis 2009) 9.80 (10 Dis 2009)	3.60-5.60 4.10-6.10 3.80-5.80

2011- Achievements

Transactions increase from 942 in the year 2010 to 1424 in the year 2011 (an increase of 33%)

Certification increase from 298 issued in 2010 to 370 in the year 2011 (an increase of 19%)

Aim of program is to enable all transactions of sale-purchase are in accordance to world cocoa price (London & New York) without price manipulations by any

Aim of certification program to ensure quality dry Malaysian cocoa bean according to Malaysian Standards (SMC) achieving zero 'sub-standard' (SS) or at best \leq (1-5%)



Breeding & Selection
Yield potential 4 – 8
kg/tree/yr



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Infrastructure Seven R&D Centres, Four Units

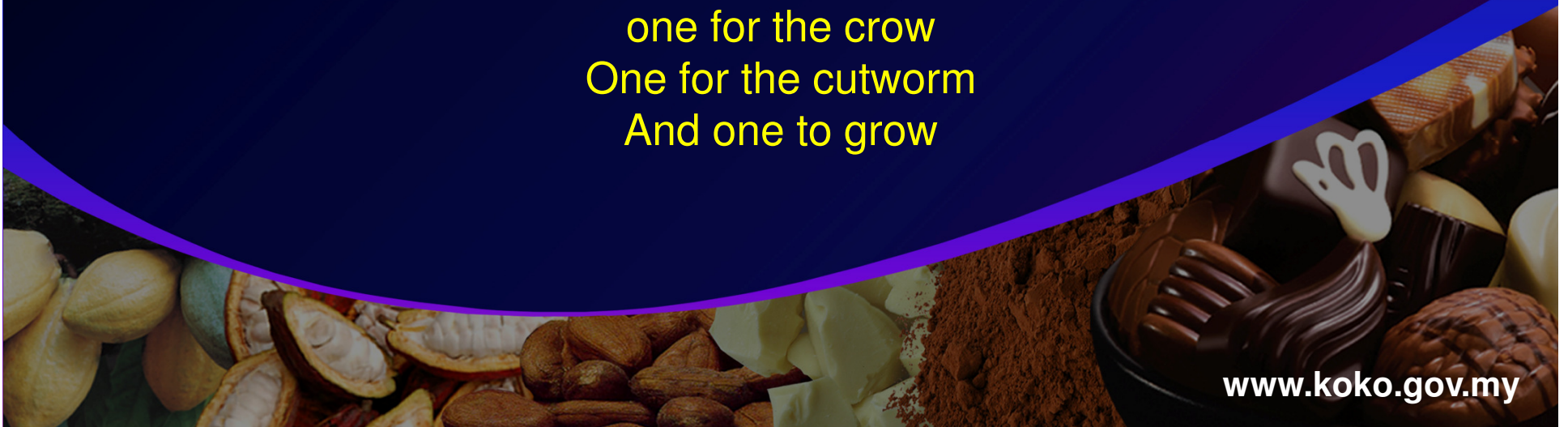


To a layman with loving and idealistic principles, he would like almost everything to be sustained, for mankind's benefit forever and hence it would be pertinent for one to have indices that can be used to measure.

Generally sustainable cocoa should be cocoa production that ensures/confers benefits economically to the farmer, uplifting/ betterment of his social needs/life-style, with continued biodiversity that is characterized by a diverse population of flora and fauna to maintain ecosystem integrity, species viability and stability on a landscape level.

We no longer live as in the early days of the praries in the 17th Century of corn planting in America where a farmer plants 4 kernels of corn for every plant he planted in trying to attain a balanced ecosystem as then Dr. Lily noted

One for the maggot,
one for the crow
One for the cutworm
And one to grow





“Malaysian Cocoa – Naturally Nutritious,
Deliciously Healthy”

Terima Kasih
Thank You

