

**UNDERSTANDING FARMER ENGAGEMENT IN
THE COCOA SECTOR IN SULAWESI:
A RAPID ASSESSMENT**

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1. REPORT PURPOSE AND APPROACH

A range of different public and private sector organisations have intervened to improve the production of cocoa and smallholder livelihoods in Indonesia. They have employed a variety of methods and approaches. While some successes are evident, cocoa smallholders continue to struggle with the challenges of pest and disease infestation, aging cocoa trees and poor market access. The rate of adoption of good agricultural practices has also been varied – with adoption slower of some practices than others, and in some districts more than others.

A key component of ACIAR's current cocoa work is to improve the extension systems and policy settings that affect sustainable cocoa production in Indonesia. Part of this involves establishing and testing interactive models for knowledge transfer to extension services and farmers, including the use of web-based and mobile phone technology. To deliver on this objective effectively, it is important to both understand and learn from the past and current context for farmer engagement in the cocoa sector. Therefore, the main purpose of this report is, via a rapid assessment, to contextualise the social context of farmer engagement in the cocoa industry in Sulawesi including existing programs and extension services.

This rapid assessment took place in Sulawesi over a period of 12 days (16-27 April 2012). The primary method for this assessment was stakeholder interviews. This method was chosen because the aim was to understand unique experiences of a targeted sample in an in-depth way. A structured interview guide was prepared in advance, revolving around four themes: clientele, business management and viability, knowledge networks (outreach and feedback), and outcomes (impacts and observations). The interview guide was designed around these themes in order to elicit specific information about farmer engagement, whilst also allowing for flexibility in the way the interview was conducted, to allow the conversation to progress naturally. The interviews were held at the farms or research sites where the interviewees worked. This also allowed for observation of practices and conditions in the field.

A range of stakeholders in the cocoa sector were interviewed. Mars has been an important actor in this space and, as is evident from the list below, a primary focus of the assessment is the ongoing work that Mars is doing to engage with farmers in the cocoa sector in Sulawesi. Interviews were conducted with the following stakeholders:

- Two Mars Facilitators (Latuppa and Terenge)
- Five Mars Cocoa Doctors (Sallu Paremang, Latuppa, East Luwu, Mayo Poso)
- Mars Key Farmer working on cocoa rehabilitation with MSI (Noling)
- Mars Key Farmer participating in the Commitment for Future programme
- One Mars Field Co-ordinator (Noling)
- The Mars Indonesia Director-President (Makassar)

During the interview process, we also visited several cocoa farms, two Cocoa Development Clinics (Latuppa and Terenge), a Mars cocoa rehabilitation site (Noling), and two Cocoa Village Clinics (Sallu Paremang and Mayo Poso). We also visited the Mars Sustainable Cocoa Clinic in Bupon that has demonstration plots, including a Rainforest Alliance compliant plot complete with shading trees and a riparian buffer zone.

Beyond the Mars work, we visited a site near Noling where ACIAR and ICCRI staff were meeting to discuss monitoring of compost trials. In addition, we interviewed four cocoa farmers working with ACIAR in the Polewali area. To get an alternative perspective on initiatives in the sector we met with staff from:

- Dinas (District Crop Department)
- BPTP
- Cocoa Sustainability Partnership
- Swiss Contact

Several of these initiatives are included in the following section (4) to provide additional examples of farmer engagement. While we have tried to be as comprehensive as possible, we recognise that there are limits to what can be achieved in a two week field visit. The information provided is a high level overview of activities, not an in-depth assessment. As previously stated, the key purpose is to provide an understanding of the many actors working to engage with cocoa farmers in Sulawesi, and to inform the future design of ACIAR's own activities.

2. SOCIAL, ECONOMIC AND ENVIRONMENTAL CONTEXT OF SULAWESI

Indonesia is an important producer of cocoa – the third after the Ivory Coast and Ghana. Within Indonesia, production estimates vary. While accurate figures are difficult to obtain, cocoa is definitely an important sector. BPS (2012) and Ministry of Agriculture (2012) reported that 809,583 metric tonnes were produced in 2009, with 91% grown by smallholders across 1,491,836 hectares. In contrast, the International Cocoa Organisation (ICCO, 2011) estimated that Indonesia produced 550,000 metric tonnes of cocoa beans in the 2009/2010 crop year. Given that approximately 450,000 metric tonnes of cocoa beans were exported and an estimated 130,000 metric tonnes were processed domestically in 2009/2010 (ICCO, 2011), the actual volume of production is probably somewhere between these two estimates. In 2010, Malaysia was the main buyer of Indonesian cocoa, importing 203,000 MT followed by the USA, Singapore, Brazil and China (UNCOMTRADE, 2012).

Cocoa is a particularly important smallholder crop in Sulawesi. In 2008 and 2009, Neilson et al. (2011) conducted a survey of 594 farmers in three districts of Sulawesi: North Luwu (South Sulawesi); Polewali Mandar (West Sulawesi); and North Kolaka (Southeast Sulawesi). Interview results revealed that most farmers generally farmed less than 2ha of cocoa, with production

levels between 290-641 kg / ha. Cocoa was the main source of income (between 64-75% of income) for all households. There were also a high proportion of farmers (from 43% in Polman to 66% in Kolaka) who relied solely on cocoa and did not produce any other crops on their land.

Sulawesi contributes approximately two thirds of total cocoa production in Indonesia from four provinces: South; Southeast; Central; and West Sulawesi (Ministry of Agriculture, 2009). Sulawesi cocoa is traded on the global market as unfermented, fat, bulk bean (USAID, 2006). Processors and manufacturers use Sulawesi bean as a 'filler', and blend it with other fermented beans that add flavour. There is minimal price differentiation for cocoa bean quality, and strong market demand for poor quality cocoa beans to be used as a 'filler'. This means that the strategy of selling large volumes of low cost filler bean makes Indonesian cocoa globally competitive (USAID, 2006). A small amount of processed cocoa (powder, liquor, cake, butter) is also exported, the main buyers of which are U.S chocolate manufacturers and European and Southeast Asian buyers (USAID, 2006). Grinders in Asia mainly use Sulawesi cocoa beans for the production of cocoa butter and cocoa powder.

This small amount of processing may change with the construction of new cocoa processing facilities, which may boost the demand for locally fermented cocoa bean. The introduction by government of a progressive export tax on cocoa bean since April 2010 has encouraged investment in cocoa in different regions. For example, a joint venture between Barry Callebaut and PT Comextra Majora will create a new company PT Barry Callebaut Comextra Indonesia, which will be constructing a new processing facility in Makassar. Cargill (USA base) and JB cocoa (Malaysia base) have also set up a cocoa processing unit in Makassar, while Nestle has set up a new plant in Karawang, West Java to produce chocolate drinks and baby food.

Despite being a major global producer, this smallholder crop is facing serious challenges in Indonesia. Cocoa is a relatively new crop to Sulawesi. While cocoa may have been present in the Palopo (Noling and Tampumea) district from the 1950s, it was local traders who travelled from the Noling area to Sabah (Malaysia) who played an important role in the adoption of cocoa in Sulawesi, by bringing back information and planting materials (Ruf and Yoddang, 2004). When cocoa crops were first planted from the late 1970s onwards, they required little management. Soils were fertile, hybrid cocoa planting material was available, and lack of pest and disease meant that a cocoa farm could easily yield 1-2T/hectare with minimum maintenance. Good returns led to expansion of the cocoa crop and the purchasing of additional land by smallholder farmers. This era of plentiful cocoa with minimal inputs did not last – consistent with Ruf's (1987) conceptualisation of stages of the cocoa cycle, and the

concept of forest rent¹. Over time, as soil fertility declined and 'forest rent' was lost, the productivity of the cocoa crop started to decrease. Increased use of pesticides and chemical fertilizers became required.

Productivity declines were exacerbated by severe drought in 1997 and, in subsequent years, the outbreak of phytosanitary problems including *Conopomorpha cramerella* (Cocoa Pod Borer - CPB), black pod disease *Phytophthora palmivora*, and vascular streak dieback *Oncobasidium theobromae*. During the late 1990s, several low costs methods were introduced to minimise CPB infestation, including: bagging; *Rampasan* practice (to harvest all pods once the infestation is indentified in order to break the life cycle of insects); use of red/black ants against the borers (which caused considerable discomfort for the harvesters); night smoking with coconut fibre or grass to keep the borers away; and, painting oil on the pods. None of these solutions were widely adopted by farmers (Ruf and Yoddang, 2004). Spraying, however, seemed more feasible and preferable to farmers, who began spraying widely to fight CPB in Sulawesi. For example, the use of Ripcord insecticide became popular (although it is mainly recommended for horticulture and grains crops). Farmers also began experimenting with pest control through pesticide combinations. For example, in 1995, in the village of Lewonu, insecticides applied included 'Decis' and 'Ambush'. Spraying was used to combat CPB as well as other emerging pathogens such as *Phytophthora sp*, *Zeuzera*, *Helopeltis*, and *Colletotrichum*.

3. EXTENSION APPROACHES IN THE INDONESIAN COCOA INDUSTRY

Since 2000, there has been increasing focus from government, NGOs, industry and development agencies towards supporting cocoa production in Sulawesi. Early extension services for cocoa smallholder in Sulawesi were pioneered by the SUCCESS (Sustainable Cocoa Extension Services for Smallholder) project in 2000, funded by the US Department of Agriculture (USDA). The project was run in partnership with World Cocoa Foundation (WCF) and the Biscuit, Cake, Chocolate and Confectionary Alliance (BCCCA). It was implemented by ACDI/VOCA, a US based international Non Government Organisation (NGO) collaborating with local government at the district level (CABI, 2002). The goal was to improve smallholder income by reducing crop losses from CPB infestation through PsPSP (Panen sering, Pemangkasan, Sanitasi dan Pemupukan) or: better pruning; frequent harvesting; sanitation; and fertilization. The project used farmer participatory training through farmer field school (FFS) activities that were conducted on farmers' farms (essentially demonstration plots).

To continue the work of the SUCCESS project, the US Agency for International Development (USAID) funded a second phase, called the SUCCESS Alliance project. The aim was to reach larger numbers of smallholder with media like film, in addition to a continuation of existing FFS

¹ The production advantage conferred from the conversion of primary forest to agricultural land has been termed 'forest rent' (Ruf, 1987). The difference between the investment and production costs of a crop on former forest land, versus the same costs on grassland, can be used to calculate forest rent.

approaches. By 2005, the project claimed to have delivered “an expanded message of training and group mobilisation directly to over 100,000 farmers throughout Sulawesi, Papua, Bali and Sumatra” (ACDI/VOCA, 2005, p. 8). Extension agents were drawn from the district crop estate departments, staff of local NGOs, and trained local farmers in order to speed up the participation and adoption (see www.thesuccessalliance.org for more information).

From 2007 to 2010, USAID funded another extension project for cocoa smallholder, Agribusiness Market and Support Activity (AMARTA). This project was focussed on improving market access through partnerships with the private sector. The project was implemented by Development Alternative Inc (DAI) and provided intensive training for on and off farm practices for 20,000 smallholders in Sulawesi (see www.amarta.net for more information). The project used a similar approach as SUCCESS Alliance, but with the addition of post-harvest quality improvement initiatives, and with a focus on implementation through cocoa industry actors. Private sector engagement encouraged the farmers to meet the national export standards for cocoa beans (moisture, bean size, waste and mould content) with direct access to exporters, rather than local collectors (BSN, 2008).

Starting in 2003, the International Finance Corporation (IFC) implemented the PENSA program (Pengembangan Usaha – Program for Eastern Indonesia Small and Medium Enterprise (SME) Assistance) in Sulawesi with financial support from various multilateral and bilateral donors. PENSA included specific support for the cocoa industry. It sought to attract wider financial commitments to industry development via public and private sector investment, and to assist initiatives which promote efficiency and quality in the cocoa supply chain. The IFC supported the establishment of the Cocoa Sustainability Partnership (CSP) in early 2006, a forum of private and government agencies who are concerned with cocoa research, farmer empowerment and technology transfer in Sulawesi (See Section 4 and www.cspindonesia.org for more information).

Another ongoing government program is being implemented by the Estate Crops General Directorate, in the Ministry of Agriculture. They launched the Gerakan Nasional (GERNAS) or National Cocoa Program for improving productivity and quality from 2009 through to 2014 . The program aims to improve 450,000 hectares of smallholder cocoa through rejuvenation, rehabilitation and intensification (Directorate General of Estate, 2008). Section 4 provides more information on GERNAS.

Various industry actors have also become involved in farm-level interventions in Sulawesi, such as Mars Inc. Mars has had a presence and interest in the Sulawesi cocoa sector since 1995. However, its first explicit program to work with cocoa farmers was the Prima Kakao project in Noling village, Palopo district, commencing in 2003. Combining Farmer Field School methods with more intensive and ongoing technical support, the project hired local technical staff living in farmer communities who were tasked with finding better ways to transfer technologies and engage the community in the project. By the end of Prima Kakao project, Mars realised the

importance of 'demonstration plots' to attract farmers' attention and the importance of good varieties of cocoa seedling to sustain yield, and of the importance of improving social and economic aspects of farm communities. In 2005, Mars introduced the concept of the Cocoa Development Clinic² (CDC), with the aim of establishing 'outreach' centres that would expose farmers to the latest technology and regionally appropriate techniques (www.mars.com).



The CDC was set up as a centre for demonstration and training. The idea was that the CDC would visibly teach nearby farmers how to rehabilitate unproductive cocoa trees through various grafting techniques and better crop maintenance. The CDC would also act as a platform for knowledge-sharing and co-investment between farmers and the private sector. In addition to this technology transfer system, Mars

also began working with local vocational high schools and colleges, to include sustainable cocoa farming system into their curriculum and to allow students to enrol in an internship program. In the Section 4, more information is provided about the Mars approach, based on a mix of interviews, field visits and a review of publicly available Mars documentation.

As demonstration plots (dem-plots) have become popular, they have been adopted by many different institutions as a means to display good agricultural practices and to deliver technical services. The plots are not only a platform for technology transfer (eg. grafting techniques, PSPsP, clonal adaptations), some dem-plots also function as educational or school gardens where the farmer field school training is conducted. It allows farmers (and students) to learn and implement practical measures on site, undertake adaptive trials of new clonal varieties, compare different pesticides and soil improvement products, and observe the results for themselves. The following table (Table 1) summarises examples of the various dem-plot projects that have been implemented by in numerous institutions (with different objectives) in Polewali Mandar District, West Sulawesi.

² For consistency, we use the term Cocoa Development Clinic throughout the document, recognising that the term has changed over time and was previously referred to as a Mars Cocoa Clinic (MCC).

Table 1. Dem-plots established in Polewali Mandar District, West Sulawesi

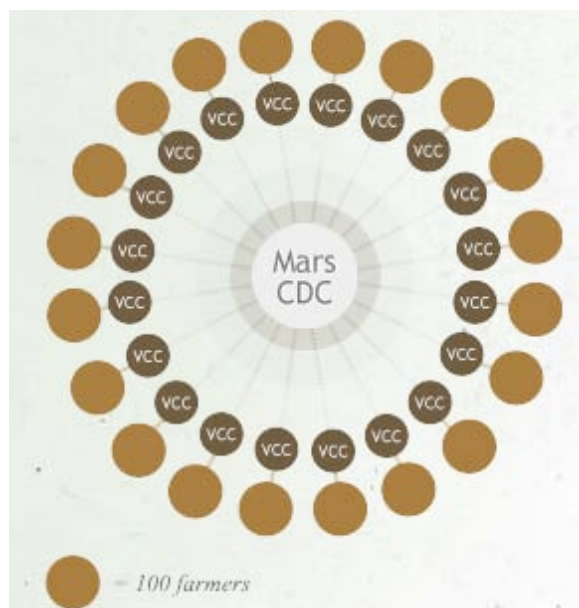
No	Year of intervention	Program-Institution	Sub district	Village/hamlet	Number of dem-plot	Goal/Purpose	Methodology	Detail
1	2003-2005	Success Alliance-ACDI/VOCA	Luyo, Campalagian, Binuang, Polewali, Anreapi, Tapango, Mapili, Binuang, Tutallu, and Allu.		35	Dem-plot for Side Grafting	Each dem-plot mainly for side grafting practical work.	The survival of side grafted trees may highly depend on the owner capacity and capability to maintain the dem-plot farm.
2	2003-2005	Success Alliance-ACDI/VOCA	Luyo, Campalagian, Tapango, Tutallu, Tutar, Polewali, Mapili, and Binuang		24	School garden for farmer field school activities	Each dem-plot mainly for side grafting or PsPSP technology display	Originally as a site for practical learning of PsPSP, and motivated farmers usually continue well maintain of the school garden.
3	2008-2009	CSP/IFC (not clear)	Luyo	Batupangandaala	1	Not clear	Not clear	
4	2008-2009	Gerakan Pembaharuan Kakao(GPK)-Provincial estate crops department	Tutar, Tapango	Ambo Padang, Rappang	10	Dem-plot to show result of NPK fertilizer application to boost productivity	The owner of dem-plot received free NPK fertilizer for one year, and often selected orchard was well maintained.	Simply a display for NPK application on the yield.
5	2008-2010	AMARTA-DAI	Tapango	Tapango Barat	2	1. Adaptive trial of good local and ICCRI varieties. 2. Source of good planting materials for nearby farmers	Select a committed farmer to maintain the clonal garden because regular maintenance and inputs remained the role of the owner. Select good variety of cocoa plants around Polman and side grafted to the selected farm.	Only nearby farmers recognize the existence of this clonal orchard due to lack of promotion, low survival rate of good planting materials were highly dependent on the owner resources in maintenance.
6	2008-2010	AMARTA-DAI	Anreapi, Tutar, Campalagian	Duampanua, Ambo Padang, Sumarrang	14	School garden of farmer field school activities	Each farmer group has a plot or orchard to use for practical field work in the demonstration of how to graft, to apply PsPSP (pruning, sanitation, frequent harvesting, and fertilizing), etc.	Though originally only as a school garden, some of motivated farmers who owned the garden continue to apply good practices and maintain the garden.
7	2008-present	SMAR-ACIAR	Anreapi	Duampanua	1	Dem-plot for adaptive clonal trial and research on select good clonal variety	Adaptive research on farmers' farms in select local clonal varieties that suit local conditions. Involved the farmer in research activity in measuring the yield and observation on pest disease infestation level for a three year field study	In collaboration with research (ICCRI, ACIAR) and local extension (BPTP, District crop department) institutions. In effort to find resistant varieties, the farmer is not allowed to use pesticides and only use fertilizer (organic and inorganic) and GAP.
8	2010 - 2011	Sygenta	Campalagian, Luyo	Sumarrang, Batupanga	2	To demonstrate application of Sygenta pesticide products (eg. Amistartop, Gramaxone, Alika, etc)	Often selected good farms as a dem-plot and the owner usually received free sygenta product for one year or less, but other inputs covered by the owners.	The owner already has experience on good farm practices from ACDI/VOCA, Prima Tani-BPTP, and AMARTA-DAI. Implemented one day training about product and application, invited 30 farmers from nearby hamlet.

9	2010-2011	Aliansi-USAID	Bulo, Tapango	Pulliwa, Bussu	2	Dem-plot for a range of applicable technology package (Intensification, graftings, replanting, nursery, and clonal garden)	Select a committed farmer group (FG) in manage and maintain the dem-plot through mutual work (gotong royong). Strengthen FG in planned group activities and involved other parties associated or interested in cocoa (exporter, farmer association or APKAI, Crop department and extension officer, member of district representative council, etc).	Combined technologies (Intensification with GAP, Rehabilitation with side and top grafting, various clone from local and ICCRI-6 gernas clones, Organic treatment, and nursery which has replanted in farmers farm)
10	2010-present	Mars Inc	Luyo	Batupanga	1	Dem-plot for adaptive clonal garden and good agricultural practice	Select key farmer, support the key farmer to set up a dem-plot for clonal garden from top grafting seedling. The farmer covers all the input expense and Mars provides technical assistance and regular monitoring.	Demplot-top grafting-farm maintained by the owner with technical assistance from Mars, but according to the owner top grafted trees have not produced good yield after more than 2 years.
11	2011-present	The Nestle cocoa plan-Bumi Surya (big local trader)	Luyo	Batupanga, Batupangdaala	7	Not clear	Not clear	Select well maintain farms, put 'dem-plot' board, no activities yet since November 2011.
12	2011-present	Armajaro	Luyo	Batupangandaala	1	School garden for farmer field days activities and dem-plot for PsPSP practice and side grafting	Select side grafted farm and invited nearby farmers to join farmer field days about four days learning PsPSP.	
13	2011-present	One good earth (Profil)-Armajaro	Luyo	Batupangandaala	1	Dem-plot for One good earth product	Experimental dem-plot to show the effectiveness of Microbe -Profil (brand) from One good earth.	The product is living soil organism which are available in a set of 1 litre pack of BC5+ (Bacteria) and 1 litre pack of TR4 (Fungi), see http://1goodearth.my/page8.html . According to Armajaro, soil sample collected regularly to measure organic and inorganic compounds.
14	2011-present	ICS initiative-Wasiat and Armajaro	Luyo, Tapango, Mapili	Batupangandaala, Tapango Barat, Rappang Barat	3	Dem-plot for GAP that meet the Utz Kapeh code of conduct	Selected farm used as a display for the other farmers that provides a model of a farm which meets the Utz code of conduct.	
15	2011-2014	ACIAR	Campalagiang	Sumarrang	2	Dem-plot for clonal garden and Integrated Pest Disease Management (IPDM) practice	To involve farmer in observing and selecting different practices which fit to their needs through 'learning by doing'	Dem-plot for clonal garden including organic fertilizer treatment under farmer management and assist by district crop department and research institution (BRIEC, BPTP and ACIAR). Dem-plot for IPDM where there is five level of treatments, later farmer will observe cost benefit analysis in select which level of treatment that fit to their need and condition.

4. FINDINGS

4.1 MARS

On their website, Mars describes their program as “technology transfer” – based on the belief that “the most effective way to raise productivity on farms is to show best practice in action and to give farmers the skills and tools they need to apply it on their own farms”. The Mars program is built around a “hub and spoke” model – pictured (Mars, 2012).



The key components of this model are the Cocoa Village Clinics (CVCs – referred to as VCCs in this diagram) and the Cocoa Development Clinics (CDCs).

4.1.1 Cocoa Development Centres

Cocoa Development Centres (CDCs) are demonstration and training sites. While funded and managed by Mars, each site has been established with additional support from an alliance of companies and organisations. Currently, there are five CDCs in Indonesia, two of them in Sulawesi. These are in addition to the Cocoa Village Clinics established across Indonesia, which are supported by the CDCs (and further explained below). In theory, a single CDC can deal directly with up to 20 CVCs, while CVCs are expected to work directly with around 100 individual farmers.

While research is not the main function of the CDC, some research is undertaken to test clonal varieties and good farm management practices. There is also the capacity for plant propagation, composting and other potential cocoa farmer enterprise opportunities, and for the evaluation of new developments. Through the screening of clonal varieties, the CDC is able to release higher yielding, pest and disease resistant varieties that produce bigger beans, higher fat content and better flavour.

Training revolves around a specific calendar for timing of management actions, and a 6-part process for farm management. This six part menu has some flexibility, and may evolve as focus shifts from pest and disease control to increasing bean quality, size and fat content. Currently it includes:

- nursery management
- grafting techniques (top and side)
- understand pest and disease

- replanting and rehabilitation
- pruning, fertilising, regular harvesting sanitation (P3S) and the proper use of pesticides
- post-harvest product management

Mars is also running a vocational training program and has worked with schools to develop a cocoa curriculum – creating the ‘next generation’ of cocoa farmers.

Organisations (such as Swisscontact, PNPM Mandiri, Mercy Corps etc), that choose to collaborate with Mars need to commit to a minimum of 5 years of support, and the implementation of the “full package” of interventions.



As part of the Mars programme, processes for engaging and communicating with farmers can include:

- On-farm trials at the CVC
- Field visits to farms by field technicians
- Training courses
- Demonstration plots at the CVC and CDCs
- Meeting with farmers at the CVC
- Annual meeting (acts as an forum for exchanging information)
- Cocoa doctor (farmer) visiting other farmers in the village to promote practices and provide free technical assistance
- Farmer to farmer training through provision of grafting services
- Farmer working groups to share the labour of rehabilitating cocoa trees

Two of the Cocoa Doctors also used Facebook. Internet services are not readily available, so email was not used. At the CDC and CVCs, large billboards utilise visual and diagrammatic representations to portray the step-by-step process and timing for management actions. In terms of information and communications technology, communication is largely through the use of mobile phones. For the Mars staff, the training is more than just delivering technical skills: it is also about changing farmers’ mindsets. There is, however, not a great emphasis on local adaptations and farmer driven innovations. The emphasis is on the appropriate application and transfer of technology developed by the CDCs. Local farmer adaptations tend to relate more to the implementation of the “full package” such as finding ways to prune more efficiently. It may take more time for farmers to become confident in their own abilities to conduct independent experiments and trials on farm.

TAHAPAN PENANAMAN KAKAO

1. PERSIAPAN LAHAN



Persiapan Lahan dimulai dengan penanaman pohon lalu dibarengi dengan pembukaan lahan yang telah dibersihkan. Penanaman dimulai selanjutnya dimulai pada awal musim hujan. Bagi kawasan yang sedang mengalami kemarau panjang tanah dicampur 2-4 bulan sebelum musim kemarau.

2. PENGAJIRAN



Cara Pengajiran: Pengajiran dilakukan untuk membentuk furang tanah yang lurus dan rata. Jarak baris 3,5 x 2,5 atau 4 x 4 m. Tika awal berumur 1,5 m dari sudut Timur dan Selatan, 30 cm ke arah Utara, 30 cm ke arah Barat dan diagonal 100 cm terpendek ke arah SP. (bukan sisi-bukit) dan ukuran jarak dibuat 5-6 m.

3. PEMBUATAN LUBANG TANAM



Pembuatan lubang tanam dilakukan 2 minggu sebelum penanaman. Tanah lapisan atas harus dibersihkan dengan tanah lapisan bawah. Lubang tanam minimal 30 cm dan kedalamannya 30 cm.

4. PEMUPUKAN LUBANG



Pemupukan Lubang dimulai dengan pemberian kompos 5 kg kemudian pemupukan SP-36 sebanyak 100 gram pada dasar lubang kemudian ditutup dengan tanah, 3000 dimasukkan ke dalam lubang lalu ditutup dengan tanah/lubang tanah. Pupuk NPK sebanyak 100 gram dituangkan selanjutnya.

5. PENANAMAN



Salah seorang petani bibit dengan bantuan petugas dinas pertanian membantu petani yang akan menanam bibit di kebun. Bibit dimasukkan ke dalam lubang dengan hati-hati. Setelah dengan tangan kanan bagian atas selanjutnya selanjutnya 2-2 cm atau lebih dan penanaman selesai. Kemudian lubang ditutup kembali dengan tanah dan disekeliling pangkal bibit dipadatkan.

6. PANCANGAN, NAUNGAN SEMENTARA, DAN POHON PELINDUNG



Kerus tanaman diperlukan untuk melindungi bibit sebelum lagi pohon tanaman. Setiap tanaman perlu diberi naungan sementara. Pohon pelindung sebaiknya 8-12 bulan sudah ada sebelum penanaman bibit kakao.

7. PERAWATAN (SANITASI, PEMBUATAN DRAINASE)



Pemeliharaan: gulma dibersihkan 3 bulan. Mengurangi pemupukan kompos, dan stabilisasi tanaman kakao. Melakukan pemeliharaan tempat (tidak erodasi).
Selanjutnya dibarengi dengan drainase yang dibuat dengan cara membuat alur di sisi kiri dan kanan jalan kebun. Berfungsi mengurangi air yang mengalir, banjir, sehingga bibit kakao tidak tergenang.

8. TOPPING



Setelah 3-4 bulan. Pohon kakao yang tinggi dipangkas 45 cm dari titik pertumbuhan. Untuk itu digunakan alat pemangkas. 5 meter untuk membantu mengurangi resiko kebakaran.

9. PEMANGKASAN BENTUK



Pemangkasan bentuk dilakukan dengan menggunakan alat yang tajam dan bersih yang sudah steril. 30-50 cm dari titik pertumbuhan (ujung) dan busukan untuk membentuk dan memelihara cabang utama.

10. PEMANGKASAN PEMELIHARAAN



Pemangkasan pemeliharaan, membuang tunas air (tanaman) dan cabang yang tumbuh di sekitar pangkal.

11. PEMUPUKAN



Pemupukan dilakukan dengan menggunakan pupuk organik dan kimia. Pemupukan dilakukan pada awal dan akhir musim pengajaran.

12. PENGAWALAN HAMA DAN PENYAKIT



Pengendalian hama kakao dilakukan per dua minggu atau sesuai di kebun. Untuk itu digunakan alat pemangkas. 5 meter untuk membantu mengurangi resiko kebakaran. Pemeliharaan dengan menggunakan alat pemangkas yang tajam dan bersih. Bisa menggunakan 10 cm. 20 gr. 10 gr. 10 gr. 10 gr.

Waktu	Dosis	Tipe Pupukan
AWAL	3000 Gr	Kompos
3	40 Gr	SP-18 dan NPK
6	60 Gr	NPK
9	100 Gr	NPK
12	120 Gr	NPK
18	150 Gr	NPK

CSA : Pemupukan dengan NPK
dikurangkan setiap 2 minggu dengan dosis 30-40 gram

11. HASIL



KEBERLANJUTAN PRODUKTIVITAS DAN KUALITAS KAKAO SELAMAT MENCIBAI !!



Design by NCD

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It was noted that chemical companies also use the billboard approach for advertising. One Cocoa Doctor was asked to be photographed by Syngenta and an advertisement was placed on his roadside farm to promote a product, which was given to the farmer for free in return (pictured).



During this rapid assessment, we visited two CDCs: one in Latuppa and one in Tarengge. The Latuppa CDC was established in 2008 (pictured below). Both centres cultivate and distribute a range of improved varieties that are more resistant to disease and have higher yields. The CDC in Tarengge was trialling a program they have tentatively titled 'Commitment for the Future'. Commitment for the Future is a new kind of initiative that responds to the particular needs of farmers groups. In this case, a farmer group approached Mars wanting more affordable seedlings and to have a farmer group business. This group has 23 farmers and forms the first pilot of this project. Mars has agreed to provide UV stabilised greenhouse nursery film so the farmers can start a group nursery to access seedlings more cheaply. Mars is teaching them how to graft. The farmers still have to pay the farmer group (not Mars) for their seedlings (at a



discount rate of 1000 IRH compared to 5000 IRH full price). The money goes back to the farmer group to cover ongoing costs (eg. maintenance). Mars has a field technician providing advice. This is a pilot project so there are no set guidelines at this stage, nor is it certain yet whether the group approach will work (rather than the focus on individual farmers).

The Latuppa and Tarengé CDCs each have a Field Coordinator, who manage various training programmes and work with the Field Technicians, who in turn advise the Cocoa Doctors (of the CVCs). There are approximately 11 Field Technicians, each allocated to a specific geographical area, with several more in training. Most farmers who worked with Mars relied heavily on the Field Technicians and Coordinators information. A key point to note is that the Field Technicians and Field Coordinators are easily accessible. Their mobile phone numbers are displayed on Mars signs at the CVCs and their phones are always switched on.

4.1.2 Cocoa Village Clinic (CVC)

Each Cocoa Village Clinic (CVC) is run by a Cocoa Doctor – a Mars trained local farmer. Farmers are chosen for the Cocoa Doctor training based on individual merit, rather than whether or not they are part of a farming group (the group approach is often used in extension programs). After an initial intensive period of at least one month of intensive training and examination, farmers who have demonstrated aptitude are then selected to become cocoa doctors. Criteria for selecting the farmers who will receive training include that they: represent their local village, have a farm which is visible and accessible (ie. roadside), are motivated, are entrepreneurial, are willing to teach other farmers (at least 100 farmers from the local area), and are willing to do the required maintenance of the demonstration (clonal selection) area and nursery. Farmers must be willing to implement a package of practices that include:

- ensuring good planting material
- managing soil fertility for both health and mineral availability through fertilisations
- application of Good Agricultural Practices (including crop protection inputs, sanitation, frequent harvesting and pruning).

Across Indonesia, Mars has 51 CVCs. In this assessment, the five cocoa doctors we interviewed all owned their own land and had cocoa farms ranging from 1ha to 10ha. All were male and only one was over the age of 40. All have been trained since 2009 as part of the Mars program. One cocoa farmer also received earlier training from USAID Amarta prior to participation in the Mars program.

As Cocoa Doctors, farmers become members of two associations, a Participatory Variety Selection and Participatory Plant Breeding association (the hope is that the associations may become more formal once more farmers join). An annual meeting is also held, where the best cocoa doctors receive recognition.



At present, a key incentive for farmers to be involved in the Mars program is that they receive ongoing advice from the CDC. It is not clear what the exact level of reliance Cocoa Doctors have on the CDC and its staff. Ways to reduce this level of reliance would need to be seriously considered if CDCs were to eventually cease functioning. Mars may also assist with resources such as UV Plastic for the creation of a nursery. Some clonal budwood is also available for farmers for free (farmers can also purchase additional material from CVC nurseries). The Mars farmers and field staff also act as a network for advertising any job opportunities or grafting contracts, as well as good deals of pesticides and where to buy them.

One of the underlying principles of Mars is “mutuality.” To them, the term mutuality really means the creation of shared benefits and shared values that will endure and are a critical part of managing a long term successful business. Mars recognises that cocoa farming is a business and that the economic sustainability of these farming businesses is essential to their survival. So they have tried to identify and support the core elements required to run a successful cocoa farming business. In order to communicate these key elements to farmers, Mars has established 56 field associates in Indonesia, developed the CDCs for demonstration and training, developed farmer enterprise business models around cocoa tree nurseries, composting and farmer enterprise extension service providers (CVC’s) and leveraged their impact by engaging with, and sharing their learning and capabilities with, other organisations willing to support cocoa sustainability through the Cocoa Sustainability Partnership. Cocoa



sustainability is not a “project” or something they do as part of a CSR program but a fundamental part of creating the necessary shared benefits system within the cocoa supply chain that is required to support their business over the long term.

Consistent with the principle of “mutuality” is the idea that the CVC should become a self-sustaining business. It would achieve this

through the propagation and selling of planting material to local farmers, as well as other services such as grafting skills and supply of inputs. Another option is the Cocoa Doctors could become a distributor of agro-inputs (such as fertilisers and agro-chemicals). The CVC could become a central point for buying chemicals in bulk and distributing product information from suppliers. This is already happening in various cases and provides additional income to the CVC as well as a reliable source of inputs for local farmers. Another step in collective action would be to create a mechanism to improve market access through aggregation or improved bean processing. Most farmers are also interested in increasing either farm size or nursery capacity. Either would require additional labour and a new set of skills to manage the labour. For example, one of the cocoa doctors had trained 12 “street kids” to do cocoa grafting and they worked on his farm (and the new land he has bought) as well as gaining contract work on other farms as well. Business, as well as technical, training may be appropriate in such instances. Another alternative is that farmers work together to share labour. As part of a Mars cocoa rehabilitation project, farmers worked together on Wednesdays and Sundays on each others’ farms.

For all five of the cocoa doctors interviewed, cocoa remains their primary source of income. It would appear imperative to consider alternative ways to diversify the CVC businesses – although we recognise that the onus of responsibility for pursuing business opportunities rests with the Cocoa Doctor. Examples of business diversification, like becoming an agro-input distributor, may help to make the CVC business financially sustainable in the long-term by providing a balance of activities. This would offset the potential risk that demand for replanting materials decreases as the current ageing stock of trees is replaced, more nurseries are built and more farmers become skilled in plant propagation and grafting.

Another diversification option is the compost business model. On-farm composting is an effective way to remove sources of CPB inoculum and replenish soil fertility. The creation of compost for sale can diversify income sources. It also provides a cheaper alternative to chemical fertilisers. The compost business model began in 2005 with collaboration between ACDI/VOCA and Mars. They facilitate farmer groups/cooperatives to establish compost businesses. Initial activities revolved around research to identify the availability of farm waste (cocoa pod, pulp, rice husk, manures) and the best composition of other substitute materials. This led to an evolving recipe to produce good quality compost and the continued introduction of composting practices from 2006 (www.marssustainableolutions.com). In subsequent years, compost practices expanded through shredding machines (pictured) that were made available to farmer groups. By 2008, there were 40 compost business stations in North Luwu, Luwu and Kolaka district. This could respond to farmer’s concerns about fertiliser costs and ways to integrate cocoa production with other landuses, including livestock. Several of the farmers we interviewed said that they would like more advice on ways to improve their mixed farm, with different land uses and integrating farming with livestock. We could not identify a specific

program that addresses these concerns, but Mars and ACIAR are trialling the use of composts as well as goat manure as a natural fertiliser.

The group we visited in Buntu Batu Village, Bua Ponrang (Bupon) Sub district, would schedule collections of raw materials from the neighbouring farms to make compost, which they then sell to fund the farmer group. The same group is also working in association with Mars, ICCRI, ACIAR and BRIEC to explore ways to improve soil health through adding microbial products to the compost. While a good model, a concern here is that this approach involves removing biomass and nutrients from the



cocoa farm that are not then returned to the same farm, but rather sold to other farmers. This is a different model to that of feeding foliage from cocoa shade trees to goats and returning the nutrients as manure. It is also a different model to composting waste on-farm, by burying pod cases, prunings, manure, diseased materials and effective microorganisms in rows between the cocoa trees. This type of composting does not involve the removal of biomass, nor does it impose transport costs.

4.2 GERNAS

The Gerakan Nasional (GERNAS) or National Cocoa Program will operate through to 2014 in Sulawesi as well as other regions across Indonesia. The target of the program is the improvement of 450,000 hectares of smallholder cocoa through rejuvenation, rehabilitation and intensification, (Directorate General of Estate, 2008). Rejuvenation aims to improve old cocoa trees that are more than 25 years old. This involves treating damaged, non productive trees or those that are heavily diseased, with a target of 70,000 hectares. In conjunction, rehabilitation aims to improve the condition of cocoa trees that have low productivity, are infested with pests and/or disease. This is achieved through side or top grafting techniques, with a target of 235,000 hectares. Intensification aims to improve and to maintain the cocoa trees according to good on-farm practices, through the application of direct inputs like fertilisers and pesticides, with a target of 145,000 hectares.

There has been some criticism in local and international print media that the Gernas seedlings being provided through Somatic Embryogenesis (SE) are not of a good quality. For example, a recent Reuters article referred to these (SE) varieties as “Frankentrees”³. According to the farmers, the SE seedlings have been disappointing because of the small surface root, lack of tap root, small bean size and *lorquette* (fan branches) that are too high. The trees are also

³ <http://www.reuters.com/article/2012/10/15/cocoa-indonesia-idUSL3E8L25ZC20121015>

reportedly prone to disease. Some farmers still use the SE seedlings as a source of budwood to graft to older trees. While lack of ongoing maintenance for the seedlings could explain high failure rates, a recent survey by the nearby Hasanuddin University showed that most trees grown from the new seeds died or fell over, or were likely to do so, prompting cocoa farmers to switch to crops such as palm that are easier to care for.

The one positive of the widespread provision of free seedlings and grafting services was that it provided job opportunities for some of the more skilled farmers. One farmer we interviewed was providing seedlings to the Gernas program as well as to ACIAR. Mars trained Cocoa Doctors were also benefiting. Gernas had employed several of the Mars Cocoa Doctors that we interviewed as grafting technicians in 2010/11. One farmer was also a trainer for PNPM Mandiri - a community development programme funded through the National Budget.

4.3. BALAI PENGKAJIAN TEKNOLOGI PERTANIAN (BPTP)

BPTP (Institute for Agricultural Technology) is the technology delivery arm of the Ministry of Agriculture. BPTP works with a range of organisations to develop and transfer technology at the province and farmer level. Farmer engagement tends to follow the Farmer Field School model, as well as demonstration sites. BPTP has a crop research centre in Bogor. They also develop farmer friendly machinery for on-farm activities, particularly post-harvest processing. There is a liaison officer in every district for coordination. Liaison officers will most often work with farmer groups, but are also available to be contacted by individual farmers as well. In 2005, when BPTP was running its Prima Tani programme, it collaborated with Mars on its Prima Kakao project in Luwu.

BPTP has also been involved in the World Banks' FEATI programme (Farmer Empowerment Through Agricultural Technology and Information), which brings together multiple technical providers at the village and district level to strengthen innovation and agriculture services (research and extension) and to improve the competitiveness of agriculture sector in international markets (World Bank, 2007). A distinctive feature of FEATI is that it is trialling a demand-driven approach to extension delivery in Indonesia. It also applies a partnership model between farmer groups, public agencies, and the private sector. In implementation, farmer groups select different topics and technical assistance based on their needs, prepare a grant proposal which they submit to the local extension office at district level (since decentralization, each district has changed the name of extension service agency eg. BPTKP in Luwu, BP4KP in Polman and BIPP in other districts). An approved proposal is then shared with BPTP and allows BPTP to provide appropriate technology and technical assistance based on proposal to each Farmer Manage Activity (FMA). In the past, BPTP has provided training for cocoa farmers in Luwu for good management practices (eg. composting, pest disease control, and other relevant assistance) and established a cocoa demonstration plot in Bojo, Luwu.

BPTP has 14 extension officers in South Sulawesi, 45 research staff and several field technicians. Of these staff, approximately 10 work on cocoa. Some staff must also work on other food crops as well, so they often work with 'lead farmers', recognising that in many cases these lead farmers will have a superior knowledge of cocoa. Field days are organised where other farmers are brought to these lead farms to view successful practices.

4.4 VECO

VECO is a Belgian NGO supporting the development of sustainable agricultural chains. It is currently working with farmer groups in Indonesia to transform them from small groups of 25-50 farmers, into farmer organisations of approximately 500-2000 members. To build capacity and the ability for farmer groups to develop into organisations, VECO is conducting training and developing training manuals. The format is similar to the Farmer Field Schools concept (See: <http://veco.vredeseilanden.org/en> and <http://en.vecoindonesia.org/> for more information). In the cocoa sector in West Sulawesi, the program involves substantial collaboration with private sector actors through a value chain approach. In Indonesia, VECO (and its parent organisation, Vredeseilanden) work in collaboration with two key cocoa firms: Mars in Flores, East Nusa Tenggara, and with Amajaro in Polewali Mandar, West Sulawesi. VECO is also working on developing internal quality control systems with farmer groups to enable them to better market their products. In West Sulawesi, they are working with WASIAT, a local NGO to strengthen farmer group (Kelompok) capacity and to support WASIAT efforts to establish farmer cooperatives in almost every sub district.



4.5 SWISSCONTACT



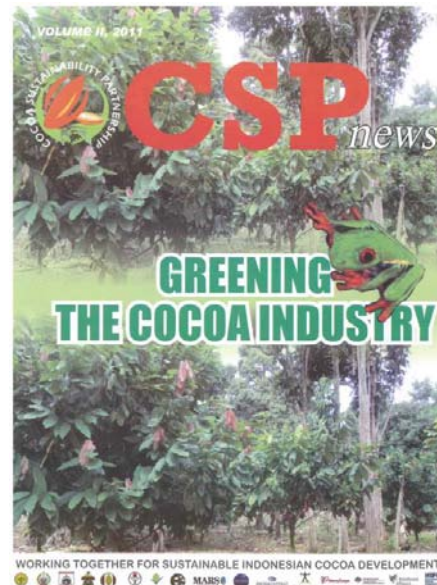
Swisscontact (Swiss Foundation for Technical Cooperation) is an international development agency funded by the Swiss private sector. Previously it was involved in the SUCCESS Alliance project. An example of a current project is the PEKA (Peningkatan Ekonomi Kakao Aceh) or Economic Development Financing Facility project, which commenced in Aceh in July 2010. The objective of the project is to increase income and job creation in the cocoa sector and to improve competitiveness of the cocoa value chain through business opportunities for the private sector. In collaboration with Mars, the project established 5 District Cocoa Clinics (DCCs) with improved clone varieties for 12,500 farmers. Approximately 2000ha of cocoa farms have been rehabilitated. To enable technology transfer, the project developed Farmer Field Schools for the farmers on best practice management in maintaining smallholder cocoa farms (see www.swisscontact.or.id for more information).

Swisscontact has recently opened an office in Sulawesi and is in the process of community consultation with farmer groups, local traders, local NGOs, cocoa collectors, government

agencies and the private sector. They are working with the farmer groups to determine the most relevant topics and areas of assistance required, and to create a contract with a private sector partner to support delivery of this assistance. Topics can range from good agricultural practices (GAPs) and certification to more cost effective access to farming inputs. Across Sulawesi, Swisscontact has engaged different private sector partners. They are working with ADM in the South East, with Nestle in the West, with Mars and Cargill in the South, and Armajaro in Central Sulawesi. They are negotiating with these private sector partners on ownership of any certification certificates and any commitments to sell to these companies as preferred buyers. For each project (for individual farmers and farmer groups), they are developing a set of baseline data and key performance indicators, to monitor progress over time.

4.6 COCOA SUSTAINABILITY PARTNERSHIP

It is also worth mentioning the Cocoa Sustainability Partnership (CSP) - a forum of private and government agencies who are concerned with cocoa research and development in Sulawesi. Part of the original purpose of the CSP was to align the many cocoa programs taking place across Indonesia through broader agreement on the key issues and solutions for the industry. It was also established to act as a forum and national network for sharing key core learning and developments in order to improve the condition of cocoa estates. As part of its ongoing role, the CSP is tasked with increasing communication, coordination and collaboration between public and private stakeholders engaged in activities promoting the development and transfer of cocoa farming technology and cocoa farming business skills. Any organisation can actively participate in the forum, either as an ordinary or honorary member.



With a growing number of actors involved in the cocoa sector, this forum has the potential to play an important role in engaging and facilitating the needs of the local and international members. Membership comprises four levels:

- Principal Funding members - organisations that provide a minimum contribution of \$10,000 for private sector /NGO members (the Directorate Jenderal Perkebunan, ICCRI, the BPTP and UNHAS are also included)
- Supporting members - organisations that provide a minimum contribution of \$1000 (for private sector / NGO members)
- Ordinary members - organisations, groups or institutions that routinely participate but do not provide direct funding

- Honorary Members - groups, organizations, institutions or individuals that are invited to be a member but may not vote or hold official positions within the CSP.

The CSP is comprised of a ‘CSP General Assembly’, a ‘CSP Executive Board’ and a ‘CSP Secretariat. The CSP General Assembly is a forum for both public and private sector members. The CSP General Assembly is led by a General Assembly Chairman. Members also meet in two working groups. The CSP Working groups are intended to at least quarterly and to report to the General Assembly. They are:

- the “R&D and Technical Transfer Working Group” which encourages links between scientists and field operatives, members also meet in working groups
- the “Farmer Empowerment and Certification Working Group” for those engaged in activities to empower farmers, strengthen farmer organizations, and cocoa certification.

The CSP Executive Board meets at least quarterly and as necessary on an ad hoc basis to review and decide on key strategic matters including: mission, membership, financial management and dispute resolution. The CSP Secretariat is a professional organization established as a legally registered “Foundation” (or “Yayasan”) and employs key staff to both manage the activities CSP Forum and manage agreed activities for communication, data collection, or specific projects as required by the members.

Currently the CSP has 21 member organisations. While it has the potential to be a peak body for cocoa in Indonesia, there are ongoing challenges with creating a joint vision and mandate that satisfies all the needs and interests of all the members. Greater willingness to cooperate and act will determine its success.

5. GENERAL RECOMMENDATIONS

The key ingredient for a successful intervention appears to involve taking a holistic approach to cocoa as a farming system, and not just focussing on one aspect. Having layers of farmer engagement, from the village level through to global buyers, appears to improve the likelihood of success and longevity. Having a commitment to the local area, with local staff, also appears to be crucial.

In terms of quantifiable impacts for the various interventions taking place



in Sulawesi, it is difficult to determine trends in a rapid assessment like this. Many of the interventions have occurred since 2008. It was difficult, therefore, to estimate any changes in rural livelihoods, including household income. Most farmers felt that it was too early to tell what the impact would be. Only one farmer was willing and able to share information on yield, which was extremely high (4 Tonnes in 2011). An exception is Mars, which collects its own detailed data (which were not accessed as part of this assessment). At the Mars CDC level, testing and validation protocols are being followed, particularly in relation to clonal varieties, yield, pests and disease infestation. Mars facilitators are also working with farmers to collect farm-level data on yield, profit and loss and fat content. Another example is Swisscontact, who are developing a set of baseline data and key performance indicators to monitor progress over time – both at the individual farm and farmer group levels.

In line with the perceived primary need of most industry actors to address on-farm crop management problems, post-harvest management practices do appear to have changed as a result of interventions. Although, again, this is hard to quantify. Practices changes are not directly compensated, but training provided farmers with comprehensive knowledge of good agricultural practices, linkages with other successful farmers and access to information on farm practices, markets, supply chains, micro finance, and other cocoa associated services. Market information may be particularly valuable for local suppliers of seedlings or budwood who are seeking to expand their service area. Trained farmers are also often employed to provide further training to more farmers in the other regions or provinces.

Certification is emerging as a complicating factor, as this involves an increased number of organisations while not necessarily empowering individual farmers or delivering price increases. Still, in terms of changes in market access, not a lot of new arrangements appeared to have been made. Each farmer has a unique relationship with the local market. One may be reliant on one local input supplier (who might also act as local buyer) in the village, while some farmers with quality beans will sell to cooperatives because of price incentives. Other farmers may sell to more than one local buyer. Inputs can be sourced through local traders, cooperatives, and agribusinesses which have outlets at the village level. Each of the cocoa farmers we interviewed still sold to a local trader and had not necessarily changed post-harvest practices.

In summary, this rapid assessment aims to show that there have been various approaches to knowledge transfer that have been introduced and trialled in the cocoa sector over the last ten years. These approaches have included farmer field schools, demonstration plots, input supports, and on-farm experimentation. The 'Extension Landscape' is therefore quite dense, and most cocoa farmers across Sulawesi have been exposed to new technologies to varying extents. While participatory methods, such as a farmer advisory committees, are not really used, most of the projects reviewed above have some participatory elements for research and innovation diffusion. For example, the Mars program is essentially a form of farmer-to-farmer

knowledge exchange, while the Farmer Field School model favoured by VECO and Swisscontact comprises a participatory approach to research. FEATI and Swisscontact both engage in community consultation before developing a specific project design. That said, the majority of interventions focus on a top-down “technology transfer” approach. Questions remain over how these organisations keep their advice and information up to date and relevant as the nature of the smallholder businesses change, new farm management challenges emerge and the dynamics of competition and competency evolve? And will the project timeframes match the true timeline for the adoption of new practices and improved market access in the sector?

6. SPECIFIC RECOMMENDATIONS FOR ACIAR OBJECTIVE 4

Based on our rapid assessment, specific recommendations can be made for Objective 4 of the ACIAR Project AGB/2010/011. Objective 4 of ACIAR Project AGB/2010/011 seeks to: “To improve the extension systems and policy settings that affect sustainable cocoa production in Indonesia”. Objective 4.1 of the project seeks to “conduct workshops to design and establish IPDM trials at one strategic location in Sulawesi and one in West Papua”. Objective 4.2 seeks “to establish and test interactive models for knowledge transfer to extension services and farmers, including the use of web-based and mobile phone technology”.

From the 1960s onwards, the transfer of technology paradigm has been dominant in many approaches to both research and extension in the agricultural sector. In this approach, scientific research is seen as the main driver of innovation and the assumption is that new knowledge and technology is to be created by scientists and then transferred to farmers (World Bank, 2006). While it is still common to see farmers described as adopters, rather than generators of innovations, the technology transfer approach has become increasingly discredited. Participatory research refers to a process of interaction between local and external actors to co-create innovations (Fisher and Carberry, 2008). This requires moving beyond consultative research (defined by Biggs 1990), where scientists make the decisions although they have organized one-way communication processes with farmers. Instead, a truly collaborative approach is required where farmers and scientists have two-way communication, both are aware of each others’ goals, and farmers are in a position to make their own informed experimental or management decisions.

While traditional approaches to extension and technology transfer still persist in many areas, participatory approaches paved the way for the emergence of concepts of ‘demand-led’ research - largely in development discourse and pro-poor policy. While this has led to increasing attention on farmers’ needs, the traditional bias towards academic pathways of research dissemination has remained. This means that the results of research remain largely inaccessible to the farmers who were supposed to benefit from the research. Researchers also retain concerns about the validity of farmer opinion. In other words, the rhetoric of demand-led research has not always been matched by practice. However, there have been an increasing number of programs that embrace farmer-driven innovation and experimentation both in developed and developing countries. For example, farmer-driven research has become

an increasingly large investment for research and development organisations in the Australian agricultural sector since 1994 (Fisher and Carberry, 2008).

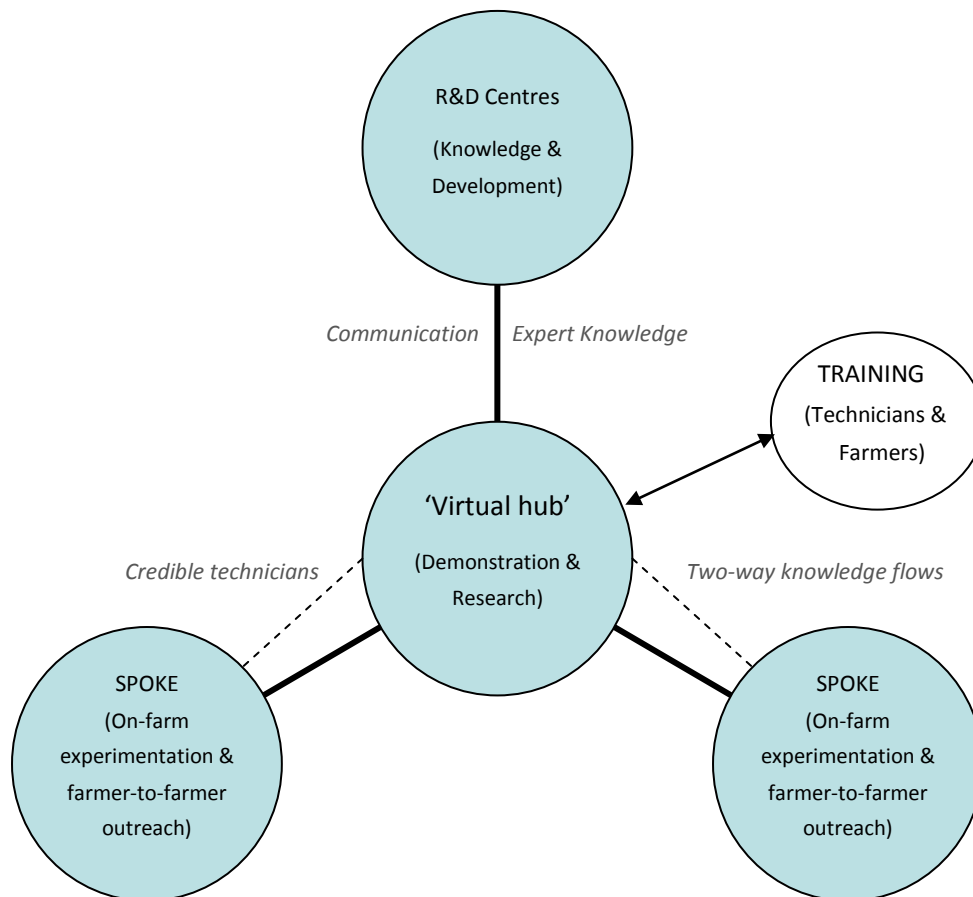
The following project is suggested as a means of delivering Objective 4.2 as well as supporting Objective 4.1, which can be achieved as a component of broader efforts to improve the extension systems and policy settings that affect sustainable cocoa production. This project draws upon insights from both the theory and practice of farmer-driven research and experimentation to test a new participatory model for engaging in farmer-driven innovation in the cocoa sector in Sulawesi, Indonesia. It builds upon *participatory research* approaches and is informed by *innovation systems thinking*. An innovation system is a bottom-up learning platform that emphasises the important roles of communication, knowledge management and collective learning (Ramirez, 1995). It moves beyond the traditional approach of ‘technology transfer’, where experts inform farmers about research in a top-down process.

We propose an adaptive and decentralised model where innovation intermediaries interact with and support farmers own experiments. We believe that this model should incorporate the following principles:

1. It should farmer-driven (or at least farmer-responsive)
2. It should be interactive and consultative
3. It should encourage farmer-led experimentation and innovation
4. It should have multi-directional communication flows that allow the exchange of new ideas and technologies between farmers and extension agents and between extension agents and sources of R&D
5. It should include multiple ‘spokes’ where different learning and knowledge exchange can take place

A trial, based in Anreapi, Polewali Mandar, should be undertaken of this new participatory model for engaging in farmer-driven innovation. This would provide a unique different geographical and institutional setting to test the model. At a conceptual level, it is proposed that the model of knowledge transfer will draw on key learnings from the approach already developed and applied by Mars Incorporated elsewhere in Sulawesi. Broadly speaking, the model would be based on a hub (centre for information dissemination, experiments or research with a semi-permanent presence of facilitators) and spokes (villages, farmer groups, NGOs, local extension services and individual farmers) model. This model is based on the Mars training hub and spokes (CDC/CVC) model, but with several differences - the key one being the idea of a ‘virtual’ rather than physical hub, which will build upon the knowledge platform being developed by ACIAR and CSP as a way to connect to best available expert knowledge and resources (see ACIAR Objective 4.2.1). The model would not replicate all components and activities of the Mars CDC / CVC model, and would not, in any way, be presented as a ‘franchise’ of that model.

The multiple ‘spokes’ of outreach will involve farmer technicians and farmer-to-farmer knowledge exchange. On-the-ground project activities will focus on working with partners to develop multiple ‘spokes’ of farmer driven experimentation, with the expectation that a field technician will be available to assist in implementation. At least one project staff member would work in the area on a semi-permanent basis to provide ongoing technical support and to facilitate farmer engagement. One of the ‘spokes’ would include the IPDM trials of Objective 4.1. Specific research, training and outreach programmes should be designed with appropriate community consultation. This ‘hub and spoke’ approach will be adapted and piloted with the support of ACIAR and BPTP. The model would look something like the following:



The specific project design will ultimately depend upon community consultation and workshops. As a general guide, we suggest the following process. It has five stages:

Five Stages

1. Consult (1-3months): Determine farmers’ goals, establish participation, set priorities
2. Design (3-6 months): Facilitation of experimental design
3. Implement (6-12months): Ongoing attention to design and the provision of assistance
4. Evaluate (12months): Determine progress, diagnose and address problems
5. Refine (12months): reassess and refine overall project design on an ongoing basis

1. Consult (1-3months): Determine farmers' goals, establish participation, set priorities

Farmer driven trials cover a range of activities, and have no one set way of implementation, and may be formal or informal. In this process, people are the key ingredient, with trust and credibility the basis for effective relationships. Enthusiasm, energy and project management skills are essential.

- Undertake a local assessment to determine what the farmers in the area actually need (local assessment should also include consultation with the multiple providers of extension services)
- Meet with farmers to determine farmers' goals and set priorities
- Meet with other stakeholder organisations who are willing to be involved and ensure there is an effective communication system in place
- Design participation around clearly specified rights, roles and responsibilities
- Be transparent about potential benefits as well as potential risks.
- Identify and work with existing platforms and processes, such as extension officers, researchers, NGOs, local co-ops and farmer groups

2. Design (3-6 months): Facilitation of experimental design

The researcher will act as a facilitator and liaison between the farmers and appropriate discipline-based scientists and other knowledge resources. The researcher may require training in facilitation and managing group processes. They will need to work with the farmers to create a plan that includes research design as well as the allocation of roles and responsibilities. Tasks will include researchers and farmers working together to:

- Document the farmers' research questions
- Define experiment rationale
- Design the research to build on and complement what farmers already know (respect farmers existing knowledge, especially as it relates to local conditions and local adaptations).
- Establish criteria to be used to evaluate the success of the research
- Agree on research protocols and standards, building in flexibility to be responsive unexpected difficulties in implementing the experiment
- Document experiment start-up costs and determine what skills, time, or finances resources may need to be provided to assist the farmer
- Set realistic timeframes and budgets, including the provision of equipment, labour, time and any other resources
- Keep an ongoing record of inputs including time provided by the researcher and the farmer(records of costs required are needed to determine if the innovation is affordable and the required inputs are available)
- Prepare a preliminary schedule so that both the researcher and the farmers have an understanding of what to expect and when

- Determine a means for farmers to access relevant knowledge and expertise
- Develop and implement research monitoring and evaluation strategies (locally based staff may need to assist in undertaking detailed measurements)

3. Implement (6-12months): Ongoing attention to design and the provision of assistance

The researcher would work with the farmer to implement the research as designed and:

- Conduct training as required and provide ongoing attention to trial design and the provision of assistance in the analysis of results

Effective communication is also a crucial part of the implementation process. Time will need to be allocated to facilitating overall process and getting more people in the district involved and having ownership of the research.

- Create support networks to support technical staff
- Coordinate work between different farmers and farmer groups to promote discussion and facilitate monitoring and evaluation by groups.
- Hold a series of hands-on farmer group workshops, held on a bi-monthly basis, and open to the entire community, where farmers provide feedback, discuss on-farm experiments and undertake farmer-to-farmer knowledge exchange.
- Provide printed materials (pictures, diagrams and text) and signage as appropriate

4. Evaluate (12months): Determine progress, diagnose and address problems

Evaluation of individual farm experiments as well as the success of the overall engagement model is required.

- At the end of the first 12 months, conduct a farm survey to get feedback from farmers on their perceptions of the project, learnings and impacts
- If the project continues beyond one year, repeat this process every 6-12 months
- Work with farmers to develop an understanding of how the research is progressing, address any problems and explore whether replication or redesign is required.
- Final project evaluation should be conducted by a team with local knowledge and understanding of the original project objectives and circumstances.

5. Refine (12months): reassess and refine overall project design on an ongoing basis

- Based on robust evaluation, reassess and refine overall project design on an ongoing basis, to ensure an adaptive and responsive process and to improve project impact and success
- Farmers must be kept in the decision making loop and their ideas need to be listened to and incorporated into the project.

As previously explained, Sulawesi has a ‘dense’ environment of extension activities and organisations, and this model should recognise and work within this context (see Table 1 as an example). It should allow for multiple actors and diverse networks, while remaining flexible and responsive to farmers needs. Suggested roles and participants for components are listed below as examples only, and require further thought. We look forward to working with other stakeholders and partners on this project.

Table Two: Suggested roles and participants for Objective 4

Component	Roles	Possible Participants
Virtual Hub	<ul style="list-style-type: none"> • Outreach and support ‘spokes’ through knowledge and resources • Link to other organisations and programmes • Link to experts and current research and development • Link to CSP knowledge platform 	Disbun BPTP Dinas Private sector companies BPP CSP IBRIEC UNHAS
Spokes	<ul style="list-style-type: none"> • On-farm experimentation • Research and demonstration of farming systems (eg. IPDM, shade trees, compost, clonal varieties, agroforestry, maintenance, mixed-farming) • Knowledge networks (eg. link to hub and experts, implement new practices, provide feedback to the hub) • Farmer-to-farmer outreach • Employ lead farmers as technicians • Identify knowledge and resource needs • Small business development (nursery, technical support) 	Salaried facilitator (paid initially by ACIAR) Lead Farmers Farmer Groups NGOs (eg. Wasiat) BPP
Training	<ul style="list-style-type: none"> • Train the trainer (extension agents and field technicians) • Farmer training 	Disbun BPP Private sector companies (eg. Mars) Lead Farmers
R&D Centres	<ul style="list-style-type: none"> • Provide latest information and advice on knowledge and market developments in the industry on an ongoing and interactive basis • Communicate the work of the ‘hub and spoke’ to others • Provide a platform for knowledge exchange 	ICCRI CSP UNHAS BPTP Nestle Mars IBRIEC

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