BASELINE STUDY ON THE IDENTIFICATION OF LOCAL PRODUCTS IN RAEOA, COVALIMA AND BAUCAU THAT HAVE POTENTIAL FOR EXPORT AND TO ATTRACT FOREIGN INVESTMENTS IN AGRICULTURAL SECTOR

FINAL REPORT

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TERMS AND ABBREVIATIONS

ACELDA	Name of local business
ASC	Agriculture Service Center
Cap	Capita
CCT	Cooperativa Cafe Timor
CNIC	Centro Nacional de Investigacao Cientifica
FGD	Focus Group Discussion
ha	Hectare
GDP	Gross Domestic Product
IMF	International Monetary Fund
Kg	Kilogram
Ltd	Limitada
MAFF	Ministry of Agriculture, Fisheries and Forestry
MAP	Ministerio Agricultura e Pescas
MECAE	Ministry of State and Coordinator of Economic Affairs
MCIA	Ministerio Comercio, Industria e Meio Ambiente
MoF	Ministry of Finance
NGO	Non Governamental Organization
NSD	National Statistic Directorate
na	not available
RAEOA	Regiao Administrativa Especial Oecusse Ambeno
RDTL	Republica Democratica de Timor-Leste
SPSS	Statistical Package for Social Science
t	Ton
TLHS	Timor Leste Household Survey
UNFPA	United Nation Population Fund
UNTL	Universidade Nacional de Timlor Lorosa'e
USD	United States Currency
ZEESM	Special Social Market Economic Zone
$	Dollar
%	Percentage

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EXECUTIVE SUMMARY

The government of Timor-Leste is committed to develop a non-oil economy through the diversification of domestic trade in particular from agricultural sector. This can be seen through the total investment in this sector of $218.4 million in the last eight year (2008-2016).

Agriculture sector has not achieved yet its potentiality. Government supports have provided high assistance to this sector, however agriculture productivity to date remains low which is due to weak agricultural management and practices. In one hand, agriculture sector has the potential to contribute to national GDP. On the other hand, there is a lack of private investment in this sector.

The study was conducted in RAEOA, Covalima and Baucau Municipalities. Respondents constituted of MAP staff (directors, extension workers and others), lead farmers/head of farmer group, head of villages and sub villages, community leaders, teachers, traders, buyers, national and international NGOs, and coordinator of MCIA.

The general objective of the study is to identify and collect information of local agriculture products and livestock in RAEOA, Covalima and Baucau Municipalities that have potential for export and to attract more foreign investments in agriculture sector.

The result of the study shows the existing local agriculture products and livestock in RAEOA, Covalima and Baucau Municipalities composed of maize, paddy rice, sweet potato, cassava, coconuts, candlenuts, mungbean, cattle, goat, vegetables and others. In general there is no significant difference of the existing products and livestock in these areas. Most of the production of these existing products is for family consumption with the rest for selling to local market.

The study revealed that there are 11 local potential agriculture products and livestock identified in RAEOA, Covalima and Baucau Municipalities, and they include cattle, maize, paddy rice, mungbean, pig, goat, cassava, peanuts, sweet potato, chicken and tomato.

The top five local potential agriculture products and livestock in **RAEOA** are ***cattle, rice (membramo), cassava, goat and chicken***. The total production of **cattle** in in 2017 is 18 835 heads (1816.9 t bovine meat). With the national consumption level for bovine meat of 1.19 kg/capita/year, which means current demand for bovine meat in RAEOA is only 82.01 t/year. The demand projection for bovine meat in the next 5 years (2017-2022) will increase by 98.4 tons or equivalent to a total of 984 head (increase by 1.6 ton/year). The main market is Dili and Indonesia.

Another potential local agriculture product in RAEOA is **rice (membramo)**. The total number of household engaged in paddy rice is around 10 800. Total production in 2017 is 2617.2 t of paddy rice (1570.3 t rice). However, the productivity is very low of 1.25 t/ha. This product is only sold in RAEOA with a very small volume is traded to Dili. Based on consumption level of 95 kg/capita/year, the current supply cannot fulfill the demand needed.

The top five local potential agriculture products and livestock in **Covalima** municipality include ***maize, mungbean, cattle, cassava and pig***. More than 50 percent of households

in Covalima produce **maize** with the total production of 10 335 t. The main market for maize is Ermera, Maubisse and Bobonaro municipalities and the average price is 0.60 cents/kg. With the consumption level of 90 kg of maize annually, the demand for maize is around 5400 t/year. This means that there is surplus of maize production in Covalima of around 5000 t/year. If this volume is to be sold with the price of 0.60/kg, it will generate a total value of 3 million dollars.

Mungbean is one of the potential products in Covalima. Nearly a half of household in this area grow mungbean to fulfill their family incomes. The total production of mungbean is 413.6 t and most of the product produced is for selling to the market. The main market is Dili and West Timor Indonesia. Most of the household growing mungbean is subsistence farmers. However, there is a commercial demand including for export. Demand for mungbean in Indonesia is around 50 000 t/year and Timor-Leste can only produce around 5 000 t/year. This means that there are market opportunities available in Indonesia and Timor-Leste needs to respond to this market. With the average price of $750/ton, Covalima will generate a total value of $310 200/annum in exports revenue ($3.75 million nationally).

Moreover, ***rice, sweet potatoes, maize, peanuts and tomatoes*** are the top five local potential products produced in Baucau municipality. The potential cultivated area of paddy rice in ***Baucau*** is 14 400 ha, and only 56% is planted. The total production of paddy rice in 2015 was 26 350 t (15 810 t rice); with the productivity of 3.3 t/ha. With the per capita consumption of 95 kg/year, which means Baucau will need 10 591 t rice annually. This indicates that the current production of rice can fulfill the demand needed. In addition, the average price for paddy rice is 0.45 cents/kg, while for rice is $1.10/kg. The main market for rice is Dili with a small quantities sold in Baucau market.

Baucau is known as one of the center for **peanuts** production in Timor Leste; Peanuts are usually grown as a cash crop, and farmers produce this product under rain fed conditions, with little inputs. In general, the product is produced for selling to the local market, providing some source of cash income for rural households. The main market is Dili; and the average price is 0.60 cents/kg. The total production in 2015 was 15.8 t with the productivity of 1.86 t/ha.

Baucau also becomes one of the main suppliers of **tomatoes** for Dili market. The potential areas for producing tomatoes include Buruma, Triloca, Bucoli, Caibada, Fatumaca and some parts of Venilale. The total production of tomatoes in 2015 was 950 t (yield 5.4 t/ha). This yield is higher than national average, which is only accounted for 1.8 t/ha. Most of the production is distributed to the local market; and the main market is Baucau and Dili. In peak season the average price is 0.62 cents/kg and in low season is $1.15/kg. It is assumed that from the total production of 950 t, only 75 per cent is marketed with the average price of 0.62 cents per kilogram, which means it will generate annual revenue of $ 441 750 dollar.

This study revealed that around 97% of the products produced in those 3 areas are sold in local market and only 29% and 11.7% are distributed through traders and retailers respectively. This indicates that there is lack of market access; and as a result there is high dependency on local market.

In terms of ***value addition***, it is only occurred for a number of products including paddy rice, maize, cassava, and sweet potatoes. The number of producers engage in value added products is very small. The main reason is due to lack of market opportunities and low price. The study revealed that producer normally performed ***grading*** for their produce (potential products) before selling to the market. The kind of grading applied is very basic including the maturity, size and color of the product.

Prices for local potential products and livestock vary among municipalities. For example, the average price of life cattle in RAEOA is $625/head, whereas in Covalima is $525/head. However, the average price for bovine meat is the same both in RAEOA and Covalima of $6.50/kg. For maize in Baucau, the cost is 0.50/kg cents while in Covalima 0.60 cents/kg. Changes in prices of the products depend on the demand as well as seasonality (low and peak season).

For cattle, it appears to be an attractive development activity in RAEOA and Covalima. Cattles are raised by a large number of households and make up a significant proportion of household income. There are established cattle and beef markets, both for domestic and export in these areas. Approximately, 43% and 56% of households in RAEOA and Covalima raise cattle respectively. Cattles from RAEOA are distributed through Wini, Kefamenanu and Kupang; while cattles from Covalima are distributed through Atambua and also Kupang. In addition, the demand for beef in Indonesia is estimated to be growing at 6 – 8%/year.

The main **constraints** faced by producers and chain players in RAEOA, Covalima and Baucau municipalities include lack of access to market and low price, low production and low quality products, high marketing cost, low skills and poor farm management, and economics of scale.

Despite the constraints, there are **opportunities** for the development of market chain for local potential agriculture product and livestock. These opportunities are high demand for some local agriculture products and livestock in these municipalities; opportunity to increase productivity of agriculture product is feasible; the demand for cattle and mungbean in Indonesia is rising. This is market opportunity for Timor Leste and therefore open-up cattle and mungbean trade to Indonesia is extremely important; the demand for bovine meat in Dili estimated around 800 t/year;

To attract more foreign investments and local private sector to invest in agriculture sector in RAEOA, Covalima and Baucau, it is recommended that government agencies and private sectors need to provide more supports and assistance to producers and chain players. These include re-open export market with Indonesia as soon as possible; promoting value-added activities for local potential agriculture products; private sector investment in markets should be encouraged; there is a need for capacity building for all chain players in these areas to ensure the efficiency and effectiveness of the supply chain; the introduction of high yield varieties for local potential agriculture products and livestock and also a better farming practices for producers in RAEOA, Covalima and Baucau.

SUMARIU EXEKUTIVU

Governu Timor-Leste iha komprimisiu hodi desenvolve ekonomia naun-petroliu liu hosi diversifikasaun komersiu domestiku liu-liu iha seitor agrikultura. Komprimisiu ne'e bele hare liu hosi total investimentu ne'ebe governu aloka ba seitor ne'e ho total $218.4 miloens durante tinan walu nia laran (2008-2016).

Seitor agrikultura seidauk atinji ninia potensialidade ne'ebe mak iha. Governu oferese ona asistensia ne'ebe mak intensivu ba seitor ne'e, maibe produktividade agríkola to'o agora sei menus liu, ne'ebe kausa hosi gestaun no pratikas agrikultura ne'ebe mak sei fraku. Iha parte seluk mos ladun iha investimentu privadu ba seitor ne'e iha Timor Leste.

Estudu ne'e hala'o iha RAEOA, município Covalima no Baucau. Respondentes ba estudu ne'e kompostu hosi funsionariu MAP (directores, extensionista no seluk tan), grupu agrikultor sira, chefe Suco no chefe Aldeia, lideransa komunitariu sira, professores, negosiantes, kompradores, NGO nasional no internasional, no kordenador MCIA.

Objetivu geral hosi estudu ne'e mak atu identifika no koleta informasaun kona-ba produtu lokal agrikultura no animais sira iha RAEOA, município Covalima no Baucau ne'ebe iha potensialidade ba exportasaun no mos bele atrai liu tan investimentu hosi rai li'ur iha seitor agrikultura.

Resultadu estudu ne'e hatudu katak produtu lokal agrikultura no animais sira ne'ebe mak existe iha RAEOA, município Covalima no Baucau mak batar, hare, fehuk midar, aifarina, nu'u, kami'i, foremungu, karau vaca, bibi, vegetais no seluk tan. Em jeral, laiha diferensia ida signifikativu entre produtu lokal agrikola no animais iha área sira ne'e. Maioria produsaun hosi produtu lokal ne'ebe existe uza ba nesesidade konsumu família nian no karik iha resin ruma mak lori ba fa'an iha merkadu lokal.

Estudu ne'e revela katak iha 11 produtus lokal agrikola no animais potensial ne'ebe identifika iha RAEOA, município Covalima no Baucau. Produtu lokal potensial hirak ne'e mak karau vaca, batar, hare, foremungu, fahi, bibi, aifarina, forerai, fehuk midar, manu no tomate.

Produtu lokal potensial agrícola no animais lima (top 5) iha RAEOA mak karau vaca, hare (membramo), aifarina, bibi no manu. Total produsaun karau vaca iha 2017 hamutuk 18 835 (1816.9 t na'an). Ho nivel konsumu na'an karau vaca nível nasional 1.19 kg/capita/tinan, signifika katak iha tempu agora dadaun demanda ba na'an karau vaca iha RAEOA atinji deit 82.01 t/tinan. Projesaun ba demanda na'an karau vaca ba tinan 5 mai (2017-2022) sei aumenta ba 98.4 t ka ekivalente ba total 984 karau vaca (aumenta 1.6 t/tinan). Merkadu prinsipal ba produtu ne'e mak Dili no Indonesia.

Produtu lokal potensial sira seluk iha RAEOA mak hare (membramo). Total uma kain envolve iha atividade hare hamutuk 10 800. Total produsaun hare iha 2017 mak 2617.2 t hare (1570.3 t fos). Maibe, produktividade hare iha RAEOA menus liu, atinji deit 1.25 t/ha. Produtu ne'e fa'an deit iha RAEOA, no ho kuantidade ki'ik fa'an mos iha Dili. Bazeia ba nivel konsumu fos 95 kg/capita/tinan, iha tempu agora dadaun oferta seidauk bele atu sustenta demanda ne'ebe mak iha RAEOA.

Produtu lokal potensial agrícola no animais lima (top 5) iha municipio Covalima mak batar, foremungu, karau vaca, aifarina no fahi. Liu hosi 50% uma kain iha Covalima produz batar ho total produsaun 10 355 t. Merkadu prinsipal ba produtu ne'e mak Ermera, Maubisse no Bobonaro, ho presu médio $0.60/kg. Ho nivel konsumu 90 kg/capita/tinan, signifika katak demanda ba batar atinji 5400 t/tinan. Ne'e hatudu katak iha exsidenti (surplus) ba produsaun batar iha Covalima hamutuk 5000 t/tinan. Karik kuantidade exsidenti (surplus) ne'e fa'an ho presu $0.60/kg, sei hetan osan ho valor $3 miloens dólares.

Foremungu hanesan mos produtu potensial seluk hosi município Covalima. Kuaze metade hosi uma kain iha município ne'e kuda foremungu hodi ajuda rendimentu ba sira nia família. Total produsaun foremungu hamutuk 413.6 t no maioria hosi produtu ne'e fa'an ba merkadu. Merkadu prinsipal mak Dili ho NTT Indonesia. Maioria agrikultores sira kuda foremungu sei subsistente. Maibe, produtu ne'e iha demanda komersial inklui ba exportasaun. Demanda foremungu iha Indonesia atinji 50 000 t/tinan, no Timor-Leste so bele produz deit 5000 t/tinan. Ne'e hatudu katak iha duni oportunidade merkadu iha Indonesia no Timor-Leste presija atu hatan ba merkadu refere. Ho presu mediu $750/t, Covalima bele hatama osan ho valor $310 200/tinan hosi exportasaun produtu ne'e ($3.75 miloens iha nível nacional).

Hare, fehuk midar, batar, forerai no tomate sai hanesan Produtu lokal potensial agrícola no animais lima (top 5) iha município Baucau. Area kultivu potensial ba hare iha Baucau hamutuk 14 400 há, no 56% deit mak uza hodi kuda hare. Total produsaun hare iha 2015 hamutuk 26 350 t (15 810 fos) ho produtividade 3.3 t/há. Ho konsumu per kapita 95 kg/tinan, ne'e signifika katak Baucau sei presija 10 591 t/tinan. Ne'e hatudu katak produsaun fos ne'ebe iha seidauk bele hatan ba demanda ne'ebe mak iha. Nune, presu mediu ba hare mak $0.45 /kg no ba fos $1.10/kg. Merkadu prinsipal ba fos mak Dili, no kuantidade ki'ik fa'an iha merkadu Baucau.

Baucau mos sai hanesan sentru area ba produsaun forerai iha Timor-Leste. Forerai sai hanesan produtu komersiu kultural no agrikultores sira kuda produtu forerai ne'e durante tempu udan ho produsaun ne'ebe ki'ik. Em jeral, produtu ne'e fa'an ba merkadu lokal ne'ebe fornese rendimentu ba uma-kain iha area rural. Merkadu prinsipal maka Dili, no presu mediu maka $0.60/kg. Total produsaun iha tinan 2015 maka 15.8 t ho produtividade 1.86 t/ha.

Baucau mos sai hanesan fornesedor prinsipal ba produtu tomate iha merkadu Dili. Area potensial ba produsaun tomate inklui suco Buruma, Triloca, Bucoli, Caibada, Fatumaca no parte balun hosi posto administrative Venilale. Total produsaun tomate iha 2015 maka 950 t (produtividade 5.4 t/há). Produtividade ne'e as liu nível nasional ne'ebe atinji deit 1.8 t/há. Maioria hosi produsaun tomate distribui ba merkadu lokal sira; no merkadu prinsipal ba produtu ne'e mak merkadu Baucau no Dili. Iha tempu tomate, presu mediu mak $0.62/kg no la'os tempu tomate presu sa'e ba $1.15/kg. Karik total produsaun tomate 950 t, maka fa'an deit 75% ho presu mediu $0.62/kg, ne'e sei fo rendimentu ho valor $441 750 dolares kada tinan iha Baucau.

Estudu ne'e revela katak kuaze 97% hosi produtu lokal potensial ne'ebe mak produs iha área tolu ne'e fa'an deit iha merkadu lokal no 29% distribui liu hosi komersiante sira no 11.7% distribui liu hosi retailista sira. Ne'e hatudu katak produtu hirak ne'e ladun iha asesu

ba merkadu no ikus mai resulta ba dependência ne'ebe maka a'as ba merkadu lokal.

Em termus adisaun valor (value addition), so aplika deit ba produtu sira hanesan hare, batar, aifarina no fehuk midar. Numeru produtor ne'ebe envolve iha adisaun valor ki'ik tebes. Razaun prinsipal maka ladun iha oportunidade merkadu no presu ne'ebe mak tun liu. Estudu ne'e mos revela katak produtores sira bain-bain halo klasifikasaun (grading) ba sira nia produtu potensial molok fa'an ba merkadu. Tipu klasifikasaun (grading) ne'ebe mak sira halo baziku tebes inklui maturidade produtu no mos kor.

Presu ba produtu lokal potensial agrikultura no animais iha variasaun entre município tolu ne'e. Hanesan ejemplu maka presu mediu ba karau vaca iha RAEOA $625, maibe iha Covalima $525. Ba presu mediu na'an karau vaca iha RAROA no município Covalima hanesan deit mak $6.50/kg. Presu mediu ba batar iha Baucau $0.50/kg no iha Covalima $0.60/kg. Mudansa ba presu depende ba demanda nune mos ho tempu produsaun.

Ba karau vaca, ne'e sai hanesan atividade atrativu ida iha RAEOA no Covalima. Uma kain barak iha área rua ne'e mak hakiak karau vaca no atividade ne'e kontribui signifikante tebes ba rendimentu uma kain sira nian. Merkadu ba karau vaca no na'an karau vaca estabelese diak tebes iha RAEOA no Covalima ba demanda rai laran no mos exportasaun. Kuase 43% no 56% hosi uma kain iha RAEOA no Covalima envolve an iha atividade hakiak karau vaca. Karau vaca hosi RAEOA distribui liu hosi Wini, Kefamenanu no Kupang; no karau vaca hosi Covalima distribui liu hosi Atambua no mos Kupang. Estimasaun kresimentu demanda ba na'an karau vaca iha Indonesia atinji 6-7%/tinan.

Desafius prinsipal ne'ebe produtores no autor adisaun valor sira hasoru iha RAEOA, Covalima no Baucau inklui ladun iha asesu ba merkadu no presu tun liu, produsaun menus no kualidade produtu mos tun, kustu ba merkadoria a'as, habilidade (skill) menus no jestaun ba farma fraku tebes, no eskala farma ne'ebe maioria ki'ik.

Iha parte seluk, iha mos oportunidade ba dezenvolvimentu korente de merkadu (market chain) ba produtu lokal potensial sira. Oportunidade sira ne'e inklui demanda ne'ebe mak a'as ba produtu agrícola no animais balun; oportunidade hodi hasa'e produtividade produtu agrícola; demanda ba karau vaca no foremungu iha Indonesia aumenta ba bebeik. Ne'e hanesan oportunidade merkadu ba Timor-Leste, tan ne'e loke fila fali komersiu karau vaca no foremungu ho Indonesia sai fator ida importante tebes; demanda ba na'an karau vaca iha Dili atinji 800 t/tinan.

Atu atrai invetimentu hosi rai-liur no seitor privadu lokal sira hodi investe iha area agrikultura iha RAEOA, Covalima no Baucau, rekomenda ba Governu no seitor privadu sira atu tulun no fo asistensia ba produtores no autor adisaun valor sira. Ne'e inklui loke fila fali atividade exportasaun ho Indonesia iha tempu badak; promove atividade adisaun valor ba produtu lokal potensial; enkoraja investimentu seitor privadu iha merkadu; presija kapasita autor adisaun valor sira iha área tolu ne'e atu nune bele garante efesiensia no efikas ba korente de distribuisaun; introdusaun variedade aihores ho produktividade as ba produtu lokal potensial; no mos fornese pratika farma ne'ebe mak diak ba produtores sira iha RAEOA, Covalima no Baucau.

I. INTRODUCTION

Private investment has the potential to make a positive impact to the country, particularly investing in small-scale producers in agricultural sector is very important. This is due to the 500 million small farmers in developing countries that support almost two billion people, which is nearly one third of the global population (Sahan & Mikhail 2012). Therefore, there is an opportunity for public and private investment to make a substantial positive impact on the livelihoods of small-scale food producers.

Geographically, Timor-Leste is a small country, but has abundant of natural resources. The economy mainly relies on agriculture sector as it may contribute to national GDP, employ almost three quarters of the workforce, provide over 70 per cent of the population with their main sources of livelihood and offer the largest potential exports and trade. In addition, Timor-Leste needs private sector agribusiness investment. Productivity levels in Timor-Leste are low by world standards and there is room for the private sector to play an important role in introducing new technologies, providing access to markets, and investing capital in the intensification of production.

Due to its significant contribution to the development, agriculture sector becomes one of the priority sectors in the Strategic Development Plan 2011-2030. As a priority sector, agriculture in Timor-Leste can provide more opportunities for investors particularly in rural areas where most of the population is concentrating and depending on this sector. In addition, agriculture sector has the potential to be developed, however, at present time; this sector is still far from its potential contribution to the national GDP.

To develop agricultural sector in Timor-Leste and to attract local and foreign direct investor, the government of Timor-Leste through its investment and export promotion agency, as so called TradeInvest needs to do more promotion regarding to the potentiality of this sector including quantity of productions, types of products, agricultural infrastructure, market linkages and others. For a promotion to be successful, information or data as mentioned are very crucial.

Currently, there is a lack of information on the issues mentioned above. Therefore, TradeInvest Timor-Leste in cooperation with National Center for Scientific Research (CNIC) – UNTL conducted a Baseline Study in order to identify and collect information regarding the potentiality of agricultural products in Timor-Leste (e.g., quantity of production, types of products, market linkages and others).

II. OBJECTIVE

The general objective of this study is to identify and collect information of local agriculture products and livestock in RAEOA, Covalima and Baucau municipalities that have potential

for export and to attract more foreign investments in agriculture sector. The specific objectives are:

- To identify types of local agriculture products and livestock existed in RAEOA, Covalima and Baucau municipalities;
- To identify local potential agriculture products and livestock in these areas;
- To identify the quantity of local potential agricultural product and livestock produced in RAEOA, Covalima and Baucau municipalities;
- To identify demand and supply trend and price index;
- To identify major opportunities and constraints at different places in the market chain for agricultural, livestock and forestry products; and
- To map out the agricultural potentiality of each area in Timor-Leste.

III. RESEARCH PROBLEM

Agriculture sector has not achieved yet its potentiality. Although, government supports have provided high assistance to this sector, agriculture productivity to date remains low, which can be due to weak agricultural management and practices. In one hand, agriculture sector has the potential to contribute to national GDP. On the other hand, there is a lack of private investment in this sector.

In order to diversify Timor-Leste's economy, the VI Constitutional Government through the Ministry of State and Coordinator of Economic Affairs (MECAE) has put a significant effort to improve the investment climate by re-establishing TradeInvest Timor-Leste as a Public Institute responsible for investment and export promotion. TradeInvest Timor-Leste has been created under the government Decree Law number 45/2015 of 30th December, with some main functions to promote Timor-Leste's investment and export potential, to attract foreign direct investors, to stimulate more national investment and to facilitate both national and international investors during pre-investment and post-investment.

For the purpose of accelerating investment in Timor-Leste, particularly in Agricultural sector, there is a need to collect a credible base line data. With a credible data, it will help develop this sector as well as attracting more local and foreign investors to invest in the country. Therefore, the research problem is "how to obtain credible and comprehensive data" from producers and relevant institutions in Timor-Leste. A good quality data can contribute to a successful promotion of this sector. This can help TradeInvest to promote local agriculture products that are potential for export to niche local market and international market".

IV. RESEARCH APPROACH

This research was implemented in three municipalities such as RAEOA, Covalima and Baucau. The reason for choosing these sites is because of the number of large investments that currently occurred and would happen in the next few years in these areas. In addition, these areas are also known as potential areas for the development of agricultural sector.
The population in this study constituted of farmers, community leaders, MAF staff, extension workers, NGOs and International Agencies and other relevant institutions with the total of 141 people. These populations were treated as sample for the study. Methods used were 'Stratified Random Sampling'. The details of samples distribution are shown in the Table 1.

Tabel 1. Sample distribution

Municipalities	Lead Farmers	Community leaders	MAF Staffs	Head of village	NGOs & Agrib. firm	Adm do Posto	Total
RAEOA	10	2	10	12	5	4	43
Covalima	10	2	10	19	3	7	51
Baucau	10	2	10	16	4	5	47
Total	30	6	30	47	12	16	**141**

Data was collected from both primary and secondary data (both quantitative and qualitative data). Methods used for gathering data included direct interview/face-to-face, FGD, in-depth interview and review of literature related crop production and marketing and others.

In addition, Participatory Rural Appraisal was used in this study such as physical field survey of the study areas. This study also used a semi-structure interview with community leaders, government institutions and local and international NGOs in order to understand institutional framework, available basic resources and organizations in the study areas. Other direct observation and documentations were also applied into this study.

The data was analyzed by using qualitative and quantitative analysis. In addition, supply chain analysis was carried out to develop a description of the value chain to identify potential high value market areas and current and potential products in the domestic and export markets in relation to the volume, specification, value and growth trends. Thus, computer-assisted qualitative and quantitative data analysis software was used in this study.

V. CONCEPTUAL FRAMEWORK OF THE STUDY

The agricultural sector has long been recognized as an important sector and plays a significant role in the development process within many developing economies (Pingali 2006). Joshi et al. (2007) found that there has been a trend towards more commercialized

farming, greater private-sector participation and a re-defined role of the government. The successful experience from the Asia-Pacific region indicated that the agricultural sector could be used to mobilize and foster economic growth in the first stages of economic development and be transformed from subsistence to a market-based system (Joshi et al. 2007). To accelerate economic growth, there is a need to modernize agricultural production, requiring markets for both inputs supply and for the sale of products and services.

In the case of Timor-Leste, agriculture is the main activity and the majority of its population depends on this sector. Thus, there are varies of crops growing by small-scale producers and the economics of scale of the farm is very small. Apart from the variety of crops growing by the household, there are a number of crops that is very potential in terms of production and market opportunities both for domestic and export market. In addition, these potential crops can attract foreign investment into the country and also local private investment. Therefore, the identification of the potential products is needed to provide comprehensive information related to the production, market opportunities, prices, demand and supply and other. If those potential crops identified can attract foreign investment and provide opportunities to local private investment in agriculture sector it will result in an increase of agricultural production. This will further impact to the rising in household income and in the end it will contribute to the reduction of unemployment and poverty in Timor-Leste.

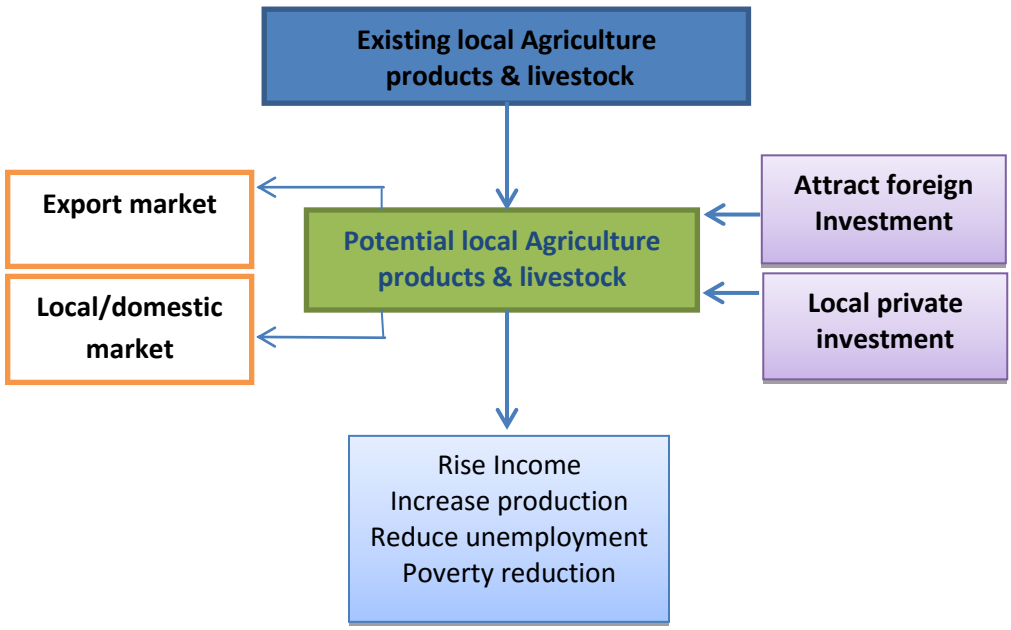

Figure 1. Conceptual framework of identification and development of local potential products

VI. LITERATURE REVIEW

Large investment in agriculture sector is significantly needed to help increase the production and marketing of agricultural products. This will further contribute to the increase in income for rural population and poverty reduction.

Private investment of all forms has the potential to make a positive impact. Therefore private sector play an important role in delivering inclusive economic growth, environmental sustainability and poverty reduction. To achieve this it must be adequately regulated and should adhere to some key principles, such as focusing on local food markets, working with producer organizations and respecting the rights of small-scale producers, workers and communities.

The main objective of government of Timor-Leste for agricultural sector is to enhance agricultural production, productivity and rural livelihoods. Therefore, investment in agriculture is a fundamental instrument to provide food and nutrition security, reduce poverty, create employment, generate sustainable broad-based economic growth, ensure environmental sustainability (MAP 2012). From 2008 – 2016 government of Timor-Leste has already investing in agriculture sector, which includes irrigation, tractors, free land preparation, seeds, agricultural equipment's and others with the total of $218.4 million dollar (RDTL 2011; National Commission for Research and Development; MAFF 2008; RDTL 2007). However, such investment has not yet produced the desired results, and Timor-Leste remains strongly depended on food imports, its agricultural production remains below potential and household food and nutrition security are still unsatisfactory. Sahan and Mikhail (2012) pointed out government investment into small-scale producers is also a key to both attracting more private investment in small-scale agriculture as well as improving the impact of any such investment.

According to MAP (2012) approximately 75 per cent of Timor-Leste's population lives in rural areas, and most of their livelihoods derive from agriculture. About one third of the country's non-oil GDP is generated from the agriculture sector. In addition, industrial tree crops (mainly coffee) contribute about 23 per cent of export earnings and account for about 80 per cent of non-oil exports. Given its size and influence, Timor-Leste's agricultural sector can generate employment and increase incomes through sectoral development.

Timor-Leste's major farm commodities are food crops (maize, rice, peanut, cassava, and sweet potato), tree crops (candlenut, coconut, coffee, cinnamon, and cloves) and livestock. Coffee is the country's primary non-oil export and approximately 28 per cent of households earn some form of income from coffee (IMF 2011). In 2005 alone, coffee exports equaled $7.6 million, with 49.2 per cent going to the United States followed by Germany (20.7%) and 12 per cent to Portugal. In addition, coastal fisheries appear to have significant economic potential, but they are also vulnerable to overexploitation. Offshore resources

include tuna, deep-sea snappers, and deep-sea shrimp, but the sustainable quantities of these resources remain very uncertain (ADB 2011).

As the majority of the population engaged in agriculture sector, raising farm output and income become a key development priority for the country and this can be done through improving agricultural productivity. Other key priorities include development of more effective agricultural markets, policies promoting investment in value-added and export commodities, and better information on prices and export opportunities.

A study done by Sendall (2006) estimates that Timor-Leste currently does not produce enough of the main commodities to feed itself, let alone produce a surplus for export. Therefore, there is an urgent need to increase agricultural production and productivity in Timor-Leste, to satisfy local demand, and produce a surplus for export. Increased economic activity within the sector, particularly trade, will provide employment and additional income across every municipality in Timor-Leste. Rahim (2005) added Timor-Leste has certain attributes that on paper lend it to being suitable to grow produce that could be sold in export markets. One example of this is snow peas. However although it is possible to work up, certain quantities of produce can be grown, certain volumes can be shipped and external markets are of a certain size. Thus, there appears to be considerable potential to diversify crop production for both local consumption and export (World Bank 2010).

Sahan and Mikhail (2012) concluded that a positive agricultural investment can benefit investors, small-scale farmers, communities and government. Therefore, government should give priority to investments in key public goods including capacity building, infrastructure, and research systems to help small-scale farmers who are not yet market-ready to ensure their food security and livelihood. Private sector on the other hand should complement public sector investment.

VII. RESULT AND DISCUSSION

7.1 Characteristic respondent

This study was conducted in RAEOA, Covalima and Baucau. The respondents constituted of MAP staff (directors, extension workers and others), lead farmers/head of farmer group, head of villages and sub villages, community leaders, teachers, traders, buyers, national and international NGOs, and coordinator of MCIA in those areas with the total of 141 respondents. The detail of the distribution of respondents per municipality is shown in Table 2. The respondent's compost of 89.3 per cent man and 13.7 per cent women and the average age was 41 years old.

Table 2. Distribution of respondent according to Posto Administrativo

Municipality	Posto Administrativo	Percentage (%)
RAEOA	Nitibe	13.6
	Oesilo	9.1
	Pante Makassar	75.0
	Passabe	2.3
Covalima	Fatululik	2.8
	Fatumean	5.6
	Fohorem	11.1
	Maucatar	33.3
	Suai Vila	16.7
	Tilomar	11.1
	Zumalai	19.4
Baucau	Baucau Villa	26.3
	Laga	26.3
	Quelicai	31.6
	Vemasse	5.3
	Venilale	10.5

7.2 Type of local agriculture products and livestock exist in RAEOA, Covalima and Baucau

The existing local agriculture and livestock products identified in these municipalities composed of seven main categories, which include food products, horticulture, fruit, forestry and livestock. The detail of the existing products is presented in Appendix 1.

The result of the study shows there is different variety of local agriculture products and livestock produced by small-scale producers in these municipalities and there are only a few products that not exist includes potato, broccoli, cauliflower and snow pea. In general there is no significant differences between these areas in terms of the existing local products and livestock produced.

The study also found that the current production systems of the existing local agriculture products and livestock in the municipality of RAEOA, Covalima and Baucau are at a subsistence level. Although each household has a diverse range of produce included livestock, the production is not geared towards selling produce. This is because there is a lack of scale in production as well as a very small potential market for produce. Households would produce for their own consumption and if there is a surplus or there is a need for cash, than they will sell to market.

7.3 Local potential agriculture products and livestock in RAEOA, Covalima and Baucau

The criteria used to identify potential of local agriculture products and livestock in RAEOA, Covalima and Baucau are including their contribution to the municipality overall production; current level of production; existing and potential market and export potential of the product; the total household involvement to produce the product.

7.3.1 Local potential agriculture products and livestock in RAEOA

Regiao Administrativa Especial Oecusse Ambeno (RAEOA) is situated in the west part of Timor-Leste, about 162 km from the capital city and it can be reached by car, ship and airplane from Dili. The total area is 814 km^2 with a total population of 68 913 people (NSD 2015).).

Agriculture is the backbone of RAEOA as the majority (78%) of the population is depending on this sector as main source of income. The total area suitable for agriculture is around 18 200 hectares. The major crops grown are maize, paddy rice, cassava and sweet potato; and livestock raised are mostly cattle, buffalo, goats, pigs and poultry. In addition, most of the agricultural production in RAEOA is subsistence agriculture and this contributed to the low productivity of the major crops grown by producers.

RAEOA recently has been designated as a Special Social Market Economic Zone (ZEESM) by the Timor-Leste Government and large-scale infrastructure development and building construction is underway.

The result of the study shows the top five (5) most potential local agriculture products and livestock identified in RAEOA are ***cattle, rice (membramo), cassava, goat and chicken***. From the interview, deep discussion and FGD it appears that these five products mostly described as potential products due to their existing and potential market and export, household involvement and the contribution of these products for overall production in Oecusse.

Cattle - RAEOA is well-known as one of the potential areas for cattle production in Timor-Leste. The total production of cattle in RAEOA in 2017 is 18 835 heads or equivalent to 1816.9 tons meat (1 cattle = 100 kg meat carcass). The national consumption level for bovine meat is 1.19 kg/capita/year (Calisto 2014), which is significantly lower than the average for least developed countries of 4.8 kilogram, and also lower than Indonesia of 2.5 kilogram. This affects the demand for bovine meat of only 82.01 ton per year for RAEOA (4.3% of the total production of bovine meat nationally). In addition, lower bovine meat consumption is clearly constrained by low incomes; with mean per capita income per month of $62 - urban $93 and rural $50 (NSD 2011). The details of the description of the potential products in RAEOA are shown in table below.

Table 3. Description of local potential agriculture products and livestock in RAEOA

Description	Potential local agriculture products and livestock				
	Cattle	Rice	Cassava	Goat	Chicken
Household number	6 178	10 835	9807	4950	10 241
Total production	18 169 head	2617.2 t (1570.3 t)	11 596 t	14 675	46 158
Productivity	na	1.25 t/ha	4.1 t/ha	na	na
Main market	Indonesia & Dili	Oecusse	Oecusse	Dili & Oecusse	Dili & Oecusse
Consumption level (kg/cap/year)	1.19	95	na	0.47	8.32
Export (national)	6 000 head	-	-	-	-
Demand (ton/year) ▪ Oecusse ▪ National	 82.01 1269.23	 6546.74 101 325.3		 32.39 501.30	 573.36 8873.96
Supply (ton/year)	1816.90	1570.3	na	513.63	na
Average prices ($)	625/head (6.50/kg)	0.50/kg (0.95/kg rice)	0.35/kg	47.50/head	15/chicken

Source: TLHS 2004; MAF; NSD and UNFPA; RDTL; IMF 2011; Calisto 2014; DNAHE-MAF 2015; MAP RAEOA 2017
 # Conversion paddy rice to rice is 60%;

In addition, based on the total population in RAEOA in 2010, the demand for bovine meat in the next 5 years' time (2017-2022) will increase by 98.4 tons or equivalent to a total of 984 head (increase of 1.6 ton/year). More details on the demand forecast of bovine meat in RAEOA are shown in table below.

Table4. Demand forecast for bovine meat in RAEOA from 2017 – 2022

Description	2017	2018	2019	2020	2021	2022
Population – 2010	76 068	77 386	78 704	80 022	81 340	82 658
Demand for bovine meat (t)- 1.19 kg/cap/year	90.5	92.1	93.7	95.2	96.8	98.4

Source: Population projection derived from NSD 2010; Waldron et al. 2015; demand for bovine meat are calculated

In the supply side however, RAEOA produce around 1800 ton of bovine meat per year. With the national consumption level of 1.19 kg, means there is plenty of bovine meat stock available which can further supply to Dili and other municipalities or export. Thus, with the annual population growth rate nationally of 2.41% and rising of the income of the population in particular in Dili, it will resulted in an increase in the demand for bovine meat consumption in the year to come. In terms of export, Timor-Leste experienced exporting of live cattle and buffalos to Indonesia. Export number was officially reported by MAF when the trade was formal before 2010; and the last number of cattle export in 2009 was 900 heads (MAF 2009). Meanwhile, hide trade remains legal, and data is not available.

Rice (membramo) - It is another potential local agriculture product in RAEOA. Approximately 85 per cent of rice production in RAEOA is for home consumption. Table 3 indicated the total number of household engage in paddy rice production is around 10 800 and the total production is 2617.2 tons of paddy rice per year or equivalent to 1570.3 tons of rice (MAP RAEOA 2017). However the productivity of paddy rice is very low of 1.25 ton per hectare (lowest than national average of 2.6 ton per hectare). The market for rice is only in RAEOA with a very small volume is traded to Dili.

An interview with rice trader in RAEOA market shows this kind of rice has certain specification including soft and good aroma and therefore there is a number of customers both from Dili that regularly bought rice in a regular basis. In addition, with the level of annual consumption of 95 kg/capita/year (TLHS 2004) means the demand of rice in RAEOA is around 6500 ton per year. In terms of supply, currently RAEOA can only supply around 1570.3 ton per year (41.9%) of rice for its population. This means there is a deficit of local rice (membramo) of around 5976.44 ton per year.

Cassava - The third potential local agriculture product is cassava. In RAEOA, cassava is mainly a staple food crop that is grown by farmer's household for family consumption. It is one of the potential products in RAEOA in terms total production (11 596 t/year). It is an important product for household food security. Aside from being used as food for human consumption, it is also widely used for animal feed. The main market for cassava is RAEOA market; and the average price 0.35 cents per kilogram.

Goat and **Chicken** is another local potential livestock products in RAEOA that currently entering Dili market in a regular basis. The total population of goat and chicken is 14 675 and 46 158 respectively; and the number of household raising these livestock is 4950 for goat and 10 241 for chicken. The average owned goat and chicken per household is 3.0 and 4.5. The main market for these products is Dili with small number of goats and chickens sold in local market in RAEOA. The average price for goat is around $48 and chicken is $15. With the total population of 68 913 (NSD 2011) and the national consumption level of 0.47 kg/capita/year the demand for goat in RAEOA will be 30.80 ton per year. For chicken, with the consumption level of 8.32 kg/capita/year RAEOA will need around 8800 kilogram of chicken meat to feed its population. From the supply side, the current production of goat and chicken (see Table 3) can guarantee the availability of these products for the entire year in RAEOA and Dili market.

7.3.2 Local potential agriculture products and livestock in Covalima

The municipality of Covalima situated in the Southwest part of the country. It has a population of 64 550 (NSD 2015) with the total area of 1230 km^2. The capital of the municipality is Suai, which lies 136 km from Dili, the national capital. Covalima has a significant second crop of maize. Maize is mainly cultivated close to the Indonesian border; meanwhile rice is cultivated in the lowlands under irrigation. Soybean, mung bean and groundnuts are also widely grown. Livestock is mainly composed of buffaloes, cattle, pig and goats.

Covalima is one of the municipalities included in the Mega Project Tasi Mane and therefore there is an intensity of development, which includes airport, roads, and others. This will offer farmers an opportunity to produce more local agriculture products in terms of quantity, quality and continuity of supply.

The top five local potential agriculture products and livestock identified in Covalima are ***maize, mungbean, cattle, cassava and pig***. These are products that mostly described by respondents as potential products in Covalima. The reasons for classifying these products as potential is the fact that most population in this area growing and produce these products, good opportunity for domestic and export markets and farmer experiences in dealing with the production of these products. The details of the production, household involvement and markets for these potential products are shown in Table 5.

Table 5. Description of local potential agriculture products and livestock in Covalima

Description	**Potential local agriculture products and livestock**				
	Maize	**Mungbean**	**Cattle**	**Cassava**	**Pig**
Household number	6398	na	6969	6248	10 343
Total production	10 335 t	413.6 t	34 455	11 596 t	44 822
Productivity	2.3 t/ha	3.5 t/ha		8.2 t/ha	4.3/hh
Main market	Ermera, Maubisse & Bobonaro	Dili, Suai & Indonesia	Dili & Indonesia	Suai	Dili
Consumption level (kg/cap/year)	90	na	1.19	na	2.22
Export (national)	-	na	na	-	-
Demand (ton/year) ▪ Covalima ▪ National	 5406.70 95 992.40		 71.47 1269.20		 133.34 5256.54
Supply (ton/year)	10 335		3445.5		2241.1
Average prices ($)	0.60/kg	0.75/kg	6.50/kg (525/head)	0.30/kg (0.40/kg dry)	235/pig

Source: TLHS 2004; MAF; NSD & UNFPA; IMF 2011; Calisto 2014; MoF; DNAHE-MAF 2015; MAP Covalima 2017

Maize - Table 5 shows more than 50 per cent of population in Covalima produce maize with the total production of 10 335 tons (MAP Covalima 2017). The main market for maize is Ermera, Maubisse and Bobonaro. An interview with maize producers in Covalima describe traders from those areas come regularly to Covalima looking for maize to purchase; and the average price is 0.60 cents per kilogram ($15/sack of 25 kg).

With the consumption level of 90 kilogram of maize annually, the demand for maize is around 5400 tons per year. This indicated that there is enough production to fulfill the demand needed (see Table 5). Based on the total production, there is still surplus of maize of around 5000 tons per year. If this volume is to be sold with the price of 0.60/kg it will generate a total value of 3 million dollars. Table 6 shows the demand forecast for maize in Covalima from 2017 – 2022.

Table 6. Demand forecast for maize in Covalima from 2017 – 2022

Description	2017	2018	2019	2020	2021	2022
Population - 2010	68 229.9	69 396.6	70 563.3	71 730	72 896.7	74 063.4
Demand for maize (t) (demand/cap/year of 90 kg)	6140.7	6245.7	6350.7	6455.7	6560.7	6665.7

Source: Population projection derived from NSD 2010; demand for maize are calculated

With the current production level of maize in Covalima as mentioned it is clear that Covalima still able to supply the demand of maize for its population in the next six years to come. Even though the consumption level of maize rise up to 100 kilogram per capita per year, the demand for maize in the next six year will reached 7406.3 tons; This volume still under the current production of maize in Covalima.

Mungbean - It is one of the potential products in Covalima. It's nearly a half of household in this area grown mungbean as a source of income for their families. This product generally produces by farmers in lowland areas. The total production of mungbean is 413.6 tons (NSD and UNFPA 2015) and most of the product is for selling to the market. The main market for mungbean is Dili and Indonesia. In the past the existing market for mungbean includes Timor Global, Leo Atsabe, Ltd., ASC Maliana, Joel Hasil Bumi, Conico Ltd., and Caracoal Ltd. In the last few years, because of the lack of access to Indonesia market, it makes it harder for these firms to continue engage in trading of mungbean products.

This directly or indirectly affected the income received by producers in Covalima. On the other hand the demand for mungbean in Indonesia is around 50 000 tons/year (Dirjen Tanaman Pangan 2012). To fulfill this demand they imported mungbean from Etiopia, Myanmar, Thailand, Australia and Brasil. Indeed, Timor-Leste has the ability to produce mungbean for Indonesian market and it close to the border. This is an opportunity for

producers to grow more mungbeans as a cash crop for the domestic and export market. In addition this product also contain high protein food for nutrition programs and therefore needs to be exploring in the future.

Cattle - Another potential livestock product from Covalima is cattle. It's around 20 percent (NSD 2015) of household in this area raise cattle with the total number of 34 455 head; and the average owned cattle per household is around 5 cattle's. The main purpose of raising cattle in Covalima is for selling to the market; and the main market is Dili and Indonesia market (hide market-through border). In Indonesian time cattle traders from Atambua and Kefamenanu came regularly to Covalima to buy cattle and distributed to Surabaya. After Independence cattle producers sold their cattle to CCT as the main buyer. In the past few years until present traders from Atsabe, Bobonaro and Ainaro normally bought cattle in Covalima and sell it to Dili; and only a small number of cattle sell in local market in Covalima. The average price of bovine meat in Covalima is $6.50/kg ($525/cattle).

Based on the level of consumption, the demand for bovine meat in Covalima is only around 71 tons per year. With the total production of cattle of 24 455 head (assume one cattle produce 100 kg carcass) it means cattle producers in Covalima can supply around 3445.5 tons of bovine meat annually. This is far beyond the demand that exist in Covalima and is able to fulfill the demand for bovine meat nationally (see Table 5).

Cassava - Farmers in lowland and upland areas around Covalima largely grow cassava. It is one of the top five potential local agriculture products and also as important subsistence crops in Covalima. Total household engage in the production of cassava is 6248 with the total production of around 11 500 tons per year. Most of the cassava produce is destined for family consumption with only small quantities is distributed to the local market in Suai. The main market for this product is local market in Covalima. Cassava distributed to the market composed of fresh and dry cassava. The average price for fresh cassava is 0.30/kg, and dry cassava 0.40/kg ($15/a sack of 35 kg). In the past, CCT has been purchasing dried cassava, but because of the price paid is very low ($ 0.16 cents/kg at the farm gate) therefore it was not attractive to motivate farmers to produce for this market.

Pig - The objective for farmers raise pig in Covalima is to sell to the market and also for cultural/traditional ceremonies. Covalima has a high number of pig totaling 44 822 with the average owned per household is around 4 pigs. The average price for pig is $235. In addition, the demand for pork in Covalima is small around 133 tons per year; while from the supply side it can offer 2241 tons annually. This indicated that there is an opportunity to supply pigs from Covalima to other municipalities including Dili and also neighboring countries.

7.3.3 Local potential agriculture products and livestock in Baucau

Baucau is the second-largest city in Timor-Leste, after Dili, the capital, which lies 122 km east of Dili. The total area is 1,507.95 km^2 with the total population of 111 484 and the total household of 22 976 (NSD 2015).

It is an important food-producing area, where rice accounts for nearly half of aggregate cereal production, the remainder being maize. In addition, the municipality is an important producer of beans, groundnuts, cassava, sweet potatoes, copra and candlenut. Main livestock are buffalo, cattle and goats. Compared to other municipalities, Baucau is agriculturally more developed and has a surplus production.

As a municipality that will become a place for establishing cement factory called "Timor Cement" in the future, this will provide more jobs and more people will come to Baucau. This will result in the demand of locally agriculture products and therefore it is important to anticipate the supply in terms of quantity, quality and continuity of local products.

The result of the study shows that the top five potential local agriculture products and livestock identified in the municipality of Baucau is ***rice, sweet potato, maize, peanuts and tomato.*** These products are very potential in Baucau due to the agronomic condition that is favorable, farmers experience, good access to market, and for some of the products it can produce year round production. The details of the local potential agriculture products and livestock in Baucau are shown in table below.

Table 7. Description of local potential agriculture products in Baucau

Description	Potential local agriculture products				
	Rice	Sweet Potato	Maize	Peanuts	Tomato
Household number	9300	na	12 338	na	na
Total production	26 350 t (15 810 t)	14 328 t	10 290.1 t	15.8 t (10.3 t)	950 t
Productivity (t/ha)	2.50	na	2.08	1.86	5.40
Main market	Dili	Dili	Dili & Baucau	Dili	Dili
Consumption level (kg/cap/year)	95		105	na	na
Export (national)	-	-	-	-	-
Demand (ton/year)					
▪ Baucau	10 591		11 705.8	-	-
▪ National	101 325.3		111 991.1	-	-
Supply (ton/year)	15 810	14 328	10 290.1	10.3	950
Average prices ($)	0.45/kg (1.10/kg)	0.35/kg (8.50/sack of 25 kg)	0.50	0.60/kg (15/ sack of 25 kg)	0.88/kg (14/bucket of 16 kg)

Source: TLHS 2004; MAFF; NSD and UNFPA; RDTL; IMF 2011; FAO 2011; MoF and MAP 2014; MoF; DNAHE-MAP 2015; Correia et. al 2015; MAP Baucau 2017
 # Conversion paddy rice to rice is 60%; Peanut shelled is 65%

Rice - It is the preferred staple for most people in Baucau both in the urban and lowland areas. It is both a food crop and a cash crop. The dominant rice systems in this area are rainfed lowlands and rainfed uplands. The potential cultivated area of paddy rice is 14 400 hectares, but only 8100 hectares are planted (56 %). In 2015 this cultivated area produced 26 350 tons of paddy rice (MAP, 2015). This means the abandoned land for paddy rice cultivation is 6300 hectares or around 44 per cent of the total potential area exists. In addition, the productivity of paddy rice in Baucau is 3.3 tons per hectare (MAP Baucau 2015). If Baucau can manage to cultivate all the remaining potential areas it will produce a total of 20 790 tons of paddy rice with the total value of US$8 336 000 in revenue ($400/ton).

With the per capita consumption of rice of 95 kilogram per year, it means Baucau will need around 10 591 tons of rice annually. This indicated the current production of rice can fulfill the demand as the total supply per year is around 15 810 tons rice; this means there is surplus of around 5000 tons of rice(demand forecast see table 8). The average price for paddy rice is 0.45 cents per kilogram, while for rice is $1.10 per kilogram ($11/sack of 10 kg). The main market for rice is Dili with a small quantity sell in Baucau market.

Table 8. Demand forecast for rice in Baucau from 2017 – 2022

Description	2017	2018	2019	2020	2021	2022
Population - 2010	124 009.1	125 798.4	127 587.7	129 377	131 166.3	132 955.6
Demand for rice (t) (demand/cap/year of 95 kg)	11 780.9	11 950.8	12 120.8	12 290.8	12 460.9	12 630.7

Source: Population projection derived from NSD 2010; demand for rice are calculated

In terms of Baucau supply chain for rice it composed of formal and informal supply chains (see Figure 2). In formal chain, producers sell their paddy rice to processors (ACELDA), who process it (milling, packing, transporting, etc) into rice and distribute to retailers and end consumers both in Baucau and Dili. ACELDA is a local business firm that operates in the agricultural sector. Its activities also include buying and selling of paddy/rice. Meanwhile, for the informal chain, producers sell their paddy rice to their neighbors. The volume of the product sold per transaction is very small compared to the volume marketed in the formal chain.

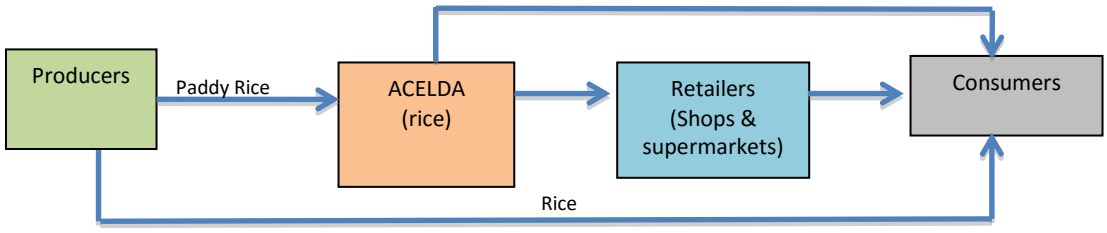

Figure 2. Supply chain of rice in Baucau

Sweet Potato – It is another local potential agriculture products in Baucau. Producers can produce this product for year round production and most of the produce (75%) is for home consumption and the rest is destined to market. The total production of sweet potato in Baucau in 2016 was 14 328 ton (MAP Baucau 2017). The average price for sweet potato is 0.35 cents per kilogram and the main market is Dili and Baucau.

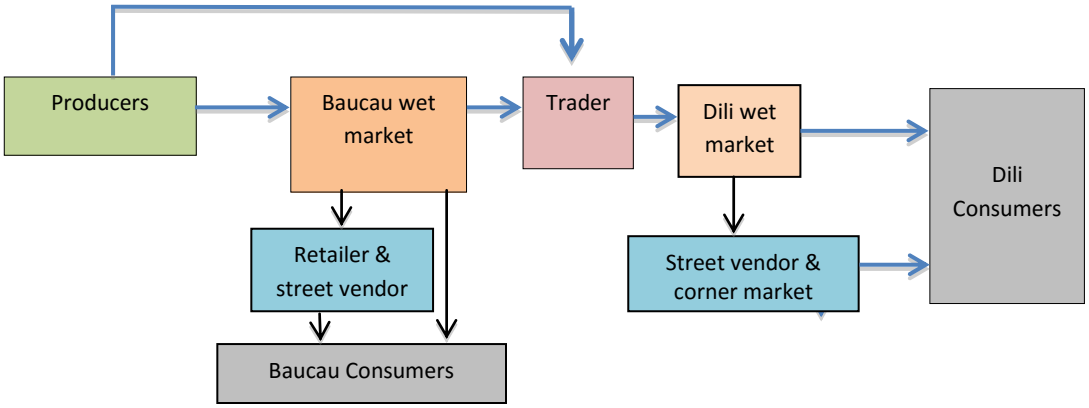

Figure 3. Supply chain of sweet potato in Baucau

Maize - One of the potential local agriculture products for Baucau is maize. It is around 12 000 household (58% of total household in Baucau) engage in the production of maize. The total production in 2017 is 10 290.1 tons of maize grain and the productivity is 2.08 tons per hectare (MAP Baucau 2017). Most of maize produce (80%) is for home consumption and the rest is for selling to the market and feeding livestock.

Peanuts - Baucau is known as a center for peanuts production in Timor-Leste; therefore it becomes one of the potential products in this area. Peanuts are usually grown as a cash crop, and farmers in Baucau produce this product under rainfed conditions, with little inputs. The product produce is generally for sale to the market, providing some source of cash income for rural households. The main market is Dili; and the average price is 0.60 cents per kilogram. The main production areas for peanuts in Baucau are including Gariwai (Baucau Vila), Fatulia (Venilale), Uaitame (Baguia) and Ostico and Uatulari (Vemasse). The total production in 2015 was 15.8 tons with the productivity of 1.86 tons per hectare (SoL 2015). Planting season for peanuts in Baucau is November – December and the harvesting time is in March – April.

Tomato - In the past few years until present, Baucau become one of the main suppliers of tomato to Dili market. The potential areas for producing tomato include Buruma, Triloca, Bucoli, Caibada, Fatumaca and some parts of Venilale. Through the interviews with stakeholders in Baucau it reveals that tomato is one of the local potential agriculture product in this municipality. The total production of tomato in 2015 was 950 tons (Direcao Statistica Municipio Baucau 2015) with the yield of 5.4 tons per hectare. This yield is higher than national average, which is only accounted for 1.8 ton/ha (MAFF 2009).

In addition, most of the production is distributed to the market; and the main market is Baucau and Dili market. The average price for tomato is slightly different between peak and low season. In peak season the average price is 0.62 cents per kilogram and in low season is $1.15 per kilogram. It is clear that peak and low season of producing tomato directly affect the price. If assume that from the total production of 950 tons, only 75 per cent is marketed with the average price of 0.62 cents per kilogram, it will generate annual revenue of $ 441 750 dollar. In terms of supply chain for tomato in Baucau is shown in figure below.

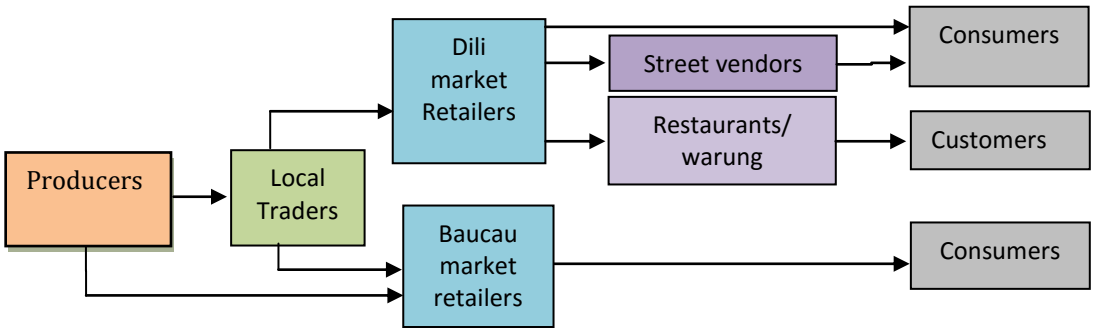

Figure 4. Supply chain of Tomato in Baucau

VIII. MARKETING OF LOCAL POTENTIAL PRODUCTS AND LIVESTOCK

Most of the local potential agriculture products and livestock in RAEOA, Covalima and Baucau are selling directly through local market, following traders, retailers and wholesalers. The details of where and to whom producers sell their products are shown in Table 9 below.

The study revealed that around 97 per cent of the products are selling to local market and only 29 and 11.7 per cent are distributed through traders and retailers respectively. This indicated there is lack of marketing access for producers to sell their produce. As a result there is high dependency on local market. As the cost of transport is expensive, and access to roads and transport to major markets is poor, this resulted to the producers relying on local markets and traders for selling their produce. These markets are characterized by

asymmetric relations between large numbers of small farmers and a few traders. This kind of market relations is characteristically uncompetitive, unpredictable and highly inequitable. Even though products distributed through traders and retailers are small however, for certain products such as cattle, mungbean and tomato around 50 percent are distributed to traders. This means these products are in high demand and good market.

Table 9. Main buyers for local potential products and livestock

Municipio	Potential product	Potential product sells to (% yes):				
		Trader	Wholesaler	Retailer	CNL	Local market
RAEOA	Cattle	50.0	23.0	20.5	-	100
	Rice	27.3	-	11.4	-	100
	Cassava	-	-	4.5	-	95.2
	Goat	20.0	-	7.5	-	97.5
	Chicken	22.2	-	5.6	-	94.4
Covalima	Maize	7.0	-	-	8.3	100
	Mungbean	50.0	-	15.0	2.8	94.4
	Cattle	55.6	-	-	-	97.2
	Cassava	47.2	-	-	-	91.7
	Pig	25.0	-	2.8	-	100
Baucau	Rice	4.0	21.1	15.0	-	90.0
	Sweet potato	21.1	21.1	25.0	-	100
	Maize	10.5	10.5	-	-	100
	Peanuts	11.8	11.8	-	-	95.0
	Tomato	50.0	11.8	10.0	-	95.0

In terms of ***value addition***, it's only occurred for a number of products including paddy rice, maize, cassava, and sweet potato; and the percentage of producers engage in value added products are very small. The reason is that there are no price differences between value added products and primary products. In addition, there is no value added for livestock products as producers mostly sell life animals including cattle, pig, goat and chicken.

The result of the study also shows most respondents (65%) revealed that producer normally performed ***grading*** for their produce (potential products) before selling to the market. However, the percentage of them conducted this activity is very small due to the lack of market access and low prices. The grading activities conducted are only on the basis of the size, maturity and color of the product.

For ***prices*** of the potential products and livestock, it varies between municipalities. For example, the average price of life cattle in RAEOA is $625 per head and in Covalima $525 per head. However, the average price for bovine meat is the same both in RAEOA and Covalima of $6.50/kg. For maize in Baucau it cost 0.50 cents while in Covalima 0.60 cents per kilogram. Changes in prices of the products depend on the demand and also seasonality (low and peak season).

For cattle it's appear to be an attractive development activity in RAEOA and Covalima. Cattle are raised by a large number of households and make up a significant proportion of household income. There are established cattle and beef markets, both domestic and export in these areas. Census data of 2010 shows that livestock is clearly an important economic activity in RAEOA and Covalima. Approximately 43 and 56 per cent of households in RAEOA and Covalima raise cattle respectively. According to Serrao et al (2010) Dili has the largest local demand for beef while Indonesia is the largest destination of beef exports from Timor-Leste.

Through a deep interview with cattle traders in RAEOA and Covalima shows that the trading system for cattle is as follows:

- The trading based around fattening households
- They buy cattle for feeding (variable periods)
- Indonesian traders can inspect and negotiate
- Fattening households or a limited number of RAEOA and Covalima traders transport cattle to border (walked)
- Transaction and payment occurs at border

In addition, cattle from RAEOA are distributed through Wini, Kefamenanu and Kupang; while cattle from Covalima are flows through Atambaua and also Kupang. The details of the flows of cattle from RAEOA and Covalima to Indonesia are presented in the diagram below.

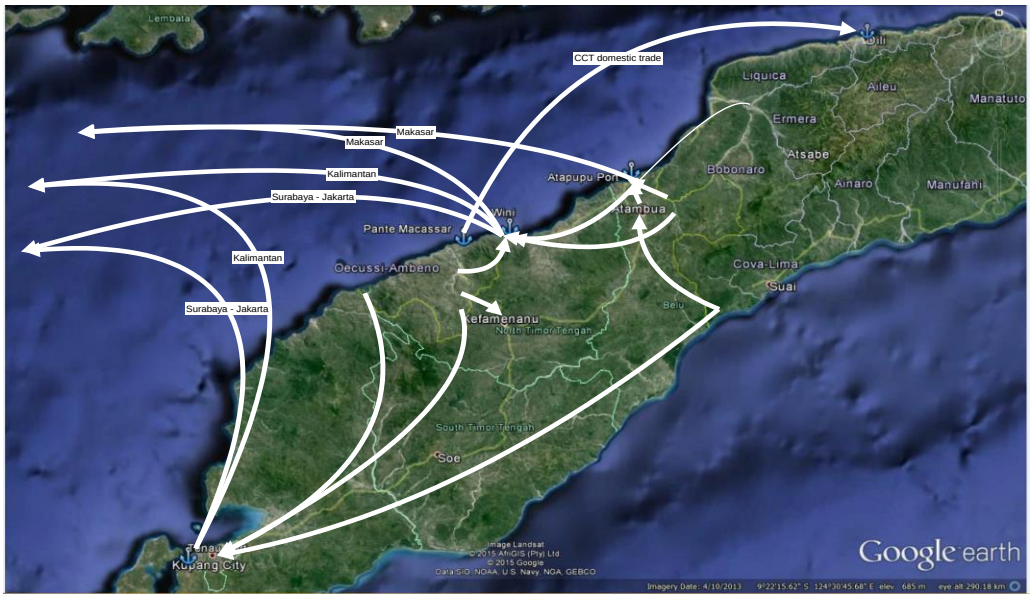

Figure 5. Broad cattle flows from RAEOA and Covalima to West Timor Indonesia
Adopted from: Waldron et al. 2015

If household in RAEOA and Covalima supply an average of two head cattle for the trade per year, then the total supply will be around 26 200 head/year (RAEOA 12 300 and Covalima 13 900 head). If this supply will be traded through the border with an average live weight

of 275 kilograms, and average price of $2.70/kg, then it will generate revenue of about $21.2 million. If Timor-Leste charges an export duty of 5%/head, then this equates to about $131 000 in government revenue.

IX. CONSTRAINTS AND OPPORTUNITIES FOR DEVELOPMENT OF MARKET CHAINS FOR AGRICULTURE AND LIVESTOCK PRODUCES

For Timorese smallholder farmers to become more involved in export-oriented crop and livestock production, they need to be equipped with complete market information, access to credit and training, particularly in production and marketing. Linking farmers closely to consumers provides new market opportunities, which can lead to fulfilling consumer preferences for quality, quantity and food safety.

The study reveals that the **main constraints** faced by producers and chain players in RAEOA, Covalima and Baucau in the development of market chain for local potential agriculture product and livestock are:

Low production and low quality product - Low production and quality are challenges that generally emerged from the response of stakeholders. This is caused by low levels of input use, lack of skills, lack of capital and lack of information. A study conducted by Rola-Rubzen et al. (2010) in Timor-Leste found that one of the main reasons for the poor productivity is the low levels of input use in the farm. To increase crop productivity, inputs such as seeds, fertilizers and chemicals are needed.

High marketing costs - As a result of poor infrastructure (e.g. roads and bridges) and lack of access to transport it affect the cost of transport, which is quite high. Rural roads are important for the distribution of goods and services needed for agricultural production and for transporting farmers produce to the market. The inadequate infrastructure in RAEOA, Covalima and Baucau presents major constraints not only in the form of high transaction costs but also prevents producers and consumers from accessing local and regional markets effectively. Poor road infrastructure also limits the volume that can be transported to the market and this increases the cost of transport.

Low skills and poor management - As the demand for some products increases both in domestic and regional markets, there is a need to increase the production and productivity of agricultural crops. However, the low skill level of most producers in the study site impacted their ability to increase production to supply the market. Even though producers have long time experience in their farm, they continue to practice traditional ways of crop management. Producing and marketing of agricultural products to high-end markets require skills, which small farmers might not have.

Lack of market access and low prices – Lack of access to market is one of the major constraints faced by producers and chain players in RAEOA, Covalima and Baucau. Lack of well-functioning agricultural marketing system in these areas resulted in producers having

difficulties in marketing their surpluses. These constraints contributed to the low productivity of the products and access to market for small producers.

Economic of scale - The majority of producers of local potential agriculture products and livestock in RAEOA, Covalima and Baucau are small landholders with a very limited formal education and lack of capital. These clearly reduce their willingness and capacity to purchased inputs needed including fertilizers and chemicals, seeds and mechanization equipment's. Other constraints include lack of input suppliers and lack of information.

Despite the constraints faced, there are **opportunities** for the development of market chain for local potential agriculture product and livestock. These opportunities are:

- High demand for some local agriculture products and livestock (e.g., cattle, mungbean, tomato and goat);
- Increase productivity of agriculture products is feasible. This can be done through government and private sector support in production and marketing, particularly linking farmers to markets programs;
- There are opportunities for producers to adopt a whole value chain approach. Through this approach, farmers would be able to capture emerging high-end markets in Dili and other regional markets;
- There is an opportunity to expand cattle trade to Indonesia, as there is growing demand for cattle in Indonesia market (6-7%/year). In addition, the demand for bovine meat in Dili is also high estimated of around 800 tones annually.
- There is a potential for increasing export from trading of mungbean to West Timor Indonesia. This commodity financially viable for producers in Covalima, with good opportunities for improving productivity and production through introduction of new varieties, and others. There is also significant potential for expanding the area of mungbean by planting as a second crop after rice
- There are opportunities to increase rice production and gradually reduce the importation of rice into the country. This can be done through yield improvement and better farm management practices
- The productivity of maize in Covalima and Baucau can be improved through the introduction of a range of technologies and improved management practices. By increased production of maize it could provide the basis for a range of commercial value-added activities, such as using maize for manufacture of human food products or livestock feeds.

X. CONCLUSION AND RECOMMENDATION

The government of Timor-Leste is committed to develop a non-oil economy through the diversification of domestic trade in particular agricultural sector. This can be seen through the total investment in this sector from 2008-2016 of $218.4 million dollars. In addition, this sector has the greatest potential to expand export and this will positively impacted to the reducing of poverty and unemployment in the country.

The result of the study revealed there are eleven local potential agriculture products and livestock in RAEOA, Covalima and Baucau which including Cattle, Rice, Maize, Mungbean, Peanuts, Pig, Tomato, Sweet Potato, Cassava, Chicken and goat.

Based on the review of literature and interviews with stakeholders it shows that these products have the potential for export and also the demand in domestic market is high. These products also involve a large number of households in the production side and this means local potential products provide more job opportunities for communities in rural areas, which in turn contributed to the income earned by rural families.

Despite the potentiality of local agriculture products for export and job opportunities as mentioned however, this sector is constrained by internal supply side (e.g., low production, productivity and quality) and also structural constraints (e.g., skills, infrastructure and land). These factors will affect to low productivity and further resulted in weak market linkages. Increase productivity of local potential agriculture products in RAEOA, Covalima and Baucau is feasible. This can be done through government and private sector support in production and marketing, particularly linking farmers to markets programs.

The result of the study clearly demonstrates there is a potential to develop local potential agriculture products and livestock in RAEOA, Covalima and Baucau. However, issues such as lack of inputs, lack of market opportunities, low price for the produce, low quality and low skills of farmers hindering the opportunity to develop these products in an effective and efficient way.

To attract more foreign investments and local private sector to invest in agriculture sector in Timor-Leste in particular in RAEOA, Covalima and Baucau, it is recommended that government agencies and private sectors involve in agriculture needs to provide more supports and assistance to producers and chain players. These supports and assistance including:

- The introduction of high yield varieties for local potential agriculture products and livestock (e.g., rice, maize, mungbean, peanuts, sweet potato, and others) and also a better farming practices for producers in these areas;

- There is a need for capacity building for all chain players in RAEOA, Covalima and Baucau to ensure the efficiency and effectiveness of the supply chain in terms of training, market awareness and producers education;
- To ensure efficient access to market, the roads from farms to markets should be good and assessable;
- Motivate producers with necessary incentives or motivation to produce local potential agriculture products mentioned in good quality and safety;
- Promoting value-added activities for local potential agriculture products;
- Improve marketing infrastructure;
- Private sector investment in markets should be encourage;
- Providing support to agribusiness firms in terms of technical and financial support for the development of value added activities and linking producers to market activities.
- Re-open export market with Indonesia as soon as possible

Finally, this study should become one of TradeInvest's priorities/annual activities (continuation to other municipalities in Timor-Leste) as part of investment and export promotion.

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APPENDIX

Appendix 1. Existing local agricultural products and livestock

Existing local product	Municipality			Existing local product	Municipality		
	RAEOA	Covalima	Baucau		RAEOA	Covalima	Baucau
Paddy rice	✓	✓	✓	Coconut	✓	✓	✓
Maize	✓	✓	✓	Coffee	✓	✓	✓
Potato	X	X	✓	Arekanut	✓	✓	✓
Cassava	✓	✓	✓	Candlenut	✓	✓	✓
Taro	✓	✓	✓	Tamarind	✓	✓	✓
Sweet potato	✓	✓	✓	Vanila	✓	✓	✓
				Cashewnut	✓	✓	✓
Cabbage	✓	✓	✓				
Chinese Cab	X	X	X	Banana	✓	✓	✓
Carrot	✓	✓	✓	Orange	✓	✓	✓
Tomato	✓	✓	✓	Jackfruit	✓	✓	✓
Garlic	✓	✓	✓	Lemon	✓	✓	✓
Shallot	✓	✓	✓	Avocado	✓	✓	✓
Mustard	✓	✓	✓	Manggo	✓	✓	✓
Brocoli	X	X	X	Watermelon	✓	✓	✓
Cauliflower	X	X	X	Papaya	✓	✓	✓
Capsicum	X	X	✓	Pineapple	✓	✓	✓
Lettuce	✓	✓	✓	Guava	✓	✓	✓
Snowpea	X	✓	X	Pumpkin	✓	✓	✓
Eggplant	✓	✓	✓	Cucumbar	✓	✓	✓
Baria	✓	✓	✓				
Chilly	✓	✓	✓	Cattle	✓	✓	✓
				Goat	✓	✓	✓
Mungbean	✓	✓	✓	Buffalo	✓	✓	✓
Red bean	X	✓	✓	Pig	✓	✓	✓
Ground nut	✓	✓	✓	Chicken	✓	✓	✓
Soybean	✓	✓	✓	Horse	✓	✓	✓
				Duck	✓	✓	✓
Sandalwood	✓	✓	✓				
Teak	✓	✓	✓	Red rice	✓	✓	✓
				B rice rice	✓	✓	✓

Appendix 2. Area of production and productivity of rice, maize and mungbean in Timor-Leste from 2007 – 2011

Year	Paddy Rice			Maize			Mungbean		
	Harvested area (ha)	Total production (t)	Yield (t/ha)	Harvested area (ha)	Total production (t)	Yield (t/ha)	Harvested area (ha)	Total production (t)	Yield (t/ha)
2007	38,582	60,424	1.57	22,480	71,526	0.99	1485	1381	0.93
2008	45,635	77,418	1.76	79,433	100,173	1.26	1448	1221	0.82
2009	38,998	120,775	3.16	71,340	134,715	1.89	2217	2193	0.99
2010	36,548	75,000	2.05	70,255	148,891	2.12	762	809	1.06
2011	35,561	98,297	2.76	21,699	30,656	1.41	2847	2858	0.90
Average	39,064	94,535	2.47	63,041	97,194	1.53	1752	1852	0.94

Source: MAP 2012

Appendix 3. Production, consumption and import of rice in Timor-Leste (2006 – 2015)

Year	Production of paddy rice (t/yr)	Production of rice (60 % milling recovery)	Consumption of rice (TLHS 95 kg/cap/yr.)	Import of rice (t)
2006	55,414	33,248	92,055	64,348
2007	60,424	36,254	94,240	64,028
2008	77,418	46,451	96,520	57,811
2009	120,775	72,465	98,895	38,508
2010	75,000	45,000	101,365	63,865
2011	98,297	58,978	101,325	97,177
2012	119,166	71,499	103,757	98,189
2013	85,334	51,200	106,247	80,337
2014	88,823	53,293	111,435	na
2015	60,361	36,216	114,095	na

Source: RDTL; IMF 2011; DNAHE-MAP 2015

Appendix 4. National production information of rice subsector in Timor-Leste

	Annual production (t/year)	Cultivated area (ha)	Average yield (t/ha)
Rice (averages for the period 2006-2015)	50,000	27 780	1.8
Average annual growth over the last 10 years (%)	2.4		
Average cost of production (USD/ton)	190		
	On farm consumption	Marketed	
Percentage of production (%)	85	15	
	Volume (ton/year)	Value (USD/year)	
Market product #1, rice	7,500	4.95 million	
	Small	Medium	Large
Level of processing operation	✓	✓	-
Level of trading/wholesale operation	✓	-	-
Level of retail operation	✓	-	-

Source: Young 2013; Correia et al. 2016

Appendix 5. Formal cattle and Buffalo exports 2005-10.

	Cattle (head)	Buffalo (head)	Hides (pieces)
2005	2,913	99	
2006	2,473	151	
2007	2,022	410	
2008	1,201	260	400
2009	910	76	4,872

Source MAFF, 2010

Appendix 6. List of stakeholder consulted

No	Expert name	Title / position	Institution	Telp
1	Quintino Gusmao	Cordenator Geral Extensionista Covalima	MAP Covalima	77359517
2	Graciano Amaral	Cordenador Extensionista Maucatar	MAP Covalima	77476888
3	Marcelino Cardoso	Cordenador Extensionista Fatumean	MAP Covalima	76470766
4	Jaime S.pereira	Cordenador Extensionista Suai	MAP Covalima	76530713
5	Paulo da Costa	Cordenador Extensionista Fatululik	MAP Covalima	77477733
6	Angelino Amaral	Vice Cordenador Extensionista Jumalae	MAP Covalima	75894250
7	Angelina S.Barros	Staf tecnico diresaun Crops	MAP Covalima	77340500
8	Urbanu M.T.Suri	Chefe Dep. Pecuaria e Veterinaria	MAP Covalima	77312864
9	Jose Fatima Xavier	Administrador Posto	Tilomar	77304183
10	Santiago Barreto	Administrador Posto	Jumalae	77304185
11	Rosalina Martins	Diretor Manager Program	OXFAM	77310889
12	Mateus C.Araujo	Ass Cordenador Micro Pequena empresas	MCIA Covalima	-
13	Inacia	Secretario Regional de Tourismo RAEOA	RAEOA	77340023
14	Elias Silva	Centro Edukasaun Civica	Local NGO-RAEOA	
15	Armindo R.dos Santos	Program Manager	OXFAM-RAEOA	77284589
16	Deolindo Sequeira	Cordenador	CCT-RAEOA	
17	Raimundo COA	Cordenador	Local NGO-AHCAE	75222200
18	Lawrance	Trader	Private sector	75375613
19	Alberto P.Nino	Administrador Posto	Oesilo	77304424
20	Antao Ulan	Administrador Posto	Passabe	78997615
21	Jacinto C.	Butcher	Local business	75949845
22	Benjamin Elo	Cattle trader	Private sector	
23	Higino	Diretor	Comp. ACELDA	
24	Insencinio A.da Silva	Cordenador Extensionista	MAP Baucau	77247446
25	Januario Pereira	Cordenador MCIA região I	MCIA Baucau	77278866
26	Jose M.Alves	Crop Manager	CRS Baucau	77325044
27	Jumilda M. Vilanova	Program manager	World Vision	77281500
28	Isac	Program manager	TOMAK Baucau	
29	Sebastiao Correia	Administrador Posto	Vemasse	77304120

Appendix 7. Photo – meeting and interview activities


MAP Baucau


MAP RAEOA


Sec Regional Turismo RAEOA


CRS Baucau


Diretor ACELDA


Community leader


Local NGO RAEOA


TOMAK Baucau


Training - enumerators


Field interview - Suai