RESEARCH REPORT 1

SANITATION VALUE-CHAIN IN NUSA TENGGARA TIMUR INDONESIA

JULY 2015

ENTERPRISE IN WASH

ENTERPRISE IN WASH

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ABOUT THE AUTHORS

The Institute for Sustainable Futures (ISF) was established by the University of Technology Sydney to work with industry, government and the community to develop sustainable futures through research and consultancy. Our mission is to create change toward sustainable futures that protect and enhance the environment, human well-being and social equity.

Research in Economics and Business (P2EB) at University Gadjah Mada conducts research in economics, with a particular emphasis on methodological thinking and high policy impact.

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Table of Contents

FIGURES

TABLES

EXECUTIVE SUMMARY

Introduction

This study examines the sanitation hardware supply in low density settings in Nusa Tenggara Timur (NTT) Indonesia. The research involved a value chain analysis and examined strategies to improve the supply of affordable sanitation products. The research was undertaken in two districts in Nusa Tenggara Timur (NTT), namely Timor Tengah Utara (TTU) and Manggarai Timur (MT). This study was undertaken by Institute for Sustainable Futures, University of Technology Sydney with University Gadjah Mada in partnership with Plan International Indonesia.

The question addressed by this research emerged from practitioners in development agencies currently attempting to support development of supply chains for sanitation products in rural areas. They were concerned about how the low population density and difficult geographical challenges would affect the effectiveness of market-based approaches to improving access to products and services. This led to an interest to investigate the actual costs along supply chains and gain a better understanding of costs and logistics involved in such remote, rural locations.

Study purpose and methods

The research objectives were: (i) To analyse the viability of market-based solutions for sanitation products in low-density areas, including the impact of distance and transport cost; (ii) To map and correlate latrine costs against poverty levels, toilet coverage and other socio-demographic dimensions in remote, rural areas; (ii) To identify strategies that could support availability of affordable, acceptable products for the poor in remote, rural areas, with a key focus on the enabling environment for pro-poor business development.

This research methodology was based on a value-chain analysis, working backwards through the supply chain from the costs of component materials to build toilets for households in three villages in each subdistrict of TTU and MT. For externally sourced materials such as cement, toilet pans and iron and zinc we followed the links up the supply-chain to local materials shops, to district and provincial shops and distributors to producers and manufacturers. The study also considered the prices and availability of locally sourced materials. For the purposes of the analysis three main models of toilet were used, where Model 1 represents a lined pit and upper structure built with local materials, Model 2 represents a brick-lined pit, cement middle and semi-permanent upper, and Model 3 represents a septic tank with water-sealed pan and permanent structure.

Key study findings

The three main findings of this study are as follows, with further detail provided below.

- Toilet costs are made up of costs of externally sourced items (subject to increases in costs along the supply chain and transport costs) and locally sourced items (subject to local variations). In the case of externally sourced items (cement, toilet pans, reinforcing iron and zinc sheets) there is little opportunity to optimise the supply chain. Cement which comprises 21-28% of the cost of a durable toilet, offers little profit margin already to actors in the supply chain. Although the toilet pan costs could be reduced (and indeed are through locally supported production in TTU), they comprise a very small proportion of the overall toilet cost. In the case of locally sourced items (sand, gravel, rock, bricks etc.), it was found that price variations in these items were significant and could outweigh the variations in cost of externally sourced items, particularly in the case of TTU.
- There was evidence that in areas of high poverty, the costs of durable toilets are high. For instance the three subdistricts of TTU with highest poverty also had the highest costs, and the subdistrict in MT with highest poverty rate had toilet costs of 139% compared with the cost in the district capital of Borong. Therefore there may be a case to target locations with high poverty rates and high costs of toilet provisions. Transport costs are highly variable depending on the location, and incidences of monopoly in the transport sector was found, where there is only one service provider available who can therefore set their prices without competition. There may be room to reduce transport costs through development of business models that include transport. This study did not specifically investigate areas without road access, however global data points to the typically low sanitation

coverage (for example in Laos's access to sanitation in rural locations without road access if 23% as opposed to 51 % in rural locations with road access) (JMP, 2012).

- Sanitation products are not made available in a consolidated package to households in that there were almost no sales of toilet packages (with or without installation) in either TTU or MT. In addition, labour is a significant cost component in both TTU and MT, and presents an opportunity to consider how such costs might be subsidised or reduced. Finally, the cost of the upper structure of the toilet is significant, and represents a major opportunity to reduce costs and materials use.

Detailed study findings

Areas of high poverty experience high costs to build a toilet: It was found that in TTU, there was some correlation between level of poverty and subdistricts with the proportion households with durable toilets (Models 2 and 3), in that subdistricts with higher poverty had lower coverage of durable latrines. This was not the case in MT, where no relationship was found, though healthy toilet coverage across the entire district is very low (5-13%).

The real per capital income in TTU is IDR 2.24 million in 2013 (BPS, 2015). In TTU, the materials cost for a Model 3 toilet ranged from IDR 3.85 million in Noemuti Timur to IDR 5.01 million in Miomafo Tengah. In TTU it was found that the three subdistricts with highest levels of poverty (Miomafo Tengah, Bikomi Nilulat and Musi) also demonstrated the highest costs to build a Model 3 toilet.

In MT the real per capita income in MT is only IDR 1.61 million in 2013 (BPS, 2015), much lower than the average of all 22 districts (IDR 2.64 million), and the third lowest in the province. MT also demonstrated high relative costs to build a Model 3 toilet, with the materials cost ranging from IDR 5.69 million in the district capital Borong, to IDR 10.52 million in Poco Ranaka Timur (185% the cost in Borong). In Sambi Rampas, the subdistrict with highest rate of poverty within MT, the cost is also high, at IDR 7.72 million (136% the cost in Borong).

The toilet pan is a minor component of the total cost: The cost of toilet pan relative to overall cost of a toilet was very low. In TTU the toilet pan comprised only 3.6% of the total materials cost, and in MT only 2%. In TTU, the main cost components were: (i) Model 1: bamboo and wood; (ii) Model 2: cement, sand, wood and rock: and (iii) Model 3: cement, sand, brick and reinforcing iron. In MT, the main costs were for: (i) Model 1: bamboo and wood (ii) Model 2: sand, cement, wood and concrete bricks; (iii) Model 3: sand cement, concrete brick and rock. The cost of labour in comparison with materials was significant. In TTU the labour cost was 28-39% of the cost, depending on the model and in MT 24-29%.

Variations in cost are due to increases along the supply chain as well as availability of locally sourced materials: Variation in cost in different locations is caused by transportation and supply-chain costs which affect materials such as cement, reinforcing iron, pipe and zinc. Variation in cost is also cause by major differences in the accessibility and price of locally sourced materials including sand, bricks, gravel, rock and locally manufactured concrete bricks. In fact it was found that these variations can outweigh the differences in costs related to transport for externally sourced materials.

- **Materials from the supply chain:**
  - **Cement**, originally sourced in South Kalimantan and Sulawesi to Kupang, is a key cost component (21-28% of the total materials cost), however is already optimised within the supply chain with a small profit margin tolerated by supply shops, allowing little room for developing economies of scale or reduced prices. Its cost within subdistricts can be up to 30% greater than in the capital due to transport costs.
  - **Toilet pans**, as mentioned above, are a small cost component, hence although locally made toilet pans reduce costs from a range of IDR 125,000 up to IDR 300,000 to around IDR 50,000, this has little effect on the overall cost of building a toilet.
- **Locally sourced materials**
  - **Sand**: 5-fold variations in price were found in TTU and 3-fold in MT, up to IDR 200,000m^3 and 300,000m^3 respectively.
  - **Bricks**: 2-fold variation in price in TTU for both bricks and concrete bricks
  - **Gravel**: Varies 5-fold in TTU and 6-fold in MT, up to IDR 250,000m^3 and IDR 400,000m^3 respectively

Transportation and its costs: The majority of households paid to travel to go and buy materials (IDR 10,000 to IDR 70,000) and transport materials to villages using a pick-up. The condition of the roads of approximately half of the surveyed villages in TTU was reported to be poor or very poor, and villages were up to 35 miles travel from the district capital and an average distance of 8 miles from the subdistrict capital. Transportation costs comprised up to 9% of the total cost of materials some location in TTU and in MT, in one location the transportation cost was as high as IDR 753,000 (Elar Selatan), which si 9 hours from the district capital. It was reported to be more profitable (10% profit) than other businesses in TTU, however in MT the business is very competitive with around 30-50 transport providers who each serve 1-2 routes.

Materials supply shops

Materials supply shops are important players in the value chain, and hence understanding how they operate, and if and how they can provide discounts or credit to customers is important when considering how to increase affordability of sanitation products in rural areas.

- **Size, revenue and formal legal status**: Shops in the TTU district capital and subdistricts were all registered, with revenue of between IDR 10 million to IDR 50 million/month, and anywhere from 1-4 employees (in subdistricts) to 5-17 employees (in the district capital). In MT all shops were also formally registered, and had gross revenue from IDR 10 million up to more than IDR 150 million per month, 2-11 full-time employees.

- **Credit and discounts for customers**: In both district and subdistricts of TTU, there was evidence that trusted customers would be allowed to delay their payment for a short time (eg 2-4 weeks) for some proportion of the payment (e.g. 20%) of up to a few million Rupees. Discounts could offered to customers who buy in bulk, though the quantity required varied- one shop suggested for 50 sacks of cement, whilst another suggested for 100-200 sacks of cement. In MT shops were generally reluctant to provide credit to customers, with exception of loyal or close customers. Some shops provide a 5-10% discount to bulk purchase (value more than IDR 10 million).

- **Choosing suppliers**: District shops generally choose suppliers in Surabaya rather than Kupang to reduce their costs. Subdistrict shops chose suppliers on the basis of informal relationships and partnerships. In MT there was no dominant method of choosing suppliers, for instance it could be a price differential or contact with a sales agent.
- **Competition**: There was significant competition in the district capital of TTU, and much less so in the subdistricts, which generally had a monopoly for their geographical area. Subdistrict shops reported challenges in addressing competition with district shops however (in Kefamenanu and Atambua) as the latter were able to provide cheaper prices that were attractive to customers. In MT the number of materials supply shops is around 6-7, with most located in Borong, the district capital. Competition is by price and also provision of service (e.g. having a car to deliver).

- **Transport**: District shops in TTU all own vehicles (around 1-3 large trucks and 2-3 smaller trucks) for their own deliveries (not rented out for other purposes), and in the subdistricts, shops also usually owned 2-3 trucks. For some subdistrict shops the transportation was included in the accounting for the overall business, and for one of these, the cost of transportation was included in the materials price. In another case transportation was treated as a separate business entity from the shop, and the trucks were rented out. Shops reported that vehicles generally return home empty after making deliveries and road access depended on the weather and location. In MT all shops have at least 1 pickup with capacity of 1-1.5 ton (one shop has a truck with capacity of $3m^3$) and pickups delivering items to customer is usually return empty

- **Participation in partnerships**: Shops had experienced large contracts to provide construction materials for buildings, however none of the shops in TTU or MT had experience of a partnership with masons or sanitation entrepreneurs.

Government and policy environment: Government's role is mainly related to promotion of healthy sanitation, which is under the auspices of Department of Health. District governments currently play a limited direct role with respect to the supply chain of sanitation materials. On the one hand this is understandable as the supply chain of sanitation materials

is market based. However, support from government could help optimise the supply chain, support sanitation entrepreneurs, and reduce costs for the poor.

In TTU attention has been given to sanitation over recent years, particularly through the support of Plan International Indonesia working with DoH staff at district and subdistrict levels. There has been limited coordination between departments to support the supply chain, and ad hoc spending of government budget to support materials for toilets has occurred rather than systematic support of the supply chain. Sanitation entrepreneurs have not received support through DSMET however could collectively apply in the future for support to develop their businesses.

In MT sanitation was not a priority until recently when Plan commenced support for implementation of STBM. Department of industry, trade, cooperatives, and SMEs (Disperindagkop & UKM) have allocated a yearly budget to include funding for training of sanitation entrepreneurs of IDR 250-270 million in their 5-year budget plan proposal.

Strategies to improve affordability of toilets in NTT

To fulfil the objective of improving the availability and affordability of products and services to build toilets, particularly in areas of higher poverty, there are a range of actions which can be considered. Some key points concerning the findings of this study that should inform development of such strategies are as follows.

- Seek opportunities to understand and where possible reduce costs of locally sourced materials
- Support further design development of the upper structure, which is currently highly costly and uses materials that are heavy and expensive to transport
- Supporting sanitation entrepreneurs to rethink and extend their business model beyond a narrow focus on toilet pans
- Support access to finance for customers, such that toilets can be paid for in installments
- Develop an association of sanitation entrepreneurs to provide mentoring and support
- Organise communities for collective purchasing to increase economies of scale
- Develop smart targeted subsidies to reach the poor, for whom the costs are currently greatest, funded by government and implemented by other actors such as non-governmental organisations, including attention to addressing the labour component of toilet costs.

1 INTRODUCTION

This document presents research on the sanitation hardware supply in low density settings in Nusa Tenggara Timur (NTT) Indonesia. The research involved a value chain analysis and examined strategies to improve the supply of affordable sanitation products. The research was undertaken in two districts in Nusa Tenggara Timur (NTT), namely Timor Tengah Utara (TTU) and Mangarrai Timur (MT).

1.1 BACKGROUND AND OBJECTIVES

1.1.1 Background

The question addressed by this research emerged from practitioners attempting to support development of supply chains for sanitation products in rural areas and facing challenges in the difficult logistics and costs involved in transporting materials for use to build toilets to remote locations. This raised a question about the viability of market-based approaches to address poor sanitation coverage in remote rural areas, and an interest in investigating the actual costs along the supply chain, and in different remote, rural locations.

Historically, little attention and few resources have been devoted to rural sanitation and its status was seen as private matter for households. Over the last five years, there has been an increasing recognition of the role of government in supporting sanitation service provision, though largely focused on urban and peri-urban sanitation (Murta and Willetts, 2014). Among the various government departments who share responsibility for water and sanitation, the Department of Health (DoH) has the strongest role in rural sanitation.

In 2005 community-led total sanitation (CLTS) was introduced through trials conducted in six provinces. Its success led to it being adopted as the main methodology for sanitation improvement, with the Ministry of Health (MoH) issuing the National Strategy for CLTS in 2008 (Sanitas Total Berbasis Masyarakat - STBM), which later became part of the five-year national development plan for 2010–2014. Sanitation marketing was first introduced to Indonesia by World Bank Water and Sanitation Program in East Java in 2007, in strong partnership with DoH. Since then, the sanitation marketing approach has been implemented by various civil society organisations (CSOs), including Plan International Indonesia, partner in this research study. Such CSOs typically work in more remote, rural contexts than East Java, where sanitation marketing was first introduced, this this study seeks to provide an evidence base to inform approaches to sanitation market development that can benefit the poor in such areas.

1.1.2 Research objectives

The objectives of this research were: [1] To analyse the viability of market-based solutions for sanitation products in low-density areas, including the impact of distance and transport cost; [2] To map and correlate latrine costs against poverty levels, toilet coverage and other socio-demographic dimensions in remote, rural areas; [3] To identify strategies that could support availability of affordable, acceptable products for the poor in remote, rural areas, with a key focus on the enabling environment for pro-poor business development.

In line with the above objectives, the research aimed to:

- Identify the main actors, processes and links in the value-chain of sanitation hardware in NTT;
- Identify the costs, earnings profiles and financial performance of different links along the value-chain of sanitation hardware in NTT;
- Examine critical links, their strengths and weaknesses, and the factors affecting them, including the influence of transport and accessibility on the value-chain;
- Assess possible actions that can be taken to improve the sustainability of the value-chain of sanitation hardware in NTT; and

- Assess government policy and regulatory framework in terms of their suitability for the improvement of the value-chain of sanitation hardware in NTT.

1.1.3 Research questions

The research questions were as follows:

1. What is the distribution of the value between the nodes in the value-chain? How does the value change along the nodes?
2. What is the relationship between poverty, toilet coverage and costs of sanitation products in low density locations in rural NTT?
3. Why does the chain look the way it does? How could the enabling environment better support development of the supply chain for sanitation products?
4. How can the supply chain be optimised or subsidised to reduce costs of sanitation products to households in low-density locations in NTT?

1.1.4 Research framework

This research was based on a value-chain analysis (VCA). This type of analysis, which was originally used for business studies in 1980s, has recently become more popular in the area of development research.

Value-chain analysis depicts a sequence of related enterprises that conduct value-adding activity to a particular product, from its primary production, through its packaging and distribution, to the final sale of the product to consumers. By depicting the value-chain, it is possible to understand the work of the chain as a whole, the function of each link along the chain and the influence of parties outside the chain. The research mapped the value chain, and examined costs, outputs and the physical flow of commodities along the chain (Kaplinsky and Morris, 2000).

There were three types of actors covered in this research, namely:

1. Value-chain actors and their linkages, which consist of primary producers, distributors (including retailers and transport providers), and consumers as the end-users;
2. Business environment actors, which refers to government officials responsible for the provision and maintenance of infrastructure, as well as for the development of policies, laws and institutions that influence how the market system works; and
3. Business development service providers, which include businesses and government extension services that support the value-chain, such as training, consultancy, marketing assistance, financial institutions or credit providers

For reasons of scope, value chain analysis in this research was started from the bottom-up, that is, from the end-user, tracing relevant products from the household level up through the supply-chain. In addition, and also for reasons of scope, a core focus was maintained on the supply chain rather than demand-side, such as willingness to pay or demand-side behaviour.

There are a number of key known issues for sanitation value chain actors. Based on a systematic literature review of enterprise engagement in water and sanitation (Gero et al., 2013) and political economy analysis of dynamics shaping enterprise involvement in Indonesia (Murta and Willetts, 2014), the following areas were investigated as part of clarifying key issues affecting actors in the supply-chain:

- Access to credit
- Nature of personal and business relationships between actors in the chain
- Legal status of businesses (if legalised/formalised or not)
- Availability of and access to business support e.g. training
- Nature of current consumer demand
- Level of entrepreneurship, risk taking etc.

1.2 METHODOLOGICAL DESIGN

1.2.1 Data and data collection

This research employed both quantitative and qualitative data. These data were collected from primary sources, through structured interviews with households, retailers, distributors, producers and local government officials.

1.2.2 Sample and sampling method

This research focused on two districts in NTT, namely TTU and MT (see Figure 1). These were selected amongst seven district locations where Plan International Indonesia is conducting sanitation programs on the basis of the following criteria: socio-economic status, sanitation coverage, accessibility and remoteness and population density.

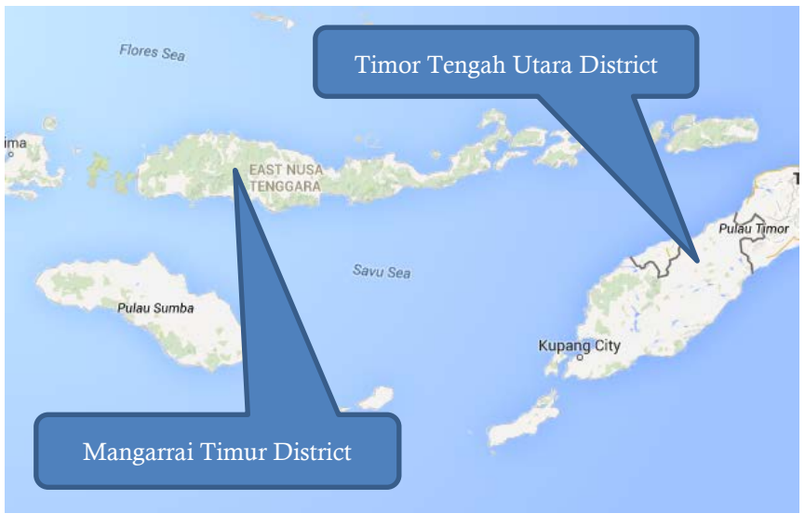

Figure 1: Research sites in TTU and MT in NTT province

TTU comprises 24 sub-districts (see Figure 2), whereas MT consists of 9 sub-districts (see Figure 4). From each sub-district, three villages were chosen, representing respectively villages whose location was (i) closest to the sub-district's capital, (ii) farthest from the sub-district's capital and (iii) somewhere in between (see Figure 3 and Figure 5). Based on this approach, 72 villages in TTU and 27 villages in MT were surveyed.

Figure 2: Subdistricts of TTU

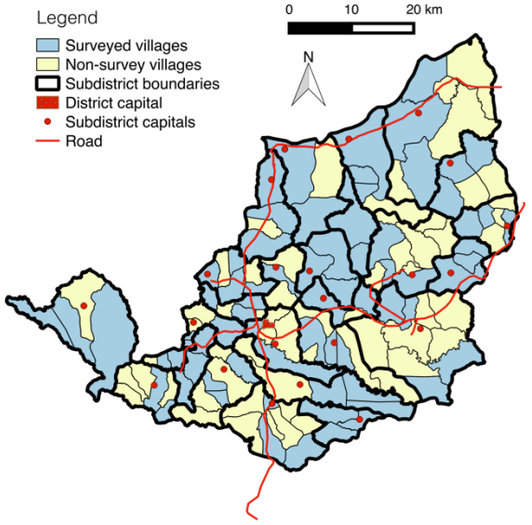

Figure 3: Surveyed villages in TTU

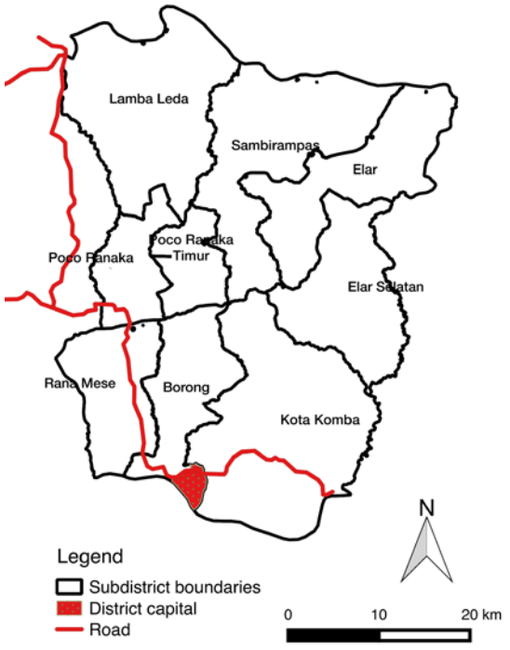

Figure 4: Subdistricts of MT

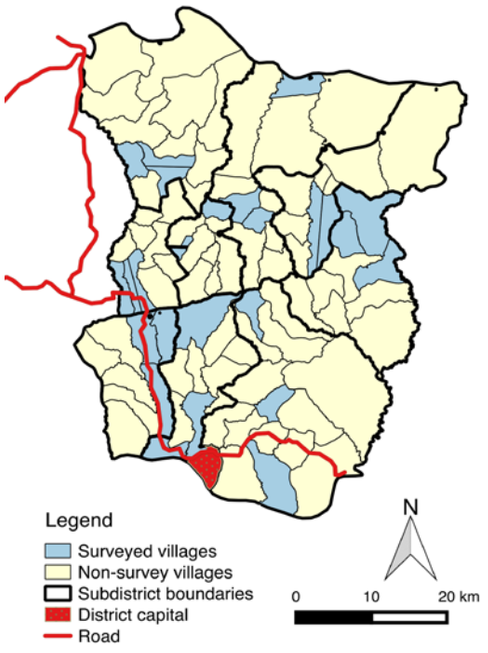

Figure 5: Surveyed villages in MT

Data on materials costs and quantities were collected based on convenience sampling of households and masons, including at least 4 households and one mason in each village.

The sample of retailers, distributors/producers, and transport and credit providers was chosen using snowball sampling, working from the household level up through the supply chain in 2-3 locations for each district. A sample of local

government officials (district agencies, subdistrict head and sanitarians) and sanitation entrepreneurs was chosen based on purposive sampling to include a cross-section of relevant key informants.

1.2.3 Data collection tools

Data collection instruments were developed for each of the following groups: villages, masons, sanitation entrepreneurs, materials shops, local government officials, transport providers and credit providers.

For the purposes of the research, toilet types were differentiated on the basis of the Sanitas Total Berbasis Masyarakat (STBM) categories for the underground, middle, and top parts of the construction (see Figure 6, Figure 7 and Figure 8).

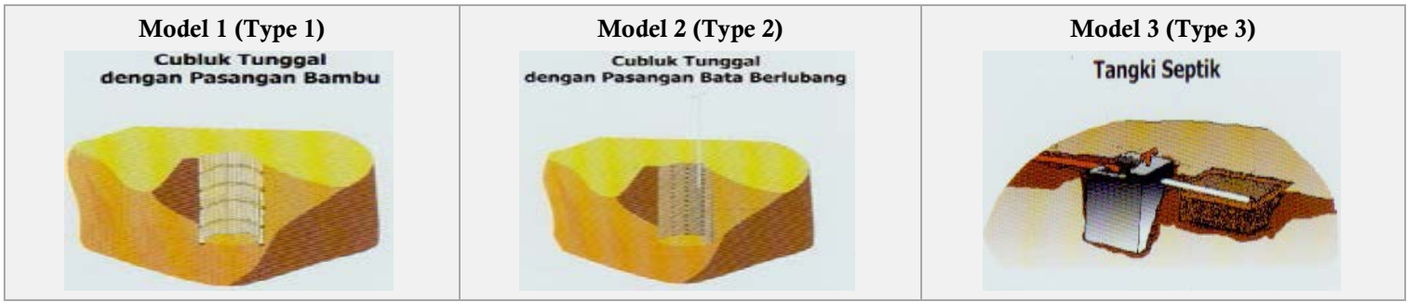

Figure 6: Variations in toilet model underground bottom section

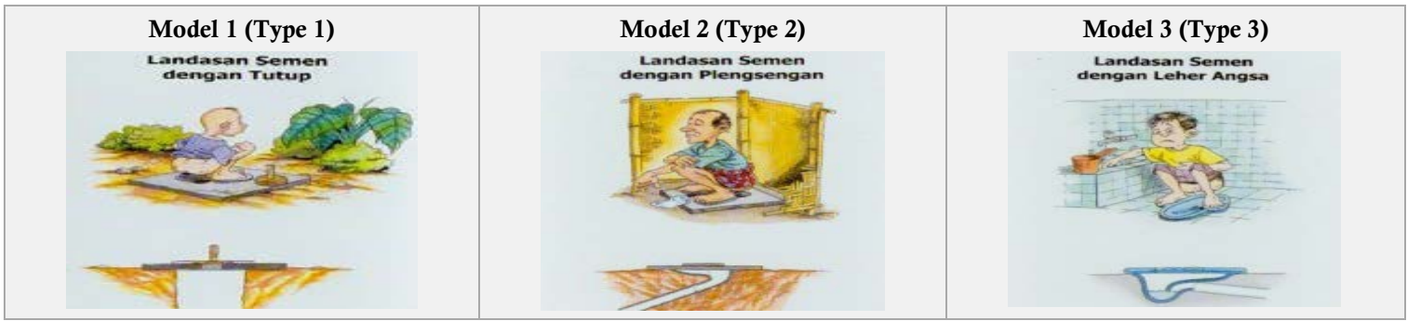

Figure 7: Variations in toilet model middle section

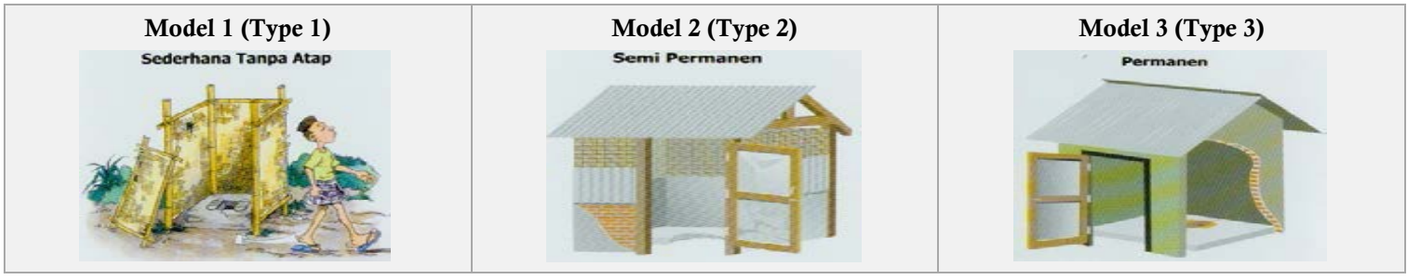

Figure 8: Variations in toilet model upper or top section

1.2.4 Data Analysis

Analysis involved several stages, starting with the iterative improvement of the quality of the cost data that underlies the value chain analysis. Data collected from village level was reviewed and where deemed implausible or incorrect, additional data was sought, or estimations were made on the basis of costs from relevant materials supply shops. To allow for comparison of costs across different villages and subdistricts, an average standardised set of quantities of different materials to build a toilet was calculated. This was used in conjunction with local cost information on materials and transport to support detailed analysis of costs in different locations.

To visualise the costs of different materials and overall costs of toilets in different locations, the results were analysed using geographic information system (GIS). Due to limited availability of GIS layers in the relevant districts, in some cases approximations for administrative boundaries have been made- particularly where villages or subdistricts have recently been divided into additional administrative areas.

The value chain mapping for externally sourced materials such as cement and toilet pans was developing using quantitative data on the buying and selling prices at different steps along the supply chain, illustrating how sanitation related products flow to end-users from producers. This quantitative analysis was complemented by qualitative analysis of key factors affecting the supply chain, drawing on interviews with a wide range of producers, distributors, materials supply shops, credit providers and transport providers.

In the final stages of analysis comparisons were made between the two sampled district locations, allowing for implications for government and external development agencies (such as CSOs) concerning strategies to support access to affordable sanitation products for the poor.

1.2.5 Limitations

This study was designed to systematically examine costs along the supply chain including costs to remote village locations. Several challenges met and resultant limitations in the research approach and the data quality should be acknowledged.

Firstly, supply chain actors were not always open to discuss their profit margins and hence these had to be inferred from buying and selling prices at different points along the chain and separate data collected on transport costs. Since transport costs can vary over time and depending on the relationships involved, this placed limitations on the estimation costs and profit margins of different actors.

Secondly, costs of materials to build a toilet were collected at village level, and these costs therefore relied on recall of interviewees. Data quality was found to vary considerably, and data was cleaned to adjust anomalous figures, using costs of materials at the nearest sub-district supply shop as a proxy.

Thirdly, challenges were faced in mapping data using GIS, as village names and locations were difficult to determine due to changed village boundaries and division of one subdistrict into two subdistricts. All data has been checked by local field staff to verify the data mapping however it is possible that there may remain minor errors.

Lastly, it was necessary to standardise the materials' quantities to allow for comparison of costs from one location to another for each toilet type. In reality there is very wide variation in quantities of materials used to build toilets since designs can vary and many permutations of the different materials are possible.

2 FINDINGS IN TTU

2.1 POVERTY AND ACCESS TO SANITATION

Across the subdistricts of TTU, the relationship between toilet coverage and poverty rate demonstrated some correlation (Figure 9). This was particularly true when the type of toilets included was limited to Models 2 and 3, which are higher cost and use greater quantity of materials. The different possible models of toilet are discussed further in Section 2.2.1 below. The coefficient of correlation between toilet coverage and poverty rate is only equal to -0.05 for all toilet models, but when limited to toilet coverage of Models 2 and 3 a relationship is visible and the coefficient correlation is -0.47 or nearly -0.5.

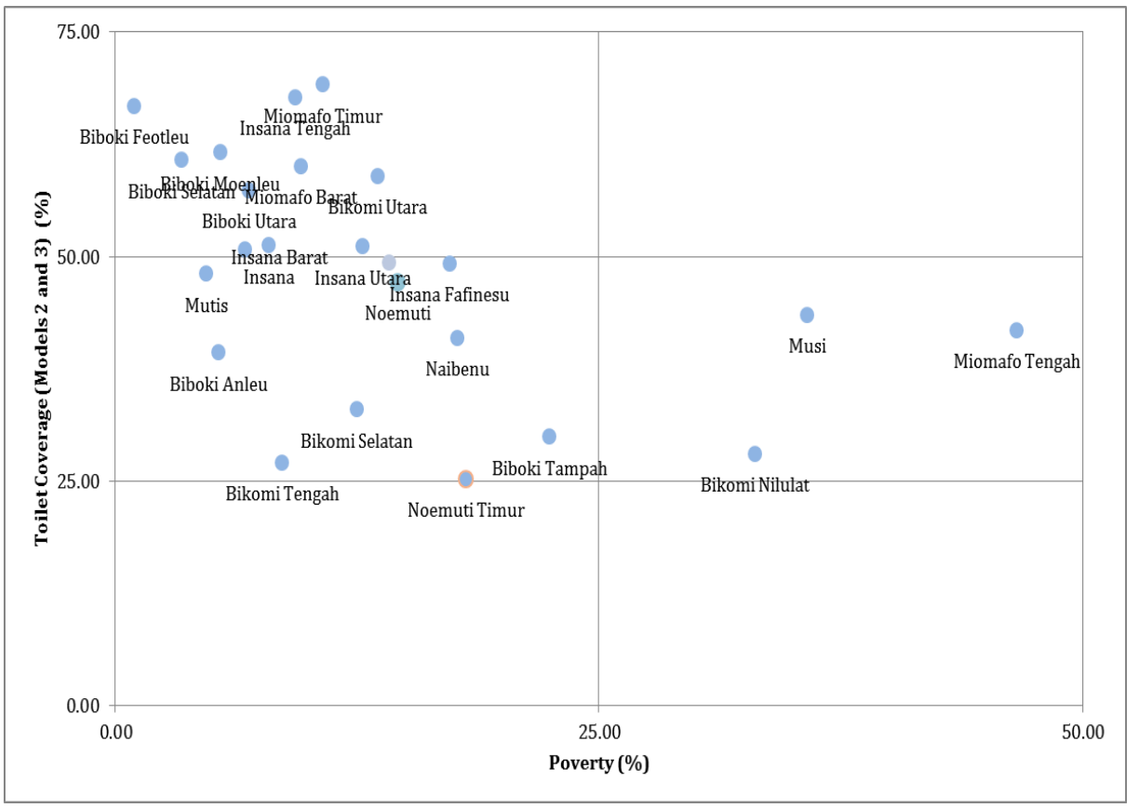

Figure 9: Relationship between poverty and toilet coverage in TTU

Source: Statistics Indonesia (2013) and Plan International Indonesia (2014)

Poverty and toilet coverage data are shown in Table 1 as well as the distance from the district capital, Kota Kefamenanu. The subdistricts furthest from Kefamenanu are Biboki Anleu, Biboki Feotlue and Biboki Moenleu-however these subdistricts are adjacent to Kota Atambua which is in the next district to the east, and hence in terms of sourcing materials to build toilets, they have access to materials shops in Atambua,. The average distance of subdistrict capitals from the district capital is 38 km.

Table 1: Poverty levels and access to sanitation in TTU

Sub-district of TTU	Population (2012)	Population density (2012) (people /km^2)	Distance from district capital (km)	Number of poor households	Number of inadequate houses	Proportion of pit latrines (%)	Proportion of squat latrine (%)	Proportion of water-seal latrines (Model 3) (%)
Biboki Anleu	15698	76	91	206	426	60	14	26
Biboki Feotleu	4043	32	97	-	201	43	35	22
Biboki Moenleu	7375	86	82	104	431	38	7	55
Biboki Tampah	9239	56	43	76	207	23	22	55
Biboki Utara	5789	58	64	310	351	52	10	38
Biboki Selatan	10639	77	45	170	551	39	13	48
Bikomi Nilulat	4381	53	29	416	322	52	23	25
Bikomi Selatan	10064	207	12	325	404	63	10	27
Bikomi Tengah	6866	112	11	173	428	66	9	25
Bikomi Utara	5723	81	33	204	295	38	18	44
Insana	18988	57	34	336	585	43	17	39
Insana Barat	9236	91	20	162	387	44	15	41
Insana Fafinisu	5188	98	33	233	358	43	19	38
Insana Tengah	10615	86	17	194	363	28	38	34
Insana Utara	9112	169	65	269	507	37	5	58
Kota Kefa	39190	530	0	244	687	19	16	65
Miomafo Barat	15191	76	38	380	641	33	39	29
Miomafo Tengah	5377	72	13	692	311	58	17	24
Miomafo Timur	10798	106	5	182	427	25	14	61
Musi	4186	51	17	446	437	57	13	30
Mutis	6741	74	66	82	328	50	33	17
Naibinu	5204	59	45	213	210	54	17	29
Noemuti	11192	72	17	407	507	52	16	31
Noemuti Timur	3810	68	40	182	399	43	4	52

The population in subdistricts of TTU is dense in the district capital of Kota Kefamenanu as well as adjacent Bikomi Selatan, and is least dense in the north-eastern subdistricts (see Figure 10 and Figure 11). The areas with the highest proportion of poor households are located in the south-west, particularly Miomafa Tengah, and also Musi and Bikomi Nilulat (see Figure 12).

Areas with the highest coverage of Model 3 toilets (55-65%) are Kota Kefamenanu, adjacent subdistrict of Miomafo Timur and Insana Utara in the north (see Figure 13).

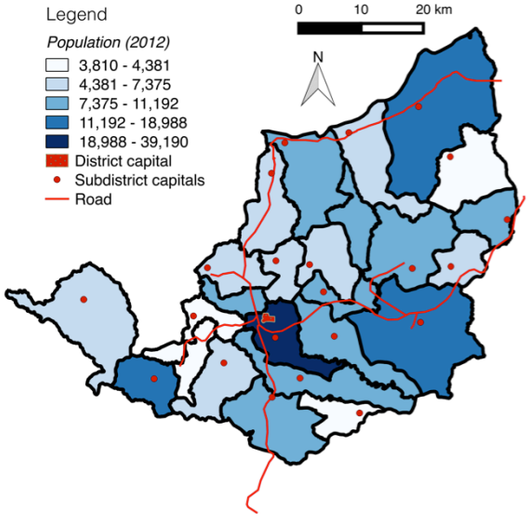

Figure 10: Population in subdistricts of TTU

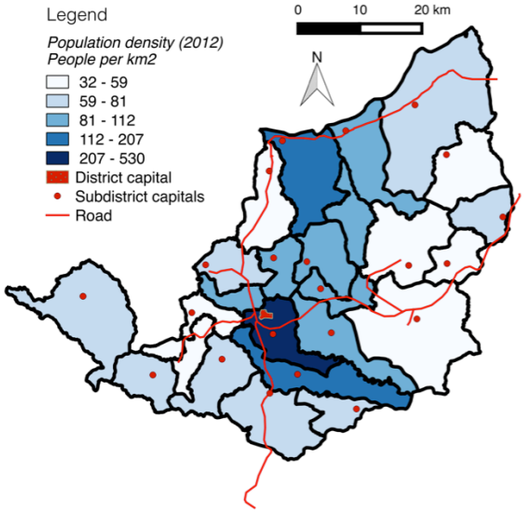

Figure 11: Population density in subdistricts of TTU

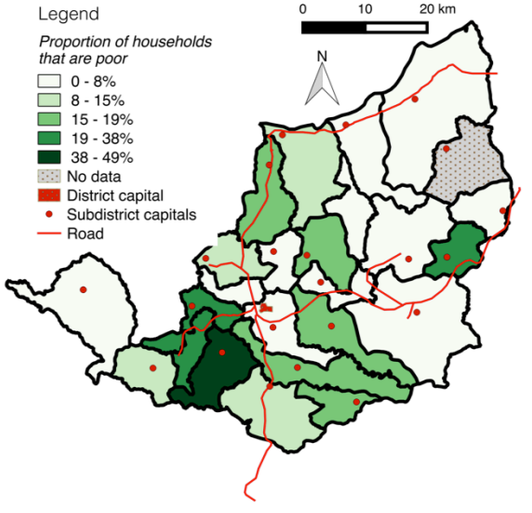

Figure 12: Proportion of poor households in subdistricts of TTU

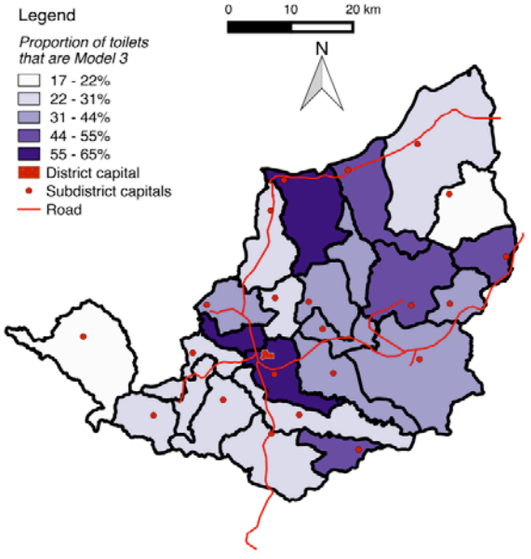

Figure 13: Proportion of toilets that are Model 3 in subdistricts of TTU

2.2 COST BREAKDOWN OF A TOILET

To determine the relative cost of different material's components for toilets in TTU, the following analysis first clarifies common toilet models in TTU and examines the average quantities of each material used in TTU for each model of toilet. Based on these findings and calculation of an average cost of each material within TTU for each toilet model, a generalised cost break-down is developed.

2.2.1 Common toilet types in TTU

Data on toilet coverage is available, however is not expected to be completely accurate. Interviews revealed that changing definitions in monitoring toilet coverage have resulted in reduced data quality. Monitoring of toilet type is also limited to a focus on the 'middle' section of the toilet (the type of toilet pan), however as discussed below, the middle section of the toilet was found to be indicative of the overall toilet model.

The coverage of each type of toilet in each subdistrict in TTU based on available data from Plan International Indonesia and government is shown in Figure 14. Wide variation in the proportion of toilets of different types is visible. In subdistricts Noemuti Timur and Musi for example, the coverage is mostly composed of Model 1, with a proportion larger than 74% and 56% respectively. In Kefa Kota by contrast, has 98% overall toilet coverage, with the coverage composed mostly (80%) by Models 2 and 3.

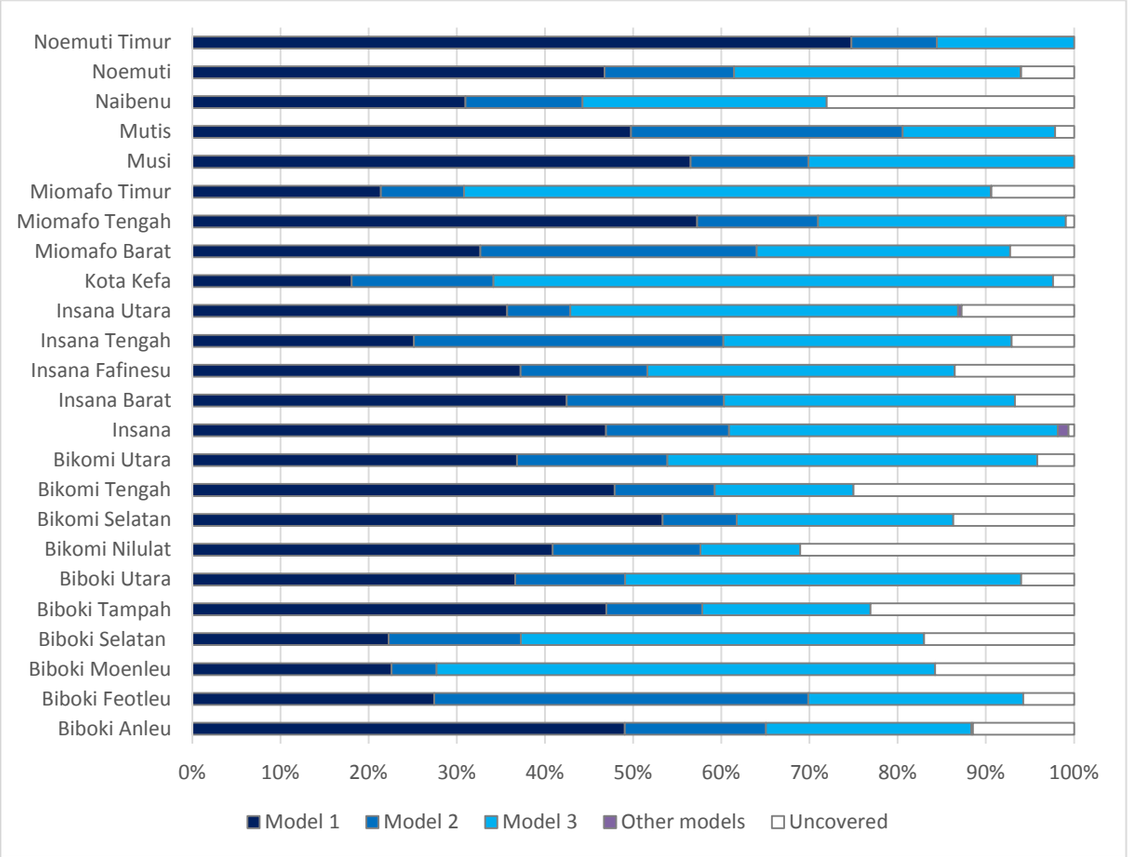

Figure 14: Toilet coverage in subdistricts of TTU disaggregated by toilet type

Source: Statistics Indonesia (2013) and Plan International Indonesia (2014)

Empirical data was also collected about the 'bottom', 'middle' and 'top' parts of the toilet across all subdistricts in TTU, since different combinations are possible across these three parts (Figure 15). It was found that Model 1 (including type

1 bottom, type 1 middle and type 1 top) and Model 3 (including type 1 bottom, type 1 middle and type 1 top) were most common. Beyond this various permutations were seen, particularly use of type 3 bottom and middle, with type 2 top (semi-permanent building) (see Figure 16).

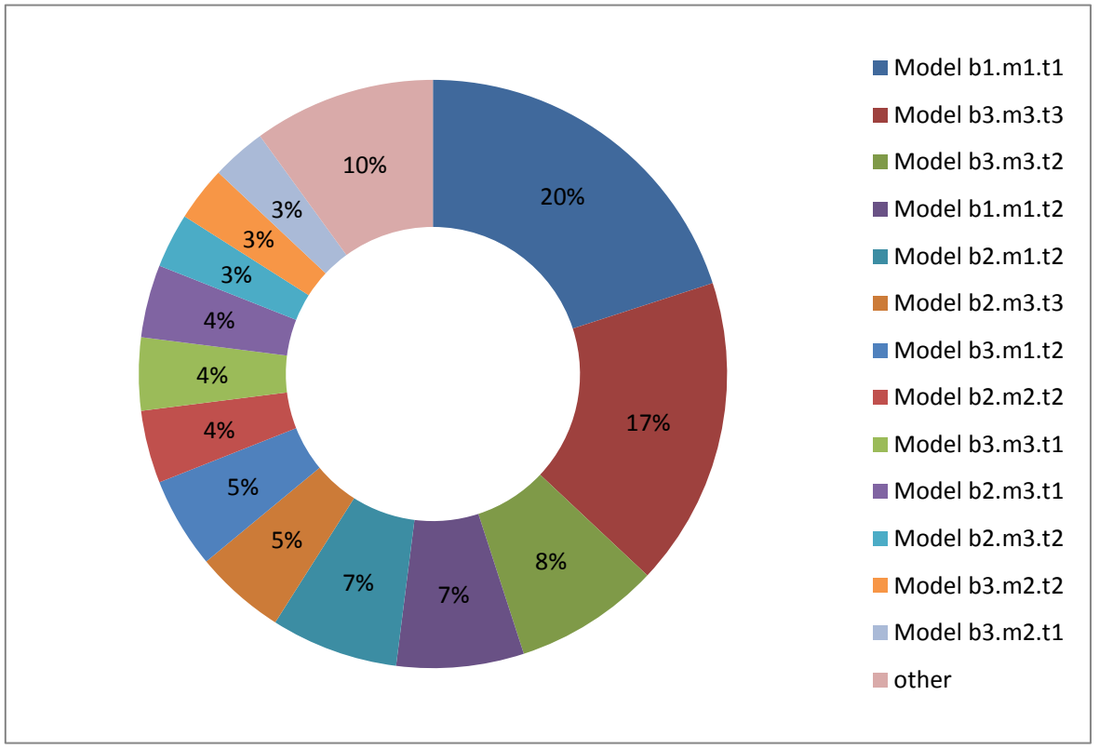

Figure 15: Common combinations of toilet model in TTU

Figure 16: Example of typical toilet models

Given that the most common toilet types were Model 1 and Model 3, for simplicity, the analysis from hereon is limited to consideration of three main model types (Model 1, Model 2, Model 3) rather than the many permutations that in reality are the case.

2.2.2 Quantities of different materials components

The cost of materials depends on the quantity of materials used and the per unit price of them. To make sure that differences in the toilet cost are not simply due to the differences in the quantity of materials used,[1] a standard quantity was set for each type of the toilet using double averaging calculation method.[2]

The standard quantity of materials used for different toilet Models are presented in Table 2. These quantities represent, on average, how much of each material is used to build a particular toilet Model in TTU. These standard quantities do not represent the quantities that would actually be used (for instance either bricks, or cement bricks might be used for a given toilet, rather than both), but rather, simply represent on average, the quantity of each material used across all toilet designs in TTU.

Table 2: Standard quantity of materials used in TTU for each toilet model

Material		Bamboo (unit)	Wood (unit)	Sand (m3)	Gravel (m3)	Rock (m3)	Brick	Cement brick	Cement (sack)	Reinforcing iron (12m)	Pipe (m)	Toilet pan (unit)	Zinc (sheet)
Model 1	Bottom	3.59	6.27	-	0.03	-	-	-	-	-	-	-	-
	Middle	0.64	3.52	0.69	0.09	0.02	-	-	0.99	0.02	-	-	-
	Upper	0.18	8.31	-	-	-	-	-	-	-	-	-	0.07
Model 2	Bottom	0.02	0.06	1.27	0.12	1.96	0.04	0.06	3.93	0.06	0.40	-	-
	Middle	0.22	0.03	0.97	0.06	0.36	0.01	-	2.82	0.11	0.30	-	-
	Upper	1.37	15.56	1.11	-	0.03	0.14	0.06	4.19	-	-	-	5.78
Model 3	Bottom	0.03	0.15	2.48	0.97	1.58	0.11	0.06	6.33	3.67	1.80	-	-
	Middle	-	-	1.13	0.05	0.11	0.07	0.02	2.81	0.43	0.26	1.00	-
	Upper	-	10.95	3.18	1.17	1.02	0.57	0.34	11.37	7.87	-	-	6.64
Model 1		4.41	18.10	0.69	0.12	0.02	-	-	0.99	0.02	-	-	0.07
Model 2		1.60	15.65	3.35	0.18	2.34	0.19	0.12	10.94	0.17	0.70	-	5.78
Model 3		0.03	11.10	6.79	2.19	2.72	0.75	0.43	20.51	11.97	2.06	1.00	6.64

2.2.3 Costs of different materials components

To understand the cost of building different types of toilets in different parts of TTU, it is important to understand the significance of the cost of each material for each toilet type. This is possible to calculate using average costs for materials across the whole district, using average standardised quantities (see Table 3 and Table 4).

For Model 1, the dominant cost is wood, and also to a lesser extent, bamboo. For Model the highest cost is for cement, followed by wood, and then sand. For Model 3, the highest cost is for cement, then sand, brick, wood and reinforcing iron. These differences can be seen in Figure 17.

[1] There are many differences in the tradition with respect to the exact shape of the toilet, the size of the platform and size of the building structure
[2] By double averaging in means that data from all sample villages are firstly averaged to obtain the mean and the standard deviation. Based on the mean and the standard deviation obtained in the previous step, outliers (i.e. data whose values are higher/lower that the value of the mean plus/minus the standard deviation) are excluded. Finally, the remaining data are again averaged to obtain the "standard" quantity of materials

Table 3: Average cost breakdown to build a toilet in TTU ('000 IDR)

Cost ('000 IDR)		Bamboo	Wood	Sand	Gravel	Rock	Brick	Concrete brick	Cement	Reinforcing iron	Pipe	Toilet pan	Zinc	Sub-total
Model 1	Bottom	51.2	171.9	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	226.3
	Middle	9.2	96.6	65.3	11.2	1.3	0.0	0.0	52.9	0.5	0.0	0.0	0.0	237.0
	Upper	2.5	227.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	233.6
Model 2	Bottom	0.2	1.7	120.5	14.4	158.6	27.7	29.0	208.7	2.0	19.5	0.0	0.0	582.4
	Middle	3.1	0.9	92.5	6.6	29.1	6.0	0.0	150.1	3.7	14.6	0.0	0.0	306.7
	Upper	19.5	426.7	105.2	0.0	2.1	93.5	27.2	222.8	0.0	0.0	0.0	258.8	1155.7
Model 3	Bottom	0.5	4.1	235.7	115.8	128.0	74.7	29.0	336.7	125.0	87.4	0.0	0.0	1136.9
	Middle	0.0	0.0	106.8	5.8	9.2	44.3	10.1	149.4	14.7	12.7	158.8	0.0	511.7
	Upper	0.0	300.3	301.9	138.5	82.7	389.0	154.3	604.4	268.1	0.0	0.0	297.3	2536.7
Model 1		62.8	496.5	65.3	14.5	1.3	0.0	0.0	52.9	0.5	0.0	0.0	3.2	697.0
Model 2		22.9	429.3	318.2	21.0	189.9	127.2	56.2	581.6	5.8	34.1	0.0	258.8	2044.8
Model 3		0.5	304.4	644.5	260.0	220.0	508.1	193.4	1090.5	407.8	100.2	158.8	297.3	4185.4

Table 4: Average cost breakdown of materials to build a toilet in TTU (%)

Cost (%)		Bamboo	Wood	Sand	Gravel	Rock	Brick	Concrete brick	Cement	Rein-forcing iron	Pipe	Toilet pan	Zinc	Sub-total
Model 1	Bottom	7.3	24.7	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.5
	Middle	1.3	13.9	9.4	1.6	0.2	0.0	0.0	7.6	0.1	0.0	0.0	0.0	34.0
	Upper	0.4	32.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	33.5
Model 2	Bottom	0.0	0.1	5.9	0.7	7.8	1.4	1.4	10.2	0.1	1.0	0.0	0.0	28.5
	Middle	0.2	0.0	4.5	0.3	1.4	0.3	0.0	7.3	0.2	0.7	0.0	0.0	15.0
	Upper	1.0	20.9	5.1	0.0	0.1	4.6	1.3	10.9	0.0	0.0	0.0	12.7	56.5
Model 3	Bottom	0.0	0.1	5.6	2.8	3.1	1.8	0.7	8.0	3.0	2.1	0.0	0.0	27.2
	Middle	0.0	0.0	2.6	0.1	0.2	1.1	0.2	3.6	0.4	0.3	3.8	0.0	12.2
	Upper	0.0	7.2	7.2	3.3	2.0	9.3	3.7	14.4	6.4	0.0	0.0	7.1	60.6
Model 1		9.0	71.2	9.4	2.1	0.2	0.0	0.0	7.6	0.1	0.0	0.0	0.5	100
Model 2		1.1	21.0	15.6	1.0	9.3	6.2	2.7	28.4	0.3	1.7	0.0	12.7	100
Model 3		0.0	7.3	15.4	6.2	5.3	12.1	4.6	26.1	9.7	2.4	3.8	7.1	100

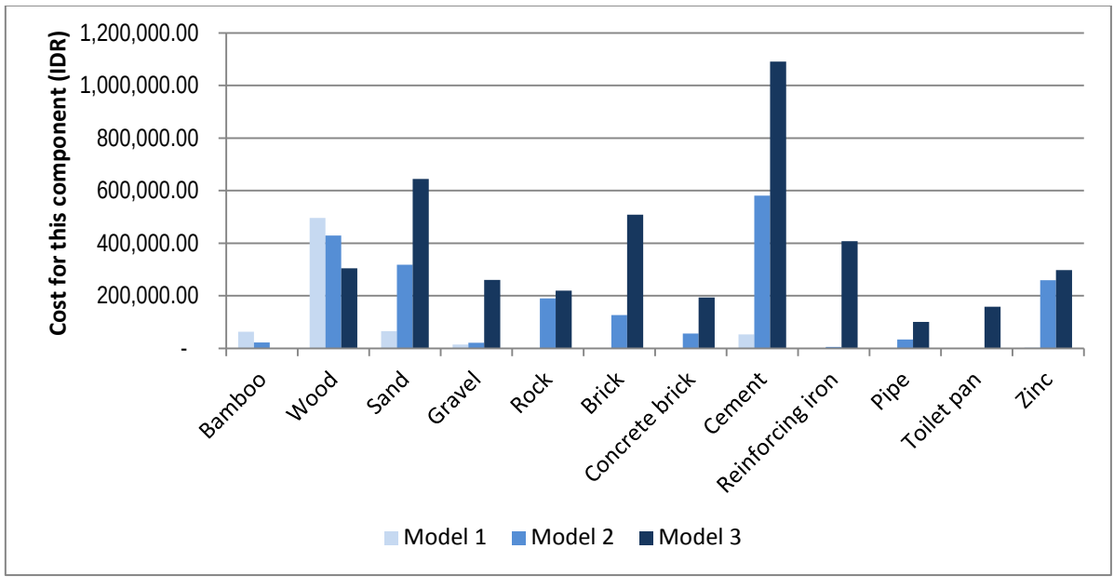

Figure 17: Cost breakdown for different materials components of three toilet models in TTU

Significant costs as associated with the upper structure of the toilet, particularly for Model 2 and even more so for Model 3 (see Figure 18). The high cost of the upper structure has also been observed in other country settings, and represents an opportunity to develop light-weight durable, transportable structures to replace current designs.

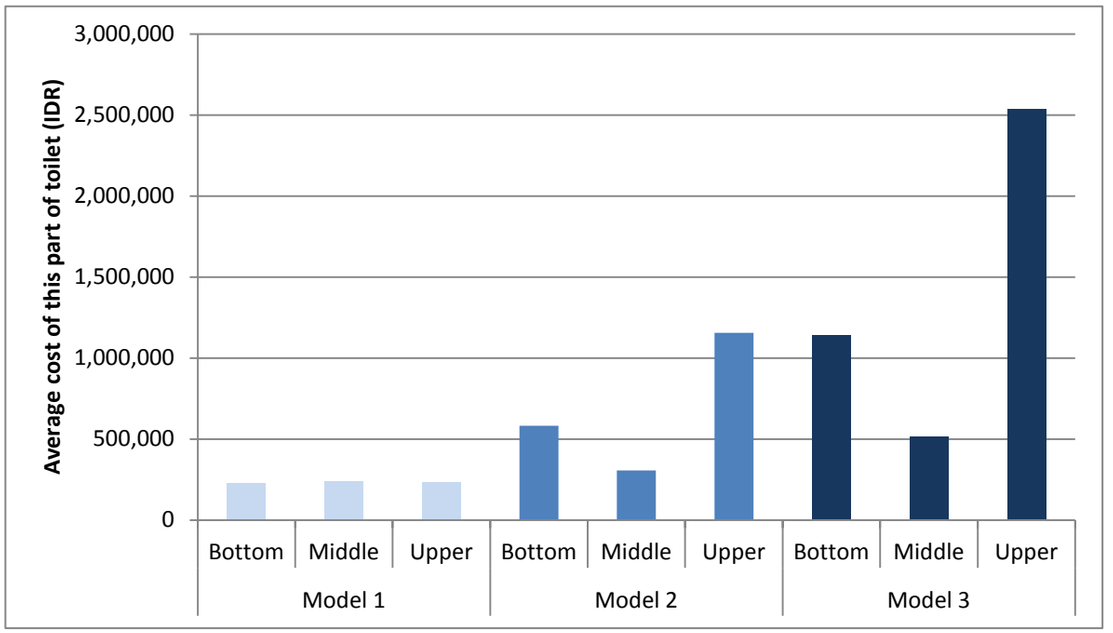

Figure 18: Average cost of bottom, middle and upper parts of three models of toilet in TTU

The labour cost for masons associated with each model of toilet is significant (see Figure 19). As a proportion of the total average cost of a toilet, labour cost is respectively 39%, 34% and 28% for Model 1, Model 2 and Model 3. Labour costs are discussed further in Section 2.4.4).

The cost breakdown by material assists in understanding the relative cost of certain components of the toilet. In particular it is important to note the relative cost of the toilet pan, given the strong emphasis that development agencies have placed on this item in their approaches to supporting sanitation entrepreneurs. This relative cost is very low

compared with the average cost of a Model 3 toilet in TTU (see Figure 20), making up just under 4% of the total materials cost.

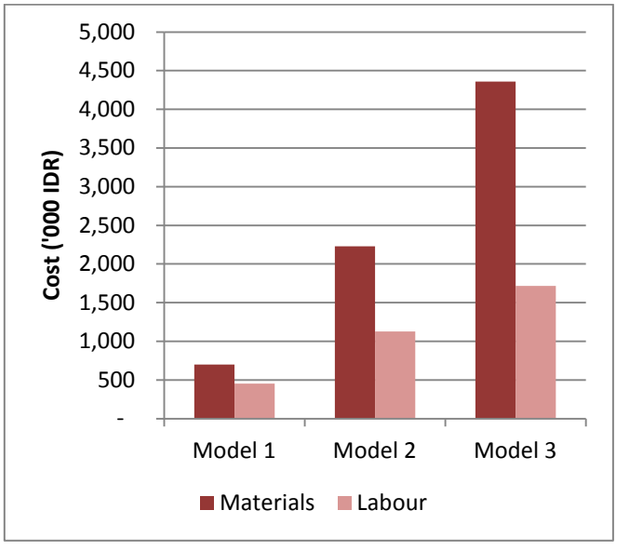

Figure 19: Comparison of materials and labour costs for three toilet models in TTU

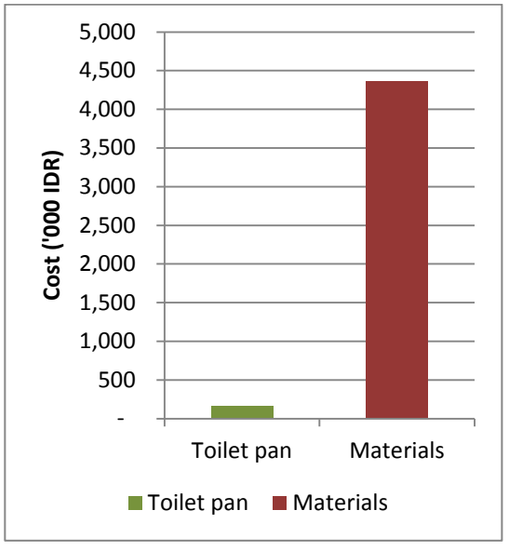

Figure 20: Comparison of toilet pan with total material cost for Model 3 in TTU

2.3 COSTS OF TOILETS IN DIFFERENT LOCATIONS

On average, for all materials, but excluding labour, a Model 1 toilet costs IDR 697,000 in TTU, Model 2 costs IDR 2.23 million and Model 3 costs IDR 4.37 million. However, the cost varies with the location throughout the district (see Table 5 and Figure 21).

Variation in cost in different locations is caused by transportation and supply-chain costs which affect materials such as cement, reinforcing iron, pipe and zinc. Variation in cost is also cause by major differences in the accessibility and price of locally sourced materials including sand, bricks, gravel, rock and locally manufactured concrete bricks. In fact the latter variations outweigh the differences in costs related to transport for externally sourced materials. For example the overall variation in cost of cement as part of the toilet is up to 340,000 IDR whereas the variation in the cost of sand as part of the toilet is up to 660,000 IDR. Further analysis of the supply-chain for externally sourced materials is provided in Section 2.4.2 and 2.5, and further analysis of locally sourced materials is provided in Section 2.4.3.

For Model 1 toilets, the cost varies between 61% and 127% of the cost in Kefamenanu subdistrict, based on differences in the cost of wood and bamboo (see Table 5 and Figure 23). For Model 2 toilet the cost varies between 90% and 119% of the cost in Kefamenanu subdistrict (see Table 5 and Figure 24).

For Model 3 toilets, the variation in cost is from 90% to 116% of the cost in Kefamenanu subdistrict (see Table 5 and Figure 25). In TTU, the location with the highest overall cost for a Model 3 toilet is Miomafa Tengah, where materials cost IDR 5.01 million. The high cost is a result of high prices for sand, gravel and brick. This subdistrict of Miomafa Tengah also has the highest proportion of poor households (see Table 1) of all subdistricts in TTU (46.6% or 692 households). Two other subdistricts with the next highest proportion of poor households are Bikomi Nilulat (33% poverty or 416 household) and Musi (36% poverty or 446 households) - both of which are subdistricts with the highest costs to build a Model 3 toilet, IDR 4.85 million and IDR 4.76 million.

In TTU, the location with the lowest cost for a Model 3 toilet is Biboki Utara, which is accessible to Atambua by a main road, and therefore has lower prices for cement and zinc, and also has low prices for some locally available materials including gravel.

Across three villages in Kefamenanu, the average cost of a Model 3 toilet is similar to the overall average for the whole district, with materials costing a total of IDR 4.30 million. Whilst cement, reinforcing iron and zinc costs are the lowest in this location, other materials such as sand, gravel and brick have higher prices than in other locations in the district.

Table 5: Cost to build a toilet in each sub-district of TTU

Cost ('000 IDR/%)	Materials and Labour Cost			Materials		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Biboki Anleu	1,081	3,163	6,120	448	2,080	4,303
	78%	91%	98%	61%	96%	100%
Biboki Feotleu	1,155	3,239	5,915	455	2,206	4,449
	84%	93%	95%	62%	102%	103%
Biboki Moenleu	1,191	3,414	6,004	558	2,247	4,421
	86%	98%	97%	77%	104%	103%
Biboki Tampah	1,049	3,117	5,620	482	1,950	3,954
	76%	89%	90%	66%	90%	92%
Biboki Utara	928	2,975	5,427	412	1,875	3,860
	67%	85%	87%	56%	87%	90%
Biboki Selatan	984	2,938	5,663	417	1,988	4,163
	71%	84%	91%	57%	92%	97%
Bikomi Nilulat	1,561	3,449	6,604	844	2,516	4,854

Cost ('000 IDR/%)	Materials and Labour Cost			Materials		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	113%	99%	106%	116%	116%	113%
Bikomi Selatan	1,360	3,326	5,527	577	2,076	3,944
	99%	95%	89%	79%	96%	92%
Bikomi Tengah	1,477	3,561	6,433	844	2,478	4,850
	107%	102%	103%	116%	115%	113%
Bikomi Utara	1,521	3,525	6,322	888	2,325	4,422
	110%	101%	102%	122%	108%	103%
Insana	1,327	3,277	6,227	794	2,244	4,560
	96%	94%	100%	109%	104%	106%
Insana Barat	1,306	3,187	5,715	740	2,070	4,048
	95%	91%	92%	102%	96%	94%
Insana Fafinisu	1,399	3,499	6,155	849	2,332	4,421
	101%	100%	99%	116%	108%	103%
Insana Tengah	1,506	3,385	6,132	840	2,352	4,382
	109%	97%	99%	115%	109%	102%
Insana Utara	1,378	3,423	5,820	761	2,203	4,003
	100%	98%	94%	104%	102%	93%
Kota Kefa	1,379	3,495	6,222	729	2,161	4,305
	100%	100%	100%	100%	100%	100%
Miomafo Barat	1,367	3,565	6,541	834	2,482	4,791
	99%	102%	105%	114%	115%	111%
Miomafo Tengah	1,555	3,715	6,759	888	2,581	5,009
	113%	106%	109%	122%	119%	116%
Miomafo Timur	1,302	3,581	6,372	711	2,231	4,422
	94%	102%	102%	98%	103%	103%
Musi	1,521	3,560	6,761	788	2,393	4,761
	110%	102%	109%	108%	111%	111%
Mutis	1,473	3,590	6,753	773	2,423	4,753
	107%	103%	109%	106%	112%	110%
Naibinu	1,674	3,547	6,002	924	2,280	4,169
	121%	101%	96%	127%	105%	97%
Noemuti	1,184	2,993	5,358	601	2,026	3,925
	86%	86%	86%	82%	94%	91%
Noemuti Timur	1,335	3,086	5,404	585	2,003	3,854
	97%	88%	87%	80%	93%	90%

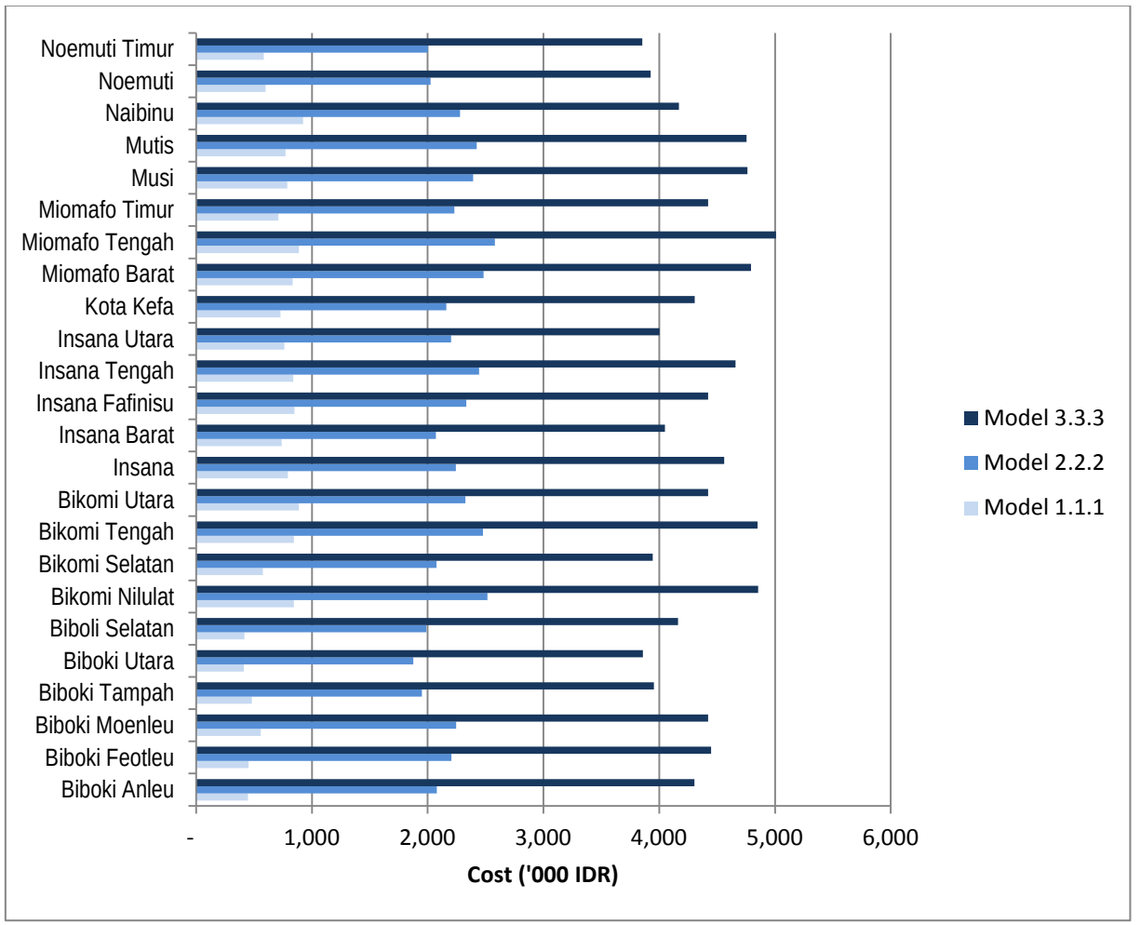

Figure 21: Cost of three models of toilets (excluding labour) in subdistricts of TTU

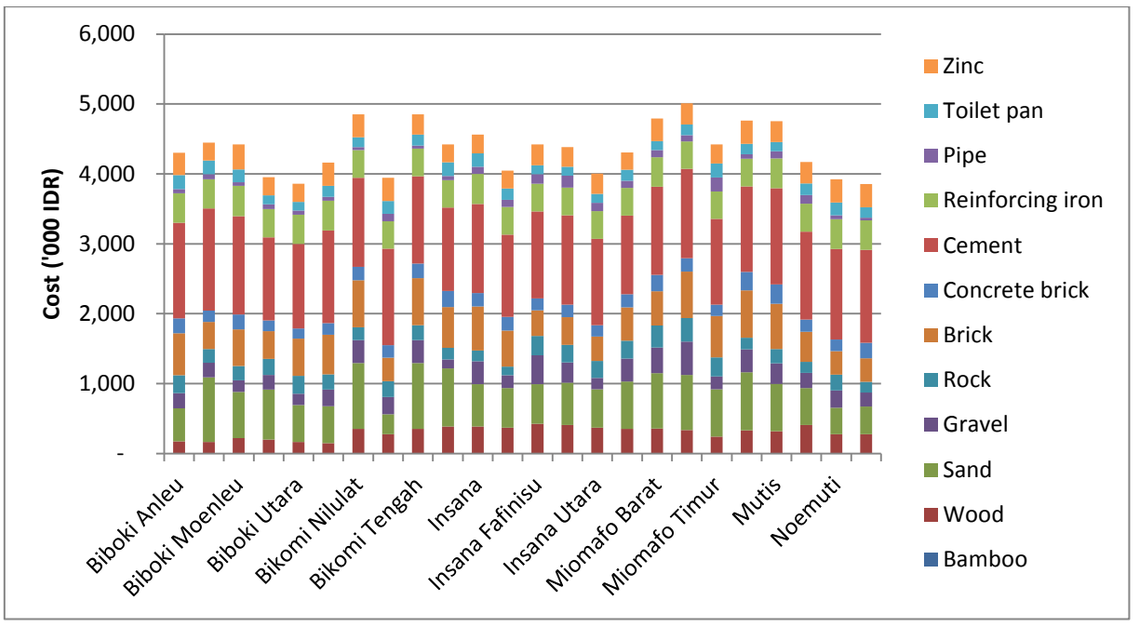

Figure 22: Costs of model 3 toilets in different subdistricts of TTU

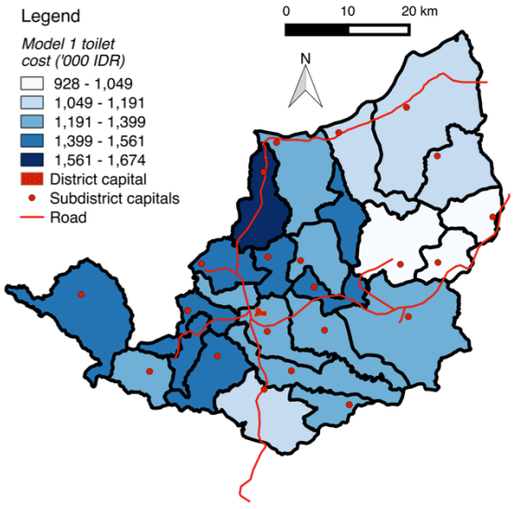

Figure 23: Cost of Model 1 toilet ('000 IDR) in TTU

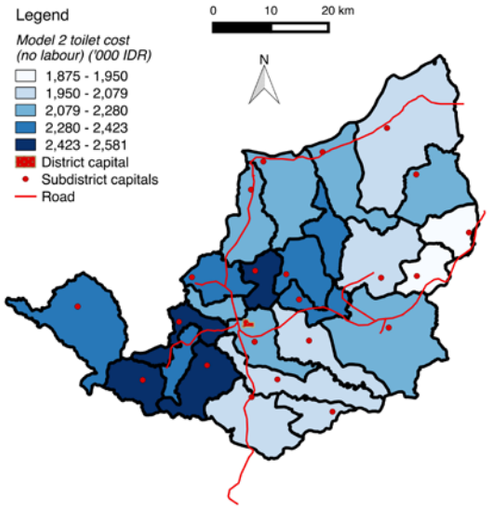

Figure 24: Cost of Model 2 toilet ('000 IDR) in TTU

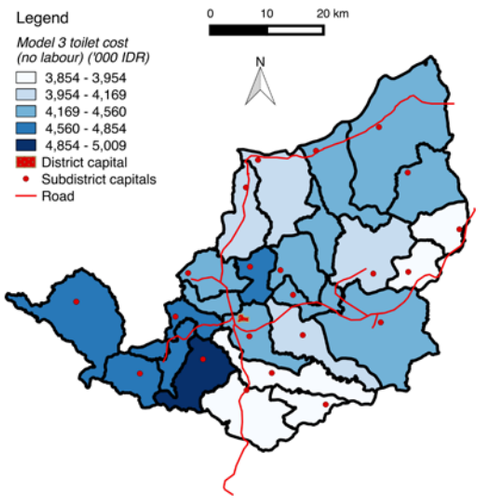

Figure 25: Cost of Model 3 toilet ('000 IDR) in TTU

Figure 26: Location of Noemuti and Biboki Tampah subdistricts

To understand the way in which costs within a subdistrict are distributed, it is useful to example two examples, namely Noemuti and Biboki Tampah (see Figure 26). In Noemuti, the cost of a Model 3 toilet is high in Popnam (most distant village from main roads), due to relatively high costs for sand, cement, transport and labour costs (Figure 27). Similarly in Biboki Tampah, the village of Sapean has relatively high cost compared with other villages in the same subdistrict due to high costs for cement, sand, rock and transport (Figure 28).

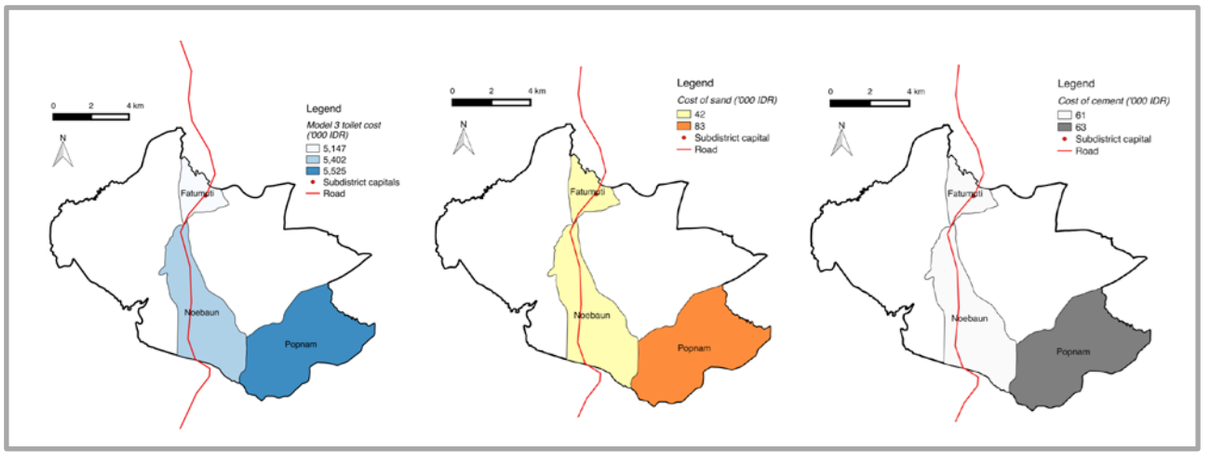

Figure 27: Costs of Model 3 toilet, sand and cement in three villages in Noemuti subdistrict

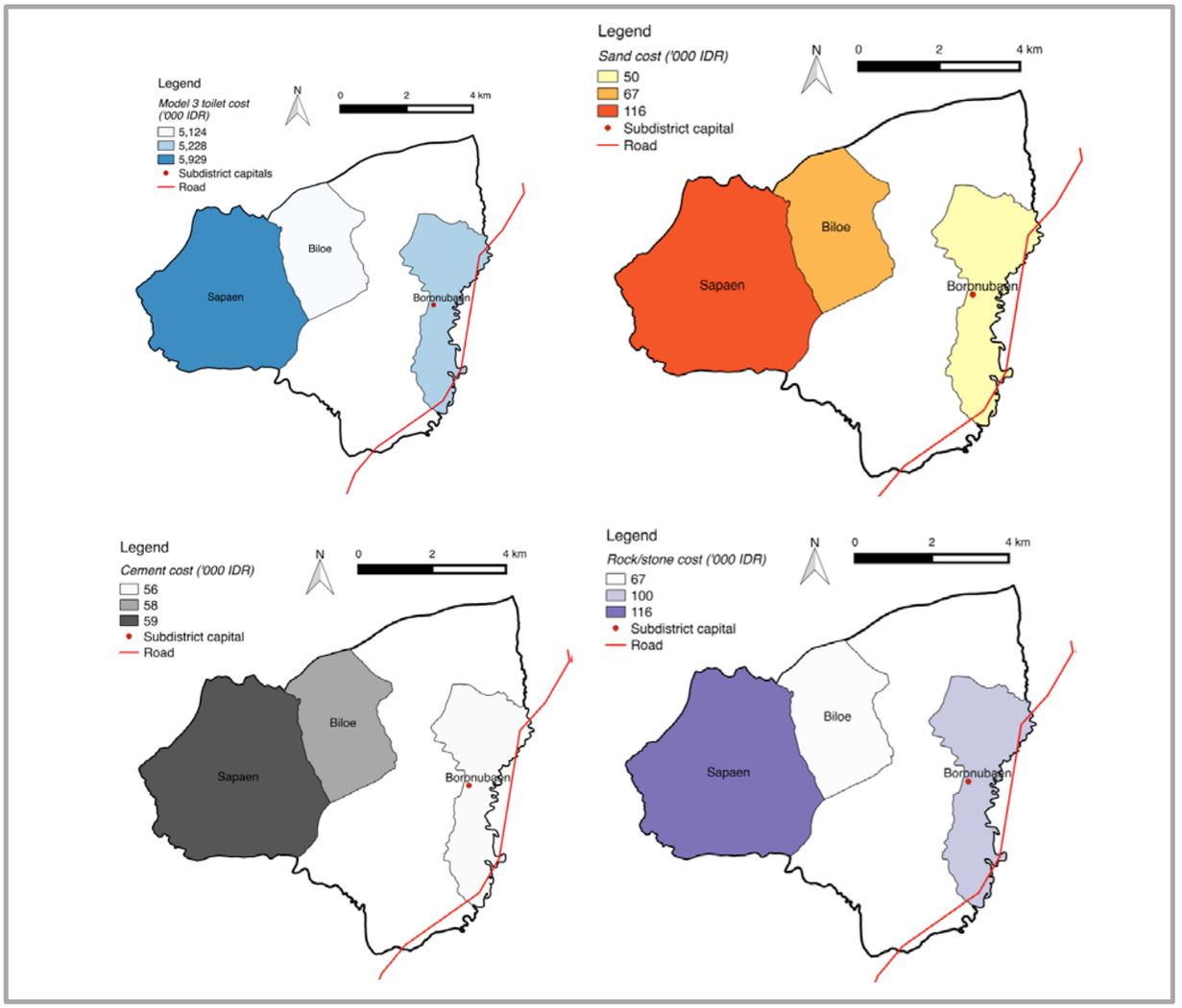

Figure 28: Costs of Model 3 toilet, sand, cement and rock in three villages in Biboki Tampah

2.4 MAIN ACTORS, PROCESSES AND LINKS IN THE VALUE-CHAIN

The supply chain for toilets consists of both product-specific supply chains for certain materials, as well as materials that may be sourced locally. The following three sections present the key actors, followed by a brief overview of the supply chain for externally sourced materials and details of the availability and prices of locally available materials.

2.4.1 Key actors

The key actors in the supply chain for different materials include:

- Materials supply shops – retailers at provincial, district and local levels
- Sanitation entrepreneurs – available at district and local levels in some locations
- Masons – available in all villages
- Transport providers – available in district centre and some subdistrict locations, often as a combined business with materials supply shops
- Local producers – concrete blocks, bricks, sand and stones or rock

2.4.2 Supply chains for externally sourced materials

The following components of the toilet are sourced from outside TTU. These products are all obtained through similar supply chains.

- Cement
- Toilet pans (ceramic and locally manufactured concrete)
- Reinforcing iron
- Zinc roofing

The main supply chain is shown in Figure 29. The costs along this supply chain are analysed and discussed later in Section 2.4.2.

Figure 29: Supply chain for externally sourced materials in TTU

2.4.3 Locally sourced materials

The following materials are usually sourced locally in TTU:

- Sand
- Bamboo
- Wood
- Bricks
- Rock
- Gravel

Easy access to locally sourced materials significantly reduces the cost to a household. As shown in Section 2.2.3, the major cost components for locally source materials each model were:

- Model 1: Bamboo (9%), Wood (71%)
- Model 2: Cement (28%), Wood (21%), Sand (16%), Rock (9%), Brick (6%)
- Model 3: Cement (25%), Sand (16%), Brick (13%), Wood (7.5%), Gravel (6%), Rock (5%)

The prices for locally sourced materials vary considerably across TTU (see Table 6). As one subdistrict government staff member suggested: "*"for villages near a river, access is easy and it is cheap. For villages not near a river, they have to buy everything, either in the subdistrict materials store or in Kefa".*

Prices for sand, a major cost component for Models 2 and 3, varies considerably, from IDR 40,000/m^3 to IDR 200,000/m^3 (see and Figure 30). In one village surveyed in Ponu, close to a river, it was indicated that the main cost for sand was the payment for transportation, which was IDR 350,000 for a truck-load ($3m^3$), despite the river being adjacent to the village.

Table 6: Prices of locally sourced materials in TTU

Material	Minimum price in TTU subdistricts	Maximum price in TTU subdistricts
Sand	IDR 40,000/m^3	IDR 200,000/m^3
Bamboo	IDR 2,000 per bundle	IDR 50,000 per bundle
Wood	IDR 10,000	IDR 50,000
Bricks	IDR 450,000/m^3	IDR 900,000 /m^3
Concrete brick	IDR 375,000/m^3	IDR 750,000/m^3
Rock	IDR 50,000/m^3	IDR 150,000/m^3
Gravel	IDR 50,000/m^3	IDR 250,000 /m^3


River bed source of sand, gravel and rock


Local production of concrete bricks

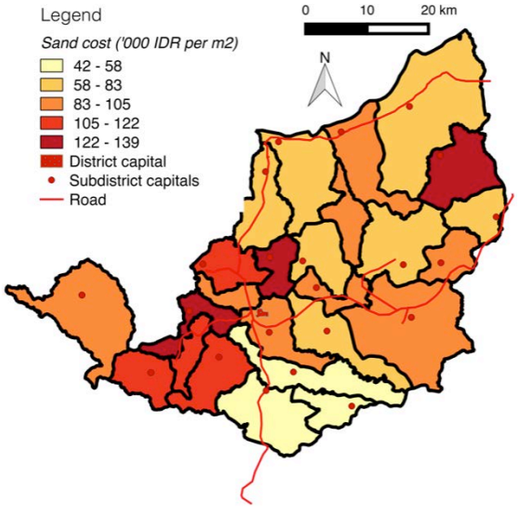

Figure 30: Prices of sand in different subdistricts of TTU

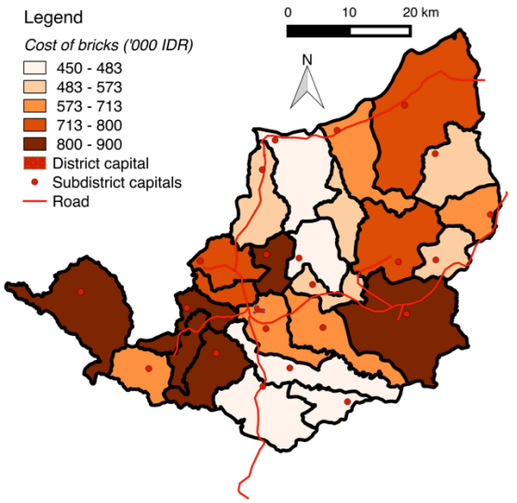

Figure 31: Prices of bricks in different subdistricts of TTU

2.4.4 Masons

Most of the masons are paid in bulk (borongan) for their services, meaning that they are paid for toilet provision regardless of the number of days spent to do the job. In general two masons are involved in the construction, a lead mason and a helper. The highest cost for labour for a Model 3 toilet was IDR 2 million (in Mutis and Musi, two remote locations in the south-west of TTU), and the lowest was IDR 1.47 million in Biboki Foetleu, a remote location in the north-east of TTU) (see Table 7 and Figure 32). Only masons in six villages are paid on daily basis. Data for these villages have been made comparable to those from other villages by assuming that each job is done by at two persons (one as a key mason and another as a mason's helper).

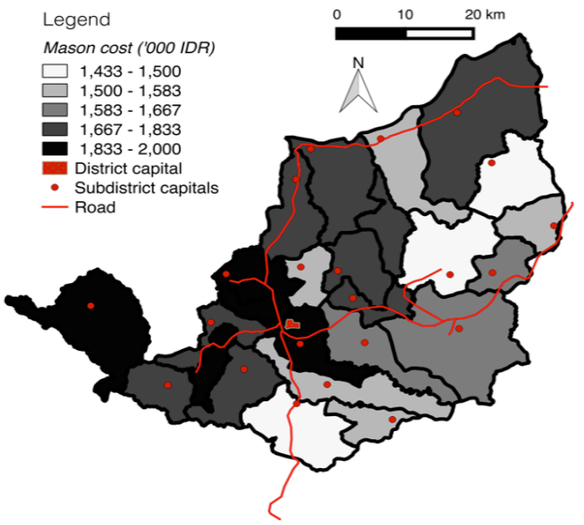

Figure 32: Cost of mason's labour in TTU

Table 7: Labour time and costs for building a toilet in TTU

No	Subdistrict	Time spent (Days)				Total cost (000 IDR)
		Bottom	Middle	Upper	Total	
1	Biboki Anleu	3.67	1.00	3.00	7.67	1,800
2	Biboki Feotleu	3.67	1.50	2.83	8.00	1,470
3	Biboki Moenleu	3.83	1.00	2.67	7.50	1,580
4	Biboki Tampah	3.67	1.17	3.00	7.83	1,670
5	Biboki Utara	3.50	1.00	3.00	7.50	1,570
6	Biboki Selatan	3.67	1.17	2.83	7.67	1,500
7	Bikomi Nilulat	3.50	1.00	2.83	7.33	1,750
8	Bikomi Selatan	3.67	1.17	2.83	7.67	1,580
9	Bikomi Tengah	3.67	1.17	3.00	7.83	1,580
10	Bikomi Utara	3.67	1.00	2.67	7.33	1,900
11	Insana	3.67	1.00	3.00	7.67	1,670
12	Insana Barat	3.50	1.17	2.50	7.17	1,670
13	Insana Fafinisu	3.67	1.00	2.83	7.50	1,730
14	Insana Tengah	3.67	1.33	3.00	8.00	1,750
15	Insana Utara	3.83	1.00	2.67	7.50	1,820
16	Kota Kefa	4.17	1.00	3.00	8.17	1,920
17	Miomafo Barat	3.67	1.33	3.00	8.00	1,750
18	Miomafo Tengah	3.83	1.17	2.83	7.83	1,750
19	Miomafo Timur	3.83	1.00	2.83	7.67	1,950
20	Musi	3.50	1.33	2.67	7.50	2,000
21	Mutis	3.67	1.00	3.00	7.67	2,000
22	Naibinu	3.83	1.33	3.00	8.17	1,830
23	Noemuti	3.83	1.17	2.50	7.50	1,430
24	Noemuti Timur	3.67	1.17	2.83	7.67	1,550

2.5 COSTS, EARNING PROFILES AND FINANCIAL PERFORMANCE OF DIFFERENT LINKS

This section of the report presents the supply chain for two key products, cement and toilet pans. The aim of the analysis was to examine the distribution of the value between the nodes in the value-chain, and how the value changes along these nodes.

Retailers in Kefamenanu were found to source their products direct from Surabaya (rather than Kupang) and retailers in subdistricts of TTU similarly sourced their materials in Kupang (rather than Kefamenanu) (see Figure 33). This practice reduces one link in the supply-chain allowing each retailer to increase their profit margin slightly.

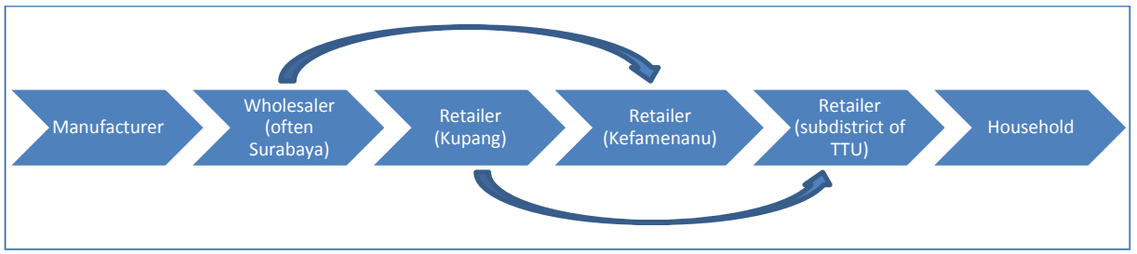

Figure 33: Common practice of skipping links in the supply-chain to maximise profit margins

The two sections that follow described the cement supply chain and toilet pan supply chain.

2.5.1 Cement supply chain

The cement supply chain begins with producers of three brands of cement in South Kalimantan and Sulawesi, followed by shipping to Kupang for further distribution. In Kupang there is also a government-owned local producer, with slightly lower quality and a marginally lower price.

The profit margins of producers were not able to be assessed, however on distributor reported their profit margin to be 5-10%. The subsequent profit margin for retailers at either district or subdistrict level is small, 3-5% and 2-4% respectively. It is only the large turn-over of cement that makes this low profit margin tolerable. One shop in Kefamenanu reported a turnover of up to 500 sacks per day in the busiest building season of June and July. Hence although this shop reported a profit margin of just IDR 750/sack, this equates to IDR 375,000/day and IDR 11.25m each month. Given the low profit margin however, there is little room for developing economies of scale in the price of cement to reduce the cost of constructing a toilet.

The last leg of the journey from a subdistrict supplier to a village was of variable cost depending on the distance and road conditions. For instance in parts of Biboki Anleu, in the northern part of TTU, the cost of cement at the village level reached IDR 57,000/sack (Figure 34).

If ojek (motorcycle taxi) were used to transport cement from a subdistrict capital to a village, the costs escalated further. As described later in Section 2.6.1, it was found that the majority of villages were reported use of pick-ups for transporting such materials rather than ojek (Figure 35).

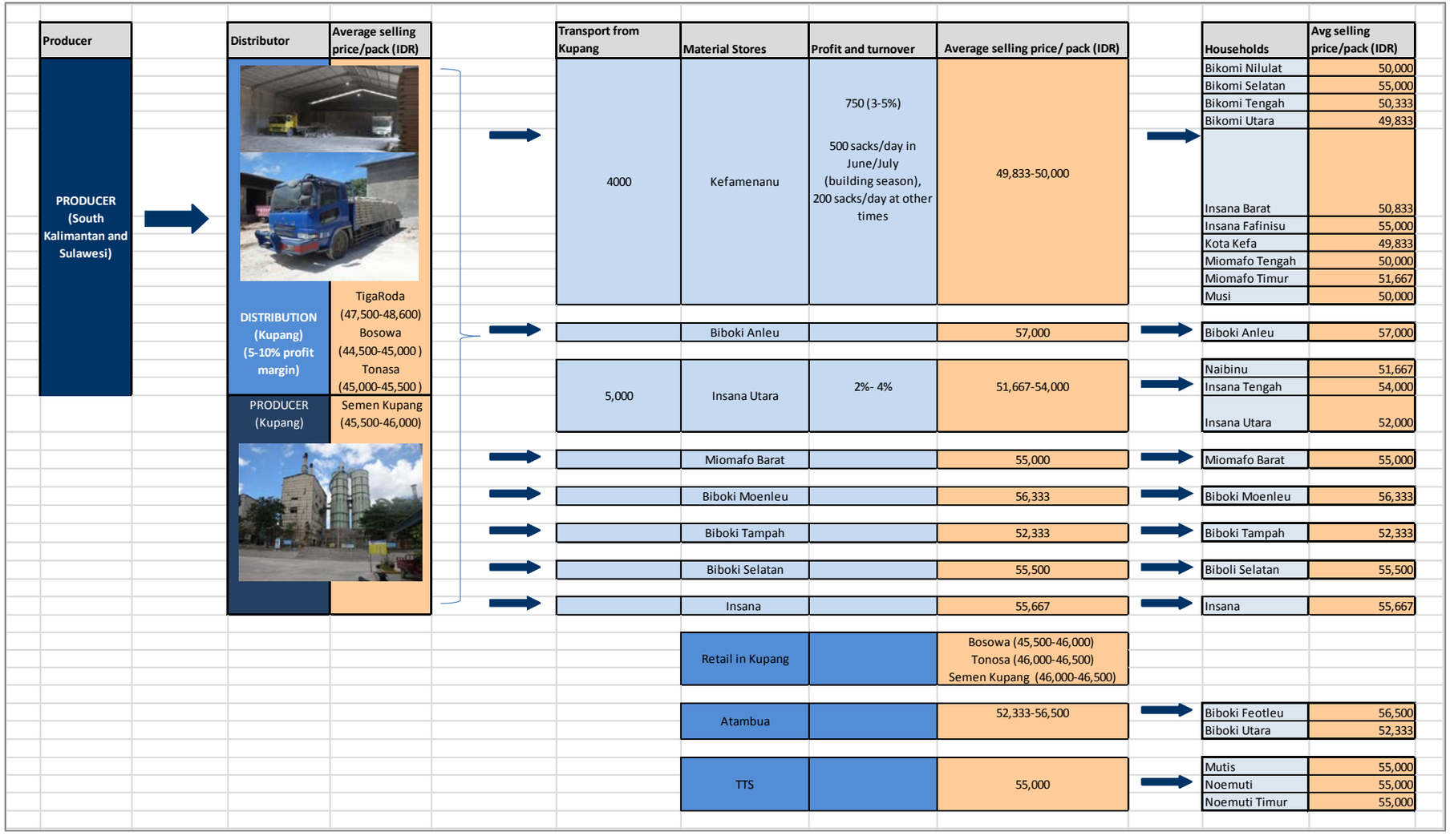

Figure 34: Cement supply chain in TTU

Figure 35: Transportation of cement from Kupang to Kefamanenu

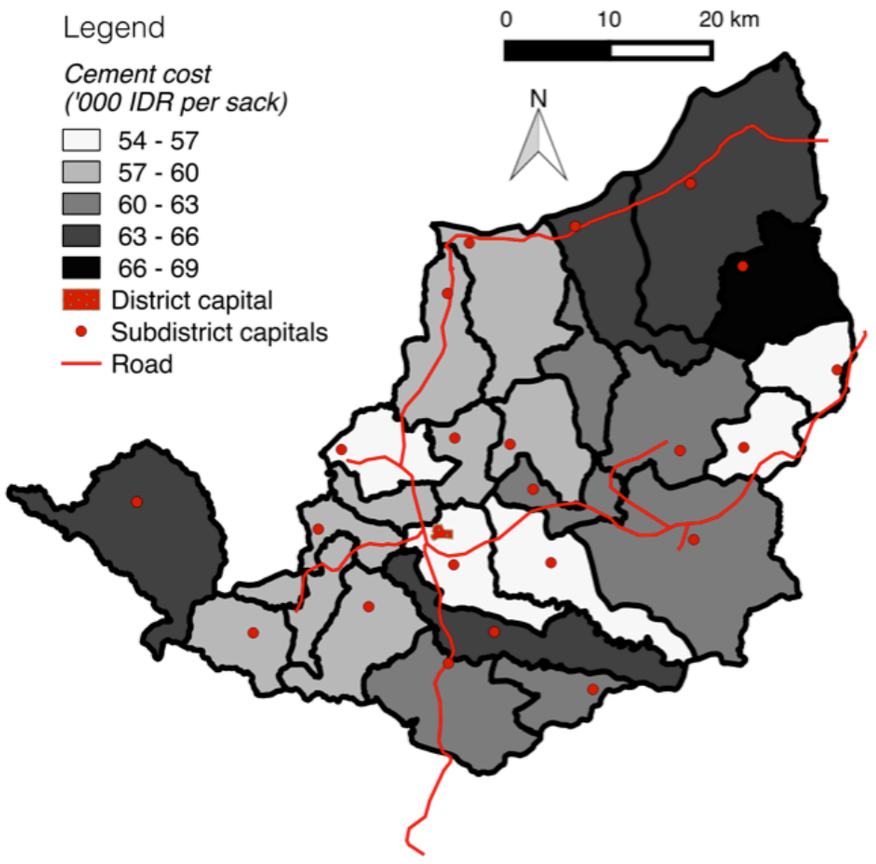

Figure 36: Cost of cement (including transport costs) in subdistricts of TTU

2.5.2 Toilet pan supply chain

Toilet pans are generally manufactured in Java Island, and transported and distributed through Surabaya. Local production of toilet pans in TTU has also been initiated through support from Plan International Indonesia. Chelsea, Duty and Data are manufactured in the same location outside Surabaya, and are sold at a cost of 80,000IDR per unit. Distributors in Surabaya mark these up by 5,000IDR per unit, and from here they are transported to Kupang or to Kefamenanu (Figure 37). In Kefamenanu, a profit margin of 10-23% is added, with a selling price of 130,000IDR per unit for the cheaper brands. Subdistrict shops, generally reported that they purchase toilet pans in Kupang rather than Kefamenanu, to skip one step in the supply chain and increase their profit margin. The final cost of the toilet pan in different villages varies from IDR 125,000 up to IDR 300,000 depending on the location (Figure 38).

Locally produced toilet pans are manufactured in small workshops at the homes of sanitation entrepreneurs trained by Plan International Indonesia, in Kefamenanu, and also about 4-5 other subdistricts. These toilet pans are generally sold for IDR50,000, hence are significantly cheaper than other brands, though as discussed elsewhere, the relative cost of this component compared with the overall toilet is very small.

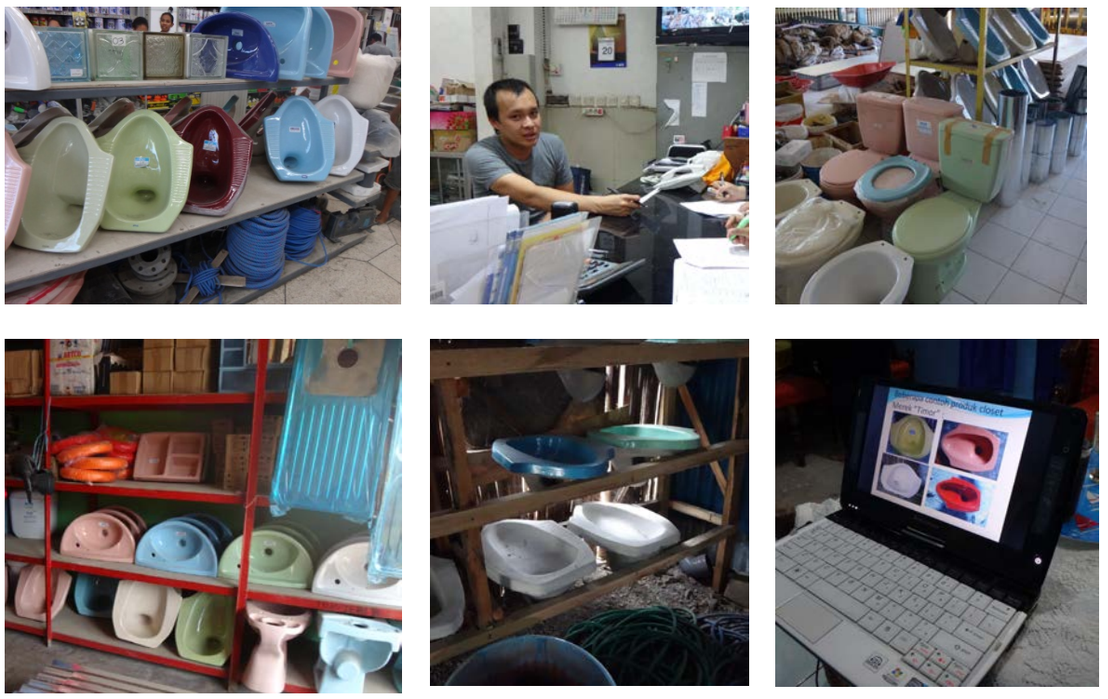

Figure 37: Toilet pan sales in Kupang (top row) and in Kefamenanu (bottom row)

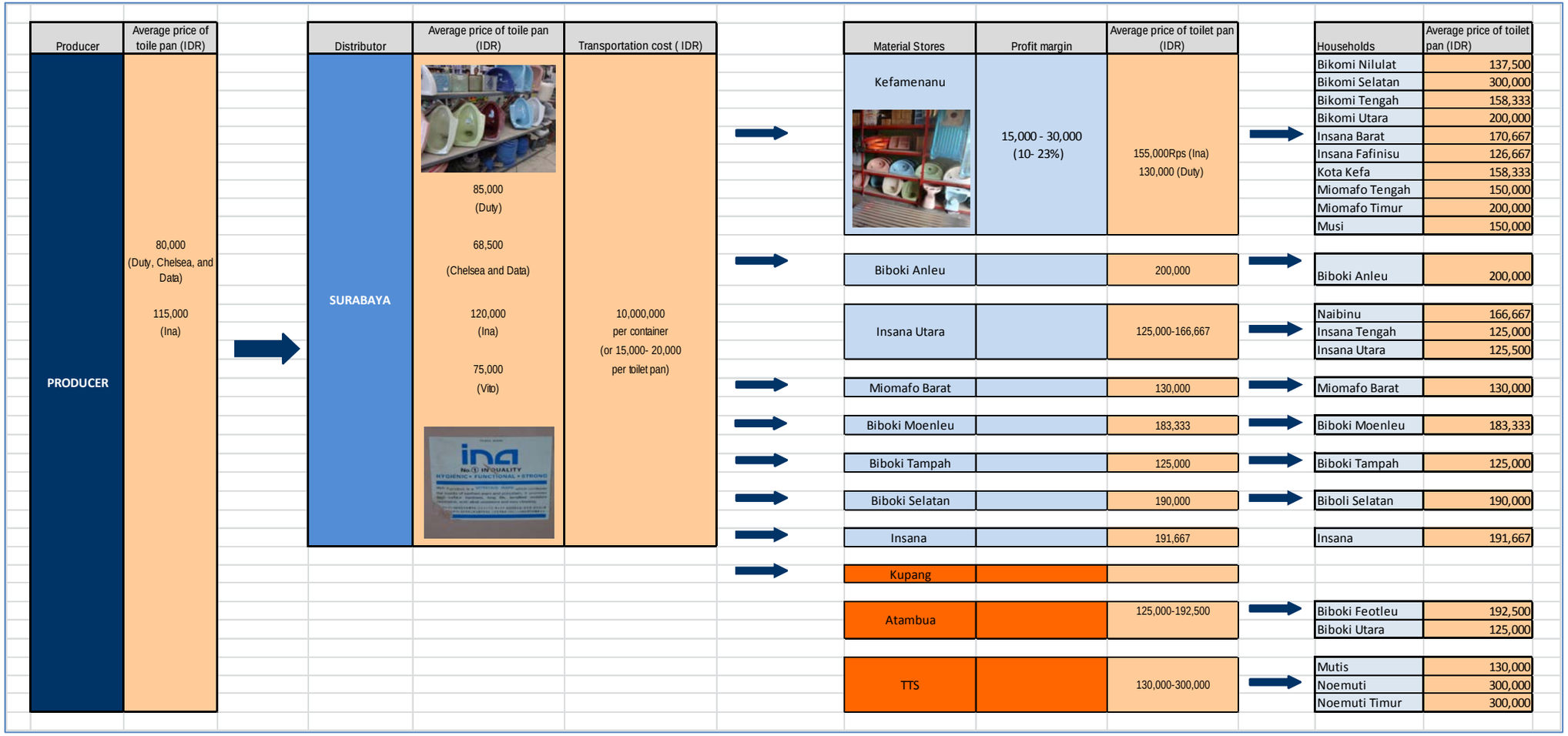

Figure 38: Toilet pan supply chain in TTU

2.6 INFLUENCE OF TRANSPORT AND ACCESSIBILITY

This section considers how the transportation business works in TTU, and the flow-on implications and opportunities to influence transport costs of toilets to households.

2.6.1 How households use transport services for sanitation products

In general, household interviewed reported that they transported materials bought from a materials store themselves, with only 4% of households reporting that the materials were delivered by the store to their home. The majority of households (78%) had to pay to travel to go and buy materials, with costs varying from IDR 10,000 to IDR 70,000. The most common transportation means to bring materials to villages was pick-up (60% of cases), followed by truck (27%) (see Figure 39). Motorcycles, carts and other types of cars represented the remainder.

The condition of the roads of approximately half of the surveyed villages was reported to be poor or very poor. Surveyed locations were anywhere from right at the subdistrict capital to up to 35 miles travel from the subdistrict capital (for example South Maurisu in South Bikomi), and an average distance of 8miles to the subdistrict capital.

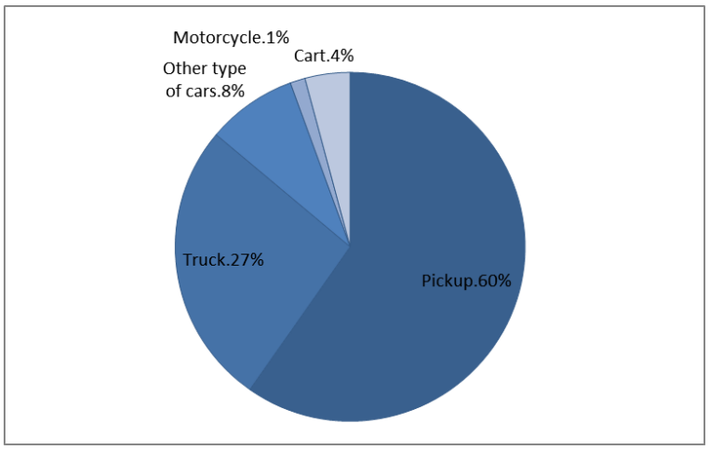

Figure 39: Most common means of transportation of materials from subdistrict to village

2.6.2 Profiles of typical transportation business types

Since transport adds significant cost within the value-chain, it is important to understand its status, the level of competition at different levels (province, district, and subdistrict) and opportunities to reduce transport costs (see Table 8). Examination of the transport sector demonstrates that high levels of competition exist at provincial and district level and serve to maintain lower prices. However this competition disappeared outside of the district capital. Subdistrict transport businesses reported on their monopoly status in their geographic location. At subdistrict level competition does remain present amongst ojek transport providers.

The transportation business is known to be a profitable one. As indicated by one interviewee who owns both a materials supply shop and a transport business: *"The transport business is more profitable than the shop. In the shop the profit is only 1-2%, whereas transport brings about 10%".* One driver also mentioned that his work in the transport business is relatively lucrative, and a quicker way to earn income than other methods: *"I also have a business to rent chairs, tents. This [being a driver] is just a 'side-job' using 20% of my time, but the profit from driving and from my other business is 50:50".*

Table 8: Examples of types of transportation business at province, district and local level

Provincial level courier service in Kupang 	Main customer base is in Kupang, but 50% of the business involves transportation to other parts of TTU district. Operates 3-4 times per week to district centre (Kefamenanu). Employs 20-30 drivers on full-time basis. Charges IDR 775,000 - 900,000/T, for Surabaya to district centre (Kefamenanu). Charges IDR 875,000 - 1 million/T for Surabaya to Atambua. Experiences competition from about 20 other similar companies.
Province capital materials shop transporter in Kupang 	Operates 10 trucks (eight 5T and two 10T), most business is local, within the area of provincial capital (Kupang). Charges IDR 1.75 million for Kupang-Kefa and IDR 2 million to surrounding area of Kefa, Wini or Atambua for 5T load. Experiences significant competition: *"there are hundreds of trucks"* which has reduced tariffs over last years and therefore reduced profits.
District capital materials shop transporter in Kefamenanu 	Provides transport services around TTU district - owns 10 trucks (2 x 20T, 3 x 12T, 5 x 7T), that are all used 7 days per week. Delivers for government programs as well as offering hire of the truck and driver. Charges: For 7T truck, for distances under 50km, IDR 50/kg; 50 to 100km is IDR 100/kg. or rental by the hour, for 8h is IDR 1m In terms of competition, this business is one of largest transport businesses in the district centre (Kefamenanu): *"Many people have about 1 or 2 trucks, however not many people have 10 trucks."* and *"If the load is small then there is competition. There is less competition for the large size trucks."*
District capital – truck driver (Kefamenanu) 	Driver – employed on salary by truck-owner (of which there are about 50 such owners in the district capital of Kefamenanu). Waits for business in the market area, or customers may call. Profit: As a driver, is paid IDR 750,000 - 1million/month. Another arrangement used sometimes is 10-20% of the price for a trip is paid to the driver. Competition: *"There are many drivers around market, but if I wait, then I always get some business"*
Subdistrict transport provider	Informal family business (husband and wife) Provides public transport (transporting people- fill the vehicle and then take people from one place to another) and private hire 1 truck and 1 pick-up, operates in local area No competition: "*No, there is no competition, just us. The next one is in Timor-Leste on the other side of the border*"

	
Ojek – subdistrict 	Both a farmer and an ojek. Undertakes trips about twice a day (2 -10 km/trip). Charges for carrying up up to 2 sacks cement and some pipe (under 150kg): • IDR 5,000 /sack for 2-3 minute journey, poor road condition • IDR 10,000/sack for 5 minute journey, poor or good road • 30 minute journey with good road: IDR 20.000 /sack • 1 hour journey with good road, IDR 25.000 /sack • IDR 25,000 /sack: 1.5 hour with poor road condition Competition: About 30 other ojeks available. *"In 2013, I raised my service price because of the rising on fuel price in order to keep my profit in the range of IDR 30.000-40.000"*

Barriers to entry in the transportation industry

The initial outlay involved in starting a transportation business is significant. The high cost of vehicles acts therefore as a barrier to entry to the transport business. As one truck driver (employed by a truck owner) reported: *"In future, I would like to own a truck, but I don't have enough capital. The bosses [truck owners], mostly they are civil servants and take loans from the bank, or private individuals- Indo-Chinese"*. Typical costs quoted by transport providers for new vehicles included IDR 160 million for a pick-up, IDR 340 million for 7T truck, IDR 700 million for 12T truck and IDR 900 million for a 20T truck.

Costs of running transport services:

The following costs demonstrate the range of costs that transport prices must cover and exceed for a transportation business to remain successful:

- *Fuel prices:* These have gone up (10% over the last year according to Kefa transport provider), which has reduced profit margins and increased prices: *"Prices are going up each year- it goes up with the price of petrol"*
- *Payment of drivers*: Most respondents reported that permanent drivers were paid IDR 1 million/month. A part-time driver was paid IDR 150,000-IDR 200,000 for Kupang-Kefa return.
- *Maintenance:* For trucks, about IDR 5m/month is required, including replacement of tires, or more if carrying sand which requires changing the tires every 3 weeks at IDR 1.2 million/tire. Oil and lubricants can be IDR 125,000 for 5,000-10,000km.
- *Vehicle tax*: Truck with yellow licence plate is about IDR 1 million, similar cost of IDR 1 million for pickup (black plate)
- *Repayable finance*: one transport provider had borrowed IDR 90 million for the truck, requiring paying 0.7%/month at credit union- about IDR 630,000/month

2.7 OTHER FACTORS AFFECTING CRITICAL LINKS IN THE CHAIN

A range of other factors affect the supply chain and the costs and accessibility of materials for sanitation. These include the level of demand and affordability of products relative to household income, the existence and level of activity of any sanitation entrepreneurs, the characteristics of materials supply shops and the availability of credit for small enterprises in the supply chain. These four areas are described below.

2.7.1 Demand and affordability

It was beyond the scope of this study to investigate demand, however it is important to include mention of it here as a supply chain can only function in the presence of demand.

During the research both government officials and entrepreneurs reported on low demand, and made linkages between this and the costs involved. Sanitarians working closely with communities also reported that affordability was a key reason why households without toilets did not invest. This view was supported by a subdistrict government official: "*What are the constraints of the change from pit [latrine] to a goose neck [latrine]? It's the lack of economic ability, they work (farming) 9 months on dry season, and only 3 months of rainy season*".

However, as understood through other research in Indonesia and elsewhere, demand is not only affected by affordability but highly influenced by people's motivation and prioritisation of sanitation amongst other demands on household resources.

2.7.2 Level of activity, role and success of sanitation entrepreneurs

Sanitation entrepreneurs have been trained since 2009 through support from Plan International Indonesia. The focus has been on development and production of a quality toilet pan that is significantly cheaper than those available in retail shops (approximately 50,000IDR versus more than 120,000IDR). The resultant activity of sanitation entrepreneurs in TTU is varied.

Many of those entrepreneurs trained did not go on to continue with this business. For example, as one subdistrict official reported: "*Last year, there was a toilet making training…. It went for 3 days and the result was good. But after the training, the problem is the capital. One of the trainees… successfully made 20 pieces of toilet with village fund. But after that, he stopped producing because lack of capital and low buying point*".

Amongst those who did continue, there were about eight entrepreneurs that can be divided into three main groups- one highly successful entrepreneur (reporting production and sales of more than 1000 toilet pans in two consecutive six month periods), two with some success (40-100 toilet pans per six months) and five with a low level of involvement in such a business (2-30 toilet pans per six month) (Source: Plan monitoring data, 2014). Reasons for varied success, barriers faced and motivations affecting sanitation entrepreneurs are described in a separate study.[3] Here we confine discussion of such entrepreneurs to their role in the broader supply chain, and the focus of their work focused on toilet pans in the context of the cost of this component relative to other costs involved in building a toilet.

In terms of the supply chain, under the current scenario, the sanitation entrepreneurs operate outside of and separately to other parts of the supply chain. This has both benefits and constraints. The benefits are that entrepreneurs are able to play a role in servicing certain communities through direct contact and maintain autonomy.

One major constraint of this status is that efficiencies of scale within the supply chain that could potentially be captured and supported by specialist sanitation entrepreneurs are not achieved. The current main supply chain instead consists of generalist services (materials shop retailers and local transport providers) that are not specifically geared to support rural households in accessing latrines at affordable prices. And these generalist materials shops do not provide all the necessary materials for building a toilet together in an accessible package, but rather as disparate items that a household must collect.

[3] See www.enterpriseinwash.info for reports of other related studies

A further related issue is that of the cost breakdown of a toilet, which raises a question concerning the narrow focus to date on toilet pans. As mentioned earlier in Section 2.2.3, the toilet pan, on average, comprises just under 4% of a Model 3 toilet. The savings generated through the locally made pans are of the order of IDR 70,000, which represents under 2% of a Model 3 toilet.

By contrast, materials such as cement and sand comprise 26% and 16% respectively. These figures highlight the need for consideration as to how entrepreneurs integrate sales of toilet pans with a household's broader needs, which is for a complete toilet. In addition, the labour costs paid by households for Model 3 were IDR 1.72 million on average, representing possible additional roles that entrepreneurs could play should they develop broader business models that offer a full toilet package with installation.

2.7.3 Characteristics of materials supply shops

The characteristics of materials supply shops in Kupang, Kefamemanu and in the subdistricts are described below. The analysis considers the profile of supply shops in terms of their size, revenue and legal status, as well as their approaches to marketing, how they choose their suppliers and the level of competition they face. It also covers their relative access to and use of credit, how they address their transportation needs, and if they have developed partnerships within or outside the supply chain.

Size, age, revenue and formal legal status

Kupang: Varied, some as old as 30 years. One informal business had 32 employees (includes a concrete brick factory) has income of more than IDR 50m /month. Another was formally registered, had 20 full-time and 10 part-time employees has income between IDR 100m-150m/month.

Kefamenanu: Both shops interviewed were formally registered (as CV or PT) and about 7-8 years old. One was larger, with 17 employees and the other smaller, with 5 full-time employees, and both with gross revenue of IDR 10 million < gross revenue < IDR 50 million. One shop had borrowed credit from a bank to establish the shop, and had support from other family members (also involved in business) on how to deal with business and finances.

Subdistricts of TTU: The materials shops were generally located in the main subdistrict town. The shops interviewed had very different ages, with one at 2 years old, one at more than 10 and the other at about 30 years old. All shops had revenue of (both with revenue of between IDR 10 million to IDR 50 million/month. The number of employees, in addition to the owner, varied from one to four, either as full-time or part-time. All shops were registered formally, as either a CV or PT. Only one of the shops had taken out a loan, from BPD (a local development bank owned by provincial government) and BRI (state owned bank). This loan was the pay for vehicles, was for 3 years, and is paid in monthly instalments. It was not reported to be difficult to access the loan, but there was a limitation to its size: "*It is not that difficult to get the loan, particularly as we are able to meet the guarantees required by creditors. But, the amount of the credit is limited*".

Marketing

Kupang: Word-of-mouth is dominant. Only one shop uses website, TV, newspaper, billboard and a sales agency. No direction promotion of sanitation products

Kefamenanu: One shop uses radio and the other word-of-mouth. No direct promotion of sanitation products but one shop offers advice in this area to customers: *"since most customers are from villages, we explain what we sell, and explain the different types of toilets and what materials are needed*".

Subdistricts of TTU: Word-of-mouth is the only method of marketing, and there is no specific promotion of materials related to sanitation

Choosing suppliers

Kupang: Sales people from Surabaya market their products (especially one brand of toilet pan- Ina). Choice based on medium or good quality and low price.

Kefamenanu: For most materials, shops obtain them from Surabaya, since the price is cheaper than Kupang. One shop reported that they rent a container from Surabaya to Kupang (IDR 10m) and use their own truck for Kupang-Kefa. In the case of cement, one shop indicated they bought it from Kupang due to pressures from the distributor in Kupang: *"I don't buy from Surabaya because the supplier in Kupang will get annoyed".*

Subdistricts of TTU: Informal relationships play a strong role in selecting suppliers. For example two shops noted that they obtain supply from a family shop in a larger centre (namely Atambua and Kupang), and another noted that they had a long-term relationship with their supplier: "*Relationship with suppliers has been made for long time*". One shop also mentioned price as an important consideration.

Competition

Kupang: Mixed information about the numbers of materials supply shops that those interviewed had to compete with. The largest shop mentioned 10 such similar businesses in Kupang, each with a similar market share, and the need to find items at the cheapest price in Surabaya in order to compete. Others mentioned from 50-80 materials supply shops in Kupang.

Kefamenanu: There are 5-7 similar shops in Kefa. One shop commented: "*I compete with price, I don't make it so high. If they need instalments, I give them, as long as we get more networking and relationships. There is an older store than us, but we are good in networking and quality of service. If a customer is looking for something and I don't have the item, I try to get it*".

Subdistricts of TTU: No competition, in general only one supply shop exists in a given area, as several shops reported that there were not competitors: "*This shop is the only one that exists in the area.".* Instead the competition is in larger centres (Kefamenanu and Atambua). Where subdistrict shops were in the vicinity of such centres, it caused challenges: "*However, there are shops in Atambua, which is a few kilometers from here. This makes it difficult for us to charge higher prices. If [we] charge higher prices, customers would choose to go to Atambua for cheaper materials."* Another shop indicated that they considered their market share to be about 50% due to competition in Kefamenanu. Another shop which did experience some local competition indicated they tried to compete based on service rather than price: "*Competition does exist, but it is not solely about prices. It is more about service to the customers because price differences are very small".* The customers for all subdistrict shops were predominantly local, but include customers from neighbouring subdistricts.

Credit and discounts for customers

Kupang: In general no credit is offered to household customers, only to smaller shops that buy in bulk. In which case discounts may be offered (e.g. discount of IDR 5,000/sack cement for minimum of 10 pieces), and credit may be offered that must be paid back within 1-2 weeks, and occasionally longer. Most shops only give credit to regular customers, for instance of IDR 3m-4m. Some shops have debt collectors, and others proactively call the customer to be paid back.

Kefamenanu: Known, trusted customers may be allowed to delay their payment by a short time (e.g. 2-4 weeks) for some proportion of the payment (e.g. 20%) of up to a few million IDR. Provision of credit might also depend on the relevant materials: *"It also depends on the materials. For example cement, there is little profit and so I would not offer credit, but would offer for items where the profit margin is bigger".* One shop commented that they had become more discerning in providing credit compared with when the business first started: "*When I started the business I offered a lot in credit, but then I evaluated the finances and realised that with a loan to pay off I had to be more careful.*" Discounts are offered for certain materials bought in bulk, and in one case might be offered on the basis of poverty/need for toilet pans: "*I am sensitive and have empathy. Especially people wanting a toilet. I would want to help. If the prices I IDR 125,000 then I would give IDR 115,000 discounted price*". Collective buying by groups of households is not common: "*What seems to be common is that people buy individually as they need*".

Subdistricts of TTU: Two out of three shops offered credit to trusted customers, and the other shop did not. Those that did allow for payment within 2 weeks (or up to one month) with a payment of 50% upfront. The amount offered in credit by one shop was significant: "*To those who are trustworthy, it is likely that we offer IDR 5 to 10 millions credits*".

Discounts are offered to customers who buy in bulk, though the quantity required varied- one shop suggested for 50 sacks of cement, whilst another suggested for 100-200 sacks of cement.

Two shops had not experienced any kind of bulk purchase from a collective of household: "We have never found such case where people band together their material purchases*." We have never found such case where people band together their material purchases*". However one shop had frequently seen, and promoted, this model: "*Yes, in many occasions people band together when they buy materials from this shop. We do suggest it to the costumers to reduce the costs of transportation (as they can split the costs)".*

Transport

Kupang: All shops have vehicles for transport, which were bought using credit. Delivery will only be offered if the road condition is good, and in general trucks return to Kupang empty. One business noted that the truck would return with sand from Kefamenanu or Atambua.

Kefamenanu: Shops interviewed all own vehicles (around 1-3 large trucks and 2-3 smaller trucks) for their own deliveries (not rented out for other purposes). One shop noted that they don't make much profit on this aspect of the business, rather, that they just cover costs.

Subdistricts of TTU: Shops noted that they owned 2-3 trucks. For two shops the transportation was included in the accounting for the overall business, and for one of these, the cost of transportation was included in the material's price. In another case transportation was treated as a separate business entity from the shop, and the trucks were rented out: "*The trucks are also rented at IDR 250,000 to 350,000 depending on the distance*". Shops reported that vehicles generally return home empty after making deliveries. Road access depended on the weather and location. As one shop reported: *"During the dry season, the road is good. But, when it gets rainy, the condition can be bad. Sometimes the trucks must wait for 2-3 days before being able to cross the road".*

Partnerships

Kupang: Existing partnerships appear to relate to construction companies. Shops indicated a willingness to consider cooperation with entrepreneurs or masons building toilets, however reservations were expressed concerning the location and *"how much the profit that will be able to be received".* One store was willing to sell toilet pans provided by an entrepreneur.

Kefamenanu: Shops have had larger contracts to provide construction materials for certain buildings. In this case shops offer special deals, and in one case, a contract to build four monasteries, one shop offered a discount price as a type of 'service' to the community. None of the shops had experience of a partnership with masons or sanitation entrepreneurs. One shop expressed interest in selling the locally made cheaper toilet pans made by entrepreneurs.

Subdistricts of TTU: One shop had ongoing cooperation under PNPM Mandiri program, but no shops had specific cooperation with construction companies or masons. Two shops expressed interest in cooperating with sanitation entrepreneurs to sell their toilet pans, but noted it would depend on if it were sellable: "*We would like to have that (cooperation with a sanitation entrepreneur] as long as the product is sellable*".

2.7.4 Forms of credit for small businesses

Bank BRI offered loans targeted to businesses. One of these was directed to small businesses (< IDR 20 million) and another for larger businesses (< IDR 100 million). The interest rate was in the range of 1.00-1.25% per month. A third type of loan (consumer loan) was available only to government employees, which offered lower interest rates and longer repayment periods. Department of Small and Medium Enterprises' are attempting to make access to credit such as this

more accessible: "*We have a partnership agreement with BRI to give credit. If you borrow about IDR 20million, can get this without the guarantee. We are pursuing this but it is hard".*

This Department was also partnering with other credit providers to support lower interest loans for small enterprises: *To provide credit to entrepreneurs we collaborate with LPDB (Lembaga Pengelola Dana Bergulir)- organization credit provider. Make a proposal and LPDB verifies- it is credible, and lower than bank rate- 0.7%/month*".

A district staff member from public works noted that at provincial level there is a program to support people to access loans (Angurmera) of IDR 250m per village. It was reported that sanitation entrepreneurs can access this in every village and at district level there is a similar program, however we did not hear of cases where this had taken place.

2.8 INFLUENCE OF CURRENT GOVERNMENT POLICY AND REGULATORY FRAMEWORK

Whilst there was an overall positive commitment to supporting the supply chain and an understanding of the need for affordable products amongst relevant government officials, there is not currently a strong enabling environment for the supply chain to develop. Current issues concerning current government roles that affect the supply chain are as follows.

Need for improved coordination between agencies: The district Department of health (DoH) reported that Department of Public Works (DPW) is responsible for the physical construction and their role is only promotion. However DoH also reported being involved in supporting provision of materials in some cases, and DPW only plays a role in communal sanitation, not household sanitation.

Equally, DPW suggested that support should be given to entrepreneurs and the supply chain, but that this should come from Department of SME's and Trade (DSMET), yet DSMET appeared to be unfamiliar with the sector and was focused on Ikat weaving as the main area for support.

From these observations it seems clear that improved coordination is an important prerequisite to support systematic improvements in the supply chain. The role to support coordination and to convene the Pokja normally lies with Bappeda. However Bappeda officials showed a low awareness of toilet provision issues, limited interest in supporting the supply chain or entrepreneurs (given toilet pans are already available in materials stores) and limited interest in playing coordination role with other departments, seeing this as extending beyond their authority and responsibility.

Funds could be used more systematically to build a strong supply chain: Both DoH and DPW reported that some of their funds were used to buy materials to support construction of toilets. These materials are bought in the district capital Kefamenanu and delivered. This approach bypasses sub-district supply shops and any sanitation entrepreneurs. For instance DPW reported that they support development of communal sanitation systems for which materials are generally purchased in Kefamenanu. DoH also reported that *"Sanitarians work together with the people to stimulate by giving sands and toilet pans to the people. DoH isn't allowed to handle physical construction. DoH encourages the people to have clean toilets. Local budget is a little hard, but the help from DoH is more flexible. If the people can get sands on their own, then DoH will help with the cements (10 sacks)".* The latter raises a question as to whether supporting households directly in an ad hoc way, as currently appears to be practiced, or supporting the supply chain more systematically would be more effective use of funds.

Variable attitudes to and support for sanitation entrepreneurs: Attitudes towards sanitation entrepreneurs by government agencies were variable. DPW demonstrated a negative attitude about prospective of sanitation entrepreneurs: *"Not many people are interested. Because many people think sanitation business isn't promising".* DoH, in contrast, suggested that the supply chain needed to be supported and reported that their sanitarians actively 'promoted' sanitation entrepreneurs. However, interviews with sanitarians highlighted that they may or may not specifically promote entrepreneurs, and that in general they see the core of the role to be on monitoring (*"making visits house to house to monitor sanitation")* and promoting behavior change *"I make suggestions to households without toilet, give education to them, explain how bad it is for your health, we try to find a solution together".* Some sanitarians were also not aware of accurate prices to build a toilet, and hence not well equipped to provide households with information in this critical area.

At subdistrict level there was also openness to provide direct support, training and funding to entrepreneurs, however this has not yet been observed in practice: *"It [government support] should be funding, bring the training to training entrepreneurs."* and *"We [government] should provide support [to private entrepreneurs] – giving funds to groups of masons that are trained and skilled. This would be okay if we received a funding proposal from masons to do this".*

***Promotion and monitoring of durable 'healthy' latrines*:** Interviews with DoH revealed challenges to having quality, consistent reporting on access to sanitation. Of note, there has been a recent change to move beyond defecation in a fixed place to understanding the nature of the toilet, including the need for a semi-permanent or permanent "healthy toilet". Healthy toilet implies that the waste products are properly managed: *"Some people have built WC cemplung, but not*

included the septic tank. So they are considered Open Defecation, even though they have used bebak (local woods) as septic tank. Therefore, DoH needs to revalidate the data" and *"So that everyone who have pit latrines changed to goose neck [water-sealed toilet]. It's called goose neck declaration".* This increased focus on proper construction of more permanent latrines has potential to increase focus on the related supply chain and skills to provide such latrines. Further one sanitarian suggested that fines should be implemented as a way to prompt changed behaviour and investment in latrines: "*Besides this, the government should make a regulation that requires every family to have a toilet. So that in the village there could be 'fines' if you don't have a toilet".*

Potential to access small business support: An avenue for support that has not yet been utilised for enterprises involved in sanitation product provision is programs available through DSMET that are designed to support entrepreneurs and small-scale enterprise. Such support typically includes provision of capital (either directly or through assistance to access loans) and training. The current focus is based on research and analysis of the most common and viable types of entrepreneurs in TTU – currently ikat weaving, however there is opportunity to put forward proposals by a group of entrepreneurs (as a cooperative) to request assistance. This process is potentially lengthy and uncertain: *"It would be a long process, and may not be approved by the Bupati",* and may require other advocacy efforts to demonstrate the socio-economic benefits of improved sanitation and sanitation supply chain to administrative and political leaders. DSMET noted that it can be difficult to find motivated entrepreneurs that will make good use of their support: *"Capital, we give capital, some use it for their business, others use it for themselves."* and *"[an successful entrepreneur is] someone who has motivation and is hard-working. Because the government can give training and funds, but if the person themselves lacks motivation then it will not be successful"*. Hence it would be important to make certain that any proposal by sanitation entrepreneurs was well conceived and sufficiently motivated entrepreneurs were involved.

***Need to carefully target any funding support*:** An important aspect to government support to any part of the supply chain is the expectations this can raise, and the potential to stymie innovation and motivation, rather than build such qualities. For example village funds may be used to support purchase of materials for certain families, however in some cases this has led to other families 'waiting' rather than making investments themselves: "*the main problem is their economic situation, they are poor. In one case, in one village, several families were helped by the village fund. Now other families heard that and are waiting for it*". One suggestion has been to focus use of funds on buying moulds that can then be shared to make toilet pans within a village, rather than providing support directly to certain households: *"Village fund for sanitation was before STBM, before Plan. Plan doesn't want subsidy and reliance on village fund. Plan wants people to be triggered and maybe next year instead of helping families to build toilets, the village fund can be used to buy moulds".* The views of one subdistrict head concurrent with this, reporting that: *"If we give money directly to the people, it doesn't guarantee that they are going to do that [build a toilet]. So it's better [to support sanitation businesses] through the sub-district level because we will assist them".*

***Dual role of sanitarians in the supply chain*:** Sanitarians, as government staff who promote health and hygiene, have also been trained to make toilet pans using a mould. As noted in Murta and Willetts (2014) this presents a complex situation for sanitarians to navigate, since building a business related to their government position can both potentially enable positive change in access to sanitation, but also raise issues of conflict of interest. In some cases sanitarians had used their training to train other masons: *"I received training, and I have given training to groups of masons in [three locations]".* Though in this case it was also reported that such trainees were interested in taking up the business but that the mould was prohibitively expensive: "*Yes, they are interested, but their economic situations makes it hard. The mould is IDR 360,000. This is expensive for farmers or fishermen".*

3 FINDINGS IN MT

3.1 POVERTY AND ACCESS TO SANITATION

Unlike TTU, where areas of higher poverty had lower healthy toilet coverage, this was not the case in MT. Excluding one outlier (Lamba Leda), there is a negative correlation between healthy toilet coverage and poverty as seen in Figure 40 below, indicating subdistricts with a lower rate of poverty have higher healthy toilet coverage. However data for toilet coverage is likely not accurate, and differences in toilet coverage are relatively small, with all subdistricts demonstrating 5%-13% of households with healthy toilets. Better access to clean water was positively correlated with larger toilet coverage, a finding common in many contexts. Poverty indicators and demographic and socio-economic characteristics are shown in Table 9, Figure 41, Figure 42, Figure 43, Figure 44, Figure 45 and Figure 46.

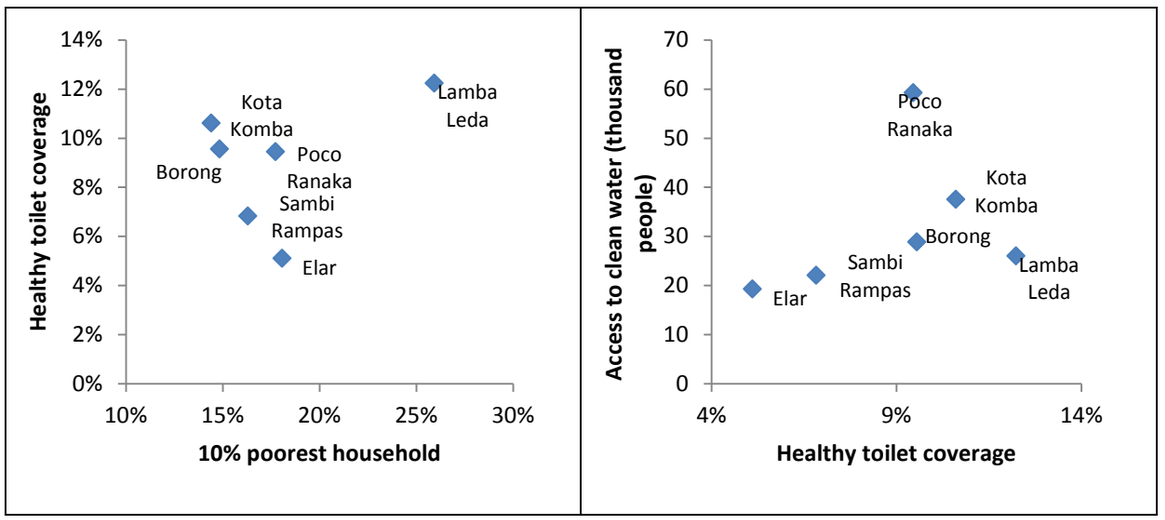

Figure 40: Toilet coverage, poverty and access to clean water in Manggarai Timur, 2013
Source: DoH MT and TNP2K

Table 9: Poverty and access to sanitation in MT (Source: DoH MT, MT Dalam Angka, TNP2K)

Subdistrict	Number of villages (2012)	Distance sub-district capital to district capital (Km)	Demography (2012)		Poverty indicator		Access to clean water (% of population, 2013)	Healthy toilet coverage (% of pop'n, 2013)
			Popul-ation	Popul-ation density	Number of inadequat e houses	Poorest 10% hh (2012, %)		
Borong	18	5	36076	736	3978	14.85	49.0	10.3
Kota Komba	22	36	48702	990	3873	14.41	77.0	10.6
Elar	15	145	15006	264	131	18.06	45.6	2.8
Sambi Rampas	20	187	26265	656	5288	16.31	84.0	6.8
Poco Ranaka	24	41	32547	1555	1739	17.73	98.8	11.9
Lamba Leda	24	77	33818	941	3262	25.93	76.8	12.2
Rana Mese	21	NA	27081	736	1590	14.85	41.3	8.7
Poco Ranaka Timur	18	NA	26582	1555	2215	17.73	101.9	7.0
Elar Selatan	14	NA	17065	264	2896	18.06	72.7	6.3

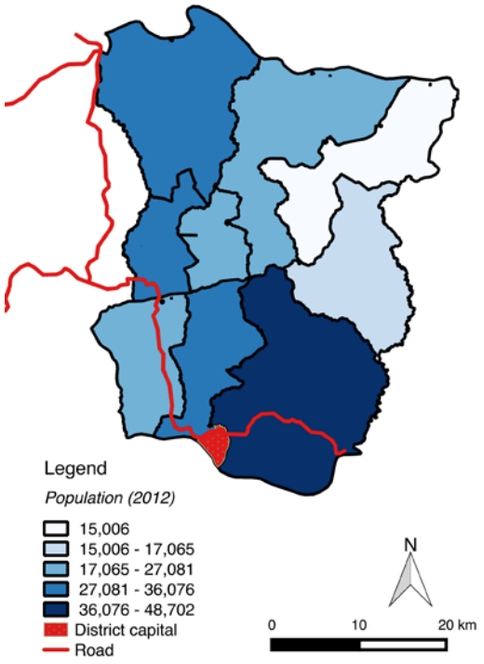

Figure 41: Population in subdistricts of MT

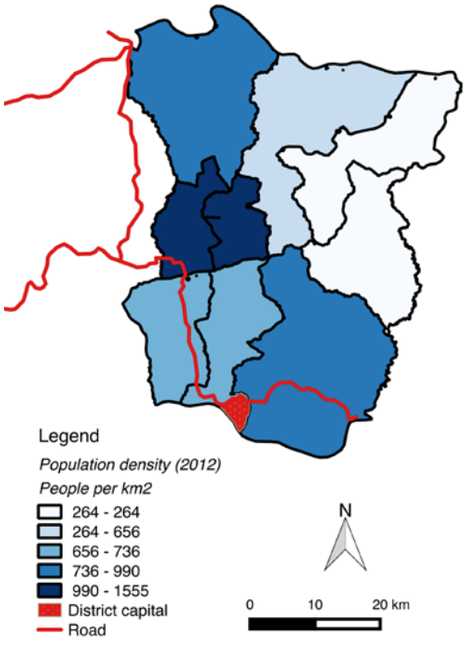

Figure 42: Populations density in subdistricts in MT

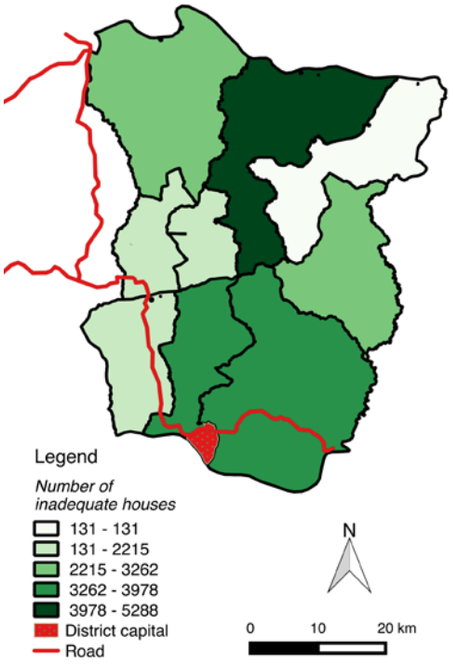

Figure 43: Number of inadequate houses in subdistricts of MT

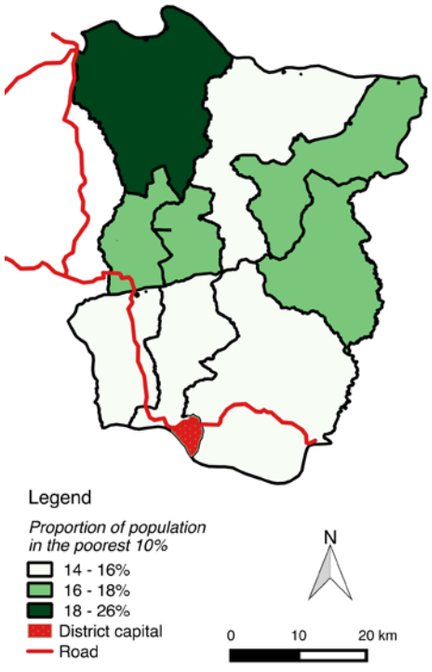

Figure 44: Proportion of population in the poorest 10% subdistricts of MT

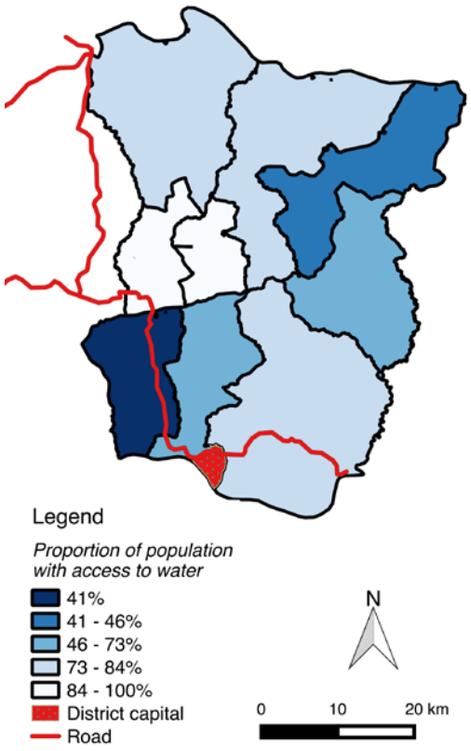

Figure 45: Proportion of population with access to water in subdistricts of MT

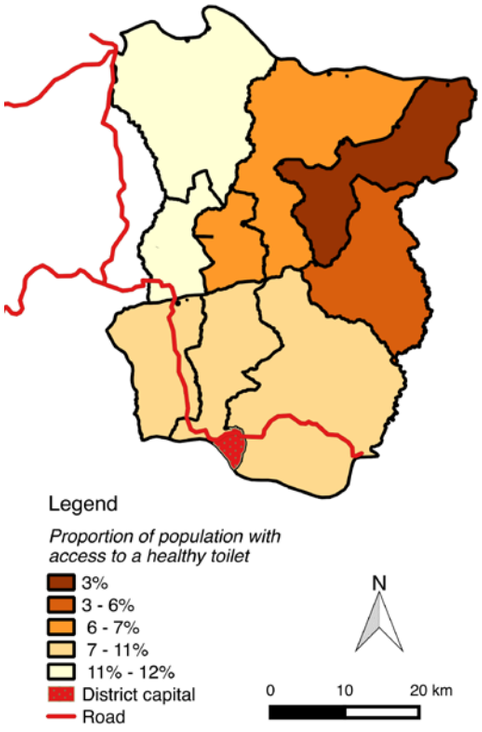

Figure 46: Proportion of population with access to a healthy toilet in subdistricts of MT

3.2 COST BREAKDOWN OF A TOILET

3.2.1 Common toilet types in MT

The most common type of toilet combination (bottom structure, middle structure, upper structure) was investigated based on data from 27 villages. Figure 47 below shows that two of the most common type of toilet combination from the survey in Manggarai Timur is the most basic type (b1,m1,t1 used by 37% of the sample) and the water-seal pan with a septic tank (b3,m3,t3 used by 25.9% of the sample). Based on this finding, the analysis of costs was simplified by considering three toilet types with the following bottom, middle and upper structures: Model 1 – 1,1,1; Model 2- 2,2,2; Model 3 -3,3,3.

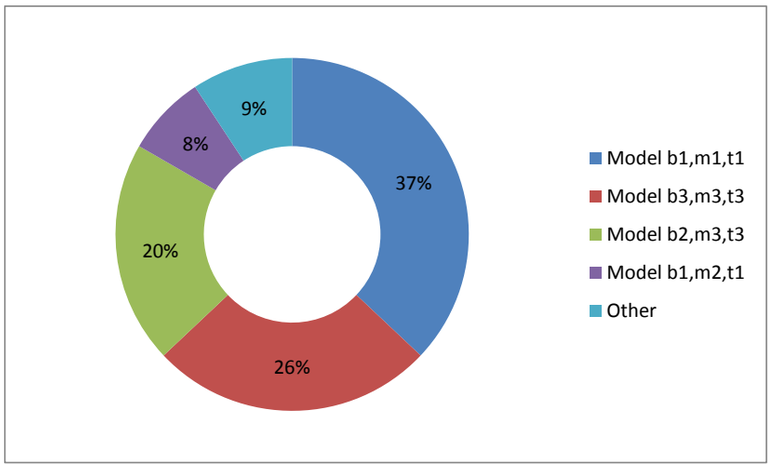

Figure 47: Common toilet types in MT

3.2.2 Quantities of different materials components

The quantity of different materials varies with the toilet type. Analysis was undertaken of the average quantity reported for each material for each toilet type and is shown in Table 10.

Table 10: Average quantity breakdown of building a toilet (excluding masons)

		Bamboo (unit)	Wood (unit)	Sand (m3)	Gravel (m3)	Rock (m3)	Concrete brick (unit)	Cement (sack)	Reinforcing iron (12m)	Pipe (metre)	Toilet pan (unit)	Zinc sheet
Model 1	Bottom	13	8									
	Middle	1	1	2				2				
	Upper	7	6									
Model 2	Bottom	5	7	4	1	2	120	10	0.25	2		
	Middle	2	3	2	1	0		2		2		
	Upper	11	15	1			160	8	3			5
Model 3	Bottom	5	8	6	1	2	156	12	1	2		
	Middle			2	1	1	20	3	0.67	1	1	
	Upper		12	3	0	1	299	15	1.83			6
Model 1		21	15	2	0	0	0	2	0	0	0	0

	Bamboo (unit)	Wood (unit)	Sand (m3)	Gravel (m3)	Rock (m3)	Concrete brick (unit)	Cement (sack)	Reinforcing iron (12m)	Pipe (metre)	Toilet pan (unit)	Zinc sheet
Model 2	17	25	7	2	3	280	20	3.25	3	0	5
Model 3	5	20	10	2	4	474	30	3.5	4	1	6

3.2.3 Costs of different materials components

If the cost of building a toilet is broken down by type of materials, it becomes clear which components contribute most to the cost (see Table 11 and Table 12). For Model 1, bamboo and wood are the dominant costs. For Models 2 and 3, the largest spending is usually for sand, cement and concrete bricks (Figure 48).

Table 11: Average cost breakdown to build a toilet in MT (000 IDR)

Cost (,000IDR)		Bamboo	Wood	Sand	Gravel	Rock	Concrete brick	Cement	Reinforcing iron	Pipe	Toilet pan	Zinc
Model 1	Bottom	455	260	-	-	-	-	-	-	-	-	-
	Middle	35	33	344	-	-	-	106	-	-	-	-
	Upper	245	195	-	-	-	-	-	-	-	-	-
Model 2	Bottom	175	228	687	211	372	305	531	12	60	-	-
	Middle	70	98	344	211	-	-	106	-	60	-	-
	Upper	385	488	172	-	-	407	424	150	-	-	231
Model 3	Bottom	175	260	1,031	211	372	397	637	50	60	-	-
	Middle	-	-	344	211	186	51	159	33	30	170	-
	Upper	-	391	516	-	186	761	796	91	-	-	278
Model 1		735	488	344	-	-	-	106	-	-	-	-
Model 2		630	814	1,203	422	372	712	1,061	162	120	-	231
Model 3		175	651	1,891	422	744	1,209	1,592	175	90	170	278

Table 12: Average cost breakdown of materials to build a toilet in MT (%)

Cost (%)		Bamboo	Wood	Sand	Gravel	Rock	Concrete brick	Cement	Iron	Pipe	Toilet pan	Zinc	Total
Model 1	Bottom	27.1%	15.4%	-	-	-	-	-	-	-	-	-	42.5%
	Middle	2.1%	1.9%	21.1%	-	-	-	6.3%	-	-	-	-	31.4%
	Upper	14.6%	11.5%	0.0%	-	-	-	-	-	-	-	-	26.1%
Model 2	Bottom	3.0%	3.9%	12.3%	3.7%	6.4%	5.3%	9.2%	0.2%	1.0%	-	-	45.0%
	Middle	1.2%	1.7%	6.1%	3.7%	-	-	1.8%	-	1.0%	-	-	15.5%
	Upper	6.7%	8.4%	3.4%	-	-	7.1%	7.4%	2.6%	-	-	4%	39.4%
Model 3	Bottom	2.4%	3.5%	14.2%	2.8%	5.0%	5.3%	8.6%	0.7%	0.8%	-	-	43.3%
	Middle	0.0%	0.0%	4.7%	2.8%	2.5%	0.7%	2.1%	0.4%	0.4%	2.3%	-	16.1%
	Upper	0.0%	5.2%	7.1%	-	2.5%	10.2%	10.7%	1.2%	0.0%	-	4%	40.7%

Cost (%)	Bamboo	Wood	Sand	Gravel	Rock	Concrete brick	Cement	Iron	Pipe	Toilet pan	Zinc	Total
Model 1	44%	29%	21%	0%	0%	0%	6%	0%	0%	0%	0%	100%
Model 2	11%	14%	22%	7%	6%	12%	18%	3%	2%	0%	4%	100%
Model 3	2%	9%	26%	6%	10%	16%	21%	2%	1%	2%	4%	100%

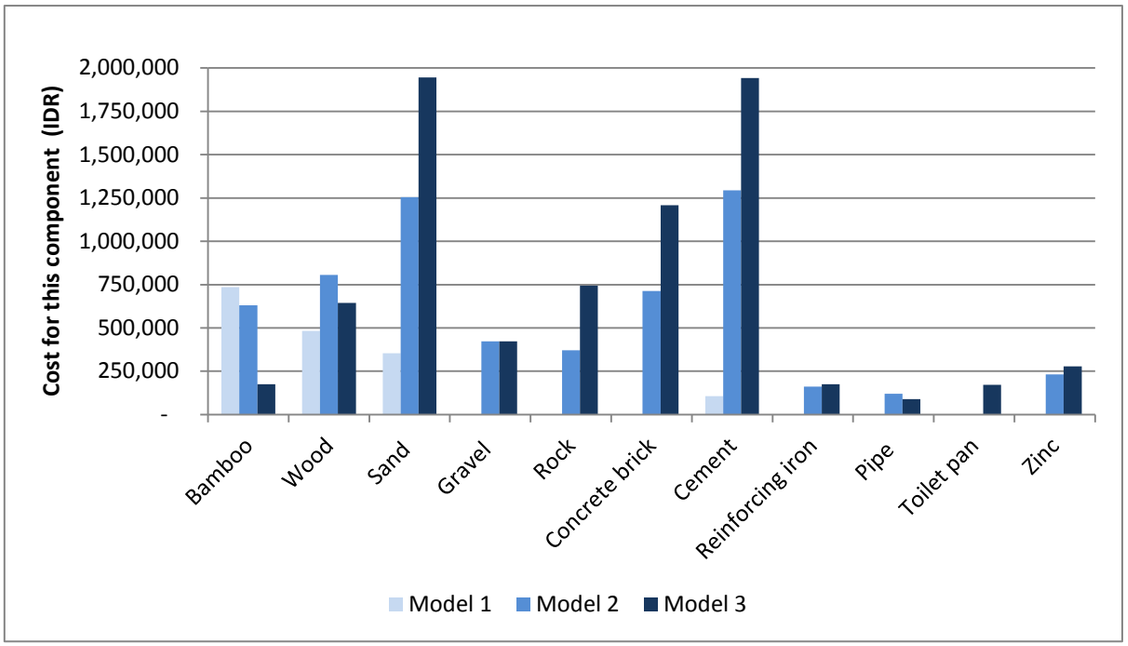

Figure 48: Cost breakdown for different materials components of three toilet models in MT

It should be noted that for Models 2 and 3, and significant proportion of the materials cost relates to the bottom structure, and also the upper structure (see Figure 49). The high cost of the upper structure has also been observed in other country settings, and represents an opportunity to develop light-weight durable, transportable structures to replace current designs.

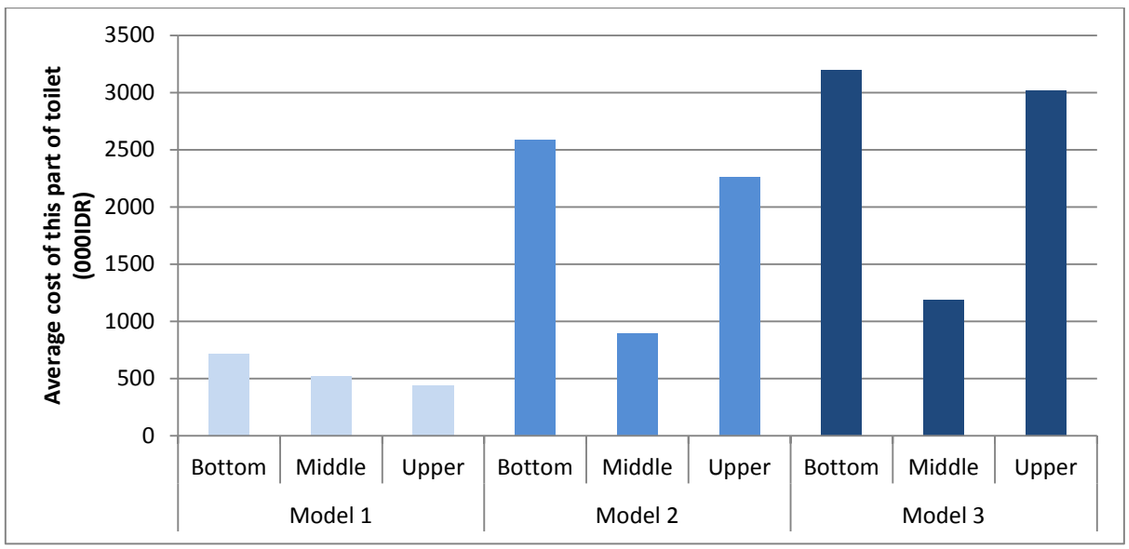

Figure 49: Average cost of bottom, middle and upper parts of three models of toilet in MT

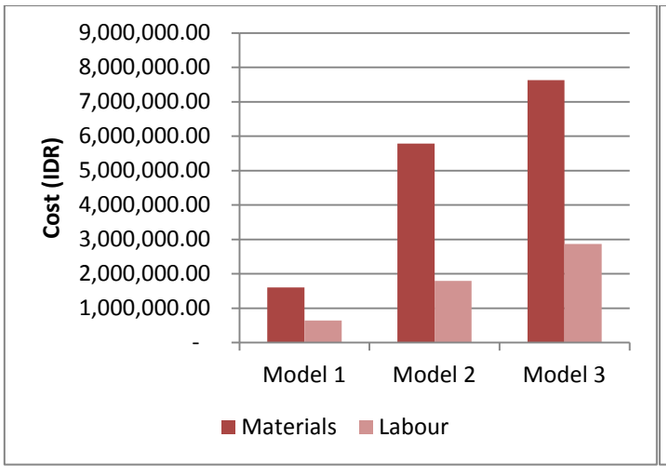

Figure 50: Comparison of materials and labour costs for three toilet models in MT

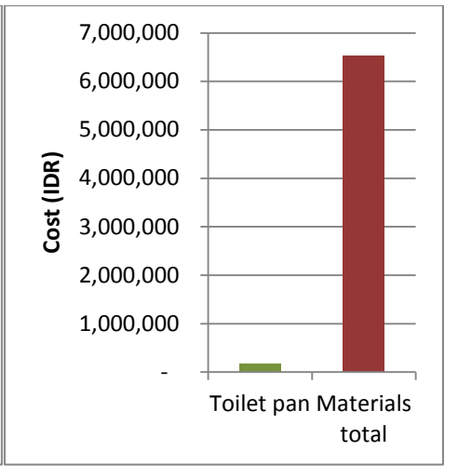

Figure 51: Comparison of toilet pan with total material cost for Model 3 in MT

3.3 COSTS OF TOILETS IN DIFFERENT LOCATIONS

The materials cost, in MT, of a Model 1 toilet is IDR 1.6 million on average, while Model 2 costs IDR 5.8 million, and Model 3 costs IDR 7.6 million (see Table 13). If labour costs are taken into account, these rise to IDR 2.1 million (Model 1), IDR 7.6 Million (Model 2) and IDR 10.5 million (Model 3).

The costs vary significantly with the location, both due to transportation costs, and also due to prices of locally sourced materials in different villages and subdistricts. The most expensive place to build a toilet is in Poco Ranaka Timur, which has a cost that is 185% that in Borong to build a Model 3 toilet, and 181% that in Borong for a Model 2 toilet (see Table 13). The reasons for the higher cost in Poco Ranaka Timur is related to the high price of sand in this subdistrict of IDR 300,000-400,000/m^3 (which makes up a significant part of the overall cost) as well as high prices for gravel, rock and concrete bricks. The subdistrict of Sambi Rampas has the second highest cost, similarly due to high costs for sand and rock.

Elar Selatan has the highest transportation costs. The transportation costs from Borong to one of the surveyed villages in Elar Selatan (IDR 950,000) made up 16% of the cost of building a Model 3 toilet in that location. This means that the cost of cement, taking into account transportation is IDR 82,133/sack as compared with IDR 52,333 in Borong, or 160%. However the relatively low costs of sand, gravel and rock in Elar Selatan mean that the overall cost of building a toilet in this subdistrict is 139% that in Borong.

Table 13: Cost to build a toilet in each subdistrict of MT[4]

Cost ('000IDR/%)	Materials + labour cost			Materials cost		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Borong	2,405	6,303	8,544	1,305	4,453	5,694
	100%	100%	100%	100%	100%	100%
Elar	1,429	8,622	9,056	1,429	5,712	7,548
	59%	137%	106%	110%	128%	133%
Elar Selatan	1,384	6,552	10,522	1,384	5,552	7,446
	58%	104%	123%	106%	125%	131%
Kota Komba	1,878	6,036	9,002	1,254	4,733	6,272
	78%	96%	105%	96%	106%	110%
Lamba Leda	2,228	6,403	10,896	1,583	5,953	7,719
	93%	102%	128%	121%	134%	136%
Poco Ranaka	2,312	6,284	10,623	2,102	5,601	7,427
	96%	100%	124%	161%	126%	130%
Poco Ranaka Timur	2,911	8,944	14,563	2,271	8,051	10,517
	121%	142%	170%	174%	181%	185%
Rana Mese	2,636	7,789	10,195	1,301	4,889	6,362
	110%	124%	119%	100%	110%	112%
Sambi Rampas	1,922	11,337	11,026	1,822	7,147	9,655
	80%	180%	129%	140%	161%	170%
Average	2,123	7,585	10,492	1,606	5,788	7,626

[4] *Note: First row in each subdistrict refers to cost to build toilet (in 000 IDR), second row refers to cost in each subdistrict relative to cost in Borong. Transport cost is only relevant for Model 2 and Model 3. Since cement used for Model 2 is just 2/3 of cement used for Model 3, transport cost for Model 2 is assumed to be 2/3 of transport cost for Model 3 as well. Standardized quantity is used to estimate the cost structure.*

Cost (‘000IDR/%)	Materials + labour cost			Materials cost		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	88%	120%	123%	123%	130%	134%

Costs of a building each toilet model vary across different sub-districts of MT (Figure 52) and costs to build Model 3 toilet are higher further away from the district capital (see Figure 53 and Figure 54).

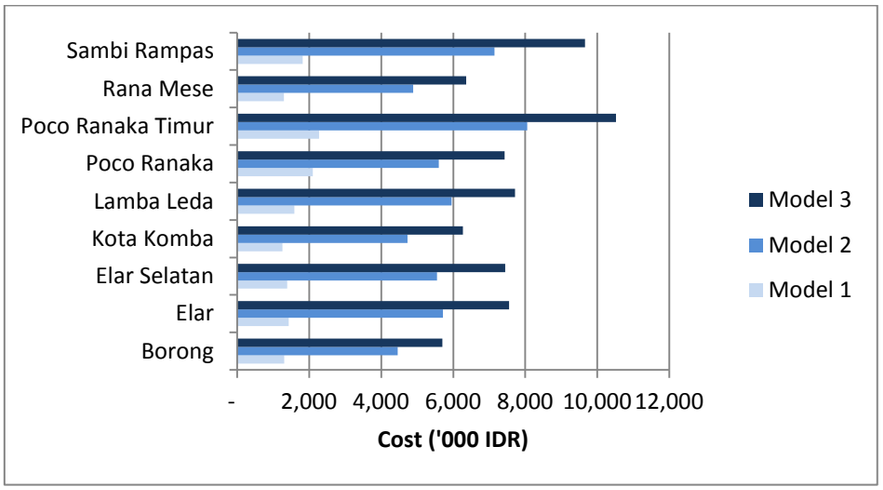

Figure 52: Cost of three models of toilets (excluding labour) in subdistricts of MT

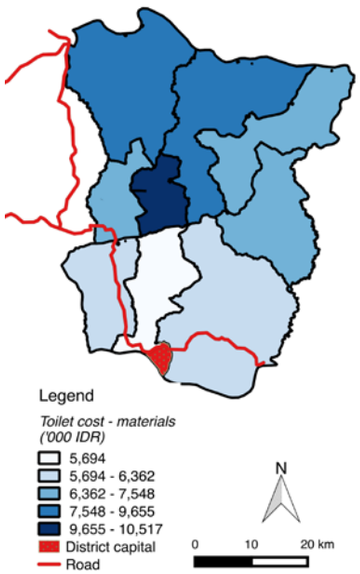

Figure 53: Costs of a Model 3 toilet in subdistricts of MT without labour

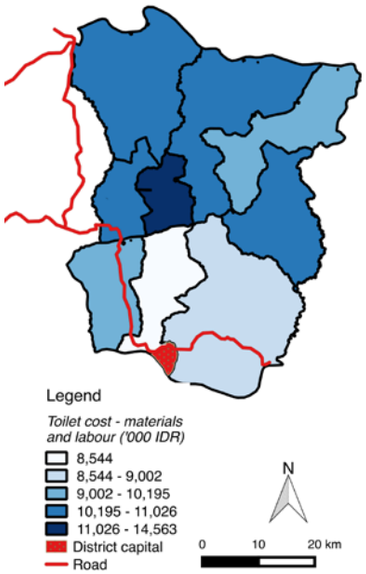

Figure 54: Cost of Model 3 toilet in subdistricts of MT with labour

3.4 MAIN ACTORS, PROCESSES AND LINKS IN THE VALUE-CHAIN

The supply chain for toilets consists of both product-specific supply chains for certain materials, as well as materials that may be sourced locally.

3.4.1 Key actors

The key actors in the chain include:

- Materials supply shops – retailers in Ruteng (in neighbouring district) and Reo (port in neighbouring district), retailers at district capital (Borong) and 1-2 in subdistricts (Kota Komba and Sambi Rampas)
- Sanitation entrepreneurs – at the time of this research there were almost no sanitation entrepreneurs in MT, however training was offered to develop such businesses
- Masons – available in all villages
- Transport providers – available in subdistricts
- Local producers – concrete blocks, bricks, sand and stone/rock

3.4.2 Supply chains for externally sourced materials

Shops can purchase items from Surabaya and transport them using land expedition or sea expedition. Each has its advantages and disadvantages (see Figure 55). Sea expedition is usually faster than land expedition but the shop must pick up the items by themselves at the port in Reo in Manggarai District.

Land expedition involves longer transportation times but provides a door-to-door service. It is also relatively safe because the items do not need to be loaded and unloaded multiple times. In general, materials supply shops buying items from Surabaya reported that they prefer to use land expedition to sea expedition, despite one material shop that mentioned that using sea expedition is slightly cheaper.

Figure 55: Transporting materials from Surabaya to Borong: by land and by sea

3.4.3 Locally sourced materials

The following materials are usually sourced locally:

- Sand, gravel, and stones
- Concrete bricks (*batako)*
- Bamboo

High quality of sands, gravels, and stones are sourced from nearby hills in Bondo in Borong Subdistrict. Lower quality of sands, gravels, and stones are sourced from small rivers (Wae Reca, Wae Bobo, dan Wae Mokel) that flowed in MT. Costs for sand vary across the district (see Figure 56) also for wood (Figure 57).

Due to its simple production process, concrete bricks are usually made by the households for own consumption such as for house and toilet construction. Some individuals, however, are producing concrete bricks and selling them to whomever that needs them.

A stone and sand producer in Bondo said that the business is good but the fee for transporting materials using trucks has increased considerably: *"before 2010 all we need is just license for mining sands, but after 2010 the local government imposed fee per truck which is more expensive that the mining license".*

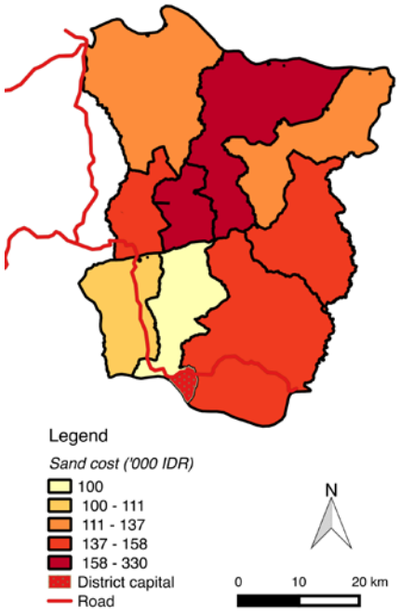

Figure 56: Cost of sand in different subdistricts of MT

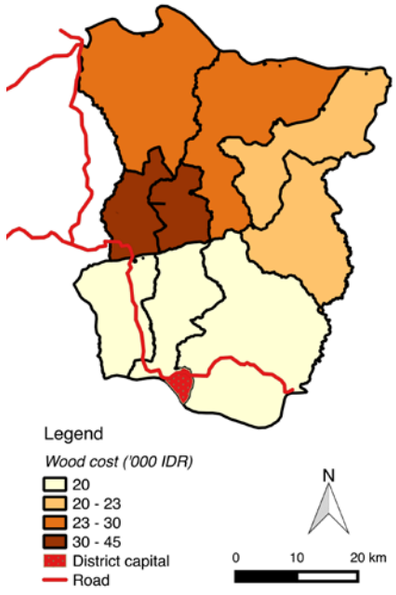

Figure 57: Cost of wood in different subdistricts of MT

3.4.4 Masons

Time spent to build a toilet showed a similar pattern across data collected in different subdistricts, where most days were spent to build either the bottom structure or the upper structure. In total, 32 days are required to build a single toilet in MT. However, a typical toilet building required two or more masons to complete the work. Therefore, if there are 2-3 masons doing the work, 10-16 days are needed to build the toilet on average in MT.

The average daily rate for mason is around IDR 74,000, but mason's cost varied from one subdistrict to another (see Table 14). In Elar Selatan the daily rate was as low as IDR 50,000 whereas in Rana Mese it was IDR 92,000. The former is very remote and the latter on a main road between Ruteng and Borong, which may explain the higher daily rates through greater connection to economic centres. The highest overall costs to build a toilet were reported in Rana Mese where longer times were also reported than in other locations (see Figure 58).

Table 14: Mason's cost

Subdistrict	Time spent (day)				Daily rate (000 IDR)	Total cost (000 IDR)
	Bottom	Middle	Upper	Total		
Borong	14	6	14	34	83	2,805
Elar	9	5	9	23	55	1,247
Elar Selatan	20	6	13	39	50	1,950
Kota Komba	16	6	17	38	70	2,660
Lamba Leda	15	3	11	30	75	2,250
Poco Ranaka	10	2	8	19	73	1,418
Poco Ranaka Timur	14	2	9	26	83	2,167
Rana Mese	20	10	20	50	92	4,583
Sambi Rampas	15	5	10	30	83	2,472
Average	14	6	12	32	74	2,395

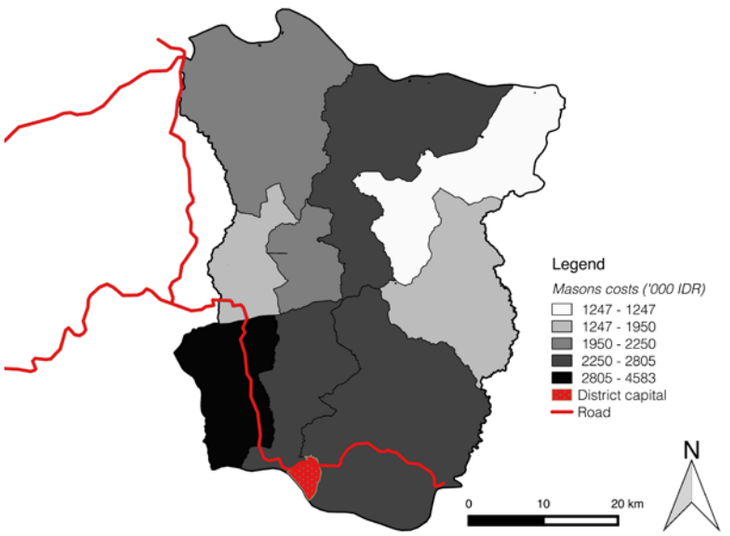

Figure 58: Masons costs to build a toilet in different subdistricts of MT

3.5 COSTS, EARNING PROFILES AND FINANCIAL PERFORMANCE OF DIFFERENT LINKS

3.5.1 Cement supply chain

There are no cement producers in MT. Consequently, all cements must be bought from Surabaya or other big cities such as Makassar or Kupang. Respondents from materials supply shops said that they bought cements that mostly originated from Surabaya using sea transport. Cement costs vary with the location (see Figure 59).

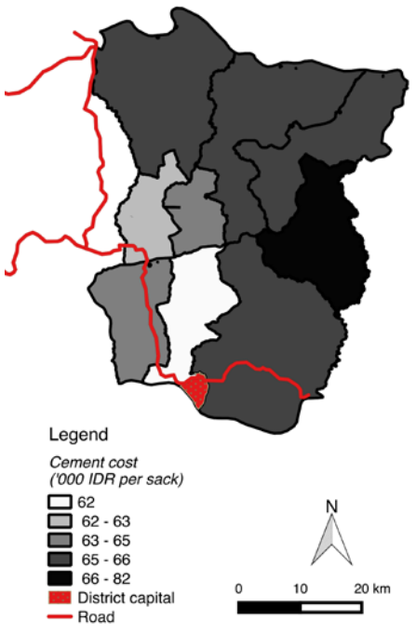

Figure 59: Cement cost in MT

A typical materials supply shop bought cement from Ruteng (via the Port of Reo) or took it directly from the Port of Waewole in Kota Komba subdistrict. From a quick observation on the price of a sack of cement we found that cement is priced at IDR 43,000/sack in Surabaya and sold at an average of IDR 50,000/sack in Borong. The price ratio in Borong relative to Surabaya is 1.16, which means that profit margin must be less than 16% because we haven't included transport cost. Depending on the location of the buyer, transportation cost to bring the cement is usually between IDR 2,500/sack to IDR 10,000/sack (see Figure 60).

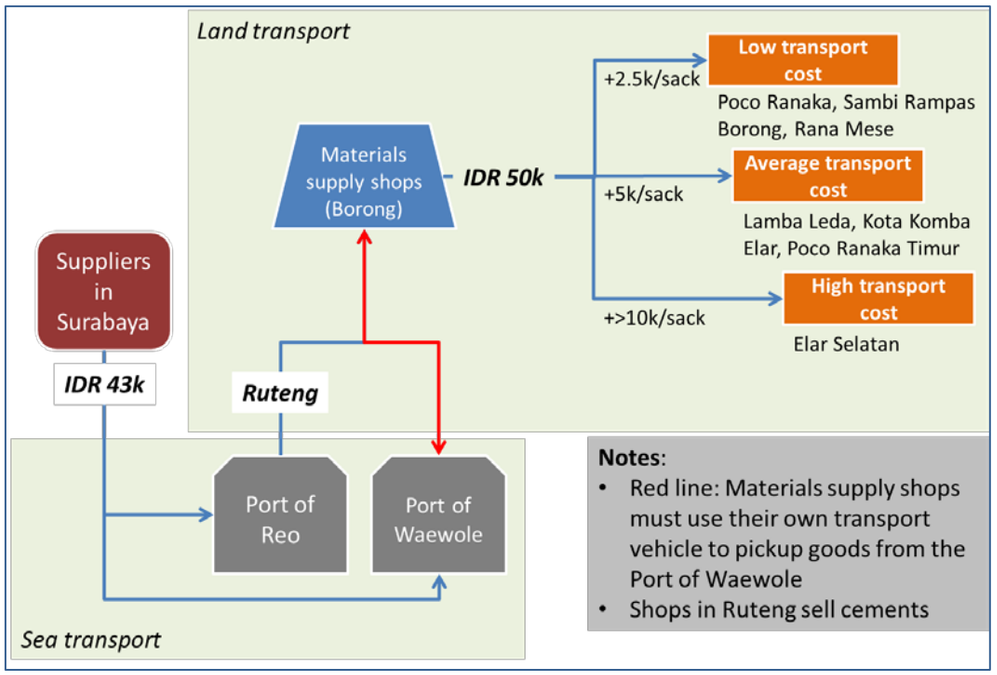

Figure 60: Cement supply chain in MT

3.5.2 Toilet pan supply chain

Similar to the case cement, there are no toilet pans producers in MT and most of them were brought from Surabaya. The difference with cement supply chain is that in procuring toilet pans materials supply shops were usually bought the toilet pans directly from suppliers in Surabaya (see Figure 61). Consequently, these materials supply shops have two options to get the items delivered: by land transport or by the sea.

Most of the shops choose to have the items delivered by means of land transport. However, if they choose to use sea transport, they must use their own transport vehicle to pick up the goods from the port. Compared to thin profit margin for cement, toilet pans provide higher profit margin as indicated by the price ratio in Borong relative to Surabaya (1.39 for toilet pan and 1.16 for cement). It should be noted, however, that even though the profit margin for toilet pan is larger than that for cement, but the trade volume for cement is much higher than trade volume of toilet pans.

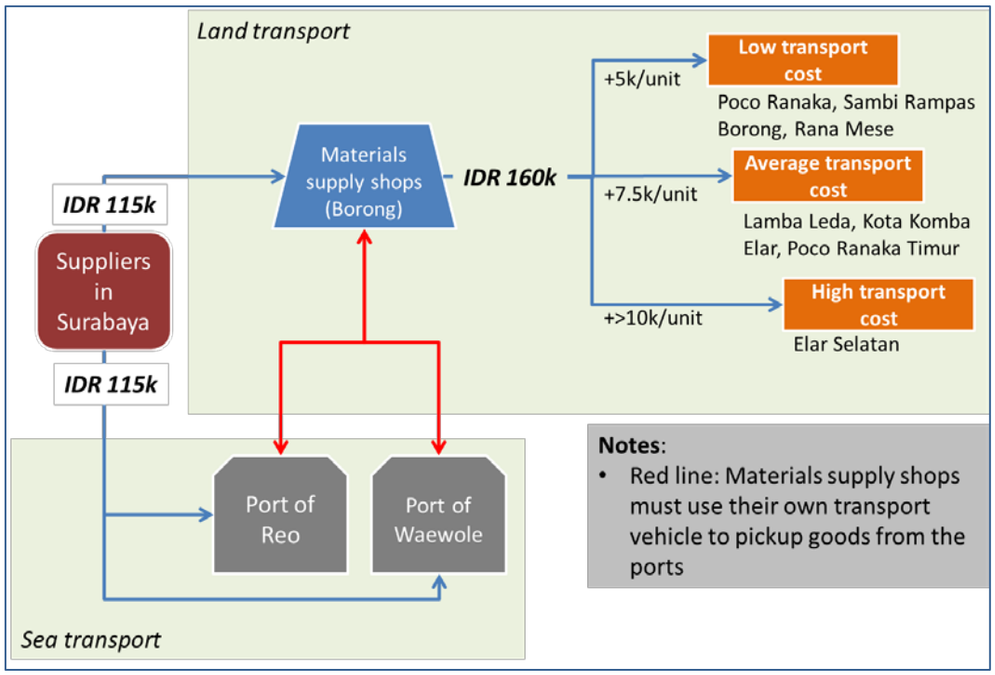

Figure 61: Toilet pans supply chain in MT

3.6 INFLUENCE OF TRANSPORT AND ACCESSIBILITY

How does the transportation business work in TTU? What are the implications for opportunities to influence transport costs of toilets to households?

3.6.1 How households use transport services for sanitation

On average, households in MT buy the materials for building toilets either from Ruteng (in Manggarai) or from Borong (MT district capital). Transportation costs varied quite considerably from as cheap as IDR 173 thousand (Poco Ranaka) to IDR 753 thousand (Elar Selatan) (Table 15). The very high transport cost in Elar Selatan is due to geographical challenges where it could took 9 or more hours to travel from Elar Selatan's subdistrict capital to Borong.

Table 15: Average transportation cost[5]

Subdistrict	Buy from	Average transport cost (000 IDR)	Discount
Borong	Borong	250	Free transport cost if buy > 5 sacks
Elar	Ruteng	350	
Elar Selatan	Ruteng	753	
Kota Komba	Borong	350	
Lamba Leda	Reo	300	IDR 7000-7500/sack
Poco Ranaka	Ruteng	173	IDR 3000/sack if buy > 300 sacks
Poco Ranaka Timur	Ruteng	308	
Rana Mese	Borong	283	IDR 3000-3500/sack
Sambi Rampas	Sambi Rampas	350	

From all households interviewed, more than half (57%) must pay for transportation services. Nearly half (48%) of materials bought must be delivered using trucks (Figure 62). In addition, the large majority (89%) of respondents said that they must arrange their own transport to bring the materials to their villages.

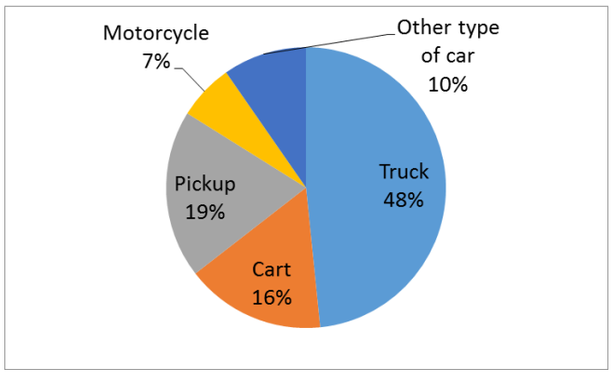

Figure 62: Type of transport means used to deliver materials

[5] *Note: average transport cost refers to the cost of bringing 40 sacks of cement using pickup from the material supply shops. Discounts are included if there is/are respondent(s) reporting a discount (discount is not applied to all those interviewed in each subdistrict). Ruteng and Reo are located in the neighbouring district of Manggarai.*

3.6.2 Profiles of typical transportation business types

The transportation business in MT is very competitive with around 30-50 transport providers, thanks to the availability of new and cheaper cars (brand Toyota Avanza, Suzuki APV, etc.). Within the district and sub-districts, generally otocalls/trucks are owned by an individual who focuses in serving a small share of the market (1-2 routes). There are no transport companies who own several transport units serving several routes. Therefore, for a given route there is no price variation.

Prices haven't changed significantly in the last 5 years, even when fuel price increased in 2010 (as the Transport Department do not allow sharp price increases). A group of local passenger transport providers pushed for a price increase but this was denied by the local government. Consequently, some transport owners said that they decided to move away from transportation services to personal use (see Table 16 for current tariff for passengers per route).

Table 16: Tariff for public transport (per passenger) from main cities in Manggarai Timur[6]

From	To	Tariff per passenger (in IDR)	Notes
Borong	Borong	1,000	Travelling within Borong
	Bajawa	30,000	
	Ruteng	20,000	
	Kota Komba (Wae Lengga)	15,000	
	Rana Mese	15,000	
	Poco Ranaka	15,000	Newer cars ask for 20,000
	Aimere	5,000	Tariff as of 2010
	Elar Selatan	50,000	9 hours on the road
	Elar	25,000	
Kota Komba (Waelengga)	Ruteng	50,000	
	Bajawa	15,000	
Pocoranaka-Ruteng	Ruteng	15,000	

With respect to transporting materials from Bondo to Borong, a fully loaded truck (capacity $3m^3$) is usually costs the customer IDR 200,000-250,000 for bringing sands or IDR 10,000/sack for cements (price is for transportation service only, excluding the materials). For farther places, such as from Bondo to Ruteng, the cost is higher at IDR 700,000/$3m^3$. Transportation cost changes depends on the fuel cost.

[6] *Note: passenger bringing additional materials must pay an additional IDR 5,000-10,000 per item*

3.7 OTHER FACTORS AFFECTING CRITICAL LINKS IN THE CHAIN

3.7.1 Demand and affordability

The demand for sanitation and sanitation product in MT is relatively low. Interviews to households and government officials show that it is only recently that the people feel the need to have good sanitation in their house, especially after a series of socialization/triggering by Plan International Indonesia in MT. The main problem with sanitation in MT is that the availability of clean water is not always reliable, especially for those living in the mountainous area of the region.

Current real per capita income in MT is only IDR 1.61 million in 2013, much lower than the average of all 22 districts (IDR 3 million), and the third lowest in the province after Lembata and Sumba Tengah. This low per capita income indicates the limited ability to pay for sanitation. Therefore, despite the reasonable price for cement and toilet pans, it seems that the people are constrained by their current income.

3.7.2 Characteristics of materials supply shops

Size, age, profit margin and formal legal status

All five shops interviewed in Borong (3 shops), Kota Komba (1 shop), and Ruteng (1 shop in the District of Manggarai) were formally registered and about 3-39 years old. The number of employees is between 2-11 people (full-time). Gross revenue from IDR 10 million up to more than IDR 150 million per month. Revenue variation depends on the demand, especially when there is a government infrastructure project. One of the shops accessed credit from a bank with fixed payment in 2012 and relatively simple procedure to get the loan. Another shop borrowed credit from banks and cooperatives with amount of IDR 200-300 million for 3-4 years.

Marketing

In all materials shops visited, word-of-mouth and direct-selling is dominant. No other marketing and promotion are provided. One of the oldest material shops in Borong explained why they did not do any promotion: "*Already here for 31 years so no need to advertise*".

Choosing suppliers

There is no dominant method of choosing suppliers by the material supply shops. Two shops noted the importance of price differential while one of them said not. Two shops pick the goods from places nearest to their shops. One shop was primarily used sales agent to buy items. Surabaya is the main source of items but the shops did not stick to just one supplier.

Competition

The numbers of materials supply shops in MT is around 6-7, where 5-6 of them are located in Borong, the district capital. This makes people from various subdistricts in MT to flock to Borong to buy materials. Only those living in subdistricts close to the border of Ende and Manggarai that choose to buy the items from Bajawa (in Ende) or Ruteng (in Manggarai). Ruteng, in particular, has many materials supply shops with around 20 shops are in operation.

Price is important and some shops provide discounts. However, competition is not necessarily all about price: *"Have to have lower price so people can come here. I know that has to make people happy so they come and buy, so that's why I bought car for deliveries. People are happy with this".*

One of the shops is a newcomer and the strategy is to always put a target: *"I'm not really obsessed [with competition]. I came far from Jogja, so I should be successful in my business"*. Competition is also tough for newcomer: *"[In other place] if you don't have it in your store you can come and buy from mine, but here is not like that"*.

Credit and discounts for customers

Generally the shops are reluctant to provide credit to customer, with exception of loyal/close customers. No clear arrangement to pay the credit: one with repayment within 1 week, one even given debt relief.

Some provide a 5-10% discount to bulk purchase (value more than IDR 10 million). Free transport is given by some of the shops if the road is good and the distance is less than 10 km.

One particular shop had a bad experience of giving credit to customer: *"I'm almost never give credits. I once give a credit of hundreds of millions and he never paid it back. No more".*

Transport

All shops have at least 1 pickup with capacity of 1-1.5 ton (one shop has a truck with capacity of $3m^3$). Four of five shops interviewed just bought the pickup after 2010 with price between IDR 80-100 million. Pickups delivering items to customer is usually return empty. Fuel consumption is between 5-35 litres per day. Service delivery is given if the road is good. All transport means are used solely for transporting materials (not rented to other parties).

Partnerships

There is no partnership between materials supply shops with other companies/masons. Shops show willingness to cooperate with entrepreneurs as long as the items are having at least equal quality as existing brand (especially Ina). They also noted that, in addition to quality, cheap price would be the important determinant for customer buying toilet pans.

Customers in MT are also known as brand-loyal (especially Ina): "*If people are making a toilet and want to sell it price needs to be very low because people have a focus in one brand. When they come from their house, they already have a plan, they want one brand*".

3.7.3 Forms of credit for small businesses

There are 2 types of financial institutions available in MT:

- Banks: BRI (national bank), NTT (provincial/regional bank)
- Cooperatives. Within this there are licenced and unlicensed cooperatives. Licencing is done by the Disperindagkop & UKM (Department of Industry, Trade, Cooperatives, and SMEs)

Both banks and cooperatives seemed to be available across the whole district. For example in Elar (most remote area visited) there are 5 credit cooperatives available and a branch of the NTT bank. In total there are 70 licenced cooperatives in MT and 20 are located in Borong.

Bank BRI offered 3 types of loans. Two of these were targeted to businesses. One for small businesses (< IDR 20 million) and another for larger businesses and investments (< IDR 100 million). A third type of loan (consumer loan) was available only to customer having fixed monthly salary and therefore the maximum amount clients are able to borrow is dependent on their salary. This type of loan offered a better interest rate than the other 2 types (0.95%/month, compared to 1-1.25%/month), and a longer maximum repayment period (10 years, compared to 3-5 years).

The cooperative in turn, offered higher interest rate than BRI (2.1%/month) but offered longer repayment periods. Further, borrowing conditions were negotiable:

> *"All members are farmers so interest rates can be negotiable. We really want to help people who want to get a loan…if a member has an accident and hasn't paid for his loan fully, we make an exception and in such cases sometimes allow for the member to take additional loan…people don't pay because they can't. We understand that so we keep chasing them slowly".*

Members of the cooperative included mostly farmers but also included small businesses such as kiosks and weaving businesses (102 out of 972 members).

Both BRI and cooperatives required the same type of collateral (e.g. land certificate, papers of motorcycle or car) although the cooperative only required this for loans higher than IDR 20 million, and for business start-ups no collateral was needed under a certain type of bank loan, as long as it had been operation for 6 months.

District's Department of Industry, Trade, Cooperatives, and SMEs also give loans in terms of "rolling fund" (*dana bergulir*) to cooperatives, the cooperatives then loan the fund to its member (~ IDR 100 million with interest rate 9%/year, given every ~3 years). In addition, Inkopdit (Credit Union Central of Indonesia) gave loans to cooperatives (IDR 200-400 million with interest rate 16%/year). In return, the cooperative must pay monthly fee to Inkoptu. One of the benefits of being a member of the cooperative is when a member of the cooperative dies, Inkoptu pays off any debt of the member and gives IDR 5 million to family.

In 2006 LPDB-KUMKM (Rolling Fund Management Office-SME & Cooperatives; managed by 3 ministries: Finance, SMEs & Cooperatives, and Administrative and Bureaucratic Reforms) established to specifically provide such rolling fund to SMEs. Technically, any SMEs can apply for the fund and does not have to be through the local government budgeting process.

3.8 INFLUENCE OF CURRENT GOVERNMENT POLICY AND REGULATORY FRAMEWORK

Historically, sanitation hasn't been a priority for MT's local government. This has been slowly changing since 2012, when Plan International Indonesia initiated socialisation of the STBM policy with local government at (district and sub-district levels) through a series of roadshows and facilitation of POKJA meetings, as part of an STBM/sanitation marketing pilot project in 3 sub-districts (Borong, Rana Mese, Kota Komba): *"Before Plan came sanitation wasn't really a priority, when Plan came it's when we really started to give attention to it…needed Plan to come to realise the importance of it [sanitation]"* (BAPPEDA).

Plan International Indonesia has been involved in setting up STBM teams at the sub-district level to facilitate the process of socialisation of STBM and triggering at the village level. The process is very recent, with formation of teams occurring in early 2014. This process has led to government setting a target of achieving 100% coverage over the next 5 years by replicating the same process Plan has been leading in the remaining 6 sub-districts. This commitment is reflected in the BAPPEDA's strategic plan (Renstra) and work plan (Renja), who are responsible for coordinating the Pokja (working group).

Specifically, the district's Department of industry, trade, cooperatives, and SMEs (Disperindagkop & UKM) have allocated funding for training of sanitation entrepreneurs in their 5-year budget plan proposal, which is subject to approval by the legislative, targeting 30 trainees/year for 3 years (2015-2018). Budget commitment is IDR 250 million (2015), IDR 260 million (2016), IDR 265 million (2017), and IDR 270 million (2018).

Plan International Indonesia and the District Department of Industry, Trade, Cooperatives, and SMEs have been doing advocacy work with the legislative and it's hoped this will result in the approval of the budget plan for sanitation marketing activities. Nonetheless, competing priorities of legislative are a challenge and advocacy work will be important:*"…each department has their own proposal so it's hard to choose"* and *"In legislative they have their own plans and priorities…they are also divided in areas".*

Socialisation and triggering process is very recent. At the time of data collection, there seemed to be a lot of enthusiasm and momentum gained by government officials but initiatives conducted so far were dependent on leadership and financial support from Plan International Indonesia. Groundwork at this stage to develop local government leadership and collective commitment to sanitation in the long term will be very important to make sure this enthusiasm doesn't fade away in a few years' time as Plan International Indonesia phases out its support/program.

One sub-district head emphasised the importance of good facilitators/leadership and collective cohesion to make this happen: *"We need good motivators/animators who have 'good spirit' [enthusiasm]"* (sub-district head) and *"Money is very important but there is something about development that is about togetherness, the spirit of working together."* (sub-district head). This same leader noted that there may be other community forums that could be tapped into to further promote awareness of sanitation, such as for example the church: *"We should use every forum to speak about sanitation… 'whenever, wherever'"* (sub-district head).

There may also be other opportunities for funding of sanitation marketing activities through the ADD ("alokasi dana desa")/village fund process. The initial amount of ADD is IDR 1 billion/village from the central government directly to the village. However, due to the tight fiscal situation, the latest Government Regulation No. 60/2014 stipulates that ADD will be just 10% of (but not included in) total transfer to regions. The district is expected to receive IDR 13.7 billion in 2015. Therefore, the amount of ADD is no longer IDR 1 billion/village but will be just around IDR 78 million/village in Manggarai Timur.

The Bupati has decision-making power over the village fund in that he approves proposals for expenditure and shares these with the central government for final approval. However, there is an opportunity to advocate for villages to

establish sanitation as a priority in their fund proposals/application through the Musrenbang process.[7] But again, this may be other competing priorities at the village level. For example, in a village in Elar subdistrict, access to clean water was regarded a main priority for the village fund.

[7] The current planning process in Indonesia is both bottom-up and top-down. The bottom-up process is called Musrenbang (development plan deliberation) that are held from the lowest level of government (village) and goes up to the subdistrict, district, province, and finally at the national level. The top-down process is led by Bappenas (Ministry for Planning) as the coordinating ministry for development planning.

4 DISCUSSION AND IMPLICATIONS

4.1 COMPARISON ACROSS TTU AND MT

Poverty, toilet coverage and costs to build a toilet

It was found that in TTU, there was some correlation between level of poverty and subdistricts with the proportion households with durable toilets (Models 2 and 3), in that subdistricts with higher poverty had lower coverage of durable latrines. This was not the case in MT, where no relationship was found, though healthy toilet coverage across the entire district is very low (5-13%).

The real per capital income in TTU is IDR 2.24 million in 2013 (BPS, 2015). In TTU, the materials cost for a Model 3 toilet ranged from IDR 3.85 million in Noemuti Timur to IDR 5 million in Miomafo Tengah. In TTU it was found that the three subdistricts with highest levels of poverty (Miomafo Tengah, Bikomi Nilulat and Musi) also demonstrated the highest costs to build a Model 3 toilet as compared with other locations within TTU.

In MT the real per capita income in MT is only IDR 1.61 million in 2013 (BPS, 2015), much lower than the average of all 22 districts (IDR 2.64 million), and the third lowest in the province. MT also demonstrated high relative costs to build a Model 3 toilet, with the materials cost ranging from IDR 5.69 million in Borong to IDR 10.52 million in Poco Ranaka Timur (185% the cost in Borong). In Sambi Rampas, the subdistrict with highest rate of poverty within MT, the cost is also high, at IDR 7.72 million (136% the cost in Borong).

Major cost components in building a toilet

In TTU, the main cost components for each model of toilet were, on average (see Figure 17): (i) Model 1: Bamboo (9%), Wood (71%); (ii) Model 2: Cement (28%), Sand (16%), Wood (21%), Rock (9.3%): and (iii) Model 3: Cement (26%), Sand (15%), Brick (12%), Reinforcing iron (10%). In MT, the main cost components for each model of toilet were, on average: (i) Model 1: Bamboo (44%), Wood (29%); (ii) Model 2: Sand (22%), Cement (18%), Wood (14%) and Concrete brick (12%); (iii) Model 3: Sand (26%), Cement (21%), Concrete brick (16%) and Rock (10%). Across both TTU and MT, in particular villages or subdistricts, if a particular material was expensive (e.g. sand) then this material can make up an even high proportion of the overall cost of the toilet.

The cost of toilet pan relative to overall cost of a toilet was very low. In TTU the toilet pan comprised 3.6% of the total materials cost, and in MT it comprised only 2% of the total materials cost.

The cost of labour in comparison with materials was significant across both TTU and MT. In TTU the labour cost comprised 39% (Model 1), 34% (Model 2) and 28% (Model 3) of the overall cost. This labour cost varied from IDR 1.47 million to IDR 2 million in different parts of TTU. In MT the labour cost comprised 29% (Model 1), 24% (Model 2) and 27% (Model 3) of the overall cost. In MT this labour cost varied from IDR 1.42 million to 4.58 million.

Average costs in each district

On average, for all materials, but excluding labour, a Model 1 toilet costs IDR 697,000 in TTU, Model 2 costs IDR 2.23 million and Model 3 costs IDR 4.37 million. If labour costs are taken into account, these rise to IDR 1.15 million (Model 1), IDR 3.36 million (Model 2) and IDR 6.08 million (Model 3). The average materials cost in MT, of a Model 1 toilet is IDR 1.6 million, for Model 2 is IDR 5.8 million, and Model 3 costs IDR 7.6 million. If labour costs are taken into account, these rise to IDR 2.1 million (Model 1), IDR 7.6 million (Model 2) and IDR 10.5 million (Model 3).

Costs in different locations

Variation in cost in different locations is caused by transportation and supply-chain costs which affect materials such as cement, reinforcing iron, pipe and zinc. Variation in cost is also cause by major differences in the accessibility and price of locally sourced materials including sand, bricks, gravel, rock and locally manufactured concrete bricks. In fact the latter variations can outweigh the differences in costs related to transport for externally sourced materials. For example

in TTU the overall variation in cost of cement as part of the toilet is up to IDR 340,000 whereas the variation in the cost of sand as part of the toilet is up to IDR 660,000.

In TTU, the location with the highest overall cost for a Model 3 toilet is Miomafo Tengah, where materials cost IDR 5.01 million, resulting from high prices for sand, gravel and brick. Within subdistricts there was also found to be variation amongst the three surveyed villages. For instance in the subdistrict of Noemuti, the cost to build a toilet including labour is IDR 5.15 million in the village of Fatumuti (on the main road and closer to the district capital of Kefamenanu) where as in the village of Popnam, it is IDR 5.52 million, due to higher transport and materials costs

In MT the lowest cost for toilets was in the district capital of Borong. Variations in cost relative to the subdistrict capital of Borong showed that the average cost throughout the district was 134% of Borong's cost for Model 3, 130% for Model 2 and 123% for Model 1. The highest relative cost was found to be in Poco Ranaka Timur, where Model 3 toilet was 185% as compared with Borong. This was due to high price of locally sourced materials (sand, gravel, rock and concrete bricks) rather than being associated with the supply chain for externally sourced materials (e.g. cement). Elar Selatan had the highest transportation costs materials sourced through a supply-chain (e.g. cement) via materials shops. The transportation costs from Borong to one of the surveyed villages in Elar Selatan was IDR 950,000 and this made up 16% of the cost of building a Model 3 toilet in this village. The relatively low costs of sand, gravel and rock in the subdistrict of Elar Selatan mean that the overall cost of building a toilet in this subdistrict was 139% that in Borong.

Supply chains for externally sourced materials

Two main supply chains were examined, namely cement and toilet pans. Zinc and reinforcing iron are also obtained through similar supply chains.

Cement: For TTU, cement was traced from South Kalimantan and Sulawesi to Kupang (where there is also a local producer), and sold by distributors with profit margins of 5-10%. The subsequent profit margin for retailers at either district or subdistrict level is small, 3-5% and 2-4% respectively, which is tolerated due to the high product turnover. Given the low profit margin however, there is little room for developing economies of scale in the price of cement to reduce the cost of constructing a toilet. The last leg of the journey from a subdistrict supplier to a village was of variable cost depending on the distance and road conditions. For instance in parts of Biboki Anleu, in the northern part of TTU, the cost of cement at the village level reached IDR 57,000/sack, as compared with 49,500/sack in the district capital of Kefamenanu, an increase of 15%. Cement costs in TTU are shown in Figure 37.

There are no cement producers in MT or on Flores Island and hence cement is sourced from Surabaya, Makassar or Kupang. Cement is sold for IDR 50,000/sack in Borong. Depending on the location of the buyer within MT, transportation cost to bring the cement is usually between IDR 2,500/sack to IDR 10,000/sack, though in the furthest survey village had an additional cost of more than IDR 15,000/sack (more than 30% higher cost than in Borong).

Toilet pans: Toilet pans are generally manufactured in Java Island, and transported and distributed through Surabaya. Local production of toilet pans in TTU has also been initiated through support from Plan International Indonesia (generally sold for IDR50,000). Cheaper brands sold by manufacturer near Surabaya at a cost of IDR 80,000 per unit. Distributors in Surabaya mark these up by IDR 5,000 per unit, and from here they are transported to Kupang or to Kefamenanu. In Kefamenanu, a profit margin of 10-23% is added, with a selling price of IDR 130,000. Subdistrict shops, generally reported that they purchase toilet pans in Kupang rather than Kefamenanu to increase their profit margin. The final cost of the toilet pan in different villages varies from IDR 125,000 up to IDR 300,000 depending on the location.

In MT toilet pans are brought in from Surabaya via land expedition (overland on the islands and door-to-door), or otherwise via sea expedition and supply shops retrieve the items from a port in Reo in the adjacent district in the north or the island. The toilet pans are bought from Surabaya for IDR 115,000 and the price increases to IDR 160,000 in Borong. Profit margin larger than for cement (1.39 relative to Surabaya versus 1.16 ratio for cement). Transport costs an additional IDR 10,000 depending on location of the village.

Locally sourced materials

Major variations were found in the prices of locally sourced materials. Given that these are major cost components when building a toilet, the overall cost of a toilet is significantly influenced by variations in such prices. Variations in cost of locally produced materials in TTU were as follows: sand varies from IDR 40,000-200,000/m^3; bricks vary from IDR 450,000 - 900,000/m^3, concrete bricks very from IDR 375,000-750,000/m^3, rock varies from IDR 50,000-150,000/m^3, gravel varies from IDR 50,000-250,000/m^3. Bamboo can vary 25-fold and wood 5-fold.

In MT, similar variations were found as follows: sand varies from IDR 100,000-300,000/m^3; gravel varies from IDR 70,000-400,000/m^3 and rock varies from IDR 100,000-300,000/m^3. Bamboo can vary 7-fold and wood 3-fold. In MT the government has introduced a fee for removal of sand, gravel and rock, which affects prices for these items.

Transport costs and transport business

Transportation of toilet materials to villages: In TTU when a household constructs a toilet, they generally transport materials from the store themselves, with only 4% of households reporting that the materials were delivered by the store to their home. The majority of households (78%) paid to travel to go and buy materials (IDR 10,000 to IDR 70,000). The most common transportation means to bring materials to villages was pick-up (60% of cases), followed by truck (27%). The condition of the roads of approximately half of the surveyed villages was reported to be poor or very poor. Surveyed village locations were up to 35 miles travel from their subdistrict capital (for example Maurisu Selatan in Bikomi Selatan), and were an average distance of 8 miles from the subdistrict capital. Transport costs in a pick-up from subdistrict supply shops to village locations were generally between IDR100,000 and IDR 300,000 across TTU, and were IDR 350,000 for Maurisu Selatan. In the latter case, this transportation cost comprised 9% of the total cost of materials in that location.

From all households interviewed in MT, more than half (57%) must pay for transportation services. Nearly half (48%) of materials bought must be delivered using trucks and 19% use pick-ups. In addition, the large majority (89%) of respondents said that they must arrange their own transport to bring the materials to their villages. In MT the cheapest transport from a materials shop to surveyed subdistrict was IDR 173,000 (Poco Ranaka) and highest was IDR 753,000 (Elar Selatan). The very high transport cost in Elar Selatan is due to geographical challenges where it could took 9 or more hours to travel from Elar Selatan's subdistrict capital to Borong.

Transport sector: In TTU within the transport sector, high levels of competition exist at provincial and district level and serve to maintain lower prices. Subdistrict transport businesses however reported on their monopoly status in their geographic location. The transportation business is known to be a profitable one. It was reported to be more profitable (10% profit) than owning a shop (1-2% profit) by a truck owner in Kefamenanu, and a driver reported that he could earn more than double the amount of an alternative job he had renting tables and chairs.

The transportation business in MT is very competitive with around 30-50 transport providers, thanks to the availability of new and cheaper cars. Within the district and sub-districts, generally otocalls or trucks are owned by an individual who focuses in serving a small share of the market (1-2 routes). There are no transport companies who own several transport units serving several routes. Therefore, for a given route there is no price variation. Prices haven't changed significantly in the last 5 years, even when fuel price increased in 2010. Consequently, some transport owners said that they decided to move away from transportation services.

Materials supply shops

Materials supply shops are important players in the value chain, and hence understanding how they operate, and if and how they can provide discounts or credit to customers is important when considering how to increase affordability of sanitation products in rural areas. Table 17 and Table 18 provide details of the characteristics of materials shops in TTU and MT.

Table 17: Material shops in TTU

Size, revenue and formal legal status:	Shops in the district capital and subdistricts were all registered, with revenue of between IDR 10 million to IDR 50 million/month, and anywhere from 1-4 employees (in subdistricts) to 5-17 employees (in the district capital).
Credit and discounts for customers	In both district and subdistricts of TTU, there was evidence that trusted customers would be allowed to delay their payment for a short time (eg 2-4 weeks) for some proportion of the payment (e.g. 20%) of up to a few million Rupees. Discounts could offered to customers who buy in bulk, though the quantity required varied- one shop suggested for 50 sacks of cement, whilst another suggested for 100-200 sacks of cement.
Choosing suppliers	District shops generally choose suppliers in Surabaya rather than Kupang to reduce their costs. Subdistrict shops chose suppliers on the basis of informal relationships and partnerships.
Competition	There was significant competition in the district capital, and much less so in the subdistricts, which generally had a monopoly for their geographical area. Subdistrict shops reported challenges in addressing competition with district shops however (in Kefamenanu and Atambua) as the latter were able to provide cheaper prices that were attractive to customers.
Transport	District shops all own vehicles (around 1-3 large trucks and 2-3 smaller trucks) for their own deliveries (not rented out for other purposes), and in the subdistricts, shops also usually owned 2-3 trucks. For some subdistrict shops the transportation was included in the accounting for the overall business, and for one of these, the cost of transportation was included in the materials price. In another case transportation was treated as a separate business entity from the shop, and the trucks were rented out. Shops reported that vehicles generally return home empty after making deliveries and road access depended on the weather and location.
Participation in partnerships	Shops had experienced large contracts to provide construction materials for buildings, however none of the shops had experience of a partnership with masons or sanitation entrepreneurs.

Table 18: Material shops in MT

Size, revenue and formal legal status	All shops were also formally registered, and had gross revenue from IDR 10 million up to more than IDR 150 million per month, 2-11 full-time employees.
Credit and discounts for customers	Shops were generally reluctant to provide credit to customers, with exception of loyal or close customers. Some shops provide a 5-10% discount to bulk purchase (value more than IDR 10 million).
Choosing suppliers	There was no dominant method of choosing suppliers, for instance it could be a price differential or contact with a sales agent.
Competition	The number of materials supply shops is around 6-7, with most located in Borong, the district capital. Competition is by price and also provision of service (e.g. having a car to deliver).
Transport	All shops have at least 1 pickup with capacity of 1-1.5 ton (one shop has a truck with capacity of $3m^3$) and pickups delivering items to customer is usually return empty.
Participation in partnerships	There was no evidence of partnership between materials supply shops with other companies/masons.

Access to credit for enterprises

In both TTU and MT there is ready access to bank BRI loans (1-1.25%/month repayment) and to cooperatives with higher rates (2.1%/moth but longer repayment rates. In TTU it was reported that DSMET were attempting to make access to credit more accessible through easing the need for guarantees, and also trying to offer cheap loans (0.7%/month) through LPDB (Lembaga Pengelola Dana Bergulir) a credit provider organisation.

Government and policy environment

Government's role is mainly related to promotion of healthy sanitation, which is under the auspices of Department of Health (DoH). District governments currently play no direct role with respect to the supply chain of sanitation materials. On the one hand this is understandable as the supply chain of sanitation materials is market based. However, support from government could help optimise the supply chain, support sanitation entrepreneurs, and reduce costs for the poor.

In TTU attention has been given to sanitation over recent years, particularly through the support of Plan International Indonesia working with DoH staff at district and subdistrict levels. There has been limited coordination between departments to support the supply chain, and ad hoc spending of government budget to support materials for toilets has occurred rather than systematic support of the supply chain. Ad hoc support in the form of materials provided directly to small numbers of households can reduce both demand (as households decide they will 'wait' until they too are provided for) and also reduce the viability of the supply chain (if purchase of materials is focused at district level and by-passes subdistrict shops) and hence should be given attention. Recent changes to the definitions of a healthy toilet has affected monitoring of toilets and may serve to increase the focus on building durable rather than make-shift latrines. Lastly, sanitation entrepreneurs have not received support through DSMET however could collectively apply in the future for support to develop their businesses.

In MT sanitation was not a priority until recently when Plan International Indonesia commenced support for implementation of STBM. Department of industry, trade, cooperatives, and SMEs (Disperindagkop & UKM) have allocated funding for training of sanitation entrepreneurs in their 5-year budget plan proposal, which is subject to approval by the legislative, targeting 30 trainees/year for 3 years (2015-2018). Budget commitment is IDR 250 million (2015), IDR 260 million (2016), IDR 265 million (2017), and IDR 270 million (2018). Plan International Indonesia and the District Department of industry, trade, cooperatives, and SMEs have been doing advocacy work with the legislative and it's hoped this will result in the approval of the budget plan for sanitation marketing activities.

4.2 STRATEGIES TO INCREASE AFFORDABILITY OF TOILETS IN NTT

To fulfil the objective of improving the availability and affordability of products and services to build toilets, particularly in areas of higher poverty, there are a range of actions which can be considered. Some key points concerning the findings of this study that should inform development of such strategies are as follows.

Firstly, toilet costs are made up of costs of externally sourced items (subject to increases in costs along the supply chain and transport costs) and locally sourced items (subject to local variations). In the case of externally sourced items (cement, toilet pans, reinforcing iron and zinc sheets) there is little opportunity to optimise the supply chain. Cement which comprises 21-28% of the cost of a durable toilet, offers little profit margin already to actors in the supply chain. Although the toilet pan costs could be reduced (and indeed are through locally supported production in TTU), they comprise a very small proportion of the overall toilet cost. In the case of locally sourced items (sand, gravel, rock, bricks etc.), it was found that price variations in these items were significant and could outweigh the variations in cost of externally sourced items, particularly in the case of TTU.

Secondly, there was evidence that in areas of high poverty, the costs of durable toilets are high. For instance the three subdistricts of TTU with highest poverty also had the highest costs, and the subdistrict in MT with highest poverty rate had toilet costs of 139% compared with the cost in the district capital of Borong. Therefore there may be a case to target locations with high poverty rates and high costs of toilet provisions. Transport costs are highly variable depending on the location, and incidences of monopoly in the transport sector was found, where there is only one service provider available who can therefore set their prices without competition. There may be room to reduce transport costs through development of business models that include transport. This study did not specifically investigate areas without road access, however global data points to the typically low sanitation coverage (for example in Laos access to sanitation in rural locations without road access if 23% as opposed to 51 % in rural locations with road access) (JMP, 2012).

Thirdly, sanitation products are not made available in a consolidated package to households in that there were almost no sales of toilet packages (with or without installation) in either TTU or MT. In addition, labour is a significant cost component in both TTU and MT, and presents an opportunity to consider how such costs might be subsidised or reduced. Finally, the cost of the upper structure of the toilet is significant, and represents a major opportunity to reduce costs and materials use.

Based on these key findings, the following strategies could be considered by government and other development agencies to improve affordability and accessibility of rural households to sanitation products and services.

Seek opportunities to reduce costs of locally sourced materials: Further investigation into the costs of locally sourced materials and reasons behind large variations in their cost may reveal strategies to reduce costs. As a minimum, if collective purchasing of materials can be arranged then costs for these materials (and related transport costs) may be able to be reduced.

Support further design development of the upper structure: Given large cost for 'upper' structure there is a need to examine other design options to reduce the costs involved this part of the toilet. It is unnecessary (in terms of providing a hygienic latrine) to have a building made of heavy materials such as bricks, reinforcing iron and cement, however in Indonesia and elsewhere it is understood that this structure is important from a consumer perspective. Ideally, a structure that uses durable locally produced lightweight materials would represent a sustainable option.

Supporting sanitation entrepreneurs to rethink their business model: There is a need to move beyond a focus on the toilet pan, which comprises such a small proportion of the overall cost of building a toilet. In particular, new business models that combine the following elements should be considered:

- focus on 'packages' for consumers that consolidate all the items required (ensuring that multiple 'packages' of different cost and quality are included), both with and without installation

- integration of transport within the business (given that monopoly on transport businesses in subdistricts of TTU and throughout MT increases transport costs)
- development of 'partnerships' with materials suppliers and sellers of locally produced materials to support reduced costs for the entrepreneur and increased bulk purchasing sales for the suppliers

Access to finance for customers: Approaches that can reduce the outlay for households, including rotating funds, credit from sanitation entrepreneurs should be considered.

Association of sanitation entrepreneurs: The value of a collective organisation to support sanitation entrepreneurs has been established through another study (Murta et al., 2015), and represents an opportunity in TTU, and potentially MT, to provide support for entrepreneurs to develop the above described or alternate business models. Funding support may be requested through DSMET, and could be focused on development and implementation of new business models described above. An association can also support sharing of skills, and developing economies of scale for entrepreneurs etc.

Organising communities for collective purchasing: Communities can be encouraged and supported to buy materials as collectives to reduce costs. Both community leaders and government staff can promote this approach, and apply incentives (such as time-bound financial support) to support development of momentum and action.

Smart targeted subsidies: Given the need to support the poor, thought must be given to how to address affordability concerns, whilst avoiding undermining private sector actors (sanitation entrepreneurs and materials supply shops) by providing non-targeted subsidies. In many countries the need to develop 'smart' subsidies has been discussed (and in some cases trialled) to look to overcome this inherent tension. Table 17 below describes a range of potential subsidies that could be used to target the poor, their relative pros and cons in relation to the criteria above as described in the literature, and examples of where they have been used. Design of a 'smart subsidy' involves considering issues in the local context in choice of subsidy, and 'designing-in' mitigating strategies for any disadvantages. Some subsidies that involve partnerships or contracts with supply shops and require several steps in their development to ensure equitable participation of supply chain actors and ensure agreements are transparent and upheld. In some other country contexts methods to 'accredit' certain suppliers have been adopted, involving suppliers agreeing to criteria around product quality, amenability to bulk delivery, price guarantees and guarantees to only provide services to eligible households.

Given the high labour costs in TTU and MT for building toilets, one potential target for a subsidy could be the labour component. Such a subsidy could be funded through government funds, but implemented by another organisation (e.g. a non-governmental organisation) and could involve a variety of models, from directly employing masons to build toilets in a cost-sharing arrangement with poor households, to vouchers provided to households to support labour costs. One advantage of a focus on subsiding labour costs might also be the chance to allow oversight of the technical quality of toilets build, such that payments are only made for constructions of sufficient quality (including the underground section which is most critical for protecting the environment.

Table 19: Types of subsidies (adapted from WSSCC, 2009 and Tremolet et al., 2010)

Subsidy type	What does it involve?	Advantages	Disadvantages	Example of its use
Direct subsidy – cash or vouchers	Payment direct to targeted households as cash or voucher to be spent on specified sanitation products or services	Empowers targeted households Stimulates market development	Expensive and complex to administer, potentially causing issues for scalabilty Potentially only viable when bundled with other social services	Vouchers have reportedly used within a program at scale by BRAC in Bangladesh however not evaluation is available concerning the results.

Subsidy type	What does it involve?	Advantages	Disadvantages	Example of its use
Hardware subsidy	Public sector (or NGO) provision of sanitation products to targeted households, usually with some input (cash/labour) from households	Enables targeted poor households access to sanitation	Often expensive with limited reach, not financially sustainable Stifles market development Can skew or fix technical design at 'high-cost' end	Bangladesh DISHARI: upfront in-kind hardware subsidy targeted to poor (covering 42% of hardware costs)
Subsidies to small-scale suppliers/services	Funding for training, product development business development services (for artisans and/or suppliers), providing credit or moulds or transport subsidies, could reward sales to the poor	Potential to support affordable products for all (not just targeted households) Supports broader market approach	Relies on interest and capacity of small-scale providers May have a slow effect where private sector development is limited Risk of failure of some providers resulting in lost investment	Mozambique Improved Latrines Program: software support to suppliers and output-based subsidy for each toilet or slab sold (40-60% of hardware costs)
Cross subsidies	Transfers in cash or labour from richer to targeted poor households	May be efficient at targeting and allocating resources	May still result in exclusion of some poor and vulnerable	
Output-based subsidies	Subsidies paid after an outcome is achieved (eg ODF, toilet use etc.)	Prevents wastage of public money Encourages efficiency and accountability	Investments must be pre-financed and this may exclude the poor Complex to administer	Maharashtra, India Total Sanitation Campaign: outcome-based hardware subsidy for poor households (covered 22% of hardware costs)
Subsidised credit	Bank guarantees or low interest loans to poor households	Supports market development	Requires competent micro-finance providers Can be complex to administer	Vietnam Sanitation Revolving Fund; access to credit at subsidised interest rates on loans for hardware (accounted for 3% hardware costs)

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APPENDIX 1: DATA COLLECTION TOOL FOR HOUSEHOLDS

FORMULIR REKAPITULASI SURVEI RESPONDEN KELOMPOK A

Nama Kabupaten *(District Name)* : .....

Nama Kecamatan *(Sub-district Name)* : .....

Nama Desa *(Village Name)* : .....

Jarak Desa dari Ibukota Kecamatan *(Distance from Sub-district Capital)* : .....

Waktu Tempuh dari Ibukota Kecamatan *(Time from Sub-district Capital)* : .....

Kondisi Jalan dari Ibukota Kecamatan – bagus/buruk : : .....

(Road condition from sub-district capital – good/poor)

Biaya Standar untuk Transportasi dengan……..dari Ibukota Kecamatan

(Standard cost for transport by……from subdistrict capital- Rps) : ……..Rupiah

Keterangan *(Additional Notes)* : .....

.....

.....

Household level data

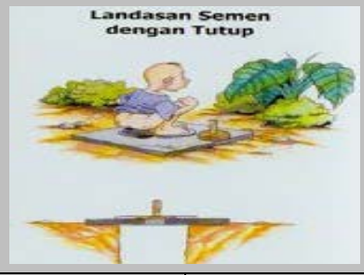
Rumah 1 (Household 1)					
I. Silakan pilih jenis toilet untuk rumah ini (Please choose the type of toilet for this household)					
BAGIAN BAWAH TOILET		BAGIAN TENGAH TOILET		BAGIAN ATAS TOILET	
Type 0 – lubang dengan tanpa penahan *(unlined pit)*	☐	Type 0 – lubang dengan bamboo/kayu (hole with local materials)	☐	Type 0 – tanpa dinding (no structure)	☐
Type 1 – lubang dengan penahan bamboo/kayu (bamboo-lined pit)	☐	Type 1 – lubang dengan semen (hole with cemented based)	☐	Type 1 – bambu (bamboo)	☐
Type 2 – lubang dengan penahan bata (brick-lined pit)	☐	Type 2 – plengsengan (brick and cemented squat pan)	☐	Type 2 – semi- permanen (wood and roof)	☐
Type 3 – lubang dengan penahan semen/buis *beton (cemented wall/concrete ring)*	☐	Type 3 – leher angsa / toilet siram (pour flush)	☐	Type 3 - permanen (brick and roof)	☐
II. Biaya transportasi (Transport costs)					
Apakah diperlukan biaya untuk pergi dan memilih atau membeli materialnya? Jika ya, berapa biayanya? *(Did you have any costs to go and choose or buy the materials? If so, what were those costs?)*				☐ Tidak *(No)* ☐ Ya *(Yes)* Biaya (Rps)*:*	
Apakah diantar oleh toko atau diangkut sendiri? *(Were the materials transported by the store or did you arrange transport?)*				☐ Oleh toko (Delivery by the store) ☐ Diangkut sendiri (Household arranged transport)	
Menggunakan apa dan berapa biaya yang harus dibayarkan untuk layanan antar tersebut, untuk cara yang Anda gunakan? (What type of vehicle was used and what was the cost, for either method?)				☐ Mobil truk *(truck)* ☐Mobil *pick up (minitruck)* ☐ Mobil jenis lain *(car)* ☐ Gerobak *(cart)* ☐ Sepeda motor *(mt.bike)* ☐ Sepeda *(bicycle)* Biaya (Rps) *(Cost- Rps):*	

LEMBAR 1: BIAYA UNTUK PEMBANGUNAN BAGIAN BAWAH TOILET ***(Sheet 1: Costs of Building the Bottom Structure of the Toilet)***

		Model 1 (Type 1) 		**Model 2 (Type 2)** 		**Model 3 (Type 3)** 	
Jenis Material *(Materials)*	**Asal Material** *(Sources)*	**Jumlah Biaya** *(Costs)*	**Jumlah Material** *(Quantity)*	**Jumlah Biaya** *(Costs)*	**Jumlah Material** *(Quantity)*	**Jumlah Biaya** *(Costs)*	**Jumlah Material** *(Quantity)*
Bambu *(bamboos)*	.....	Rp	..... batang	Rp	..... batang	Rp	..... batang
Kayu *(woods)*	.....	Rp	.....batang	Rp	..... batang	Rp	..... batang
Pasir *(sands)*	.....	Rp	.....m^3	Rp	..... m^3	Rp	.....m^3
Kerikil *(gravel)*	.....	Rp	.....m^3	Rp	..... m^3	Rp	.....m^3
Batu *(stones)*	.....	Rp	.....m^3	Rp	..... m^3	Rp	.....m^3
Bata *(bricks)*	.....	Rp	.....m^3	Rp	.....m^3	Rp	..... m^3
Semen *(cements)*	.....	Rp	.....sak	Rp	.....sak	Rp	.....sak

Besi tulangan *(reinforcing irons)*	.....	Rp ……....	……...meter	Rp ……....	……...meter	Rp ……....	……...meter
Buis beton *(concrete rings)*	.....	Rp ……..……	……...unit	Rp ……....	……...unit	Rp ……....	……...unit
Pipa *(pipes)*	.....	Rp ……....	……...meter	Rp ……..…	……...meter	Rp ……....	……...meter
Lain-lain *(others)* ……	.....	Rp ……....	……..……	Rp ……....	……..…	Rp ……	……..……
Tenaga Kerja *(Labor)*		**Jumlah Biaya** *(Costs)*	**Lama Bekerja** *(Quantity)*	**Jumlah Biaya** *(Costs)*	**Lama Bekerja** *(Quantity)*	**Jumlah Biaya** *(Costs)*	**Lama Bekerja** *(Quantity)*
Tenaga kerja *(Labor costs)*		Rp ……	……...hari	Rp ……	……...hari	Rp ……	……...hari

LEMBAR 2: BIAYA UNTUK PEMBANGUNAN BAGIAN TENGAH TOILET ***(Sheet 2: Costs of Building the Middle Structure of the Toilet)***

		Model 1 (Type 1) 		**Model 2 (Type 2)** 		**Model 3 (Type 3)** 	
Jenis Material *(Materials)*	**Asal Material** *(Sources)*	**Jumlah Biaya** *(Costs)*	**Jumlah Material** *(Quantity)*	**Jumlah Biaya** *(Costs)*	**Jumlah Material** *(Quantity)*	**Jumlah Biaya** *(Costs)*	**Jumlah Material** *(Quantity)*
Bambu *(bamboos)*	.....	Rp ……..…	……batang	Rp …….....	……. batang	Rp …….....	……. batang
Kayu *(woods)*	.....	Rp ……..…	……batang	Rp …….....	……. batang	Rp …….....	……. batang
Pasir *(sands)*	.....	Rp ……	……..…m^3	Rp …….....	……..…m^3	Rp …….....	……..…m^3
Kerikil *(gravel)*	.....	Rp ……..	……..…m^3	Rp …….....	……..…m^3	Rp …….....	……..…m^3
Batu *(stones)*	.....	Rp ……	……..…m^3	Rp …….....	……..…m^3	Rp …….....	……..…m^3
Bata *(bricks)*	.....	Rp ……..	……..m^3	Rp …….....	……..…m^3	Rp ……..	……..…m^3
Semen *(cements)*	.....	Rp ……..	……..…sak	Rp …….....	……..…sak	Rp …….....	……..…sak

Besi tulangan *(reinforcing irons)*	.....	Rp ……	……..meter	Rp ……....	……..meter	Rp …….....	……..meter
Pipa *(pipes)*	.....	Rp ……..	……..unit	Rp ……....	……..…… unit	Rp ……....	……..…… unit
Dudukan toilet *(toliet pan)*	.....	Rp ……..	……..meter	Rp ……....	……..meter	Rp ……....	……..meter
Lain-lain *(others)* ……	.....	Rp ……	……..……	Rp ……....	……..……	Rp ……....	……..……
Tenaga Kerja *(Labor)*		**Jumlah Biaya** *(Costs)*	**Lama Bekerja** *(Quantity)*	**Jumlah Biaya** *(Costs)*	**Lama Bekerja** *(Quantity)*	**Jumlah Biaya** *(Costs)*	**Lama Bekerja** *(Quantity)*
Tenaga kerja *(Labor costs)*		Rp ……	…… hari	Rp ……	……..… hari	Rp ……	……... hari

LEMBAR 3: BIAYA UNTUK PEMBANGUNAN BAGIAN ATAS TOILET ***(Sheet 3: Costs of Building the Top Structure of the Toilet)***

		Model 1 (Type 1) 		**Model 2 (Type 2)** 		**Model 3 (Type 3)** 	
Jenis Material *(Materials)*	**Asal Material** *(Sources)*	**Jumlah Biaya** *(Costs)*	**Jumlah Material** *(Quantity)*	**Jumlah Biaya** *(Costs)*	**Jumlah Material** *(Quantity)*	**Jumlah Biaya** *(Costs)*	**Jumlah Material** *(Quantity)*
Bambu *(bamboos)*	.....	Rp ……	…….. batang	Rp ……	…….. batang	Rp ……	…….. batang
Kayu *(woods)*	.....	Rp ……	…….. batang	Rp ……	…….. batang	Rp ……	…….. batang
Pasir *(sands)*	.....	Rp ……	…… m^3	Rp ……	…… m^3	Rp ……	…… m^3
Kerikil *(gravel)*	.....	Rp ……	…… m^3	Rp ……	…… m^3	Rp ……	…… m^3
Batu *(stones)*	.....	Rp ……	…… m^3	Rp ……	…… m^3	Rp ……	…… m^3
Bata *(bricks)*	.....	Rp ……	…… m^3	Rp ……	…… m^3	Rp ……	…… m^3
Semen *(cements)*	.....	Rp ……	…… sak	Rp ……	…… sak	Rp ……	…… sak

Besi tulangan *(reinforcing irons)*	.....	Rp ……	……..… meter	Rp ……	……..… meter	Rp ……	……..… meter
Asbes *(asbestos)*	.....	Rp ……	…….. unit	Rp ……	…….. unit	Rp ……	…….. unit
Seng *(zincs)*	.....	Rp ……	……..… meter	Rp ……	……..… meter	Rp ……	……..… meter
Lain-lain *(others)* ……	.....	Rp ……	……..……	Rp ……	……..…	Rp ……	……..……
Tenaga Kerja *(Labor)*		**Jumlah Biaya** *(Costs)*	**Lama Bekerja** *(Quantity)*	**Jumlah Biaya** *(Costs)*	**Lama Bekerja** *(Quantity)*	**Jumlah Biaya** *(Costs)*	**Lama Bekerja** *(Quantity)*
Tenaga kerja *(Labor costs)*		Rp ……	…….. hari	Rp ……	…….. hari	Rp ……	…….. hari

APPENDIX 2: DATA COLLECTION TOOL FOR MASONS

FORMULIR SURVEI RESPONDEN KELOMPOK B

Nama Responden *(name)* : .....

Alamat *(address)* : .....

No telp *(mobile)* : .....

Desa *(village)* : .....

Kecamatan *(sub-district)* : .....

Kabupaten *(district)* : .....

1. Benarkah bahwa Anda melayani jasa pembangunan fasilitas toilet bagi warga desa di sini? *(Is is true that you offer services of toilet facilities provision for people in this village?)*

   ☐ Benar *(True)*
   ☐ Tidak *(No)*

2. Bila benar, sudah berapa lama Anda melayani jasa pembangunan fasilitas toilet tersebut? *(If it is true, how long have you been offering the services?)*

   (a) Kurang dari 1 tahun *(less than 1 year)*
   (b) Antara 1 sampai 3 tahun *(Between 1 and 3 years)*
   (c) Antara 3 sampai 5 tahun *(Between 3 and 5 years)*
   (d) Lebih dari 5 tahun *(More than 5 years)*

3. Bagaimana warga desa mengetahui bahwa Anda melayani jasa pembangunan fasilitas toilet bagi warga desa? *(How did people in this village know that you offer services of toilet facilities provision?)*

   .....

   .....

   .....

4. Apakah Anda pernah menerima pelatihan mengenai cara membuat toilet, terutama yang lebih rumit, misalnya *septic tank*? *(Have you ever received training on how to build toilets, especially more complicated ones- eg septic tank?)*

   .....

   .....

5. Secara singkat, apa saja yang Anda kerjakan saat membangun fasilitas toilet bagi warga desa? *(Briefly, could you please explain the things that you do during the process of toilet facilities provision in a certain house?)*

	Bagian Bawah Toilet *(Bottom Structure)*	**Bagian Tengah Toilet** *(Middle Structure)*	**Bagian Atas Toilet** *(Top Structure)*
Deskripsi Aktivitas *(Description)*	…… …… …… …… …… …… …… …… …… …… ……	…… …… …… …… …… …… …… …… …… …… ……	…… …… …… …… …… …… …… …… …… …… ……
Jangka Waktu *(Time)*	…….. hari *(day)*	…….. hari *(day)*	…….. hari *(day)*
Imbalan/Upah *(Compensasion)*	…….. rupiah	…….. rupiah	…….. rupiah

6. Berapa tarif/upah harian Anda? (What is your daily rate for labour?)……..Rupiah
7. Berapa lama waktu yang Anda butuhkan untuk membangun sebuah toilet? (How long does it usually take you to build a toilet?)
8. Apakah Anda menerima pembayaran selain uang? *(Do you accept payments other than cash?)*

   ☐ Ya *(Yes)*
   → Sebutkan *(Please mention)* ……

   ……

   ☐ Tidak *(No)*
9. Apakah anda menawarkan jenis-jenis keringanan penjualan seperti pembayaran secara mencicil atau potongan harga? *(Do you offer any payment facilities such as instalment or price discount?)*

   ☐ Ya *(Yes)*
   → Sebutkan *(Please mention)* ……
   ☐ Tidak *(No)*

10. Di luar jasa pembangunan fasilitas toilet itu sendiri, apakah Anda juga menjual bahan-bahan untuk pembangunannya, seperti bambu/kayu, pasir, batu, bata, semen dan pipa? *(In addition to providing services of toilet facilities provision, do you also sell materials related to toilet facilities such as bamboos/woods, sands, stones, bricks, cements and pipes?)*

    ☐ Ya *(Yes)*
    → Sebutkan *(Please mention)* .....

    .....

    ☐ Tidak *(No)*

11. Bila iya, berapa harga penjualan/pembelian bahan-bahan tersebut? Darimana Anda membelinya dan mengapa? *(If the answer is yes, what are the selling/buying prices? Where did you buy the materials and why?)*

Material *(Materials)*	**Harga Jual** *(Selling Price)*	**Harga Beli** *(Buying Price)*	**Asal Material** *(Sources)*	**Mengapa** *(Why)*
Bambu *(bamboos)*	Rp ….. per batang	Rp ….. per batang	……	……
Kayu *(woods)*	Rp ….. per batang	Rp ….. per batang	……	……
Pasir *(sands)*	Rp ….. per m^3	Rp ….. per m^3	……	……
Kerikil *(gravel)*	Rp ….. per m^3	Rp ….. per m^3	……	……
Batu *(stones)*	Rp ….. per m^3	Rp ….. per m^3	……	……
Bata *(bricks)*	Rp ….. per m^3	Rp ….. per m^3	……	……
Semen *(cements)*	Rp ….. per sak	Rp ….. per sak	……	……
Buis beton *(concrete rings)*	Rp ….. per unit	Rp ….. per unit	……	……
Pipa *(pipes)*	Rp ….. per unit	Rp ….. per unit	……	……
Dudukan toilet *(toliet pan)*	Rp ….. per unit	Rp ….. per unit	……	……
Asbes *(asbestos)*	Rp ….. per lembar	Rp ….. per lembar	……	……
Seng *(zincs)*	Rp ….. per lembar	Rp ….. per lembar	……	……
Lain-lain *(others)* ……	Rp ……..	Rp ……..	……	……

12. Bagaimana bahan-bahan pembangunan fasilitas toilet di atas diangkut ke tempat penjualan dari tempat pembelian? *(How were the materials transported?)*

Cara Mengangkut *(Methods)*	**Bambu** *(bamboos)*	**Kayu** *(woods)*	**Pasir** *(sands)*	**Kerikil** *(gravel)*	**Batu** *(stones)*	**Bata** *(bricks)*	**Semen** *(cements)*	**Buis Beton** *(conc rings)*	**Pipa** *(pipes)*	**Dudukan T** *(toilet pan)*	**Asbes** *(asbestos)*	**Seng** *(zincs)*
- Diantar oleh supplier *(dropped by supplier)*/ - Transportasi umum *(public transport)*/ - Sewa transpor khusus *(rent a car* - Diangkut sendiri *(to be brought own vehicle)*												
- Mobil truk *(truck)*/ - Mobil *pick up (minitruck)*/ - Mobil jenis lain *(car)*/ - Gerobak *(cart)*/ - Sepeda motor *(mbike)* - Sepeda *(bicycle)*												
- Total biaya transportasi dan keterangan detail tentang cara perhitungannya *(total transpor-tation cost and the details on the way it is calculated)*												
- Tambahkan biaya transportasi individu untuk keperluan pembelian material tersebut *(please add the methods and costs of the person's transportation)*												

13. Apakah Anda memakai jasa keuangan/perbankan untuk kegiatan usaha Anda? *(Do you use credit facilities to finance your activities?)*

    ☐ Ya *(Yes)*
    → Sebutkan *(Please mention)* .....

    .....
    .

    ☐ Tidak *(No)*

14. Di luar jasa pembangunan fasilitas toilet, apakah Anda juga memiliki pekerjaan lain sebagai sumber penghasilan Anda? *(Beyond toilet facilities provision, do you have any other paid job?)*

    ☐ Ya *(Yes)*
    → Sebutkan *(Please mention)* .....

    .....
    .

    ☐ Tidak *(No)*

15. Menurut Anda, mana pekerjaan yang lebih penting, apakah jasa pembangunan toilet atau pekerjaan lain tersebut? Mengapa? *(Which job is more important for you, toilet facilities provision or the other jobs you have? Why?)*

    .....
    .

    .....
    .

    .....
    .

APPENDIX 3: DATA COLLECTION TOOL FOR MATERIAL SUPPLY SHOPS

I. LOKASI (LOCATION)		
1	PROVINSI (PROVINCE)	NUSA TENGGARA TIMUR
2	KABUPATEN/KOTA (DISTRICT)	
3	KECAMATAN (SUBDISTRICT)	
4	DESA/KELURAHAN (VILLAGE)	
5	JARAK DARI IBUKOTA KECAMATAN (DISTANCE FROM SUBDISTRICT'S TOWN CENTER)	KM
6	NAMA TOKO (STORE MATERIAL NAME)	
7	NAMA RESPONDEN (RESPONDENT NAME)	
8	ALAMAT RESPONDEN (RESPONDENT ADDRESS)	
9	NOMOR HANDPHONE (HANDPHONE NUMBER)	

THE BUSINESS

1. How long have you had this business?
2. What is the monthly average net revenue of the firm in the past year:……..

   ☐ Pendapatan *(Revenue)* 000 ≤ IDR 10.000.000
   ☐ IDR 10.000.000 ≤ Pendapatan < IDR 50.000.000
   ☐ IDR 50.000.000 < Pendapatan ≤ IDR 100.000.000
   ☐ IDR 100.000.000 < Pendapatan ≤ IDR 150.000.000
   ☐ Pendapatan ≥ IDR 150.000.000

3. What is the number of your employees, in addition to the owner?

	Full-time employees	Part-time employees
Saat ini *(At present)*:	_____	_____

4. Is the business legally registered? (have an SIUP- business license, company registration certificate, tax identification number?
   ☐ Yes
   ☐ No
   Comments:_____
   _

MARKETING

5. How do you market and promote your business (product and services)?) (multiple answers possible)

☐ Web-page/Internet ☐ TV ☐ Radio ☐ Pemasaran mulut ke mulut
Word-of-mouth

☐ Staff pemerintah
Government staff
☐ Penjualan langsung
Direct selling
☐ Koran
Newspapers
☐ Posters/flyers
☐ Papan Ikln
Advertising board
☐ Pameran
Store visibility
☐ Agen penjualan
Sales Agent
☐ Lainnya, _____

6. Do you do any particular promotion related to sanitation materials

_____

_____

SUPPLIERS

7. How choose your suppliers for different materials? [prompts: cheapest? relationship? other criteria?]

COMPETITION

8. How many other shops are there around here?
9. Do you face competition with other shops (including those in Dien Bien)?
10. What do you estimate the market share of your shop to be?
11. Where are your customers from?

CREDIT FOR CUSTOMERS

12. Do you offer credit, and if so, how do you manage this arrangement? Why / do you feel obliged to offer credit?
13. Do you offer credit to any household who asks?
14. Do you provide discounts to any customers?
15. What arrangements have you developed for people to pay back?
16. What amount in credit do you offer your customers?
17. Discounts for bulk purchases? Do households band together when they buy products to split transport costs?

TRANSPORT

18. Does your business own a vehicle?
19. How much does it cost to buy a truck/pick-up of different sizes?
20. If you own your own vehicles – are you paying them off? What are fuel costs?
21. When transport vehicle returns, is it carrying anything? Do you combine delivery of products with restocking of others?
22. What are the roads like throughout the year? Is this place easily accessible year round? For any of your customers, are there challenges purchasing things due to road conditions?

CREDIT FACILITIES

<table>
<tr><td colspan="3">23. Do you take out loans?</td></tr>
<tr><td colspan="3">☐No → Why not?</td></tr>
<tr><td colspan="3">☐Yes → Go to question no. 2</td></tr>
<tr><td colspan="3">24. From which institution did you get the loan?</td></tr>
<tr><td></td><td colspan="2">Name</td></tr>
<tr><td>☐Bank</td><td colspan="2"></td></tr>
<tr><td>☐Cooperatives</td><td colspan="2"></td></tr>
<tr><td>☐Other</td><td colspan="2"></td></tr>
<tr><td colspan="3">25. How often did you take out loans?</td></tr>
<tr><td>☐Monthly</td><td colspan="2" rowspan="2"></td></tr>
<tr><td>☐Yearly</td></tr>
<tr><td>☐Irregular →</td><td>How many times in the past 1 year?</td><td>_____ times</td></tr>
<tr><td colspan="3">26. Tell us more about the loan. How difficult to get it? How burdening it is? What kind of arrangements that you do with the financial institutions?</td></tr>
</table>

INTEREST IN COOPERATING WITH SANITATION ENTREPRENEURS/MASONS

27. Do you have any existing partnerships or links to masons or construction companies?

28. Would you be interested in cooperating or having a partnership with a sanitation entrepreneur or masons building toilets? Why? Why not?

HARGA DAN LOGISTIK (PRICE AND LOGISTICS)								
Material	**Buying**					**Selling**		
	Price (Rp)	Quantity bought	Where from	Transport mechanism to receive materials (sea/land, time required)	Transport costs (specific delivery charges? Incorporated into the price of the item?)	Selling price (Rp)	Turnover (demand for this product) [e.g. # or T/month)	If and how is delivery or transportation included in the price (impact of distance/quality road etc.)
Toilet pan (include type)								
Cement								
Zinc roofing								
Pipe								
Steel								
Concrete ring								
Bricks								
Wood								
Sand								

APPENDIX 4: DATA COLLECTION TOOL FOR LOCAL GOVERNMENT

District level

To be used for:

- Bappeda
- DoH
- Department Public Works
- Department SMEs
- BKPMD (Dept Trade and Investment)

General question guide:

1. What is the role of your department related to sanitation?
2. What do you think are the key reasons why sanitation coverage is low? Is affordability of latrines one of the issues?
3. What are the ways that the government is trying to improve sanitation? For instance we heard that in some places there is a village fund for toilets, was your agency involved?
4. Have you heard about sanitation businesses in this district? By sanitation business we mean business producing or reselling hardware related to the provision of toilet, or installing toilets?
5. Currently, are there any programs or policy designed specifically to support the sanitation business? (For example trainings to improve their capability, tax concessions etc.)
6. Do you think it is necessary for the government to provide support for sanitation businesses?
7. What are the ways government could provide support to the supply chain? What about your department in particular?

Additional questions for department SMEs and BKPMD (Dept Trade and Investment)

8. What kind of SMEs do you support currently?
9. How do you select who receives support?
10. What's the state of entrepreneurial activity in this area?

Additional questions for department of public works

11. If you are involved in construction of any sanitation facilities, what is your experience of:
    a. Availability of materials
    b. Costs of materials
    c. Transportation issues

Additional questions for Bappeda

12. What has been the involvement Dept SMEs or BKPMD in Pokja?
13. Have you tried to make efforts to involve them? What has been the response?
14. What do you think Dept SMEs or BKPMD could offer to support improved access to sanitation products and services?

Department of Health

15. What is your budget for sanitation related activities?
16. What kinds of activities is the budget used for?
17. How are decisions made about how this budget is spent?

Subdistrict level

Head of sub-district

1. What is the sanitation coverage in this sub-district?
2. What do you think are the key reasons why sanitation coverage is low? Is affordability of latrines one of the issues?
3. What are the ways that the sub-district government is trying to improve sanitation? For instance we heard that in some places there is a village fund for toilets, was your agency involved? Are there any regulations concerning sanitation in this subdistrict?
4. What role have the Puskesmas and their sanitarians been playing concerning sanitation?
5. Have you heard about sanitation businesses in this sub-district? By sanitation business we mean business producing or reselling hardware related to the provision of toilet, or installing toilets (eg masons)?
6. What is the availability of skilled masons who know how to build toilets? Are there any female masons in this sub-district?
7. Currently, are there any programs or policy designed specifically to support the sanitation business in this sub-district? (For example trainings to improve their capability, tax concessions etc.)

8. Do you think it is necessary for the sub-district government to provide support for sanitation businesses?
9. What are the ways sub-district government could provide support to the supply chain? What about your department in particular?

Sanitarian

1. What is the sanitation coverage in this sub-district?
2. What do you think are the key reasons why sanitation coverage is low? Is affordability of latrines one of the issues?
3. What is your role? What do you do, day-to-day, to support improved sanitation? [prompt: any role in linking demand and supply chain]
4. What would a household normally do if they wanted to build a latrine?
5. What are the most typical types of toilets built in this sub-district?
6. Do you know what typical costs are for building a toilet?
7. How easy is it for households to obtain the materials they need?
8. What is the distance to villages close and far from the sub-district capital? (in distance and in time)
9. What are common methods used by people to transport materials? What transportation costs are involved?
10. Are there any sanitation businesses in this sub-district? By sanitation business we mean business producing or reselling hardware related to the provision of toilet, or installing toilets (eg masons)?
11. What is the availability of skilled masons who know how to build toilets? Are there any female masons in this sub-district?
12. Do you think it is necessary for the government to provide support for sanitation businesses?
13. What are the ways government could provide support to the supply chain?

APPENDIX 4: DATA COLLECTION TOOL FOR TRANSPORT PROVIDERS

I. LOKASI (LOCATION)	
PROVINSI (PROVINCE)	NUSA TENGGARA TIMUR
KABUPATEN/KOTA (DISTRICT)	
NAMA RESPONDEN (RESPONDENT NAME)	
NOMOR HANDPHONE (HANDPHONE NUMBER)	

II. THE BUSINESS	
1. What kind of transport services do you offer?	
2. How long have you been in this business?	
3. Is it your sole job or do you do other jobs?	
4. How much time do you spend transporting materials? Average number of trips per day/week/distance travelled?	
5. Main customer base?	
6. Formally registered as a business?	

III. INPUT COSTS	
1. Vehicle	
2. Fuel costs	
3. Maintenance	
4. Other fixed or variable costs	

IV. PRICES				
From	**To**	**Cost**	**Max weight carried**	**Time required/quality of road**

V. COMPETITION	
1. Are there many other businesses like yours around here?	
2. Do you face competition from others?	
3. What do you think your market share it?	
4. Have the prices for transportation (and possible profit) changed over the last few years?	

APPENDIX 5: DATA COLLECTION TOOL FOR CREDIT PROVIDERS

I. LOKASI (LOCATION)		
1	PROVINSI (PROVINCE)	NUSA TENGGARA TIMUR
2	KABUPATEN/KOTA (DISTRICT)	Kefamenanu
3	CREDIT PROVIDER NAME	Credit Union - CU (Catholic)
4	NAMA RESPONDEN (RESPONDENT NAME)	
5	NOMOR HANDPHONE (HANDPHONE NUMBER)	

II. BACKGROUND	
1. How long have you provided services	
2. Who is the client base? [are small businesses part of your target group]	For clients doing cattle farming, productive businesses that get immediate results- eg crops to sell, or tailors.
3. What are your criteria for people to access loans? [legal basis?, collateral?]	You need to be a member. The amount depends on the savings. When you become a member you need to attend 2 days training. You take out a loan but need to pay in savings every month until you have as much as you wanted to borrow. There are three types of 'books' to track savings and loans- 1. Loan book 2. Retirement insurance 3. Savings It is 1m Rps to be a member and then need to pay in 10,000Rps every month.

III. LOAN TYPES OFFERED				
Purpose	Amount	Interest rate	Repayment period	Typical clients
Productive loan	Varies depending on savings	1.7% /month	variable	See above
Consumptive loan		1.8%/month		

IV. SANITATION BUSINESSES
Would you have an interest in providing credit to a sanitation entrepreneur? [prompt: regarded as viable/not etc., importance of supporting a socially oriented business]