



**MARKET  
DEVELOPMENT  
IN THE NIGER DELTA**

**DFID** Department for  
International  
Development

Funding for this programme  
is provided by the United Kingdom's  
Department for International  
Development (DFID)



■ Learning Paper Series Vol. 2

# USE OF SMART SUBSIDIES TO STIMULATE MARKET DEMAND- A CASE OF THE TECHNOLOGY ADOPTION



**CONTACT:**  
13B ONTARIO CRESCENT  
MAITAMA, ABUJA  
Tel: +234 818 800 5248  
DAISERVICES@DAI.COM



**MARKET  
DEVELOPMENT  
IN THE NIGER DELTA**

**Learning Paper Series**

**Learning Paper Series**

**USE OF SMART SUBSIDIES TO  
STIMULATE MARKET DEMAND-  
A CASE OF THE TECHNOLOGY  
ADOPTION**

**April 2019**



---

**Table of Contents**

<b>SYNOPSIS .....</b>	<b>2</b>
<b>BACKGROUND TO MADE II PROGRAMME.....</b>	<b>2</b>
<b>THE TECHNOLOGY ADOPTION GRANT MODEL AND RESULTS ACHIEVED .....</b>	<b>2</b>
<b>CRITICAL SUCCESS FACTORS .....</b>	<b>6</b>
<b>SUMMARY OF LESSONS LEARNED .....</b>	<b>10</b>
<b>ADDENDUM .....</b>	<b>11</b>
<b>Success Stories .....</b>	<b>11</b>
<b>Voice/ Quotes .....</b>	<b>11</b>



## SYNOPSIS

*Donor programmes and the private sector as part of their corporate social responsibility (CSR) invest large sums of money to address development problems. However, these investments that often include subsidies to NGOs, community development foundations and individual beneficiaries often do not change the underlying dynamics of the constraints they are designed to address, and their effects die off shortly after they are provided. MADE's experience with use of technology adoption grants (TAG) to stimulate market demand among fish processors, oil palm millers, fabricators and smallholder farmers as shared in this learning paper is that smart subsidies can lead to longer term systemic change, but they require very careful and thoughtful design and execution. To validate and consolidate the programme's lessons learned from use of smart subsidies, MADE II Programme organised a learning event held in Benin (Edo State) on 4<sup>th</sup> April 2019, targeting appropriate stakeholders (i.e. government agencies, development programmes and grant recipients). The experiences of these stakeholders as shared during the event have been integrated for wider dissemination.*

*After more than five years of programming, MADE is seeing the benefits of the TAG intervention to the private sector service providers and farmers. They now have improved produce, increased access to improved knowledge and agricultural inputs than they had at the beginning of the intervention. As shared during the learning event, MADE identifies the following success factors as critical to design and implementation of smart subsidies: a) building the design from a good initial diagnosis to understand the underlying problem that needs to be solved; b) identifying available tools/technologies to address the underlying problems; c) understanding/defining the value proposition for their adoption at a commercially viable scale; d) careful targeting of subsidy to stimulate demand beyond the pilot period; e) carefully design offer to accompany the grants which will result in longer term adoption of behaviours needed for a dynamic system; f) determine who will access the subsidy and what commitments they must make in return for the assistance provided; g) active marketing of the solution by the project (making the offer public); and h) knowledge sharing events to promote crowding in and wean the market actors of the subsidy.*

## BACKGROUND TO MADE II PROGRAMME

Market Development in the Niger Delta (MADE), being funded by DFID, seeks to reduce poverty and conflict in the Niger Delta region through developing rural agricultural markets and other sectors that impact poor people. The programme has been addressing underlying systemic constraints that adversely affect the lives and livelihoods of target beneficiary groups. These constraints, which limit productivity of smallholder farmers and processors relate to technical and business skill gaps, access to improved technology and business linkages.

MADE I (September 2013 – February 2018) surpassed its target in achieving a 15% income increase for 150,000 people in the Niger Delta area across five value chains: Agricultural Input, Cassava, Palm Oil, Poultry and Fisheries. Building on the success of MADE I, DFID approved a costed extension for additional two years (March 2018 – February 2020) with additional target of 155,000 smallholder farmers and entrepreneurs experiencing increased incomes. It is expected that 30,000 of those with increased incomes will be poor low-skilled youths and women from Edo State that are susceptible to human trafficking. With respect to Edo State, the programme seeks to promote alternative sources of income that can deter youth and women from attempting a risky migration that may result in them becoming victims of human trafficking. The second phase of the programme is focusing on increasing its impact on the four states with the greatest challenge to stability in the Niger Delta, namely Delta, Bayelsa, Rivers and Akwa Ibom States as well as Edo.

## THE TECHNOLOGY ADOPTION GRANT MODEL AND RESULTS ACHIEVED

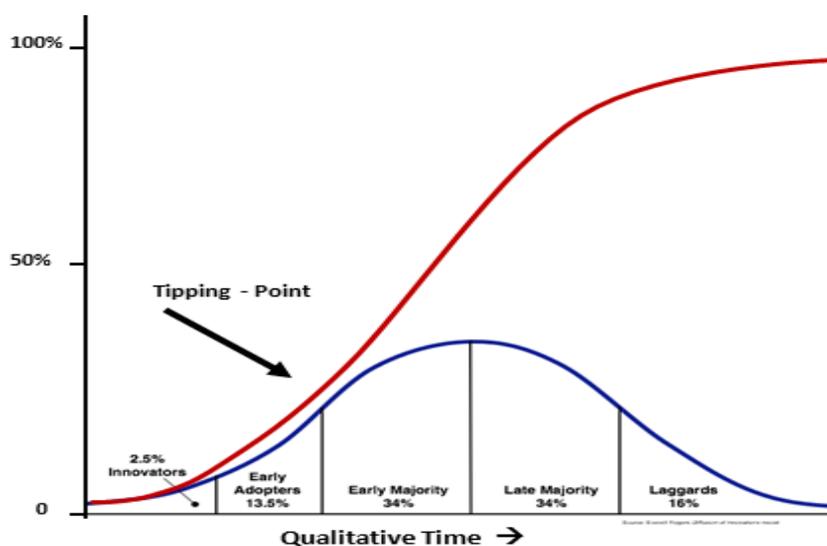
Market systems development programmes seek to introduce and mainstream commercial approaches that build more dynamic and resilient market systems that benefit the poor by increasing their incomes and agency. The level of engagement to deliver these expected results depends on the actual level of maturity and the challenges within the market system. In some cases, where the market system already exists and is mature, light touch initiatives and simple facilitation may be enough. But in market systems that are quite weak or nascent but are needed to address an underlying constraint affecting the poor, greater investment is required. For instance, when there is need to prove a new concept or stimulate demand,

smart subsidies can play an important role in addressing the underlying problems and creating a sustainable inclusive market system.

MADE designed the Technology Adoption Grant as a short-term investment to stimulate the demand for processing and harvesting technologies that can address identified market failures related to capacity gaps and information asymmetry between providers and suppliers who did not understand the value proposition for investment in new technologies. The funds were disbursed to encourage adoption of new technologies in the palm oil and fisheries value chains using an inclusive business model that would stimulate the participation of the poor in the value chains by demonstrating commercial incentives, production efficiency and benefits to the actors on the supply and demand sides.

The technology adoption grant was intended to support businesses engaged in the selected value chains at the production and processing levels targeting new market actors and related service providers (such as oil palm commercial millers, harvesters, farmers group, etc.) to acquire newly or upgrade to use of improved technologies to improve efficiency and commercial viability of their businesses. TAG was meant to trigger the demonstration effect required for broader adoption by other actors in the value chain that meet the eligibility criteria, the predetermined objectives and successful scale up.

Given the challenges of adoption of the technology by millers, harvesters and smokers, MADE sought a way to address the problem of uptake to reach the minimum scale to move beyond the early adopters (see Figure 1, the adoption model) through the introduction of the Technology Adoption Grant in 2015. In a bid to resolve the constraints, MADE designed a two-pronged strategy of 1) strengthening the capacities of fabricators and marketers to manufacture and promote the adoption of appropriately sized improved technologies and 2) stimulating demand for those improved technologies.



The programme also saw the need to increase capacity

utilisation of improved technologies. Prior to the intervention, improved technologies donated by government and donors were largely un-utilised and abandoned upon the first signs of breakdown as no one took ownership. In this case, private sector investors are seeking innovative ways to make their investment profitable and as such are driving increased utilization of these technologies.

The TAG model has been very successful as results achieved to date continue to proof the validity of assumptions underlying MADE's design of the TAG support. The assumptions and evidence proofing their validity are reviewed below:

*Competent and skilled equipment providers will manufacture and market the improved technologies that will benefit smallholders.*

TAG provided a platform for fabricators and marketers to engage with small scale consumers resulting in business improvement, availability of after sales support and adaptation of the technologies in terms of appropriateness and suitability for the targets. We have seen a growing number of fabricators and promoters of the improved technologies adopting the business model to provider solutions to farmers and

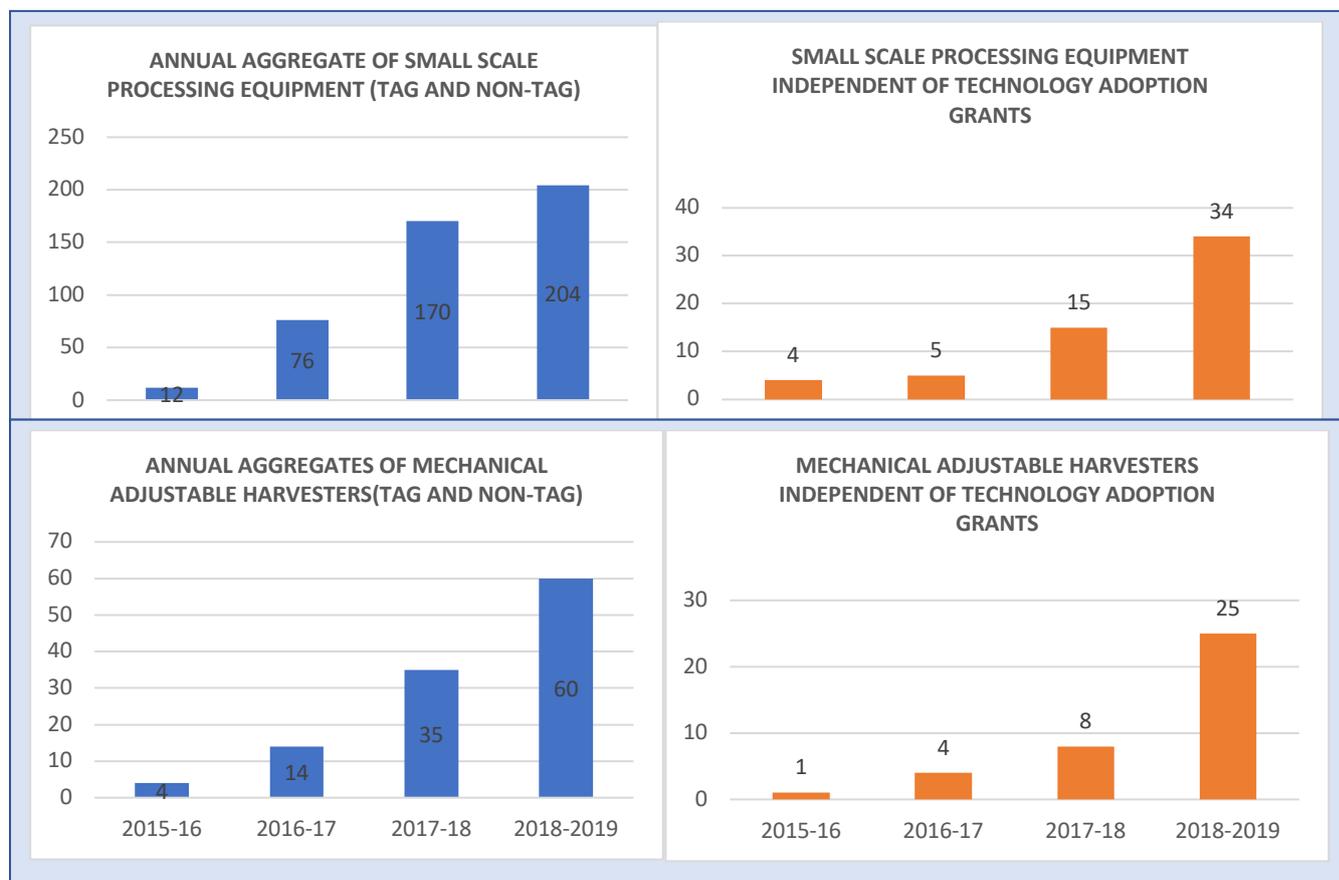
processors. In the palm oil sector, for instance, while only nine fabricators were trained in 2015, the programme recorded up to 15 fabricators of the improved processing by end of March 2019. Some of these fabricators have recorded sales increases of 50-70%.

There is an increasing institutionalization of the business model by the fabricators and marketers as they expand promotional activities to other states within the region. Over the years, we are also beginning to see evidence of fabricators adapting the technology design. An example is the reconstruction of some components of the SSPE - sterilizer and clarifier to utilize less water and plans to further scale down on size of the equipment to suit the needs of the millers. The feedback on the relatively high cost of the MAH led to the introduction of the MK as a cheaper alternative for harvesting.

*Market actors will raise awareness and demonstrate the economic benefits of using the technologies.*

MADE introduced a business model whereby equipment providers collaborate with smallholders to demonstrate to other farmers, millers and processors<sup>1</sup> the economic benefits of using the improved technologies, pursued in a bid to stimulate adoption (i.e. purchase and usage) across clusters within the region. We believed that using market systems thinking, the important point was to generate enough awareness on the ground so that the demand for the new technologies could reach the tipping point where enough early adopters of the technology would now make it visible to their neighbours and competitors to stimulate broader, market driven adoption. We also believed that knowledge of the potential demand coupled with improved capacities would incentivize the equipment providers to demonstrate and market the benefits of utilising the new and improved technologies. In this regard, the subsidy has been effective in creating ongoing demand and sales. We have also seen that as demand increases, other technology providers will begin to crowd-in and further adapt the technologies to suit smallholders. The increased awareness and visibility of the technologies is stimulating demand and increasing the number of fabricators providing solutions. As shown in Figure 1 below, while TAG ended in February 2018, the market is continuing to expand as we have recorded sales of more equipment now that our subsidy is over.

Figure 1: Continuous Growth of the Technology Market Beyond TAG Support



<sup>1</sup> Millers who process FFB at commercial mills on fee paying basis

There has been continuous sales of the harvesting and processing technologies independent of grant support. The most impressive has been sale of smoking kilns as 70% of all equipment produced and sold by a total of 14 fabricators are independent of grant support. The attributes of the technologies encouraged actors to invest in them and led to the uptake of 16 units of SSPEs and MAHs in 2015-2016; 144 units of SSPEs, smoking kilns and MAHs in 2016-2017 and 474 units of SSPEs, smoking kilns and MAHs in 2017-2018 by the time TAG closed in 2018. For MAH and MK, demonstrations organised by the marketers significantly increased awareness of the functionality and benefits of improved harvesting equipment. The benefits of reduced drudgery, timesaving and ability to harvest more FFB by using the improved harvesting equipment is leading to increased sales.

We have also observed strong demand for equipment in some specific states compared to others. This is probably due to economic and socio-cultural factors such as suitability of equipment viz a viz type of raw material available, willingness and attitudes towards contributory grant schemes. In oil palm, demand for technologies was strong in Edo state due to the presence of the improved oil palm variety (the SSPE and MAH are more suitable for the improved *Tenera* than the local *Dura* variety) while demand was relatively weak in Akwa Ibom state due to history of donations of such equipment by the state government and oil companies.

*The programme will leverage private sector investment to increase scale and potential for sustainability:* As TAG was a contributory scheme, it leveraged additional private sector investment for the improved technologies as well as additional equipment deemed functional by smallholders. For palm oil, MADE's investment in TAG worth about NGN71.6 million leveraged additional NGN158.6 million investment in these technologies in the region. For fish, MADE's investment was NGN35.7 million which leveraged an additional NGN51 million investment in the technology.

*Smallholder farmers and mill users will realise increased productivity from use of improved technologies:*

The net result of adoption of the improved technologies was to be increased productivity, enhanced competitiveness and increased incomes. As reported by smallholder farmers and mill users during outcome surveys, the use of these improved

technologies by smallholders is increasing output and earnings. In a similar manner, commercial SSPE mills are recording increased patronage in mills. Milling is now a lot more hygienic and there is an average of 30% increase in oil output - a key attraction for processors. The benefits of reduced drudgery, timesaving and ability to harvest more FFB by using the improved harvesting equipment is leading to increased sales. Table 2 below provides a summary of the net benefits to smallholder farmers and mill users.

*"Before, we got the SSPE, we did two tons of oil palm per day with four staff/workers, but with the SSPE we now do three to four tons per day with three workers. The quality and volume of oil are also better than we used to have because the SSPEs enhance productivity. At peak seasons we have 100 to 150 gallons of oil" - Mrs. Mary Edna Aibangbe, commercial miller*

Summary of Results by March 2019		
Palm Oil		Fisheries
Improved Processing Technologies	Improved Harvesting Technologies	Improved Processing Technologies
<b>15</b>	<b>8</b>	<b>14</b>
Fabricators promoting improved processing technologies	Agro-equipment dealers promoting use of MAH and MK	Fabricators promoting the smoking kiln technology
<b>204 SSPE</b> worth N160M sold to private and commercial millers	<b>60 MAH and 1,516 MK</b> worth N44.2M purchased by oil palm farmer groups and commercial harvesters	<b>208</b> Technologies worth N85 Million purchased by fish smokers and processors
<b>7,433</b> Palm oil millers and mill users involved in SSPE demonstrations within the region	<b>7,361</b> Oil palm farmers and harvesters involved in MAH/MK demonstrations within the region	<b>11,600</b> Fish smokers involved in smoking kiln demonstrations within the region
<b>3,325 (74% women)</b>	<b>4,805</b>	<b>3,234</b>

Mill users are using improved processing technologies and experiencing average increase of 33% oil yield.	Farmers used improved harvesting technologies and experienced 40% increase in FFBs harvested	People used improved smoking technologies and experience 25% reduction in post-harvest loss
---	--	---

The programme experienced initial hitches with implementation of TAG and adaptations were made along the way. The key challenges experienced are outlined below:

*Initial uptake of the improved technologies was slow*

Even though there had trained fabricators who could make the equipment and were demonstrating it to mill owners, initial uptake of the SSPE was slow. As there were not many mills available out there for demonstrations, potential buyers did not know about their benefits. In addition, fabricators did not know how to run demos very effectively, and they were constrained by low levels of working capital. While potential mill owners (buyers) were not aware of the equipment, the uncertainty on the actual return on investment also limited their willingness to commit capital for the purchase.

The key challenge was how to stimulate a sufficiently large number of millers to buy the mills from the fabricators, which would provide enough awareness in the overall market to reach the tipping point where demand would become more spontaneous (having moved from the “early adopter” stage into the “early majority” stage of sectoral transformation). The same issues existed for the MAH. Even though the agro-retailers were demonstrating them, the uptake was slow. But as with the SSPE, similar challenges arose on the uptake of the kilns. Because there were few of them on the ground, there was little demonstration effect and demand was slow to develop. The fabricators could not do widespread demonstrations to stimulate the market to the point of higher awareness.

*Lack of asset financing schemes*

As access to finance for smallholders was identified as key to the success of the uptake, MADE facilitated linkage between the technology providers, smallholders and financial institutions. Nonetheless, many of the financial institutions were reluctant to adopt the model based on their perception of risk inherent in dealing with smallholders and their limited understanding of the palm oil and fish business.

*Accessibility of kilns into the creeks:*

The cost of transporting the kilns into the creeks was very high as commercial fish smokers needed to hire their own boat to transport one unit of kiln to the creeks. The kilns were quite heavy and transporting each to the creeks cost about forty thousand naira (N40, 000), and getting an aftersales support from the fabricators was not possible. As a result, contrary to the project’s expectation, the kiln has served fish farmers developing ponds more than fisherfolks engaged in wild capture. There were also issues of difficulty to adjust from the norms; there were signs of resistance to change as fish farmers in the creeks felt that they still preferred the black fish (produced by traditional smoking methods) rather than the one smoked by the new technology which looked like a different fish to them. They wanted darker dried fish despite the better quality of the fish that would be produced by the kilns.

## CRITICAL SUCCESS FACTORS

While some say grants are dangerous and distortionary, our lesson is that it is all in how one uses grants, how you market them, how you scale them back, and when you stop them. Our experience shows that when the technologies are delivered through the fabricators and marketing agents, it is very effective for stimulating the market demand in non-distortionary ways, speeding up the visibility of various technologies by getting them in the field, and raising the market awareness of the fabricators. This has enabled the project to get to the tipping point with several key technologies and purchases, as many are now being bought by market actors outside of TAG.

Outlined below are the critical success factors in designing and implementing smart subsidies.

*1. Build the design of smart subsidies from a good initial diagnosis to understand the underlying problem that needs to be solved.*

During the design stage of the Market Development in the Niger Delta (MADE) programme, detailed sector analyses were carried out. MADE also engaged selected supply side actors - fabricators, marketers and relevant commercial service providers (such as oil palm commercial millers, harvesters, fish processors, farmers groups, etc.) to get their views on the proposed initiative.

The programme identified and selected economic sectors based on i) potential for direct impact on large numbers of poor people (including women); ii) pro-poor growth potential and iii) feasibility of stimulating market led interventions. After selecting the palm oil and fish smoking sectors, among others, a detailed understanding of the constraints binding the growth of those sectors was undertaken. In both sectors that require improved technologies, it was diagnosed that low rates of productivity were increasing costs and reducing incentives to invest in the sectors. Therefore, a technological solution was identified as necessary to address those productivity constraints.

In the palm oil sector, for instance, MADE recognised that changes within the sector is hinged on improving processing efficiency at the mills, as increased oil output will incentivise demand for improved fruit variety and changes at the production level. The use of these improved technologies by smallholder would increase output by at least 30% thus increasing productivity and earnings. This would in turn create the incentive to process more FFB, thus stimulating demand for more FFB. The increased demand for FFB would then incentivise small-scale plantation farmers to improve productivity of existing palm by adopting best management practices and utilising inputs in the short term and expanding area under cultivation in the long term.

***Box 1: Technology Adoption Grant (TAG)***

<b><i>Market failure</i></b>	Capacity gaps and information asymmetry between demand and suppliers who did not understand the value proposition for investment in new technologies.
<b><i>Use</i></b>	Smart subsidies as a programme tool to stimulate demand and adoption of existing profitable technologies
<b><i>Output</i></b>	Skilled actors manufacturing and promoting improved technologies increased awareness of the improved technologies
<b><i>Outcome</i></b>	Increased interaction between target consumers and suppliers of technologies leading to innovation, increased capacity utilization of new technologies and increased productivity

While improved technologies existed within the region, they were not available in the rural areas where they were needed the most; hence, there had been no adoption of the improved technologies. Existing technologies include the Small-Scale Processing Equipment (SSPE) designed by the Nigeria Institute for Oil Palm Research (NIFOR) for palm oil processing, the Mechanical Adjustable Harvester (MAH) for oil palm harvesting, the smoking kiln developed by the National Institute of Oceanography and Marine Research (NIOMAR) for drying fish - but they were largely unutilised by smallholders. Poor adoption of these technologies was mainly due to capacity gaps and information asymmetry between demand and supply with key actors on the demand and supply sides not understanding the value proposition for investment in new technologies (see Box 1 above).

***2. Identify available tools/technologies to address the underlying problems***

In 2014, MADE began facilitating the scale-down of the two-ton (worth N2.5-3.5 million) SSPE to 0.5-ton (worth N750,000) capacity to make it suitable and affordable, bearing in mind cash and credit constraints faced by small-scale millers. MADE worked with the Partnership Initiatives in the Niger Delta (PIND) and NIFOR to strengthen the capacity of a pool of nine local fabricators located across the Niger Delta states on fabrication and marketing of the smaller sized models of the equipment, which is more affordable to the communities and clusters of oil growers. Consistent with the adoption model for the palm oil small-scale processing equipment, MADE also worked with Nigerian Institute of Marine Research (NIOMAR) to train local fabricators close to the fishing communities on production and promotion of the improved fish smoking kiln. MADE and PIND also engaged with Texmaco (an agricultural equipment importer) to promote the Mechanical Adjustable Harvester (MAH) which doubled the productivity of harvesters, while also making it easier to harvest the crop as no climbing was required.

***3. Understand and define the value proposition for adoption of the tool at a commercially-viable scale***

The relative newness of the technologies in the region required awareness raising initiatives targeted at small-scale millers, fish processors and farmers to educate potential buyers about the benefits. Hence, MADE supported linkage platforms that enabled fabricators and marketers to engage agricultural extension agents (a major source of information to farmers), cooperatives and commercial millers and

harvesters with the aim of providing information on the increased functionality, potential financial benefits of the improved technologies and upcoming demonstrations.

MADE subsequently supported selected fabricators and marketers to promote TAG at demonstrations and awareness raising events across the region. The initial demonstrations provided platforms for actors to witness the economic benefits of the technologies and engage with fabricators and commercial service providers. In the case of SSPE, the participants at the demonstration gained awareness of the capability of the new technologies to increase oil yields by approximately 30% more than the output of the current processing technology employed by smallholders. The increased oil output raises earnings by additional 30%. They also recognized that the new technology has the capacity to process about 50-70% more fruits which could curb the endless wait/queues at mill and waste of FFBS in addition to reduced drudgery experienced at mills.



Figure 2. Commercial millers attending a demonstration to promote adoption of small-scale processing equipment (SSPE)

The harvesters and farmers recognised that the MAH and MK enabled commercial harvesters to harvest more FFBS. The average volume of fruits harvested with the use of MK (100 FFBS) and MAH (140 FFBS) is significantly higher compared to 80 FFBS harvested through manual climbing efforts. The demonstrations of the fish smoking kiln showed the smokers and processors the benefits of using the smoking kiln over the artisanal methods. The smoking kiln curbs post-harvest losses and improves the shelf life of the finished product by reducing the moisture content to less than 15%.

We also saw the need to stimulate the initial uptake by a sizeable number of demand side actors buying the technologies from fabricators and marketers, which would provide enough awareness in the overall market to the point that demand would become more spontaneous (having moved from the “early adopter” stage into the “early majority” stage of sectoral transformation).

#### 4. Carefully target the subsidy to stimulate demand beyond the pilot period

MADE identified that the supply side actors were best suited to drive adoption of the improved technologies. Therefore, the programme’s design of offers was based on their capacity (technical and marketing competence) and incentives (such as increase in sales, patronage, etc.) to promote adoption by smallholders (demand side actors) to acquire or (upgrade from existing technologies) to the new technologies they will use to improve the efficiency and commercial viability of their businesses. These offers included limited price discounts, capacity strengthening support and support for demand stimulation activities in exchange for active marketing and promotional activities targeting smallholders. The Grant funds was expected to trigger the demonstration effect required for broader adoption by other actors in the value chain. Based on careful analyses, MADE decided on the amount of support required to hit the tipping point (number of subsidies to be provided over a timebound period) and states to be targeted as shown in Table 1.)

Description	Capacity (MT/Day)	Quantity	States
<b>Palm Oil</b>			
SSPE	3 MT/ 10 Hr shift	80	Imo, Akwa Ibom, Delta, Edo, Abia, Cross River, Rivers, Ondo
MAH	140 FFB / Day	40	Imo, Akwa Ibom, Delta, Edo, Abia

Malaysian Knife	70 FFB / Day	150	Imo, Akwa Ibom, Delta, Edo, Abia
<b>Description</b>	<b>Size (Kg)</b>	<b>Quantity</b>	<b>States</b>
<b>Fish</b>			
Kiln	50-75Kg	80	Rivers, Bayelsa, Akwa Ibom, Delta, Edo, Cross River
Kiln	100Kg	20	Rivers, Bayelsa, Akwa Ibom, Delta, Edo, Cross River
Kiln	200-250Kg	32	Rivers, Bayelsa, Akwa Ibom, Delta, Edo, Cross River

*5. Carefully design offer to accompany the grants which will result in longer term adoption of behaviours needed for a dynamic system:*

The pilot was designed to get financial institutions to understand the profitability of these businesses in a bid to get them to develop suitable asset financing products for smallholders. The original design of the TAG was intended to achieve this through a tripartite arrangement between millers, financial institutions (FIs) and MADE; expecting that greater awareness by the FIs would increase their willingness to lend for the purchases. In this arrangement, commercial millers who met the selection criteria and expressed willingness to meet the conditions for financing, would indicate their interest with any of the trained fabricators or the FI to move forward. On meeting the FI's requirement, an agreement would be reached based on the funding for the equipment and promotion of the use of the material amongst mill users.

Unfortunately, despite significant engagement, no financial institution actively stepped up to lend for the desired equipment. Therefore, the link to the financial institutions was dropped in order to get the equipment out in the fields in the hands of promoters and users that will actively demonstrate the benefits and functionality as a means of stimulating the demand. Fabricators and promoters demonstrating and actively marketing the technologies became the main drivers of the change process. We also saw the need to collaborate with medium scale actors and commercial processors interested in providing efficient fee-based services to numerous potential buyers and users.



*Photo 3. CLICE Foundation, a co-facilitator, running a demonstration after the installation of the 500kg MADE supported smoking kiln in Agwagune Biase LGA Cross River State.*

*6. Actively market the solution by making the offer public*

To gain traction, MADE ensured the offers were made public, allowing interested market actors to apply within the deadline. The programme circulated flyers within existing networks of appropriate market actors.,

*7. Determine who will access the subsidy and what commitments they must make in return for the assistance provided:*

MADE agreed selection criteria that grantees must meet. Applicants indicate interest in accessing TAG funds were then screened and upon being successful, an agreement is reached. They then deposit 50% of the cost of the equipment with the fabricator, while MADE facilitates the disbursement of the additional 30%. The 20% balance is paid to the grantees upon delivery and installation of the equipment.

The TAG support included commitments from grantees that they must make in return for the assistance. For instance, grantees were required to organize demonstrations as part of their commitment. In this arrangement, commercial service providers who meet the eligibility criteria and express willingness to meet the conditions (mainly 50-60% up-front payment) demonstrate commitment to promote the use of the equipment amongst non-mill owner processors, non-kiln owner processors and small-scale farmers) indicate interest with selected trained fabricators.

Upon installation of the equipment, as part of his counterpart contribution (offer) the miller would make his/her mill available for the fabricator to lead demonstrations for other millers and mill users to come to learn about the benefits of the use of the improved processing technologies. The fabricators (who benefited from the sale) would also commit to carrying out the demonstrations as part of their offer. This would stimulate demand for mills and sales and improve the fabricators ability to market their products. The demonstrations would also help the commercial miller to reach out to the customers of mills (processors) who would be interested in switching to the use of the SSPE for processing.

Post installation, the grantees were supported in setting up technology demonstrations to create awareness and stimulate usage of the technologies by the ultimate poor beneficiaries - processors and farmers. The service providers organise demonstrations and awareness raising events for non-mill owner processors, non-kiln owner processors and small-scale farmers while the fabricators organize demonstrations for interested prospective service providers within the same cluster in a bid to reduce travel. The expected outcomes are i) increased sales for fabricators; ii) increased utilization of improved mills in terms of number of customers and volume of fruits processed; iii) increased revenue for commercial millers; iv) reduced drudgery; and v) increased oil output and ultimately incomes for processors.

*8. Undertake knowledge sharing events to promote crowding in and wean the market actors of the subsidy.* While the programme has recorded huge success with TAG, a learning event to stimulate wider adoption of the technologies was organised on 4<sup>th</sup> April 2019. The event, which was held in Benin, Edo State also offered an opportunity to sharing the project's experiences on the concept of smart subsidies. It was also an opportunity for partners to share their specific implementation experiences on ranging from those receiving the training, implementing demonstrations, adopting new technologies and sales of new equipment by fabricators. After a series of presentations, participants were clustered into groups of three for knowledge sharing, and snippets were collected from their discussions.

The event targeted similar donor funded programmes and implementing partners working brought together, with agriculture sector players mainly from the fisheries and palm oil value chains and representatives of government offices, private sector service providers, MADE partners - millers, fabricators, and heads of local NGOs.

## SUMMARY OF LESSONS LEARNED

MADE and partners have learned the following lessons from design and implementation of TAG:

*Security is a key factor to include when investing in technologies, especially within riverine communities:* As with every asset, whenever security is compromised, the target beneficiary may lose access to the technology. This can impede progress in developing or enhancing the capacity of entrepreneurs to increase yield and incomes.

*Programmes need to work hand in hand simultaneously with the private and financial sectors to build a strong platform for development of and adaptation of technology:* It is important to build connections with the private sector and financial institutions early on to attract investment. There is an increasing number of investment funds aimed at buying technology-driven machinery that increases productivity among farmers. As technology companies seek investment funds to increase the use of new agricultural

technologies, they often need to address the financing needs of their end customers and identify the right investor for their risk profile and expected returns.

*A holistic approach to developing the value proposition of technology is critical:* A holistic approach, including access to technology, finance, and markets, helps build sustainability and technology uptake over the long term: Training farmers on a new technology is not enough to ensure adoption and sustainability as other technologies may be required to facilitate finance and market connections as a sustainable tool for production, income and resilience.

*Understand the market and do not take anything for granted:* It is important to understand what motivates farmers and leverage local culture to encourage adoption of new technologies.

*Capacity strengthening support can reinforce the ability of supply side actors to implement initiatives:* In the case of TAG the training support given to fabricators equipped them to run demos and promote the initiative. This led to wider awareness in communities and among millers and farmers.

*Limited role of facilitator in implementation of TAG ensures continuity of market changes post- grant implementation phase.* By ensuring that the market actors drive the process, which is characteristic of M4Ps, MADE has achieved sustainable change in the technology market.

## ADDENDUM

### Success Stories

#### Oil yield increased after the adoption of Improved processing equipment

Henry Ikhile, a palm oil processor from Sobe village in Owan West LGA of Edo State attended a demonstration of the new small-scale processing equipment (SSPE). He had ten years of experience in oil processing; because of this, he quickly understood the value proposition of the processing time and increased oil yield. Henry contracted Muhat, one of the trained fabricators, and made an outright purchase of the SSPE. In the course of using the SSPE, he has demonstrated about 33% increased yield in oil extracted from every batch, and the improved rapid processing time (the new machine processed the same amount of fruit in 1.5 days as the old engine did in 6 days). His labour costs for processing per ton have significantly reduced as well. With the much higher throughput, he is now able to serve more processors and has experienced an increased upsurge of patronage by female mill users who are also enjoying the increased economic benefits of the improved mill.

#### Expanded market opportunity from better quality products

Mr Fubara Dappa Wilcox is a fish farmer and processor in Port Harcourt, Rivers State. He has over 5 years' experience in fish smoking. Following the post-harvest losses associated with artisanal methods of smoking, he adopted the smoking kiln. Upon using the smoking kiln, he has recorded an increased rate of processing time and an increased yield of over 25%. The artisanal machine smokes and dries fish in 2 days with traces of the benzo-a-pyrene, which is a cancerous substance, while the smoking kiln processes in 12 hours.

### Voice/ Quotes

#### Increase in sales of improved palm oil technology

*"Prior to our partnership with MADE, machines sales were slow, about 1-3 over a year as we had focussed on large scale millers. The engagement with MADE pointed us in the direction of the huge market potential amongst small and medium scale millers which informed the tweaking of our model. The decision to scale down on size and cost of the SSPE and embark on its promotion was the best we had taken in recent times as we experienced a 300 percent increase in sales in the first year"* **Engineer Babatunde Abdulkareem Managing Director, Muhat Nigeria Limited, Edo state**

#### Better Quality of Oil from SSPE

*"After attending the demonstration sessions on palm oil processing technology facilitated by MADE, I installed the SSPE to boost productivity. Before we adopted the technology, our mill produced 6 gallons of*

25 litres from 1 tonne of fresh fruits, but now, this has increased to 8.5 gallons of 25 litres from 1 tonne of fresh fruits, which increased profit. To overcome the challenge in processing Dura, which is predominant in Cross River State, we mix it with the Tenera variety when sterilising and digesting the fruit at the ratio of 60% Dura to 40% Tenera. Oil produced using the SSPE does not contain water and has no odour as it is in the case palm oil processed with the local technology.” **Sanusi, Manager, FADASCUM Oil Mill, Cross River State.**

#### **Career opportunity and increased earnings with SSPE**

**Mr. Ifidon Austin Egberan** used to be a school teacher, however after he benefitted from the SSPE he changed careers and began to mill palm oil commercially for farmers in his locality. Now, Ifidon makes an average of N250, 000 monthly.

*“I engaged with MADE three years ago; I was just a classroom teacher in a private school. Someone brought this idea to me about SSPE. He came with his mechanical harvester to invite my proprietor, who has a vast farm, for a demo. When I saw the equipment, I thought it was one of the mowers we used in school to mow the lawns. I tried to touch it, but the man asked me not to move it.*

*I was appointed to go and represent the school. During the demo, I took notice of the ability of this mechanical harvester. Before, I had a piece of manual equipment used to mill oil. With my wife, we began to do it as a business. In the first year, we used the manual machine, and we made some money. We managed to buy a septic tank for N21,000. Oh, it was big we were slapping ourselves on the back. The next year we bought a tank and a pumping machine. Because of the demo that I had seen, I told my wife - this SSPE is worth buying. We keyed into it, we collected the form and paid our counterpart fund demanded by the organisation.*

*I got the SSPE in April 2018, and from then on it has been success, success and success. I had to resign from the classroom because my salary was next to nothing. Today, I can make my salary thrice in a day. The success I achieved using the SSPE machine is unimaginable; let me tell you, just for this month, I have made over N250,000 using the device to produce oil (commercially) for people and the things I sell. I also have a small farm.*

*You can make a living out of using the SSPE, but you must also have the mechanical harvester and the Malaysian blade because they will enhance your ability to harvest quickly to bring to the farm, reduce cost and make you not to wait for a harvester who may often disappoint you.*

*Besides, I am providing jobs for older men and women around me; I was giving them kernels free of charge, to crack and sell, but later I started telling them to pay. I lured them into the business, and now they are begging me to sell kernels to them. Now, I am making money, and they are also making money. So, you can see the change. I am most grateful to MADE for giving me the smart subsidy grant; now I am self-employed and different.”*

