



Shanti Kleiman for Mercy Corps

SCOPE LEARNING STUDY

Reducing poverty and environmental impact in the Indonesian tofu and tempeh sector

JANUARY 2016

Background

In Indonesia, tofu and tempeh produced from soybeans are a staple source of protein consumed by millions every day. Yet their production is highly energy-intensive and is a major source of local pollution and carbon emissions. Small-scale producers represent the bulk of production and emissions, predominantly relying on firewood and inefficient and unhygienic equipment such as open fires and oil drums. Nationally, an estimated 85,000 cottage industry micro and small enterprises (MSEs) currently produce tofu and tempeh, employing approximately 285,000 low-wage workers.

Mercy Corps' SCOPE program (Scaling Sustainable Consumption and Production of the Soybean Processing Industry in Indonesia), funded under the European Commission's SWITCH mechanism, spotted the potential in the market system for tofu and tempeh to achieve the two programmatic goals of promoting energy efficiency and

reducing environmental impact; and contributing to poverty reduction through improvements in the profitability of tofu and tempeh MSEs.

To achieve these goals, SCOPE aimed to use a market systems development approach to catalyse a shift to clean production using clean burning fuels and efficient and hygienic equipment such as stainless steel vats and steam boilers.

This learning study examines the extent to which SCOPE was able to achieve impact in each of these two goals. It also seeks to learn from the process of implementation, drawing out key lessons relevant for other market development programs in the energy sector and beyond.

Program design

What constraints were identified?

SCOPE's market assessments identified four major constraints preventing a shift to cleaner and more efficient production of tofu and tempeh. These were: unavailability of appropriate clean production technology in the local market; a lack of information and awareness among market actors; lack of financing options for investment in technology; and low consumer demand for cleaner or healthier tofu and tempeh.

What interventions were selected for the SCOPE program?

In response to the four identified constraints, the SCOPE team designed and implemented interventions in four areas, each targeting a 'supporting function' of the market system:

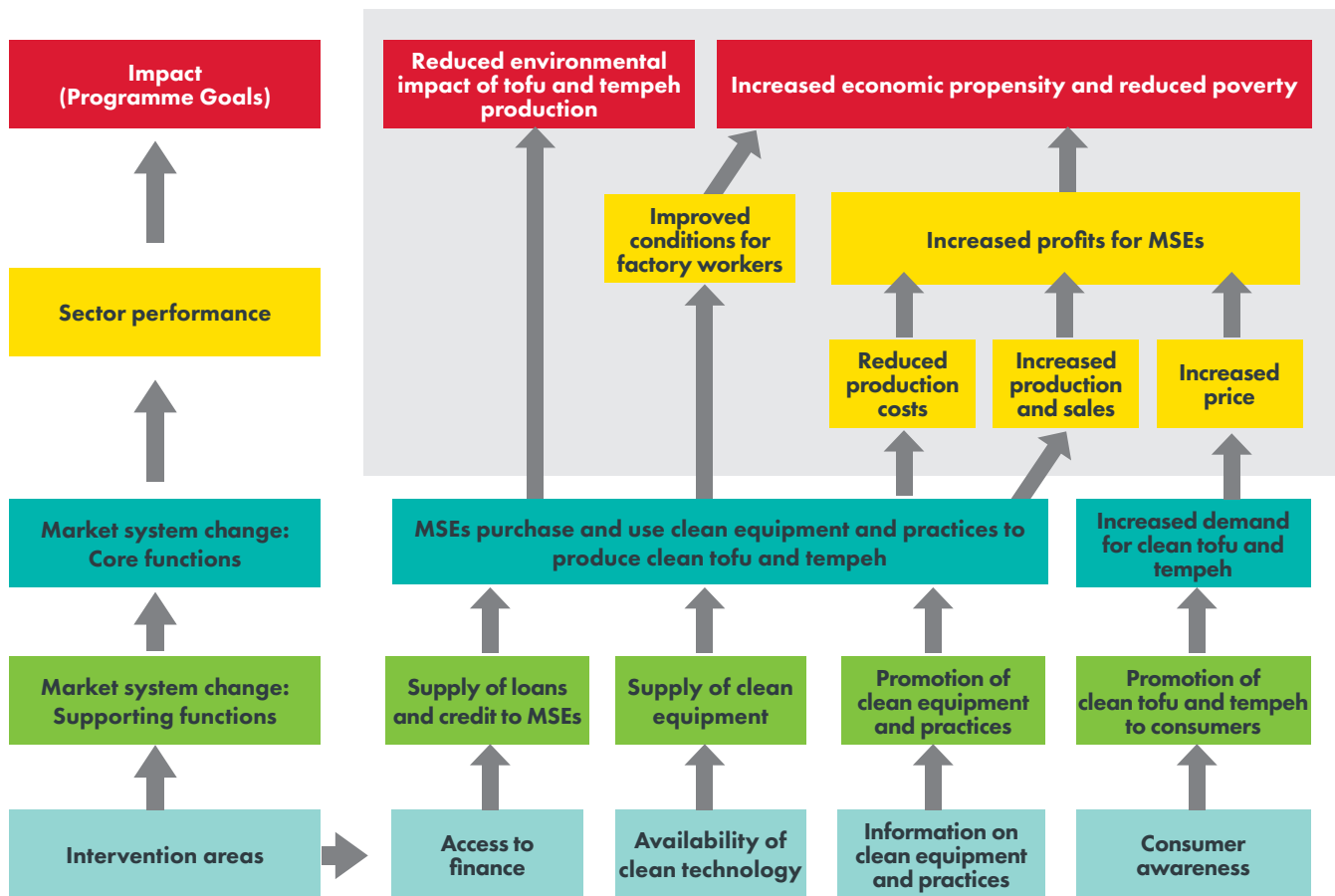
Availability of clean technology for tofu and tempeh MSEs: Using market assessment data, SCOPE worked to convince selected manufacturers that there was a business case for producing tofu and tempeh equipment. The team provided basic technical advice on technology designs, but far more significant was the facilitation of relationships between manufacturers, equipment retailers and MSEs producing tofu and tempeh, who then worked together, using their own financing, to develop optimal designs.

Information on clean production equipment and practices for MSEs: Using a market facilitation approach, SCOPE activities included: transforming existing cooperatives of tofu and tempeh producers (KOPTIs) into agents for change; supporting the emergence of model factories managed by KOPTIs; and supporting manufacturers to develop distribution channels by selling equipment through resellers. SCOPE also engaged in some direct promotion, by organising marketing events and cross visits.

Access to finance: Mercy Corps supported existing commercial banks and MFIs to offer loan products suitable for tofu and tempeh MSEs, and facilitated their outreach and linkages with MSEs.

Consumer awareness about clean tofu and tempeh: This intervention was largely implemented directly by the SCOPE team and included mass media promotion on television, radio and in newspapers, and coordination with consumer awareness groups. In one case, SCOPE took a facilitation approach, supporting one model factory to develop distribution channels for clean tempeh for high-value end-markets.

The strategic framework below (figure 1) illustrates the theory of change for the SCOPE programme:



Program Impact

What evidence is there of systemic change in the market system for clean tofu and tempeh?

The learning study first looked at the extent to which SCOPE was able to stimulate systemic change in the market system for tofu and tempeh:

Supply of clean technology for tofu and tempeh MSEs: The SCOPE program was successful in stimulating systemic change in the supply of clean tofu and tempeh equipment; three partnering manufacturers have become sustainable producers of equipment, and at least five other manufacturers have crowded-in. A key factor in this success was SCOPE’s focus on a facilitation approach that allowed manufacturers to take ownership, and financial responsibility, for developing the technological designs in consultation with the market actors that would become their customers.

Promotion of clean production equipment and practices: The SCOPE program achieved notable success in stimulating new and sustainable distribution and marketing channels for clean tofu and tempeh equipment, from

manufacturing to sales. The ripple effect of this supply chain extended beyond the core program areas, to 7 districts outside of the original 3 program target districts. Nevertheless, the reach of the new supply chain and the ability of market actors to promote the new equipment and practices to MSEs are still limited, with only four equipment retailers selling equipment in fairly confined geographic areas. This highlights how last-mile distribution can be a formidable challenge even in high-density urban areas; the SCOPE program would have benefited from a stronger programmatic focus on building wider distribution channels and a greater number of points-of-sale.

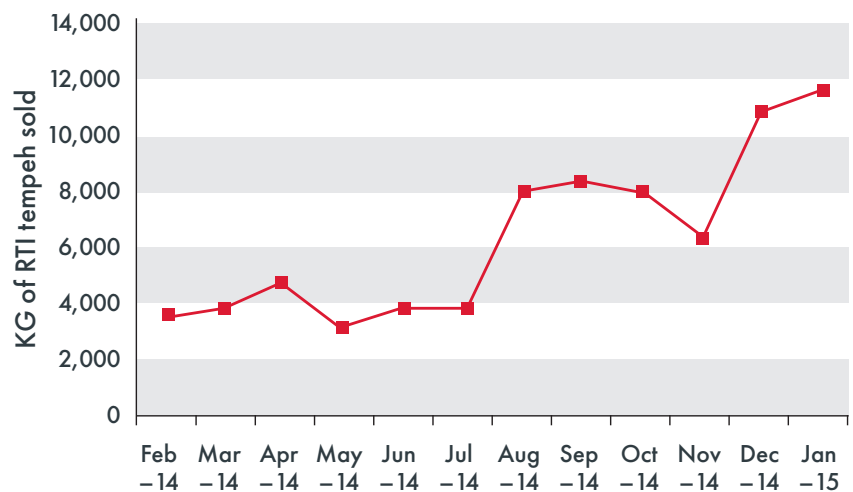
Access to finance: The SCOPE program had limited success in its efforts to stimulate systemic change in the supply of credit to MSEs from partnering banks and MFIs, largely because of a failure to address the underlying constraints, such as collateral requirements, preventing MSEs accessing loans. This was partly mitigated by other private sector actors, including equipment retailers and lease financing companies, which responded to this gap by developing new channels for the provision of credit to MSEs.

Consumer awareness about clean tofu and tempeh: In one instance the SCOPE program used a market facilitation approach to support a tempeh producer to develop their own consumer awareness-raising and marketing activities, and this proved very successful (see box 1 below). However, in most cases the SCOPE program took a direct role in ‘consumer awareness’, organising awareness raising activities that ended up being largely disconnected from the everyday business activities of tofu and tempeh MSEs, and as a result had little impact on consumer demand and purchasing behaviour. The limited ability of MSEs to effectively market their improved products to consumers remains a major gap in the new market system, limiting the ability of MSEs to get a better price for their clean tofu and tempeh and therefore acting as a disincentive to switch to clean practices.

Box 1: A new market for quality tempeh

Prior to August 2014, Rumah Tempeh Indonesia (RTI) had been selling tempeh to a handful of independent retailers in the Bogor area, and sales had stagnated. In August 2014, with Mercy Corps support, RTI developed partnerships with two external distribution companies that had large existing retail networks. The number of outlets stocking RTI tempeh promptly skyrocketed. By January 2015 RTI tempeh was being sold in approximately 120 outlets in the Greater Jakarta area. Partnering retailers included 10 multi-chain supermarkets, including Carrefour and Lotte, and chains of high-end vegetable stores. As a result, monthly sales of RTI tempeh also increased dramatically, rising by 198% in just 6 months.

Figure 2: Monthly sales of ‘clean’ tempeh by RTI



Purchase and use of clean production equipment and practices by tofu and tempeh MSEs: By the project end, SCOPE interventions had resulted in 771 tofu and tempeh MSEs switching to clean production, an impressive outcome and only just less than the ambitious program target of 800 MSEs. Of these, 331 MSEs purchased equipment, with the remainder renting equipment from other producers (202 MSEs) or, in non-target areas, receiving equipment from government or a KOPTI (238 MSEs). SCOPE has effectively demonstrated the business viability of clean tofu and tempeh production, and the number will continue to grow beyond the project-end. Nevertheless, it does not yet constitute scale and there is huge potential for more widespread uptake of clean production practices.

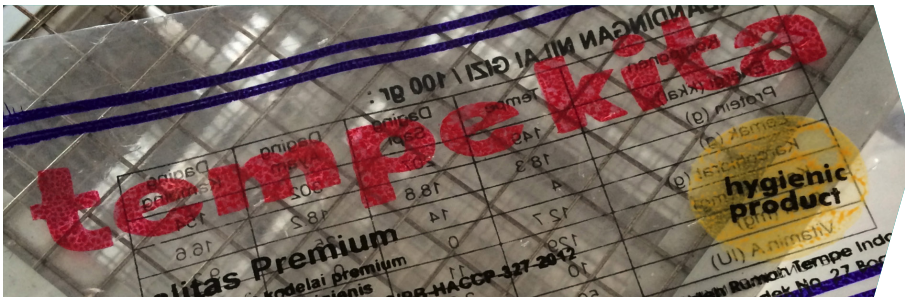


771
Number of tofu and tempeh MSEs that made the switch to cleaner production practices as a result of the SCOPE program”

What evidence is there of impact on sector performance and program goals?

Having assessed the extent to which market system changes were achieved, the learning study next looked at the impact that these market system changes had on the performance of MSEs and the overall program goals:

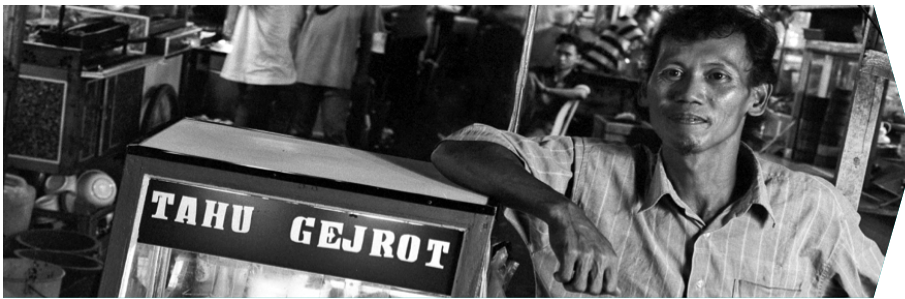
Profits: The switch to clean production practices increased profits for 38% of MSEs, with an increase of 25% on average. The main driver of this was increased quantity of production and sales (37% of MSEs increased production by 50% on average), made possible by the efficiency gains of the new equipment in terms of time saved.



38%
Percent of MSEs that increased their profits as a result of switching to clean production practices (by an average of 25%)

Working conditions: As expected, the switch to clean equipment resulted in significant improvements in the physical environment in tofu and tempeh factories, and this was identified as the single biggest benefit by MSE owners. There were also two unanticipated impacts in working conditions. First, over 2,000 tofu and tempeh workers (in 43% of MSEs) benefited from an increase in wages of more than 20% on average, resulting in a net income gain of over \$1 million each year. Secondly, in 57% of MSEs, workers benefited from an average 14% decrease in hours of work, made possible by enhanced production efficiency.

Poverty reduction: SCOPE succeeded in achieving an impressive pro-poor impact, but not through the mechanism originally intended. The increase in MSE owners’ profits did not contribute to poverty-reduction directly, as the learning study found that owners are relatively well-off and cannot be classed as poor. Instead, pro-poor impact was achieved through the impact on factory worker conditions, including increased wages and reduced working hours.



\$1 million +

Net annual income gain for more than 2,000 low-wage tofu and tempeh workers employed in MSEs that made the switch.

Environmental impact: SCOPE also successfully contributed to the environmental impact goal. MSEs that switched to clean equipment on average reduced firewood use by 73%, resulting in cleaner air in residential areas around tofu and tempeh factories and a substantial reduction in carbon emissions of almost 90,000 tonnes per year.



73%

Average reduction in firewood use by MSEs that switched to clean tofu and tempeh production

Lessons learned

Market development approaches can be successful in simultaneously achieving dual environmental and pro-poor goals, but technical and market assessments need to be rigorous to ensure one goal does not undermine or dilute the other

Mercy Corps originally anticipated that the pro-poor impact of SCOPE would arise from increased profits for tofu and tempeh MSE owners, helping to lift them out of poverty. However, as this study found, MSE owners are relatively wealthy and increasing their incomes did not directly contribute to poverty reduction. The SCOPE program nevertheless had an impressive pro-poor impact, through increased wages and shorter working days for low-wage workers in MSEs that made the switch. This unanticipated outcome of the SCOPE program was not a part of the original program design and was not tracked in program monitoring.

This highlights the need to pay particular attention to poverty analysis of beneficiaries when designing market development programs with additional non-economic goals. Early assessments of tofu and tempeh MSEs, for example, should have included analysis of the poverty level of owners and also factory workers. Understanding these dynamics may have influenced the intervention design, including the technology selected and the distribution channels for equipment.

The ability to manage a programme adaptively can be hindered by organisational structures and working culture as well as the external enabling environment

The SCOPE team's ability to implement adaptively was hindered by the siloing of team members into specific areas of responsibility (for example one staff was working on access to finance; another was working on consumer awareness activities; and another on PIRT certification). This led to staff focusing on achieving their own

individual activities and indicator targets, with limited collaboration across activity areas, and resulted in missed opportunities for synergies between different interventions. For example activities supporting MSEs to adopt branded packaging was not aligned with consumer awareness-raising activities.

SCOPE was also constrained by restrictive donor regulations that made even small changes to activities and staffing extremely difficult. The log-frame, with indicators for each activity, meant the SCOPE team felt locked into rolling out the prescribed number of trainings and events, even when these were not proving effective.

Non-economic incentives can be a key driver of market system change, but without a clear economic benefit uptake of new practices can be sluggish.

Far more MSEs that switched to clean production were motivated by non-economic factors (53% identified a clean kitchen and less smoke as the primary motivation) than by economic factors (26% were motivated by time savings, a higher value product or increased sales). MSE owners placed a high value on having a clean working environment, and the SCOPE team and KOPTIs were successful in promoting this vision of modern production.

Nevertheless, where clear economic incentives are lacking they can result in sluggish system change, and this appears to have been a factor in the SCOPE program, where the increasing price of liquid petroleum gas (LPG) acted as a disincentive for MSEs to purchase clean equipment; 25% of MSEs that had not made the switch cited 'LPG is more expensive than firewood' as the primary reason.

Including research, design and testing of new appropriate energy technologies can take a long time and can result in technological 'dead-ends'.

The SCOPE team spent more than a year of the program supporting the design and testing of a vacuum cooker, investing significant staff time in this process, which ultimately proved unviable due to the difficulty in using it and the time and cost necessary for maintenance. In other Mercy Corps energy programs, in particular those promoting cookstoves (which tend to be produced locally in contrast to household solar technologies), this is also a significant challenge. MSD programmes in the energy sector should avoid including a research and development (R&D) component where possible, instead seeking to integrate existing technologies with adaptations as necessary. When R&D is unavoidable, facilitating private sector actors to work together to develop the designs themselves, as SCOPE did for most new technologies, can reduce the risk of inappropriate designs, reduce pressure on program resources and accelerate the design process.

Implementing agencies should avoid taking a direct role in consumer awareness activities and rather support private sector partners to develop their own consumer-awareness and demand-creation activities.

Prior to the SCOPE program awareness of clean production technologies among tofu and tempeh MSEs was extremely low (only 10% said they had 'some information' or 'a lot of information'), so generating awareness of the new equipment was a major challenge for the SCOPE team and private sector partners. This is typical of many Mercy Corps programs in the energy sector, for example those facilitating new distribution channels for solar products or cookstoves.

The pressure to rapidly achieve a sustainable scale often leads Mercy Corps to engage in some direct marketing as a one-time boost to market uptake, as was the case with the SCOPE program. Face-to-face awareness-raising by the SCOPE team seems to have contributed to market take-up to an extent, but this non-systemic approach is time intensive for program staff and in some contexts can be counter-productive (in a similar study of a Mercy

Corps solar energy program in Timor-Leste, sales were found to be among the lowest in areas where Mercy Corps had the most visible presence). SCOPE investment in mass marketing to consumers, on the other hand, was almost completely ineffective, as it failed to build a connection between tofu and tempeh retailers. In Indonesia, Mercy Corps' media messaging could not compete with the widespread and sophisticated advertising machinery of businesses, as is often the case given limited NGO budgets. In other energy programmes Mercy Corps has found that supporting private sector actors to invest in their own face-to-face marketing has been far more effective, and the example of RTI suggests this should also have been more of a focus for SCOPE.

Up-front trust is important to stimulate market demand for energy products, as transactions are generally one-off or infrequent and require a significant investment.

The SCOPE team and the KOPTIs recognised the need to rapidly build trust in the clean equipment, and this led to an increased focus on model factories and peer-to-peer visits to demonstrate the new technology in action.

Market development programs in the energy sector are vulnerable to fluctuating energy prices, which creates uncertainty around technological choices.

The price of LPG increased by 29% in the course of the SCOPE program, creating a disincentive for tofu and tempeh MSEs to purchase clean technology. In the SCOPE program, dual-fuel technologies helped to mitigate this uncertainty; the manufacturer of steam boilers for tofu production responded to requests from MSEs and developed a design that could use firewood or LPG, so MSEs were able to switch between firewood and LPG depending on price and availability.

Market development programs in the energy sector often have to navigate the prominent involvement of government, which can have a positive or negative impact on the market system.

In SCOPE the impact was positive; the government distributed sets of equipment for free during SCOPE, but these were in distant provinces so did not undermine the nascent market, and were intended to demonstrate the new equipment and potentially seed new markets. However, without an explicit link to distribution channels, this did not result in sustainable access to clean products in these new districts.

CONTACT

WILLIAM BARON
Economic and Markets Advisor |
Technical Support Unit
wbaron@uk.mercycorps.org

SHANTI KLEIMAN
Energy and Environment Advisor |
Technical Support Unit
skleiman@mercyorgs.org

About Mercy Corps

Mercy Corps is a leading global organization powered by the belief that a better world is possible. In disaster, in hardship, in more than 40 countries around the world, we partner to put bold solutions into action — helping people triumph over adversity and build stronger communities from within. Now, and for the future.



45 SW Ankeny Street
Portland, Oregon 97204
888.842.0842
mercyorgs.org