switchasia
NETWORK FACILITY

ASIAN SMEs ADOPTING SUSTAINABLE CONSUMPTION AND PRODUCTION



Selected case studies from companies that participated in SWITCH-Asia projects

(2008 – 2015)

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Introduction

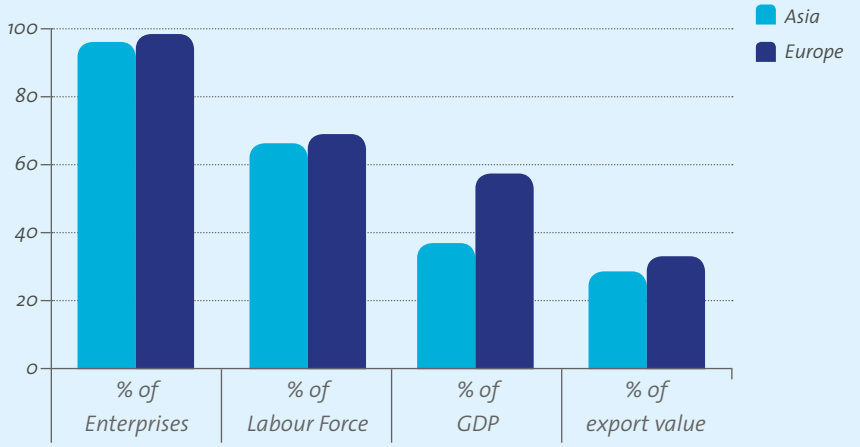
Small and Medium-Sized Enterprises (SMEs) are the main target group of the SWITCH-Asia Programme, funded by the European Union since 2007 with the objective of promoting sustainable production and sustainable consumption patterns and behaviours in Asia.

While the European definition goes by the number of employees, a universal definition of SMEs in Asia is lacking. However, despite different local definitions, SMEs are always characterised by a small workforce, working with older and labour intensive technologies, and comprising low assets with a limited turnover.

On average, SMEs account for 90% of the licensed companies in Asia. A main source of employment, domestic growth and export, SMEs represent the backbone of Asian economies and as such remain key for the economic resilience of the region. Therefore, supporting Asian SMEs towards their sustainable, resource-efficient and environment-friendly development contributes to sustainable and inclusive growth with positive repercussions for both Asian societies and the global community.

Similarly to Asia, in Europe SMEs represent 99% of all enterprises and they employ 66% of the whole workforce (see figure for more details).

Relevance of SMEs in Asia and Europe



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However in Asia, SMEs contribute only 38% of the national Gross Domestic Product (unlike 52% in Europe), which points to a low resource efficiency of Asian SMEs. To address this aspect, the SWITCH-Asia Programme supports SMEs in learning about, applying, replicating and scaling up sustainable consumption and production (SCP) practices, technologies and approaches.

To date, SWITCH-Asia has supported more than 80 grant projects that directly and via industry associations work with hundreds of SMEs in 16 developing countries in Asia, across a wide spectrum of sectors, ranging from textiles to food, from construction to transportation, and more. Via this avenue, SWITCH-Asia has reached out to and improved the SCP and social performance of thousands of Asian SMEs, enhancing their contribution to environmental preservation as well as to local economies and livelihoods.

This publication provides a sample of case studies from SMEs that participated in SWITCH-Asia projects. With the technical support and training received by these projects, they were able to implement changes and adopt new practices that have resulted in substantial improvements in resource and energy efficiency, as well as occupational health and safety.

The case studies featured in this publication have been selected from a series of proposals submitted by individual SWITCH-Asia projects, both ongoing and completed. The SWITCH-Asia Network Facility reviewed each case to assess the changes occurred, the impact generated and the potential for replication across industries and countries. The final selection of case studies was also based on the criteria of balanced distribution of experiences from different countries and industries in the region.

The SWITCH-Asia Programme supports SMEs in learning about, applying, replicating and scaling up sustainable consumption and production (SCP) practices, technologies and approaches.

SCP concepts can be applied successfully and substantial improvements realised also by SMEs working with very limited resources and within challenging regulatory and business environments.

The cases illustrated in this publication are not intended to be an exhaustive review of all impact generated by the SWITCH-Asia Programme towards Asian SMEs. They are intended as showcases of how SCP practice, approaches and tools are also "SME-friendly" and do not necessarily require costly investment or sophisticated technology. This collection demonstrates that the concept of SCP is not a complex approach affordable only by large companies with abundant resources in developed economies. SCP concepts can be applied successfully and substantial improvements realised also by SMEs working with very limited resources and within challenging regulatory and business environments. Implementing SCP concepts also supports these companies in optimising their resource utilisation and becoming even more resilient. At the same time, these cases demonstrate how simple and cost-effective measures can generate large benefits and substantial returns within a short payback period.

Furthermore, the cases illustrated in this publication are not exclusive; the experiences described and the solutions implemented can be adjusted and adopted easily in other industries and countries, in order to raise efficiency, as well as bettering environmental and social compliance and performance.

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NETWORK FACILITY

Selected case-studies of Asian SMEs adopting SCP

Bangladesh

GOLDEN HANDICRAFTS (BD) LIMITED

Established in 2013, Golden Handicraft BD Limited is located in the Rangpur district of Bangladesh. Its main focus is weaving, using both cotton and jute fibre. The key products are floor mats made from a combination of both jute fibre and cotton; other products include table mats, wall hangings (sika) and jute bags. Jute diversified products (JDPs) are sold are sold not only locally, but also exported to Malaysia, Australia and China, as well as to Europe and the wider world. With a staff of 104, Golden Handicraft has an annual turnover of BDT 600 000 (EUR 6 897). Under the SWITCH-Asia project, the SME acted as:

- **Trainer:** Golden Handicraft BD Limited provided training to the JDP workers on JDP production and technical skills development. By participating themselves in the training sessions, they also increased their own product diversity.
- **Buyer:** Golden Handicraft BD Limited buys JDP accessories and other JDPs produced by the JDP workers. The production order was placed directly with the JDP project workers after they had completed four months of training.
- **Order placement:** After project training, Golden Handicraft BD Limited also placed orders with 75 JDP workers for JDPs, e.g. floor mats, table mats, sika, in order to market the products via international fairs.

Having previously worked only at the district level, Golden Handicraft now addresses the requirements of national and international buyers.

Through participation in the SWITCH-Asia project, Golden Handicraft has:

- earned revenue from by providing training to the project's JDP workers;
- increased product diversity due to participation in the training sessions (SME training);
- expanded its work force, due to linkages with the project's JDP workers;
- increased its production capacity as well as turnover.

> *A product of vulnerable women.*
>
> *The slogan of Golden Handicrafts (BD) Limited*

SWITCH-ASIA PROJECT

Promoting Sustainable Consumption and Production of Jute Diversified Products

PROJECT LOCATION

Bangladesh

PROJECT TIMEFRAME

Mar. 2013 – Aug. 2016

PROJECT PARTNERS

- CARE, France
- Debi Chowdhurani Palli Unnayan Kendra (DCPUK), Bangladesh,
- Eco Social Development Organisation (ESDO), Bangladesh,
- Sheba Manab Kallyan Kendra (SMKK), Bangladesh
- UTTARAN , Bangladesh

PROJECT WEBSITE

www.carebangladesh.org

MAIN PROJECT ACTIVITIES:

- Training for 16 000 jute farmers regarding modern cultivation methods.
- Development of links, for these farmers, with agricultural dealers and jute millers.
- Identify and enable 60 local organic fertilizer producers and link them to jute farmers.
- Skills development training provided for 2 000 jute diversified product (JDP) workers and capacity building to qualify 200 master trainers.
- Identify 20 JDP SMEs and develop their capacity.
- Attending national/international trade fairs, fashion events, etc.
- Undertaking joint promotion campaigns, advocacy, policy development, and JDP export.

MAIN PROJECT ACHIEVEMENTS:

1. For the first time in 2015, 199 Jute farmers were able to produce 1 391 kg of jute seeds on their own, without using imported seeds.
2. During last two harvesting seasons, 15% of the project jute farmers practised line sowing, which resulted in an increased fibre yield of 17%.
3. In September 2014, farmers were able to sell 9 000 kg fibres directly to a jute mill, bypassing intermediaries, and earning BDT 12 390 (EUR 129) more than the local market price.
4. 1 500 community-based artisans received four months of practical training on JDPs. Their products were exhibited in an international fair, generating much interest, both nationally and itnernationally.
5. Farmers received 1 781 kg of jute seed and 141 jute ribboners from public agencies, such as the Bangladesh Jute Research Institute and Bangladesh Agriculture Development Corporation.

Over the years, Golden Handicrafts (BD) Ltd. has employed 150 women and men, most of whom were the only earning member of their family. It sold their goods to buyers, and from the income paid wages to the producers on a piecework basis. Through this project, the company employs 75 JDP workers and it is developing its infrastructure facility to engage another 500 JDP workers to produce JDPs. The organisation employs mostly widowed and divorced women, who work in order to survive and to provide financial support to their families. This employment also helps them to be empowered in their family and society.

Jute is perishable, releasing a high volume of oxygen and absorbing a high volume of CO_2, compared to other plants. The artisan products from jute replace goods made of polypropylene, thus saving the environment from pollution. The Switch-Asia SCP fund assists a large number of JDP workers, innovating new products and designs, exploring new markets and learning the export compliances for JDPs. This sort of cooperative assistance from the European Union is exemplary in the jute sector of Bangladesh. As an SME in this sector, Golden Handicrafts (BD) Ltd. was targeted to explore markets for JDP products mostly in Europe, then other parts of the world.

BEFORE SWITCH-ASIA

AFTER SWITCH-ASIA

BEFORE SWITCH-ASIA		AFTER SWITCH-ASIA
104 workers	1	**180 skilled workers**
Lack of skilled JDP workers	2	**400 JDP workers received skills development training**
Low JDP production capacity	3	**Due to skilled manpower, production capacity has already been increased**
Lack of linkage with national-level JDP SMEs	4	**Becoming a beneficiary of this project has linked the company with national market channels**
Lack of knowledge about international product standards	5	**After training from this SWITCH-Asia project, knowledge on international product standards is enhanced**
The company concentrated solely on the production house	6	**The company adopted a cluster-based approach for JDP production**

POTENTIAL FOR REPLICATION

Golden Handicraft is one of the promising SMEs at the regional level in the JDP sector and many local SMEs were inspired to follow its lead. SMEs from other sectors were also motivated to work in this sector, considering environmental and climate perspectives. The followers adopted the cottage industry approach in producing JDPs, which benefited remote rural female workers and increased their income. Green production processes are being replicated by the growing number of green-oriented SMEs, which is positive for the environment. In the JDP production process, Golden Handicraft does not use fuel or automated machinery, rather hand looms with the individual worker adding value to the JDPs, which have a consequent higher demand in the international market. Factory compliance, order collection, meeting buyer requirements, export compliance, product costing and cost minimisation are also followed by other SMEs.

Production House of Golden Handicrafts which was the only source of production before involving with SWITCH-Asia Project

Group approach by Golden Handicrafts after linkage with SWITCH-Asia Project

FOR MORE INFORMATION

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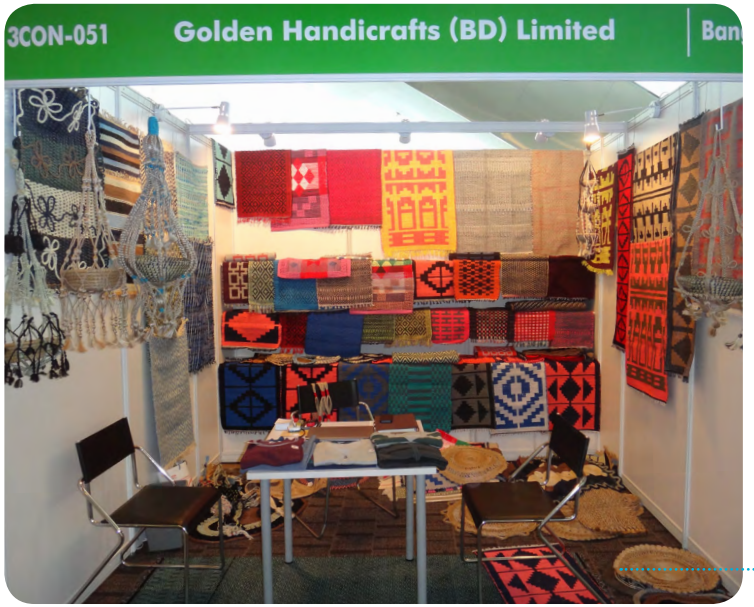


Golden Handicraft (BD) Ltd. exhibited JDPs made by this project's JDP workers, at the Hong Kong Housewear Fair, 20th – 23rd April 2015.

Golden Handicraft is a high potential SME in the JDP sector. It participates in different international fairs to attract orders for JDPs. Its entrepreneurship is effective in generating income for poor rural women employing them in JDP production.

The SWITCH-Asia project team

Bhutan

PELING RESORT

Peling Resort Surrounding

Peling Resort was established in 2012 and is located five kilometres from Phuentsholing town. Rated a three star establishment by the Tourism Council of Bhutan (TCB), it is considered one of the best hotels in the country. The hotel offers sixteen air-conditioned rooms, including two suites, furnished with all modern facilities and services. The hotel has a multi-cuisine restaurant with Indian, Chinese, continental and Bhutanese dishes, with a bar attached.

The hotel also offers a conference hall, lounge bar, business centre, car hire, discotheque (three nights a week) and package tour on demand, as well as organising birthday parties.

Before engaging with the SEID project, the hotel was already conscious about SCP regarding resource and energy efficiency, for example, it was illuminated by energy efficient compact fluorescent lights (CFL).

The recommendations provided during the initial assessment phase were appreciated, and the low cost recommendations such as regular cleaning of stove burners, shifting the refrigerator few inches away from the wall, regular cleaning of AC filters, setting the AC temperature (at 24°C) and refrigerator (-18°C for freezer and 2°C for refrigerator), covering food items before storing in the refrigerator, turning off the lights when not required, proper segregation of organic waste from non-organic waste and cascade

SWITCH-ASIA PROJECT

Sustainable and Efficient Industrial Development in Bhutan and Nepal (SEID)

PROJECT LOCATION

Bhutan and Nepal

PROJECT TIMEFRAME

Feb. 2012 – Nov. 2015

PROJECT PARTNERS

- Centre for Appropriate Technology (GrAT), Austria
- Asia Society for Social Improvement and Sustainable Transformation (ASSIST), Philippines
- Federation of Nepalese Chambers of Commerce and Industry (FNCCI), Nepal
- Bhutan Chamber of Commerce and Industry (BCCI), Bhutan
- Austria Recycling (AREC), Austria
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), India
- STENUM Asia, India

PROJECT WEBSITE

http://switch-seid.org

MAIN PROJECT ACTIVITIES:

- Micro, Small and Medium-Sized Enterprises (MSME) Consulting: Direct practical support for 200+ MSMEs in the target regions: Thimphu, Paro, and Phuentsholing in Bhutan, and Kathmandu valley, and Pokhara, Jhapa, and Chitwan in Nepal through on-site audits, technical assessments, proposition of improvement measures, support in implementation appropriate technology solutions, monitoring of environmental and economic performances, etc.
- Capacity building: Through a series of training programmes and fieldwork, young local engineers and consultants gain knowledge and skills across a wide range of SCP topics, such as resource efficiency, cleaner production, renewable energy, building energy performance, and water & waste management.
- Technology showcases: The project identifies local needs in resource and energy supply to develop and optimise appropriate technology solutions. The case studies are then showcased to ensure replication.
- Empowering Academia: SEID encourages interaction and cooperation between industry and academia (especially environmental science, engineering, and management faculties) for integration of practical SCP solutions, both in the curriculum and in business.
- Enabling institutional environment: SEID studies existing policies on tourism, renewable energy, waste management, and environment conservation, and supports governmental/sectoral agencies for the implementation and refinement of the institutional mechanisms (e.g., subsidy programmes, guidelines).

MAIN PROJECT ACHIEVEMENTS:

1. 200+ MSMEs from Nepal and Bhutan are being supported in resource and energy efficiency;
2. 40+ local engineers and graduates have been trained to work as Local Consultants;
3. Green Clubs have been formed in eight schools to practise environmental conservation campaigns;
4. With the help of available prototypes and through diverse awareness campaign materials, environmental consciousness in the industries, hotels and academia has been increased.

BEFORE SWITCH-ASIA

Dishes were washed in running water.

The refrigerators were kept very close to the wall.

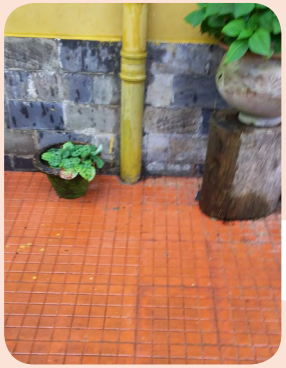
The temperature setting of the re-frigerator was either too low or too high.

Uncovered foodstuffs inside the refrigerator (hygiene concern).

The stove burners were not cleaned regularly due to which incomplete combustion was observed.

The cardboard boxes were either thrown out or were taken by staff.

The AC temperature setting was too low (18 degrees Celsius).



The AC filters were not cleaned regularly, leaving room for germs and bacteria to incubate.

CFL light bulbs were used.

The water flowing through gutter was not utilised.

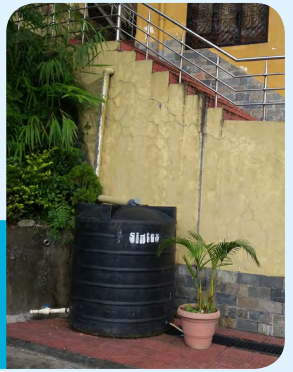
AFTER SWITCH-ASIA

1. **Dishes are pre-soaked with the final rinsed water before applying soap.**
2. **Refrigerator is kept 3 inches away from the wall to cool the compressor and to increase efficiency.**

3. **The refrigerator is set at the correct temperature.**
4. **The foodstuffs are properly covered.**
5. **The burners are now regularly cleaned.**

6. **The hotel sells the cardboard boxes in bulk, gaining an economic benefit.**
7. **The ACs are set at the right temperature (24 degrees Celsius).**

8. **The AC filters are regularly cleaned.**
9. **Replacement of CFL light bulbs with LED bulbs.**
10. **A water tank was installed to collect rain water. The collected water is use for toilet, gardening and car washing purposes.**



Peling Resort has been inspired by sustainable consumption and production approaches and implemented most of the recommendations from the SEID project to improve energy and resource efficiency and reduce waste. As one of the solutions to overcome the acute water shortage in Phuentsholing, the hotel also started utilising rainwater.

Rinzin Gyem, Peling Resort Proprietor

use of water for dishwashing) were implemented instantly.

Peling Resort is the first SEID member company in Bhutan to implement rainwater harvesting. This recommendation has helped them to manage water demand when there is a lack of water within the municipality. The water stored in the 3 000 litre tank is used for toilets, gardening and cleaning purposes. Approximately 315 cbm of water can be saved annually, while increasing the service quality for guests.

After working with the project, the hotel is more focussed on energy, water and resource consumption. With their project-supplied 'monitoring chart', the company monitors daily figures for overnight stays, walk-in guests, organic waste generated, and electricity, water and liquefied petroleum gas (LPG) consumption. This monitoring chart reflects the changes in the resource and energy consumption over time and verifies the effect of the project's support.

Peling Resort has shown great interest in being recognised as an exemplary hotel, due to its low resource and energy consumption. Most of the project recommendations were implemented quickly, as the calculation of the payback period for investment in green technologies and good housekeeping practices convinced the management.

With the implementation of resource and energy efficient measures, energy, water and LPG consumption have reduced by 33%, 18.9% and 16.9% respectively in comparison to previous years. The hotel also started to gain income from selling the solid waste.

POTENTIAL FOR REPLICATION

The resource and energy efficiency solutions implemented by Peling Resort are mostly simple, thus can easily be replicated by other SMEs. The savings are evident in reduced monthly bills, which should inspire and encourage other SMEs.

Peling Resort Surrounding

Throughout the SEID MSME support programme, similar measures have been recommended to over 50 other hotels and resorts in Bhutan. Implementation depends on the individual MSMEs and their financial status/ plan. The exemplary techniques that help improve energy and resource efficiency and minimisation of waste, with the same/low input costs, are promoted by Local Consultant groups and through awareness campaign materials.

FOR MORE INFORMATION

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The success of this company can be set as an example to all other SMEs in the country. The company has shown that the technically feasible options can be incorporated easily and the cost saving is guaranteed. The company owner and the staff understand that the implementations are not only for their economic benefit, but also to help reduce pollution and protect the environment.

Rozal Adhikari, Local Consultant for Peling Resort

Bhutan

DRUK MEH-WANG FABRIC AND PAPER UNIT

The GPP Bhutan project aims to implement GPP practices in Bhutan, enabling the procurement cycle to be used as a driver for green growth. One of its specific goals is to provide an incentive for sustainable production among suppliers, particularly SMEs. When the private sector can depend on long-term and scaled up demand for sustainable goods and services from the public sector, this provides them with the certainty they require to take risks and improve their production practice.

In this particular case, the success story is one of a new company forming in Bhutan at the same time as the project was beginning, thus building confidence in the growing market for "green". Since early 2015, Druk Meh-Wang Fabric Unit, Bhutan has been providing biodegradable packaging materials to the domestic market – the first company of its kind in the country. It quickly became a key supply-side project stakeholder, presenting its products (type and the benefits) to the project team. The company leveraged the visibility of the GPP Bhutan project to disseminate information on their business, and link it to the government ministry needs during meetings and consultations. Personnel will also participate in the upcoming training courses being provided through GPP Bhutan.

The Royal Government of Bhutan unsuccessfully attempted to ban plastic bags in June 1999. The initiative was further reintroduced in 2005 and again in 2009, but failed due to the lack of substitutes on the market. Now with the eco-friendly fabric bags, part of Druk Meh-Wang Fabric Unit's business plan is to work closely with the government to ban plastic bags and propose an alternative. Furthermore, the government itself could become a client as they require packaging materials for gifts and conferences,

SWITCH-ASIA PROJECT

Green public procurement in Bhutan: A cross-sectoral strategy for sustainable industrial competitiveness ("GPP Bhutan")

PROJECT LOCATION

Bhutan

PROJECT TIMEFRAME

Jan. 2014 – Jul. 2017

PROJECT PARTNERS

- International Institute for Sustainable Development (IISD), Canada
- Bhutan Chamber of Commerce & Industry (BCCI), Bhutan
- Collaborating Centre on Sustainable Consumption and Production (CSCP), Germany
- Royal Institute of Management (RIM), Bhutan
- Royal Society for Protection of Nature (RSPN), Bhutan

PROJECT WEBSITE

www.gppbhutan.bt

MAIN PROJECT ACTIVITIES:

- Develop policy and practice recommendations for the Royal Government of Bhutan as well as for Bhutanese suppliers of goods, services and works on implementing Green Public Procurement (GPP).
- Develop dedicated GPP guidance materials for public procurers and suppliers.
- Design preferential procurement programmes for Cottage, Small and Medium Industries (CSMIs), in effect improving access for CSMIs to be able tender for large government contracts through Framework Agreements.
- Design and facilitate GPP training sessions for public procurers and suppliers.
- Mentor real time GPP pilot tenders in selected industrial sectors.
- Establish a GPP knowledge platform and curricula. To ensure the continuity of GPP in Bhutan beyond the life of the project, the knowledge platform will be an online hub for GPP witten materials, training activities and all relevant project outcomes and lessons learned.

MAIN PROJECT ACHIEVEMENTS:

1. The project team has completed a thorough review of the regulatory landscape governing public procurement in Bhutan and identified the legal and policy space to pursue GPP.
2. An in-depth analysis of all aspects of the procurement cycle – needs identification, prequalification, technical specifications, evalaution of bids and awards, and contract monitoring – has informed the next steps.
3. Dedicated guidance materials on GPP for procurers and suppliers have been developed.
4. A preferential procurement programme for SMEs is underway.
5. Training of both stakeholder groups is planned for the end of 2015 and the beginning of 2016.

M/s. Druk Meh-Wang Fabric and Paper Unit is the leading supplier of biodegradable packaging materials in the country. Established in 2014 and operational since early 2015, this company's mission to "go green" is bolstered the SWITCH Asia project "GPP Bhutan", which seeks to augment government-led demand for sustainably produced goods, services and infrastructure.

Mr. Kinley P Dorji
Proprietor, Druk Meh-Wang Fabric and Paper Unit

BEFORE SWITCH-ASIA

Limited knowledge of the future market demand for green products within Bhutan.

Limited knowledge on how to respond to green public procurement tenders.

AFTER SWITCH-ASIA

1. **Establishment of a new SME producing sustainable goods in Bhutan – namely biodegradable bags and packaging materials – with the certainty of future demand for green goods by the public sector.**

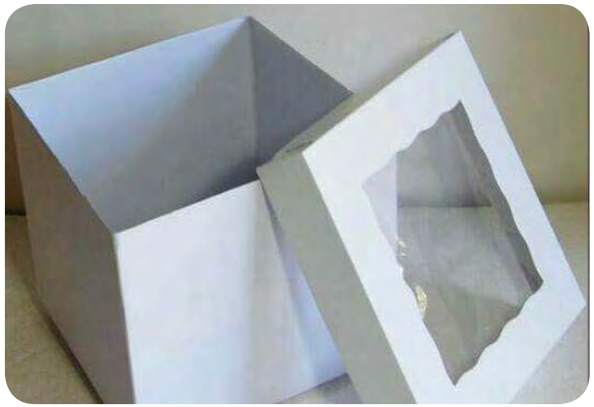
2. **Enhanced capacity in responding to green public procurement tenders, and for collaborating with other SMEs in framework agreements with the government.**

as well as for some procured services in the catering and cleaning sectors.

To date, almost all packing bags are imported from neighbouring countries, consisting mostly of non-biodegradable plastic materials. Druk Meh-Wang Fabric and Paper Unit seeks to contribute to the conservation and management of the rich biodiversity of Bhutan by sustainable solid waste management. With a business sales annual turnover per year of EUR 50 564.48, the company manufactures eco-friendly carry bags and take-away paper meal boxes with high quality non-woven fabrics and first grade paper sheets, of a high quality and 100% non-hazardous. The products are soluble in the soil and disintegrate in the water or river; as such, they are extremely environmentally friendly.

In addition, the company offers employment, particularly to young people. The company employs seven highly motivated men and women, and all employees, irrespective of gender, are given equal opportunity for employment and upward mobility.

All machinery and technology used in the manufacturing of these bags and containers is new to Bhutan. The unit therefore provides train-the-trainer programmes, with help from Ministry of Labour & Human Resources. In this way, the unit is further developing the skills of Bhutanese youth, and has plans to scale up these efforts.



Druk Meh-Wang Fabric Unit is the sole maker and distributer of biodegradable bags and containers in Bhutan. Currently their main clients are private shopkeepers, and their highest production per month initially is approximately 6000 kg or 320 000 bags. There is hope, though, that through public commitment to implementing GPP, the government will also become a principal client, and that the nationwide ban on plastic bags will be reinstated.

FOR MORE INFORMATION

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> ***When the private sector can depend on long-term and scaled up demand for sustainable goods and services from the public sector, this provides them with the certainty they require to take risks and improve their production practice. This in turn fosters the growth of a dynamic private sector that catalyses the transition to a green economy.***
>
> *The SWITCH-Asia project*

India

THE JAIPUR INTEGRATED TEXCRAFT PARK PRIVATE LIMITED (JAIPUR BLOC)

Bird eye view of the park

The Jaipur Integrated Texcraft Park Private Limited (Jaipur Bloc) is a cluster of SMEs who came together to support the sustainable production of handcrafted textiles in Rajasthan India. The members include small and medium-sized enterprises (SMEs) that create handcrafted textile products for the Indian domestic market as well as for global trade.

The plan for the park began in 1997, when a group of Hand block textiles SMEs from Jaipur formed Consortium of Textiles Exporters (COTEX) to work towards the betterment of hand block printing and dyeing in an age-old craft cluster called Sanganer near Jaipur. The group felt the need to coordinate the traditional craft Information and take it the level where all possible social and environmental norms were followed. In 2006 JITPPL was formed and applied for funds under the 'Special Integrated Textile Parks (SITP) scheme under the Ministry of Textiles, Government of India (GoI).

Construction began in 2008 and was completed in 2013. At present 12 members out of 20 have moved in the park and started full production under the brand name 'Jaipur Bloc' (www.jaipurbloc.com). The final 8 members will move by the end of 2015. The park has 40 full time staff working for the maintenance of the CETP, general administration and housekeeping.

At this time, the SUSTEX project was also being designed and COTEX worked with Traidcraft to develop the project that would enable the SMEs to receive part-financing

SWITCH-ASIA PROJECT

Sustainable Textiles for Sustainable Development

PROJECT LOCATION

India

PROJECT TIMEFRAME

Jan. 2009 – Dec. 2014

PROJECT PARTNERS

- Traidcraft Exchange, UK
- All India Artisans and Craftworkers Welfare Association, India
- Consortium of Textile Exporters (COTEX)

PROJECT WEBSITE

www.aiacaonline.com

MAIN PROJECT ACTIVITIES:

- Establishment of central and secondary effluent treatment plants and water conservation units.
- Awareness about technology for occupational health and safety (OHS), including application of safety gears, proper handling of chemicals, and taking into account the optimised agronomy for specified crops.
- Business services for production of eco-friendly products; these include skills upgrade, new product development, quality assurance, business skills and marketing support.
- Domestic and international market research and access to markets for products, such as garments, and home textiles, such as quilt bedcovers, cushion covers, curtains, etc.
- Consumer awareness about eco-friendly products, particularly use of eco-friendly and natural dyes and the use of organic cotton.
- Policy advocacy on key issues, such as importance of policies on occupational health and safety, and effluent treatment.

MAIN PROJECT ACHIEVEMENTS:

1. The Project put the spotlight on the importance of environmental and OHS measures in the textiles sector, which now form part of the government's policy through its inclusion in the 12th Five Year Plan. As part of this process, a policy briefing paper was submitted to the Planning Commission and a representative of AIACA was invited to sit on the expert committee, which met several times to determine the policies that would go into the Plan.
2. A combined effluent treatment plant (CETP) treating waste water and recycling 500 000 litres water per day was set up with support from SMEs in a texcraft park in Bagru, Rajasthan. The Park produces sustainable products (products that are produced without excess water, good health & safety practices, and good working conditions) and is committed to labour friendly policies (*www.jaipurbloc.com*).
3. Three secondary effluent treatment plants (SETPs), set up in three small artisanal clusters, provide a useful demonstration of replicable, relatively low cost technology. SETPs help to save EUR 191/day against the purchase of water; 80% of the water used is recycled.
4. Gender-friendly employment in the sector has been promoted through provision of skills to over 800 female artisans in Rajasthan. Following the project training sessions, the number of women employed by project SMEs is 13% greater with a plan to increase this to 38% by the end of 2015.

5. A toolkit on sustainable textile production was disseminated to over 3 000 micro, small and medium-sized enterprises (MSMEs). The toolkit includes technical know-how, expressed in layman's terms, on sustainable treatment of waste from textile units, including steps in how to install ETPs. Recommendations for adopting Occupational Health and Safety (OHS) norms were also included.
6. Research on low cost technologies was documented and then disseminated to artisans in 16 textile clusters across the country, covering some 6000 artisans. It focused on the impact of weaving and printing processes on the environment and their mitigation, and serves as an essential reference guide for policy makers, academics, health specialists, labour organisations, government agencies and the affected artisans themselves.

"This project gives hope to Hand Block textile producers creating awareness about the impact of textile effluents on health and environment, showcasing different ways of saving natural resources while keeping the traditional craft of the region alive.

Vikram Joshi, Managing Director
Jaipur Integrated Texcraft Park Private Limited

BEFORE SWITCH-ASIA

AFTER SWITCH-ASIA

7% of the SME park employees were women.	1	**13% of employees are women employed since the start of the project, and this will rise to 38% by end of 2015, with one SME starting operations with only female workers.**
Each SME was using vast quantities of water (dyeing and printing requires much water), and water was not re-cycled.	2	**With the CETP in place, 90% of water is now being recycled, and every unit now has a water harvesting facility; the park also has a huge water harvesting facility.**
Water disposal was not monitored and it was contaminating the ground water.	3	**A zero liquid discharge approach is now in place, which ensures that not a single litre of water goes back to the water table.**
Poor planning of work spaces; OHS was not followed.	4	**Well-ventilated and naturally lit workspaces are provided for workers. Improved technology and better working conditions are ensured through the use of steam-heated dyeing and processing equipment, rather than using firewood.**
Little effort to tap natural resources.	5	**Focused planning to collect rainwater, solar energy (55 KVA solar power back up), and recycling of waste water even from sewage.**

Common Effluent Treatment Plant (CETP)

to construct a CETP and water harvesting facilities. The park received about 50% of the cost of the CETP and water harvesting facilities from the SUSTEX project. The rest was funded by the Government of India's SITP scheme, and the members themselves. Through support from the project the park members now recycle an average of 500,000 litres of water per day. Although the park still spends USD 4 per 1,000 litres, compared to USD 1.6 per 1,000 litres (if the water was purchased from an outside source), the members strongly believe that this expenditure is worthwhile as the Park is creating less stress on the environment. Besides the contribution to protecting the environment, the project has also had an immense benefit to the health and wellbeing of the artisans and workers in the park through better working conditions, and also to the villages around the park with the reduced contamination of groundwater resources and employment opportunities particularly for women.

In order to build its capacity the Park was supported with domestic and international market research to develop new products including an international designer who worked with local designers to develop a new range of products. These products were showcased at the Maison et Objet Fair in Paris, and drew a lot of interest from buyers. The SME members also received support in terms of training on occupational health and safety, training of craftworkers in a range of skills for the textile sector, and other opportunities to share learning and experience.

Printing in progress Prahlad

JITPPL products

Traditional crafts in India, especially hand-block printing are facing a major threat because of excessive use and abuse of water. These centres are gradually shutting down or are on the verge of shutting down. This project therefore is a hope for other textile clusters that are looking for sustainable practices. With resources from the European Union, national governments and financial institutions, such projects can easily be replicated not only in India but also worldwide. Countries such as Indonesia, Thailand and Malaysia which have a strong tradition of handcrafted textiles like batik printing tie and dye clusters will benefit from the experience of the park and the technologies showcased.

FOR MORE INFORMATION

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> ***The park is a perfect example of planet, people and profit, blending together to make the world a better place, working on environmental and health concerns, revitalizing of traditional crafts and making them commercially viable. The project therefore creates a reference point for other clusters to combat challenges faced.***
>
> *Vikram Joshi, Managing Director*
> *Jaipur Integrated Texcraft Park Private Limited*

Indonesia

TRANGSAN MANUNGGAL JAYA COOPERATIVE

Trangsan Manunggal Jaya (TMJ) is a cooperative developing the rattan business. The members are rattan companies from the Sukoharjo area in Central Java. Their main concern is to ensure a regular and adequate supply of sustainable raw rattan materials for their rattan-producer members, as previously producers could not obtain rattan raw material at certain times as no providers could ensure regular supply. Therefore, the cooperative acts as a provider to ensure a sustainable supply for its members. The sustainable supply of rattan is an important issue for the industry as they cannot produce rattan products when there is no rattan available.

The member companies sell their products in domestic markets, such as Bali and Java; some also export to other (mostly European) countries. The cooperative was established in 2007 with 25 members (rattan companies) and the annual turnover is IDR 2.5 billion (around EUR 169 500).

There were evident synergies between the cooperative and the project: the former had a sound industrial reputation, and the project assisted with training activities on green design and cleaner production, capacity building for rattan producers and development of alternative rattan products. The assistance provided by PROSPECT improved the company's capacity so much so that it

Rattan Collecting

SWITCH-ASIA PROJECT

Promoting Eco-friendly Rattan Products (PROSPECT)

PROJECT LOCATION

Indonesia

PROJECT TIMEFRAME

Jan. 2013 – Jan. 2017

PROJECT PARTNERS

- The Association for Advancement of Small Business (PUPUK), Indonesia
- Innovationzentrum Lichtenfels (IZL), Germany
- SNV Netherlands Development Organisation, The Netherlands

PROJECT WEBSITE

www.prospectindonesia.org

MAIN PROJECT ACTIVITIES:

- Raising awareness of using eco-friendly rattan products
- Promoting and branding of eco-friendly rattan products from Indonesia

MAIN PROJECT ACHIEVEMENTS:

1. Capacity building and training provided to 750 rattan farmers on eco-friendy and sustainable cultivation in upstream areas.
2. Established three demonstration sites for rattan seedlings, in order to have sustainable rattan trees in Central Sulawesi, Central Kalimantan and Aceh.
3. Trained 600 producers on how to trasform their methods of production to the practice of cleaner production.
4. Participated in exhibitions to promote and brand eco-friendly rattan from Indonesia.

was recognised as a "strong and trusted" organisation by other institutions: for instance, it received a grant from the Central Bank of Indonesia for IDR 150 000 000 (EUR 10 350) to buy raw materials in order to have sufficient supply at all times.

Many effective methods were taught in the training courses on how to optimise resource efficiency (raw materials, energy, and recycling) and to practice cleaner production. As an example, the FIFO (first in first out) system for using rattan material in storage reduces the proportion of damaged and rotten rattan, occurring through disorganisation. Another is transforming rattan waste into briquettes to be used as energy, to replace LPG or gasoline, to steam the rattan.

The project also encouraged innovation in rattan products through provision of training on green design, assisted by designers from IZL Germany, and complemented by

> *"The company has more support from other stakeholders, for example from the local government, designers, and universities, which helps to develop the rattan industry. There is strong bonding between the stakeholders as PROSPECT knits them into a formal institution – the eco-friendly rattan collaboration forum.*
>
> *Mr. Suryanto, owner of CV. Surya Rattan (a member of the Cooperative which is actively involved in the PROSPECT Project)*

BEFORE SWITCH-ASIA		**AFTER** SWITCH-ASIA
Not all members were actively involved in TMJ, as there were few activities.	1	**Most members are now actively involved, since there are regular meetings and training courses being organised by the project, TMJ, the local government, university and business association.**
No other stakeholders involved, only rattan companies/producers.	2	**The project has convinced other stakeholders to become involved to support TMJ, and now there are representatives from the government, bank, university, and designers.**
TMJ was recognised as a cooperative in the rattan industry.	3	**TMJ is recognised as cooperative in the rattan industry, with strong support from many stakeholders. For example, the regional university supports them with free design input, and the local government supports them with technical skills, as well as promoting their products in an exhibition with all costs covered. Additional support came from bank via a soft loan.**
TMJ was not aware of eco-friendly rattan products.	4	**TMJ is aware of and committed to producing eco-friendly rattan products.**
TMJ had no means to influence local government policy regarding rattan industry development.	5	**TMJ has influence over the local government policy and are now always consulted regarding the development of the market for the rattan industry in Central Java.**

Rattan weaveing

research on alternative rattan products. Demand for rattan products is expected to rise, helped by the increasing reputation of the products resulting from "cleaner production". In order to become an eco-friendly product, the project provides support to the producers through cleaner production training, eco-friendly harvesting for rattan farmers, as well as publishing research on eco-friendly rattan cultivation. The project is also supporting research implemented by two German experts to develop a standard eco label for rattan products.

The definition of eco-friendly rattan products was developed during the summer of 2015, and is due to cover all production aspects (material, labour, health and safety, etc.). Rattan products are currently considered to be eco-friendly when produced from raw rattan material which is harvested in sustainable way not harming the forest, produced using clean production practice, the products do not use harmful material such as toxic colouring rather water-based colour, and the rattan factory does not employ child labour, etc.

TMJ is looking into alternative and eco-friendly rattan products, expanding from solely furniture – a first for the area. R&D has resulted in suggestions for rattan wall decor, rattan toys and other rattan interior design products, with showcase prototypes planned for late 2015.

Providing waste bin in workshop of SME

The project also facilitated the development of suitable green financing systems for the rattan industry. As a result, at the end of 2014, TMJ received financial support from Bank Indonesia as a soft loan to support their rattan material buffer stock storage. The soft loan scheme uses a "green system", which is fairer and easier to access for the rattan producers. This financial support has made a great impact on TNJ's raw rattan business development, maintaining a sustainable rattan supply for its members. The project established the collaborative forum, which has resulted in strong bonds between members; as the government is also a member, stakeholders in the forum give input to policy development.

TMJ's improvement of institutional management, capacity building of members, and establishment of linkages with institutions (academia, local government, banks and associations) are best practice and processes that have not yet been implemented by other industries. Their approach could be replicated by other sectors, especially the collaborative forum, from which so much strength was derived.

ToT cleaner production

ToT cleaner production

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Good teamwork, with strong bonds to each other, creates a positive image of an institution, resulting in recognition, trust, and many benefits.

Vision of Trangsan Manunggal Jaya Cooperative

Malaysia

BAN SOONG HENG SDN BHD (BSH)

Ban Soong Heng Sdn. Bhd. (BSH) is a family business, established in the 1960s, manufacturing clay products. In 1998, it extended its product line to clay pipes; the company now develops, manufactures and sells vitrified clay pipes used in sewerage and drainage. The pipes are produced according to Malaysian Standards (MS 1061:1999) and have been approved by the National Water Services Commission (SPAN) to be installed in sewerage systems nationwide. Located in Chemor, Perak, Malaysia, the Company employs some 25 people and sells its products across Malaysia, generating an annual turnover of EUR 630 000. In 2014, the company received an invitation from SIRIM Berhad – Environmental Technology Research Centre (ETRC) – to participate in the Carbon Footprint Pilot Programme (March – Dec 2014). With help from the technical team, BSH representatives collated the carbon calculator, product data sheet, and CFP study report, together with amassing relevant skills.

> *"The Product Category Rules (PCR) on sewerage pipes has been established by SIRIM, which now sets the standard or guideline for carbon footprinting of sewerage pipes for Malaysian manufacturers. The company is the first manufacturer in Malaysia to have carbon footprinted their product following this PCR, which will encourage other manufacturers to establish inventory systems meeting these criteria. Other manufacturers of different pipe materials will also have a set of guidelines to follow if they wish to have their products carbon footprinted.*
>
> *Mr. Elweennz Tan Siong Heng, Ban Soong Heng Sdn. Bhd.*

SWITCH-ASIA PROJECT

Environmental Declaration Scheme for Construction and Building Materials

PROJECT LOCATION

Malaysia

PROJECT TIMEFRAME

Dec. 2012 – Dec. 2015

PROJECT PARTNERS

- SIRIM Berhad, Malaysia
- Carbon Trust (CT), UK and China
- Federation of Malaysian Manufacturers (FMM), Malaysia
- Malaysia Green Building Confederation (MGBC), Malaysia
- Building Materials Distributors Association of Malaysia (BMDAM), Malaysia

PROJECT WEBSITE

http://lcamalaysia.sirim.my

MAIN PROJECT ACTIVITIES:

- Development of environmental declaration scheme, Product Carbon Footprinting (PCF) and labelling scheme for building materials.
- Piloting the scheme with selected companies in eleven product categories.
- Promotion of the scheme to defined target markets.
- Prioritisation of the product categories in the construction and building materials sector.
- Development of a mechanism for long-term sustainability and economic performance of Malaysian SMEs who supply materials within the construction and building sectors.

MAIN PROJECT ACHIEVEMENTS:

1. The CFP labelling and certification scheme was launched by the Malaysian Deputy Minister of Science in 2014.
2. Ten companies have already received their carbon footprint (CFP) licence under this scheme, which only launched in 2014.
3. Development of first set of thirteen Product Category Rules (PCR). This CFP labelling and certification scheme is the first such scheme to be launched in Malaysia.
4. Development of web-based carbon calculator toolkit (known as SIRIM Karbon Kalkulator).
5. Training of thirty-five consultants and verifiers for the CFP labelling and certification scheme.
6. Establishment of an indigenous network for SIRIM, partners and pilot companies through the engagement and training sessions.

BEFORE SWITCH-ASIA

- Limited environmental awareness among employees.
- Lack of guidance on cost savings during the manufacturing process.
- Limited awareness about environmental impacts of manufacturing processes.
- No waste management.

The ordinary fuel oil/ diesel burning system.

AFTER SWITCH-ASIA

1. **More environmental and climate change related awareness among employees (e.g. employees have learnt to keep the working area clean, now know to switch off the lights when not using them and know which materials can be recycled back to production).**
2. **More knowledge about cost saving options during the manufacturing process. Electricity usage is down by about 6% per month and fuel consumption by around MYR 6000 per month.**
3. **Awareness about environmental impacts is present.**
4. **Recycled and reduced waste: the rejection rate is 12% of production – approx. 10% of this is recycled back to production, 2-3% remains for other usage.**
5. **Increased brand awareness and acceptance in the market through attending seminars and by having the Carbon Footprint licence, which allows BSH to explain to their clients their efforts for the environment in their manufacturing processes.**

The renewable green energy burning system (fueled by pulverized palm kernel shell powder) to replace the fuel oil/ diesel burning system.

After SWITCH-Asia: Heat from the kiln is being collected and recycled into the dryer through steel piping system with an exhaust fan. The dryer is used for drying up the pipes until less than 5% moisture content.

After their involvement with the project, BSH is more aware of their responsibility towards the environment, as well as seeing an increase in their profit. The calculation of carbon emissions for each manufacturing process gives BSH guidance in controlling energy consumption, reducing wastage and recycling the generated heat. They harness the heat from the kiln, generated during firing, through an exhaust pipeline, which is then used for drying pipes in the drying chamber, i.e., they recycle the heat and reduce energy consumption. Compared to the old burners, which used diesel and heavy fuel oil, a biomass burning system is now installed, which reduces fuel consumption through more efficient burners. BSH believes that renewable green energy, in use at their factory, is best for sustainable growth compared to conventional fuels, as well as being 20% cheaper. The biomass fuels emit zero SOx, NOx, and CO.

> ***The commitment of this SME in the Carbon Footprint Certification and labelling will help the entire industry to grow without sacrificing the environment. Industry players will improve sustainability, innovate their products and processes in order to stay competitiveness.***
>
> *Ban Soong Heng Sdn.Bhd.*

BSH will continue to invest in and upgrade their burning systems (firing kilns) to exploit this green energy fully. Green energy from pulverised palm kernel shells, which are normally dumped, help to reduce stockpiles of the shells at palm oil mills, further reducing environmental problems.

BSH's successful carbon footprint labelling will help other manufacturers of sewerage pipes of different materials, e.g., plastic pipes (HDPE, PE), concrete pipes, ductile iron pipes, etc. to have guidance in labelling their product. Every step and procedures is clearly stated in the PDS or PCR; the manufacturers can easily replicate and compare their carbon footprint value. Overseas manufacturers may need to comply with this PCR on entering the local market, resulting in a more competitive environment towards green products.

FOR MORE INFORMATION

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Mongolia

TAVAN BOGD INSULATION LLC

Established in 2014, Tavan Bogd Insulation LLC manufactures insulation materials with sheep wool in Ulaanbaatar. Now employing seventeen people, the company currently targets the national construction market, with plans to expand in the future. The annual turnover is MNT 368 700 000 (approx. EUR 170 000).

Tavan Bogd Insulation LLC recognised the potential of sheep wool insulation and, in January 2014, made an initial large investment (EUR 1 800 000) in a state-of-the-art European-made production line. However, the company realised they lacked technical knowledge to set up and fine-tune production, so approached the SWITCH-Asia project

Tavan Bogd factory

SWITCH-ASIA PROJECT

Turning Sheep Wool into an Environmentally Friendly Building Material: Integrated approach for supply chain development

PROJECT LOCATION

Mongolia

PROJECT TIMEFRAME

Jan. 2013 – May 2016

PROJECT PARTNERS

- People in Need, Czech Republic
- National Association of Mongolian Agricultural Cooperatives (NAMAC), Mongolia
- Mongolian Nature and Environment Consortium (MNEC), Mongolia
- SEVEn – Energy Efficiency Center, Czech Republic

PROJECT WEBSITE

www.pin-mongolia.org

MAIN PROJECT ACTIVITIES:

- Increase know-how about and the means to produce and market sheep wool building insulation (SWBI) within producing SMEs.
- Set up purchasing mechanisms for sheep's wool from shepherds.
- Increase awareness of architects, and engineering and construction SMEs on the advantages of SWBI and its applications.
- Increase consumers (individual/private/public) awareness of SWBI.
- Facilitate incorporation of SWBI into policy instruments (national standards, training modules for TVET and universities, awareness raising of policy makers).

MAIN PROJECT ACHIEVEMENTS:

1. Interdisciplinary market survey on sheep wool building insulation in the cities of Darkhan, Erdenet and Ulaanbaatar.
2. National standard "MNS 6470:2014 Sheep's wool based insulation product for building -Technical requirements" developed by the project in collaboration with the Research and Development Institute for Light Industry (RDILI) and Erdenet Carpet llc, approved by the National Council for Standardisation of MASM on 2 October 2014.
3. In 2014, the sheep's wool based insulation product manufacturers were able to produce 26 870 m2 of wool-based insulation products, enough to insulate 89 single-family homes (based on the estimated average of 300 m2 of SWBI per house).

BEFORE SWITCH-ASIA

Tavan Bogd Insulation LLC produced sheep wool building insulation only with thickness of 4 and 8 cm.

Without technical knowledge, Tavan Bogd Insulation LLC purchased scoured wool that could not meet stringent requirements. Therefore, the final product, sheep wool building insulation, was of a low quality.

Tavan Bogd Insulation LLC treated the sheep's wool building insulation with Thorlan IW to increase its resistance to pests and moths.

AFTER SWITCH-ASIA

1. **Making equipment adjustments, the Tavan Bogd Insulation LLC was able to produce building insulation with thicknesses of 3, 4, 5, 8 and 10 cm. These varied products meet insulation requirements for all elements of construction.**
2. **With improved technical knowledge, Tavan Bogd Insulation LLC was able to source and purchase high-quality scoured wool and start to produce final products with an excellent quality.**
3. **Learning from the European experience, Tavan Bogd Insulation LLC tested different chemicals/substances to improve wool performance in terms of its hydrophobic and hydrophilic properties, fire resistance and pest protection. Now it is able to produce sheep wool building insulation with good fire and moth resistance.**

team in April 2014, who then supplied technical assistance. This technical assistance consisted of production line fine-tuning, participation in a project study tour to Austria and the Czech Republic, assistance in consumer/construction sector awareness raising, and support for quality testing and standardisation.

In Mongolia, sheep wool is mainly used for traditional felting and carpet manufacturing. Currently, around 49% of the production is sold to China, either as a raw product or solely pre-processed (scoured). The value added for the Mongolian economy is hence very weak and the lack of demand keeps prices low for the herders.

By establishing a sheep wool insulation factory, Tavan Bogd Insulation LLC will support the domestic demand for wool, contributing to the diversification of income for herders and with the potential to raise the price of the commodity. Moreover, along the value chain, the added value from the transformation and further retail will be maximised, as well as staying in-country.

The sheep wool building insulation is made from 95-100% wool and is marketed as a green alternative to traditional building insulation, which is made from petrol-derived extruded polystyrene, glass or mineral fibres. The manufacturing technology itself for wool-based thermal insulation requires 15% less energy than the production of conventional fibre glass insulation. However, additional environmental advantages lie in the fact that sheep wool is a local product

> *"Sheep wool building insulation was identified as a technology already in use in Europe, the USA and Canada providing excellent environmental protection performance compared to other building insulation materials. It is a highly innovative approach turning an undervalued material into a high-value added, environmentally-friendly product with multiple impacts – from economic benefits at the micro-level reducing heating bills, as well as extending the market for insulation. This technology adoption by Mongolian companies is greatly appreciated.*
>
> *A. Batsukh, Chief of the Tavan Bogd Factory*

Tavan Bogd factory

for a local market, reducing the carbon footprint significantly. Its lifecycle is also almost neutral, not polluting if disposed of nor needing complicated recycling schemes.

Tavan Bogd Insulation LLC started to release products into the domestic market in October 2014 and produced 15 000 m2 of sheep wool building insulation, equivalent to supplying around 50 small houses, which is an achievement considering that the construction season is short and was ending when they initially started manufacturing. Their production meets the newly set-up national standards and contributes to an overall improvement in energy efficiency in the construction sector.

Sheep wool insulation produced in Mongolia is competitive in terms of prices. At EUR 2.3/sqm for a thickness of 4 cm, it sells at the same price as glass wool and is cheaper than rock or basalt wool. In terms of pure insulation properties at 0.035 W/(sqm x C), it is as good or slightly better than the competition. Nevertheless, sheep wool has other advantages over other products, such as acoustic insulation and humidity regulation.

POTENTIAL FOR REPLICATION

Mongolia is a country where, despite long and bitterly cold winters, energy efficient building and building materials have not yet been mainstreamed. However, the increased demand for off-grid individual housing and the tendency of the authorities to deregulate energy prices are creating a favourable environment for insulation products. Within this context, three more SMEs, with various competitive advantages and marketing strategies, have entered the sector and are supported by the project. One of these is based in Khovd province and its smaller production aims at covering the insulation material market in the immediate vicinity. With a competitive price and the trend of policy makers to support 'Made in Mongolia' products, together with the increasing price of energy, sheep wool insulation has good potential to become a central product in construction sector company catalogues in the years to come.

Building insulation

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Actors along the sheep wool building insulation value chain are numerous and include herders, cooperatives, wool middlemen, equipment suppliers, producers, logistics and construction companies, wholesalers and retailers. For each, there is the potential to earn income, create jobs, generate profits and taxes, divert sales away from imported products and participate in a more energy efficient housing sector.

The SWITCH-Asia Project

Nepal

KATHMANDU GUEST HOUSE

Converted from a Rana Dynasty mansion, Kathmandu Guest House (KGH) was established in 1967. KGH is considered legendary, being one of the first hotels in Thamel, a tourist hotspot in Kathmandu city with many small and medium hotels, restaurants, bars, and souvenir shops.

Having started with 13 rooms in 1967, KGH now offers 133 including 35 deluxe rooms. The hotel was renovated and expanded in 2011. KGH employs 125 staff to handle more than 60 000 overnight stays annually, with a high level of comfort. In its quest to provide better services whilst using environmentally friendly solutions, KGH became a SEID member company to benefit from the technical support and practical suggestions for better environmental management. Through regular visits and interactions, many SCP measures were recommended by SEID, most of which were implemented

LED light bulbs → 2

"The project helped us to minimise our energy and resource consumption with the adoption of several energy/resource efficiency techniques. We are contributing to the development of sustainable tourism in Nepal through the optimisation of processes and housekeeping practices, which at the same time results in improved competitiveness in the market.

Ms. Saguni Singh Shakya, Manager, Kathmandu Guest House

SWITCH-ASIA PROJECT

Sustainable and Efficient Industrial Development in Bhutan and Nepal (SEID)

PROJECT LOCATION

Bhutan and Nepal

PROJECT TIMEFRAME

Feb. 2012 – Nov. 2015

PROJECT PARTNERS

- Centre for Appropriate Technology (GrAT), Austria
- Asia Society for Social Improvement and Sustainable Transformation (ASSIST), Philippines
- Federation of Nepalese Chambers of Commerce and Industry (FNCCI), Nepal
- Bhutan Chamber of Commerce and Industry (BCCI), Bhutan
- Austria Recycling (AREC), Austria
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), India
- STENUM Asia, India

PROJECT WEBSITE

http://switch-seid.org

MAIN PROJECT ACTIVITIES:

- Micro, Small and Medium-Sized Enterprises (MSME) Consulting: Direct practical support for 200+ MSMEs in the target regions: Thimphu, Paro, and Phuentsholing in Bhutan, and Kathmandu valley, and Pokhara, Jhapa, and Chitwan in Nepal through on-site audits, technical assessments, proposition of improvement measures, support in implementation appropriate technology solutions, monitoring of environmental and economic performances, etc.
- Capacity building: Through a series of training programmes and fieldwork, young local engineers and consultants gain knowledge and skills across a wide range of SCP topics, such as resource efficiency, cleaner production, renewable energy, building energy performance, and water & waste management.
- Technology showcases: The project identifies local needs in resource and energy supply to develop and optimise appropriate technology solutions. The case studies are then showcased to ensure replication.
- Empowering Academia: SEID encourages interaction and cooperation between industry and academia (especially environmental science, engineering, and management faculties) for integration of practical SCP solutions, both in the curriculum and in business.
- Enabling institutional environment: SEID studies existing policies on tourism, renewable energy, waste management, and environment conservation, and supports governmental/sectoral agencies for the implementation and refinement of the institutional mechanisms (e.g., subsidy programmes, guidelines).

MAIN PROJECT ACHIEVEMENTS:

1. 200+ MSMEs from Nepal and Bhutan are being supported in resource and energy efficiency;
2. 40+ local engineers and graduates have been trained to work as Local Consultants;
3. Green Clubs have been formed in eight schools to practise environmental conservation campaigns;
4. With the help of available prototypes and through diverse awareness campaign materials, environmental consciousness in the industries, hotels and academia has been increased.

by KGH. These include installations of additional solar water heaters, a heat pump for hot water with a 1 000 litre storage tank, solar PV panels, particularly for lighting, and higher energy efficiency devices like CFL/LED bulbs and LED TV sets. KGH's kitchen waste is sold as animal feed, and the revenue gained is used for staff welfare. Some biodegradable waste is composted as garden fertilizer. Before the start of the project, 40-50 kg solid waste per day was destined for landfill during the peak season. It has now been reduced to approximately 25 kg per day. Furthermore, KGH is planning to adopt the locavore concept of growing local vegetables and flowers in the garden by using organic compost from food waste in jars and plastic bottles. The harvested food will be eaten in the restaurant, not only saving money but also offering organic ingredients to guests. The management also wishes to make KGH

Guest message

BEFORE SWITCH-ASIA

AFTER SWITCH-ASIA

DG set is used at the time of load shedding for all the loads (under load or overload)	1	Installation of two Solar PV panels (140 Wp)
Use of CFL bulbs in guest rooms	2	Replacement of CFL light bulbs with LED bulbs
CRT TV sets are installed in some guest rooms	3	Replacement with LED TV sets
No measurement or monitoring of water use	4	Installation of water meters, replacement of old faucets and shower heads with new aerator ones
No segregation of waste	5	Proper segregation of waste and composting of organic waste to make fertiliser
No resource efficiency – use of geyser for hot water	6	Installed heat pump for heating water (5 kW) and additional solar water heater
Plastic used for laundry bags	7	Cloth bag used as laundry bag
Artificial lighting in the kitchen	8	More natural lighting in the kitchen
Hotel staff were not monitoring consumption of resources properly	9	Hotel staff are aware of the importance of monitoring resource and energy consumption

stand out internationally as a certified green hotel in Nepal, despite no such standards yet existing in Nepal. The SEID project is also assisting the Hotel Association in Nepal (HAN) to include more SCP-related criteria in hotel rating standards.

POTENTIAL FOR REPLICATION

Many of the SEID recommendations can easily be replicated by other hotels. Even small changes by housekeeping staff can achieve significant savings in the long term. Most of the investment made by KGH in resource and energy efficient techniques and renewable energy solutions was paid back within a few months through the reduction of costs for materials and utilities and increased number of overnight stays. The KGH success story encourages other hotels to follow suit.

Heating pump for hot water

→ 6

FOR MORE INFORMATION

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Guests are allowed to fill their own plastic water bottles in the lobby

> ***Travellers to Nepal are mostly nature lovers, who appreciate visible efforts to conserve the environment. The tourism sector can adopt a strategy to declare Nepal as a green destination, where hotels and restaurants offer the most environmentally conscious services. This could work as an effective instrument to recover from the recent stagnation of the sector due to the earthquake. Small behavioural changes (e.g., adjusting temperature setting of air conditioner, regular cleaning of solar panels) and little investment in more efficient and environmentally conscious techniques (e.g. water saving faucet and showerhead, organic composting), will be the first steps, and gradually more advanced solutions (e.g. heat pumps, PV) can be implemented.***
>
> *Dr. Myung Joo Kang, Lead Project Manager, GrAT*

Philippines

ALTA PENSION HOUSE

Increased linen inventory

Alta Pension started in the late 1980s with 18 rooms. Alta Pension now has 78 rooms, 56 of which are air-conditioned, including some family rooms. It is strategically located in Davao City, close to popular landmarks, tourist attractions and major universities.

The establishment targets the budget hotel/backpackers inn sector, and attracts not just local and national guests, but those from much further afield, such as Europe, Canada and the USA. The twenty-three year old company employs twelve people and in 2014 turned over EUR 196 534.

Alta Pension attended a conference organised by ZCR in Davao City, Philippines and applied to become a member. It received insights on reducing its carbon footprint, following which it initiated all necessary measures is necessary to reduce energy and water wastage.

In September 2015, Alta Pension was honoured at the Hotel Investment Conference Asia Pacific – "Sustainable Hotel Award" in the "Sustainable Operation" category. This is the first time that they received an award related to sustainable development, and ZCR suggested that they enter.

SWITCH-ASIA PROJECT

Zero Carbon Resorts – Building Energy-Autonomous Resorts Creating Appropriate Technology Solutions

PROJECT LOCATION

Philippines

PROJECT TIMEFRAME

Nov. 2009 – May 2014

PROJECT PARTNERS

- GrAT-Center for Appropriate Technology, Austria
- Palawan Council for Sustainable Development (PCSD), Philippines
- Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT) – Plataforma Solar de Almería (PSA), Spain
- Asia Society for Social Improvement and Sustainable Transformation (ASSIST), Philippines

PROJECT WEBSITE

www.zerocarbonresorts.eu

MAIN PROJECT ACTIVITIES:

- Baseline analysis and energy, waste and water reduction solutions for SMEs.
- Capacity building through training courses and workshops, according to ZCR 3R methodology (Reduce-Replace-Redesign).
- Development of appropriate technologies for cooking (improved cooking stoves - two designs, biogas digester for cooking), heating water (solar water heater from local materials, reuse of waste heat from generators to heat water), replacement of compact fluorescent lamps with LED lights.
- Showcase building construction.
- Outreach strategies and extension programmes.
- Stakeholder conferences for multi-stakeholder approaches.
- Policy support on the integration of zero carbon technologies in future tourism developments and of indicators for energy and resource efficiency into the monitoring system to ensure that hotels, resorts and other tourism projects are implemented in appropriately designated zones and pursue sustainable development objectives.

MAIN PROJECT ACHIEVEMENTS:

1. Integration of the project into the national Strategic Environmental Plan, ensuring that any new tourism establishment in Palawan would respect the balance between development objectives and environmental protection.
2. Recruited more than 500 members in the Philippines from tourism establishments (hotels, resorts, inns, etc.). Of them, 152 have implemented resource saving measures, including annual savings of energy, water, waste and chemicals of PHP 241 878 143.41 (EUR 4 850 000) with an equivalent avoided carbon emission of 11 860.37 tonnes of CO_2.
3. Established the ZCR Demonstration Building: the first environmentally sound building in the Philippines with a stand-alone energy supply and water system that minimises its carbon footprint over its entire life-cycle.

4. International recognition of ZCR members: three out of five awardees from the Philippines for the ASEAN Green Hotel Awards 2014-2016* are members of the project: Daluyon Beach & Mountain Resort, Amarela Resort, The Manor.
5. 247 selected SMEs (known as the "Frontier Group") from the hospitality industry in Palawan and ZCR members, as well as engineers, architects and other professionals, benefitted from the capacity-training programme of the ZCR project in the Philippines.
6. Appropriate technologies were developed within the capacity-building programme, such as improved cooking stoves, rice husk insulated solar water heaters and biogas digesters for cooking.
7. Handbooks and technical videos were developed that follow the 3R phases of the project (Reduce-Replace-Redesign), and then distributed widely to ZCR members.

BEFORE SWITCH-ASIA

Use of thick duvets

Manual switch for toilet and bathroom lights and exhaust fan (which comes on when the light is on)

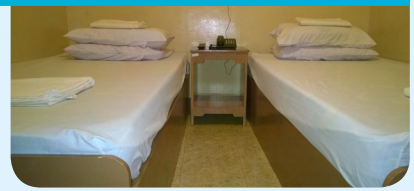
Water heater controlled only by a thermostat

Use of CRT televisions

Use of compact fluorescent lamps

AFTER SWITCH-ASIA

1 **Use of thin cotton linens (blankets, pillowcases and bed sheets)**

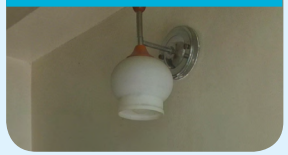


2 **Installation of motion detectors to switch off bathroom lights and exhaust fans once guests leaves the bathroom**

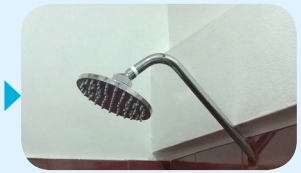
3 **Water heaters controlled by thermostat and timers or auto switches installed on centralised water heaters**

4 **Replaced CRT TVs with LED televisions**

5 **Replaced fluorescent lights with LED lights**



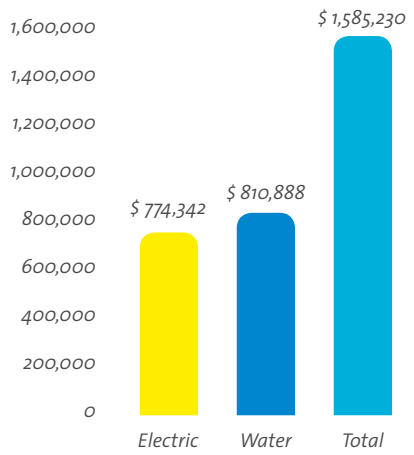
Installed water saving shower heads



* http://malaysiatravelnews.com/asean-green-hotel-awards-2014

IMPACT POST SWITCH-ASIA INTERVENTION

Total Savings from Electric and Water in 2014 Compared to 2010 Consumption (PhPesos)



POTENTIAL FOR REPLICATION

Alta Pension's improvements towards its goal to optimising its resources can all be replicated by other SMEs, for instance:

1. Use thin cotton linens, like blankets, pillowcases and bed sheets: compared to thicker linens, thin linens require less water and soap during laundry and less electricity during drying. Additionally, thick comforters are usually used during winter in cold climates. In the Philippines, they would require guests to lower the room temperature to achieve thermal comfort, consuming more energy in air conditioning.
2. Installation of motion detectors inside toilet and bathrooms, to save electricity on lighting.
3. Replace CRT television with LED televisions: Alta Pension House replaced 70-watt 14" CRT TVs by 35-watt 24" LED TVs. Additionally, fifty older and sometimes defective CRT television sets (which had an average use of 5 hours per day) were replaced with LED TVs. Energy savings for 50 TVs = 3 193.75 kWh per year.
4. Replace compact fluorescent lamps with LED lights: Alta Pension House replaced 20 and 40 watt fluorescent lightbulbs with 7-watt LED lights in the main bedrooms. In the toilets and bathrooms, 10-watt fluorescent lightbulbs were replaced with 3-watt LED lights. To date, 193 lamps have been replaced, resulting in an annual energy saving of 13 976.58 kWh.

'Simple measures go a long way.'
We at Alta Pension started focusing on Zero Carbon Resorts' mission and in 2010 switched our attention to sustainable use of resources. Now, we are reaping the benefits from those small steps and are continuing initiatives towards efficiency and sustainability.

Roland G. Dubouzet, Manager at Alta Pension House

The biggest impact on the reduction of energy consumption may be attributed to the motion detectors installed in our toilets and bathrooms. A room for two used to require a ¾ to 1 horsepower air conditioning unit to cool its guests sufficiently. With the motion detector, the exhaust fan shuts off automatically when it is not needed and cool air from the room is no longer expelled unnecessarily, so the room maintains its coolness even with a ½ horsepower air conditioning unit. Installing a separate water pipe for sanitary use meant that we were able to reuse laundry waste water for toilet flush water. Starting slowly and implementing these measures helped us to realise savings. And once you get started, you will find more to improve.

Roland G. Dubouzet, Manager at Alta Pension House

FOR MORE INFORMATION

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Solar Water Heater 3

Insulated Walls

Vietnam

ELEGANCE COMPANY LTD. FOR RESEARCH AND DEVELOPMENT, MANUFACTURING AND SERVICES

Founded in May 2011, Elegance's mission is to contribute to the sustainable energy transition in Vietnam by providing its creative solutions and practical low-cost technologies. Their commitment is to contribute to sustainable development and climate change mitigation by commercially viable renewable energy solutions, such as gasification solutions suitable for both households and industry.

With a total of 11 members, mainly experts from the thermal, mechanical, electricity and metal-forming fields, Elegance now is focusing on target customers including (i) direct groups such as agri-foods and furniture companies and (ii) indirect groups such as non-profit projects. Direct groups will use Elegance products themselves, while indirect groups may provide Elegance products for other direct beneficiaries.

Since 2011, Elegance has designed and built 19 biomass boilers (17 direct combustion, one semi-gasification and one fully gasification), three solar heating dryers and one hybrid solar-gasification system for non-wood material drying. The average power of the boilers is about 500 kg steam/per hour, with thermal efficiency at around 25%. These projects generate an annual revenue of VND 2.3 billion (EUR 96 800). Being aware of the potential for biomass gasification for both industrial and domestic use, initially Elegance started cooperating with SPIN in developing a highly efficient design of gasifier, which is being patented. The cooperation then expanded to solar and combining solar with gasifier solutions based on significantly successful results. Elegance received support from the SPIN project, as follows:

> *"The biomass gasifier developed with the support from the SPIN project is a total solution for SMEs as it solves economic, environmental and social problems. Energy consumption is often a key issue for SMEs, especially when fossil fuels are being depleted.*
>
> *Mr. Nguyen Hong Long, Regional coordinator of the SPIN project*

SWITCH-ASIA PROJECT

Sustainable Product Innovation in Vietnam, Laos and Cambodia (SPIN)

PROJECT LOCATION

Vietnam, Laos and Cambodia

PROJECT TIMEFRAME

Apr. 2010 – Sep. 2014

PROJECT PARTNERS

- Delft University of Technology (TU Delft), Netherlands
- Vietnam Cleaner Production Centre (VNCPC), Vietnam
- Asian Institute of Technology in Vietnam (AITVN), Vietnam
- Lao National Chamber of Commerce and Industry (LNCCI), Laos
- Cambodian National Cleaner Production Office (NCPO), Cambodia
- United Nations Environment Programme (UNEP), France

PROJECT WEBSITE

www.spin-asia.org

MAIN PROJECT ACTIVITIES:

- Set up SPI Support Centre in Vietnam and and helpdesks in Cambodia and Laos.
- Baseline studies in the 3 countries.
- Select sectors/subsectors and companies.
- Develop SPIN methodology and toolkit to deploy product innovation in companies and provide training on them to relevant organisations and companies.
- Mainstream Master's and PhD research.
- Synergy with other projects (non-profit projects, ODA and local projects).
- Policy advocacy on National Green Growth Strategy.
- Set up SPI Networks, national conferences, webmovies and publicity, reports.
- Hosting of dissemination workshops.

MAIN PROJECT ACHIEVEMENTS:

1. Reached out to more than 540 SMEs in the region, in five relevant sectors with 21 sub sectors.
2. A versatile SPIN toolkit was designed for a user-friendly and practical approach. They are also publically available online at: *http://spin-e.vn/*
3. Over 2 000 new or re-designed sustainable products (in comparison with 1 000 projected) in key industries in Vietnam, Cambodia and Laos have been developed by SMEs.
4. Involved 18 international experts, 23 local designers, 25 local experts, 11 Master's students, 2 PhD candidates from TU Delft and 17 international/local volunteers.
5. 18 official training courses and 12 other courses relating to the SPIN methodology, toolkit, and branding/marketing skills have been delivered to over 400 participants from different fields.
6. Partnerships or cooperation agreements with 14 development agencies and four design organisations and sector associations who have joined SPIN and implemented its concept.
7. Development of over 30 sustainable technologies on energy, agriculture, materials, foodstuffs, garments and furniture.
8. Four outreach initiatives to communities and partners for the projects "i-nature", "green street", "green designer club" and "technology hub".
9. Synergy with seven projects (from the UN, Oxfam, World Bank and more).

BEFORE SWITCH-ASIA

One of first models: low efficiency, difficult to operate, high cost

AFTER SWITCH-ASIA

The newest model: much higher efficiency, more durable, compact, and cheaper if produced in industrial manufacturing.

Low efficiency (18%)	1	**Very high efficiency (50%)**
High production cost (VND 1.5 million /each)	2	**Low production cost (VND 300 000 /each)**
Performance not yet tested	3	**Performance tested by the testing centres established in Laos with the help of the SWITCH-Asia cookstoves project**
No professional design	4	**Professional design**
Low feasibility on commercialisation	5	**Higher feasibility on commercialisation**

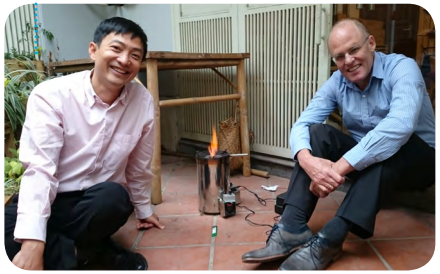
- Human support: design experts from Delft University in developing new models and feedback from professional experts, which increased efficiency from 18% to 35%;
- Capacity and strategy building: various training courses relating to sustainable production innovation, and marketing and branding;
- Facility support: testing new gasifier prototypes under laboratory conditions to check their performance;
- Networking support: through sharing cooperation results in project networks, both local and international, in order to find potential partners, customers and investors.

Key achievements during the project cooperation period include:

ECONOMIC IMPACT

- Thanks to lower fuel costs and higher efficiency, applicants (households or companies) were helped to reduce their energy costs by a factor of 2 to 10 by switching to renewable energy with higher efficiency (rice husks, saw dust, corn cobs, pellets).

Mr. Crul (project manager) and Mr. Long (Regional cordinator) visit and test new model



- Increase competitiveness of companies by incorporating Elegance's technologies (cost reductions mentioned above), or by an increase in the product/material quality with respect to solar heating;
- The renewable energy market in Vietnam is nascent, so Elegance solutions contri-bute to forming new markets, which are more sustainable, and creative companies can exploit this business opportunity.

ENVIRONMENTAL IMPACT

- Significantly eliminate dependence on fossil fuel energy;
- Contribute to reducing environmental pollution by turning biomass waste into valuable energy sources: although Vietnam has about 118 million tonnes of biomass annually that can be used as fuel, little is used;
- Reduce GHG emissions by switching to renewable energy, with the additional benefit of carbon sequestration;
- Avoid deforestation, which is partially caused by families collecting wood for their cooking and heating needs.

SOCIAL AND HEALTH IMPACT

- Reduce societal costs spent on: (i) healing diseases caused by polluted air due to fossil fuels (gasification technology can help eliminate toxic air like CO in comparison to direct burning); (ii) pollution treatment and (iii) imported fuel;
- Improve working conditions for personnel in industrial zones, or household living conditions, by avoiding exposure to toxic air (output air is only CO2, H2O, NOx);
- Create local jobs.

CLIMATE BENEFITS

- Contribute to reducing the impact of climate change throughout GHG emission reduction and carbon sequestration.

GREEN FINANCE

- Connected to green finance programmes, such as the Green Credit Trust Fund or a programme on Low carbon transition in energy efficiency, where Elegance plays the role of technical provider.

POLICY DEVELOPMENT

- Contributed case studies and lessons learnt to policy development programmes.

EUROPE-ASIA COOPERATION

- Exchange research cooperation between Elegance and European institutes, such as the Delft University of Technology.

In Vietnam, about 20 million households in rural and urban areas have hundreds of thousands of boilers, which use fossil fuels such as gas, diesel and coal. On the other hand, there are very few companies working on providing renewable energy solutions. At the same time, Elegance solutions are unique due to their design with high efficiency. Once registered, this innovative design can be put into mass production, further reducing unit costs.

With effective cooperation mechanisms, the expertise would be transferred and replicated, especially given that fossil fuel cost is increasing and that there is more interest from government and development programmes working on promoting cleaning energy transition.

FOR MORE INFORMATION

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Technology and Renewable Energy Team Manager
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> ***Renewable energy is here to stay; companies that embrace it will see the returns, not only financial, but social and environmental. To be successful, you do not only need creative product ideas, but also innovation in the implementation process, strategy and approach. There are many external resources and supports that businesses can utilise to overcome the difficulties in development, especially in this new industry.***
>
> *Nguyen Minh Hai*

Vietnam

I-NATURE SUSTAINABLE AGRICULTURE GROUP

i-nature is a start-up business consisting of a team of experts in permaculture and related fields who wish to promote sustainable agriculture activities in Vietnam. Its products are mainly different types of organic vegetables and livestock (meats and eggs). The organic market in Vietnam is still nascent, at around 10 years old. With only three members at the outset in 2011, i-nature now has eight members and several Vietnamese and international volunteers. In 2014, products produced amounted to about 8 000 kg of vegetables, 5 000 kg of meat and fruits, herbs, generating a turnover of around EUR 32 000 EUR. The i-nature farm is based in one of Hanoi's rural district areas, Ba Vi. The model has already been transferred to other provinces.

During the SPIN project, SPIN project members had the chance to work with i-nature's members. They shared a vision of future agriculture development, of an agriculture that does not depend on chemical inputs, based on a closed eco-system.

After application of SWITCH-Asia: front side of farm

SWITCH-ASIA PROJECT

Sustainable Product Innovation in Vietnam, Laos and Cambodia (SPIN)

PROJECT LOCATION

Vietnam, Laos and Cambodia

PROJECT TIMEFRAME

Apr. 2010 – Sep. 2014

PROJECT PARTNERS

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- Vietnam Cleaner Production Centre (VNCPC), Vietnam
- Asian Institute of Technology in Vietnam (AITVN), Vietnam
- Lao National Chamber of Commerce and Industry (LNCCI), Laos
- Cambodian National Cleaner Production Office (NCPO), Cambodia
- United Nations Environment Programme (UNEP), France

PROJECT WEBSITE

www.spin-asia.org

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8. Four outreach initiatives to communities and partners for the projects "i-nature", "green street", "green designer club" and "technology hub".
9. Synergy with seven projects (from the UN, Oxfam, World Bank and more).

i-nature was born from ideas generated by members of both groups. Before the i-nature initiative, i-nature's members just were individuals who knew each other. They also knew SPIN and shared a vision of agriculture development. SPIN played a bridging role as well as providing much support, including:

- Consultancy of experts in different areas: agriculture, packaging, food processing, marketing and branding, energy;
- Training courses on sustainable production innovation, marketing and branding;
- Equipment such as gasifiers, shredders and solar heat for a value to a value of USD 5000;

> *Much work is needed to achieve success in the sustainable agriculture industry, but the i-nature project proves its feasibility, resulting in comprehensive changes throughout the value chain.*
>
> *Mr. Nguyen Hong Long, Regional coordinator of the SPIN project*

BEFORE SWITCH-ASIA

- Monoculture
- Dependence on fossil fuel resources
- Linear model
- Buying input materials
- No interaction with end-users

AFTER SWITCH-ASIA

1. **Polyculture**
2. **Almost complete use of renewable energy resources**
3. **Closed-loop model**
4. **Produced input materials by itself**
5. **Good knowledge of final consumers**

- Customer workshops that applied co-creation methodologies;
- Synergy with other projects, such as the SWITCH-Asia GetGreen project;
- Networking with other SPIN partners;
- Identifying financial support: SPIN introduced donors, funding programmes and helped in building project ideas;
- R&D support through TU Delft PhD and Master's candidates.

THE "I-NATURE" MODEL

- reduced production costs by 1/2 to 1/3 by turning all waste sources into input materials (e.g. biomass for cooking, animal waste for making compost, feeding decomposing animal matter to fish or other animals, vegetable waste used for animal feed or making compost);
- increased farmer income by 20-100% compared to conventional farming methods;
- created a dozen local jobs in the last three years;
- improved environmental quality and adaptation to climate change. Environmentally, soil is improved by organic matter, and there is no chemical residue in soil and water. By encouraging crop diversification, the project better prepared farmers for climate change;
- offered organic foods (according to organic standards and with the approval of UNIDO's sustainability assessment system) to more customers with an affordable price.

The cooperative is also considering providing micro finance for new farmers who wish to become organic by providing finance and technical support.

i-nature's model touches on most aspects of sustainability; innovation does not only take place in products but also across the whole value chain.

ECONOMIC IMPACT

- i-nature reaches breakeven point and can operate as a business after an incubator period of 2 years;
- Gained 3 small grants from development programmes (SEED initative, Thriive, CSIP) to invest in infrastructure, equipment or operation activities;
- Established 200 regular customer database in different customer clubs;
- Farmer income increased by 20-50%;
- Production costs reduced by 20-40%, for example by producing animal feed on the farm, and arable farmers reducing their reliance on agro-chemicals.

ENVIRONMENTAL IMPACT

- Eliminated agro-chemicals, such as fertilizers, pesticides and insecticides;
- Enhanced bio-diversity through poly-culture and the balancing of species;
- Soil quality enriched through the use of organic matter;
- Renewable energy applications reduce the carbon dioxide emissions;
- The agricultural waste is reduced through its reincorporation in agricultural production.

SOCIAL IMPACT

- Reduced local agricultural migration through generation of local employment;
- Improve people's health by provision of healthy food;
- Indirectly contribute to reduction in social health care costs through better nutrition;
- Improvement of relationship between farmers and consumers.

CLIMATE BENEFITS

- Mitigating climate change and extreme weather conditions, through a holistic approach to the natural environment;
- Reduction in dependence on fossil fuel resources.

TARGET GROUP ENGAGEMENT

- Farmer groups: support to agricultural co-operatives regarding techniques, skills, marketing and finance;
- Social investors: the organic sector is a potential market for investors in the long term; by soliciting support from this group, the model can be expanded and replicated better;
- Environmental or sustainable activist groups have been established, with a focus on the agriculture sector; these groups can contribute expertise and spread the model to a wider community.

EUROPE-ASIA COOPERATION

The project co-operated with the SUSTAIN ASEAN-EU project, and is now in the preparatory phase identifying co-operation opportunities with Wuppertal University, another project member.

i-nature is a flexible model – through different technology packages that capture and imitate the natural bio-cycle, the model can create suitable closed-loop scenarios depending on region and farm context. The i-nature model can thus be adapted in almost every region of Vietnam, from the small to the large scale. I-nature has already deployed its model in several regions of Vietnam, such as the Lao Cai province (Northwest) and the Ninh Thuan province (Central).

FOR MORE INFORMATION

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> ***i-nature is fortunate to work in a sector that is close to basic human needs. Food is more simple than other sectors, such as fashion or electronics. Food also has a direct impact on human health. The food sector has fewer barriers and higher demand than other sectors, enabling it to embrace innovative ideas more easily. In other sectors, the gap between concept and reality may be far, but it is not impossible – so do not give up!***
>
> *Pham Nhu Trang*

Vietnam

VIET LIEN GROUP

The Viet Lien Group operates in the agricultural sector with 38 staff and a turnover of EUR 615 000 in 2014. It has four farms growing organic vegetables, moringa, tea, etc. and provides both fresh and dried agri-products.

From 2005 to 2007, Viet Lien cultivated in a traditional way. In 2008, this SME chose organic cultivation and switched from using pesticides to using essential oils and other more environmentally friendly methods. For example, they changed their cultivation area to attract more bees, which help to pollinate, and ants, which prevent soil diseases as well as assisting in the cultivation of crops, by biological control.

Viet Lien joined the SWITCH-Asia co-funded "Sustainable Product Innovation" project (2010 – 2014), which had been implemented by the same consortium as GetGreen Vietnam. Since then, Viet Lien keeps in contact with the project team and regularly joined in with relevant activities. The GetGreen Vietnam team saw the company as suitable for co-creation activity and invited them to participate.

During June – July 2014, Viet Lien participated in the co-creation component of GetGreen Vietnam. Co-creation is a collaborative creative act between two or more parties, in this case between the producer (Viet Lien) and their consumers. It is a process that inspires new ideas and better solutions to existing problems towards more sustainable production and consumption.

> *After joining the SWITCH-Asia project, both my awareness and that of my employees has been raised. Especially me, I did not know much about sustainability before, but now I even use solar energy in the drying process. I want innovation to be at the core of my business.*
>
> *Ms. Nguyen Thi Phuong Lien, Viet Lien Director*

SWITCH-ASIA PROJECT

GetGreen Vietnam – Sustainable Living and Working in Vietnam

PROJECT LOCATION

Vietnam

PROJECT TIMEFRAME

Apr. 2012 – May 2015

PROJECT PARTNERS

- Delft University of Technology, Netherlands
- Vietnam Cleaner Production Centre (VNCPC), Vietnam
- Asian Institute of Technology Center (AITCV), Vietnam

PROJECT WEBSITE

http://getgreen.vn/

MAIN PROJECT ACTIVITIES:

- Research on consumption behaviour of Vietnamese people and worldwide sustainable consumption (SC) practice.
- Development of project methodology and testing with 10 consumer groups in Hanoi and Hochiminh City.
- Development of GetGreen Guidebook for normal consumers, Co-creation Handbook for SMEs and other supporting materials for trainers.
- Capacity-building for relevant CSOs and NGOs to become GetGreen trainers.
- Full deployment with 52 GetGreen groups (more than 1 000 participants) in Hanoi, Hochiminh City, Da Nang and Can Tho.
- 16 co-creation sessions between companies and consumer groups.
- Information dissemination and networking (website, dissemination workshops, networking events, publications).

MAIN PROJECT ACHIEVEMENTS:

1. 1 099 participants were certified as Change Agents, who not only change their consumption behaviour towards sustainability but also inspire and convince their families, friends and colleagues to change.
2. 56 trainers were involved in the Training-of-Trainers and GetGreen group implementation.
3. Eight Sustainability Days were organised in four cities as networking events where all trainers and Change Agents were brought together in one city (and some Change Agents from other cities) to share their experience, achievements and to encourage them to continue practising SC.
4. Observation and reporting of participants' changes in consumption were made both during and after project implementation.

Co-creation activities included **(1)** a preparation meeting between company and co-creation expert to gain an understanding on company's issues (e.g. sustainability of products could not be communicated well to customers) and identify co-creation content; **(2)** a co-creation session between the company and their consumers to discuss and generate ideas for selected topics; and **(3)** a meeting between the company and an expert to evaluate the ideas and plan for the next steps. The selected product of Viet Lien was guava leaf tea and discussed topics in Step 2 included:

- feedback on packaging;
- ranking of essential elements for the packaging;
- creating a new packaging concept.

Since participants of the co-creation session were consumers who understood and practised sustainable consumption, namely "sustainable consumers", the ideas were

The old (in the middle) and new products (on the sides)

⇨ 3

BEFORE SWITCH-ASIA

Very little knowledge on sustainability.

Use of electricity in drying.

The product was poorly designed.

Company had a very small market (mainly B2B).

Short-term and traditional business planning.

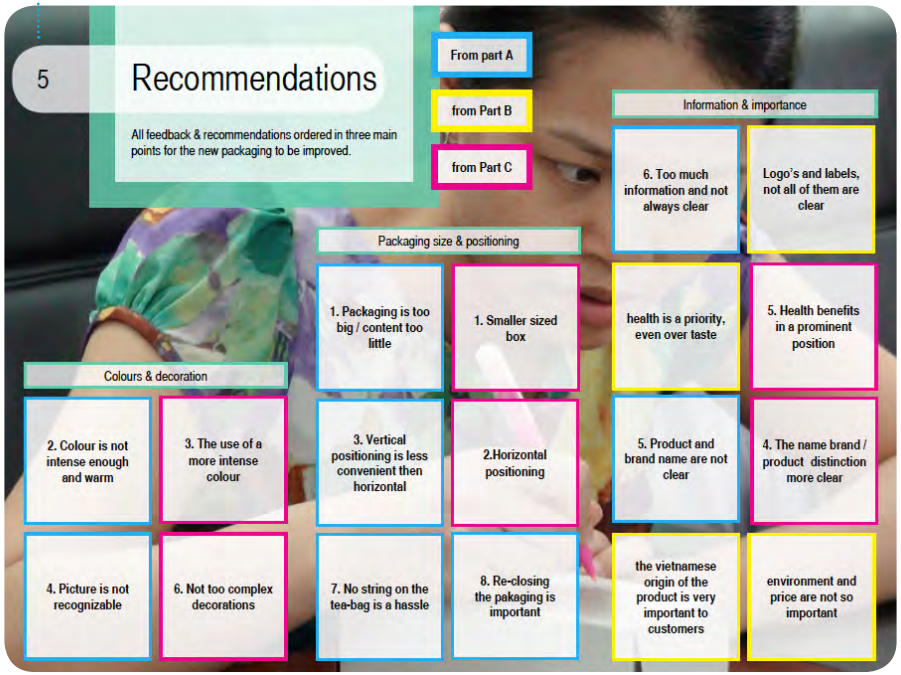
AFTER SWITCH-ASIA

1. **Awareness of both the company leader and staff has been raised.**
2. **Drying by means of natural heat and solar energy.**
3. **In November 2015, three newly packaged tea product lines will be introduced to the market. Within the design, sustainability aspects of the product are told as a product story.**
4. **After the product improvment, Viet Lien will focus more on the market and expects to expand to B2C.**
5. **Company director, Ms. Phuong Lien, said that her perspective on SCP had been changed dramatically. She would like to have a long-term innovation plan to drive her business towards sustainability. For example, the company will target raising awareness of the supplier farms and together improve the area to become chemical-free.**

related to sustainability. After the session, a report collecting all ideas and suggestions was produced and based on that, Viet Lien has been developing new packaging for this product and other product lines. The whole newly package-designed product line will be launched in November 2015. During the testing phase, some impacts can be recorded as follow:

- Economic impact: packaging cost is now 32% lower, the box size is 17% smaller, which reduces transportation costs and shelf display space/cost (at supermarket).
- Environmental impact: the paper material is more environmentally friendly, as it has no calendaring. Calendaring is when you have a (thin) plastic layer on the paper. Without this plastic layer, the box is simply paper and thus more environmentally friendly.
- The company has started to use solar energy instead of electrical energy to dry the tea leaves.
- Target group engagement: although the new product has not yet been introduced, Viet Lien has sent the newly-designed packaging to their close customers and received positive feedback. All surveyed customers like the new product appearance.

Ideas and suggestions of co-creation participants



> ***The co-creation with Viet Lien showed that customers have a great deal to say about overall design and packaging design in particular, and that when given tools to express their ideas, anyone can be very creative. Most important is that customers gave the direction for change and encouraged Viet Lien to pursue a new packaging design with their input.***
>
> *Jotte de Koning, Project co-creation expert*

POTENTIAL FOR REPLICATION

Co-creation is a method of user involvement that can be applied by any production company/ service provider, especially those targeting sustainability in their business. It is the facilitation of time and space where producers and consumers of sustainable products can exchange ideas, information and give input on product design. Consumers will feel more empowered and will be stimulated to taking control of making their own lives and surrounding environment more sustainable. The specific case of co-creation with Viet Lien and their tea-drinking customers showed that the input of customers on new designs and feedback on old designs paved the way for more suitable and sustainable packaging. Other companies could follow their lead and replicate co-creation sessions by involving customers in the design process. Also, specifically for other tea producing companies, the findings from co-creation can be replicated:

- the use of smaller packaging to decrease material use and transport energy;
- use only one size of packaging design (but different labels) for different products to be able to save production energy and create more efficient wholesale packing for transport;
- use uncoloured packaging material, the only print being on the labels, to cut down on the use of chemicals as well as facilitating recycling of the packaging.

FOR MORE INFORMATION

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