

# SIRIMLink

Driving innovation through technology and quality



## INNOVATIVE COMMUNITIES

Empowering the Community through Technology, Innovation and Creativity

### IN THIS ISSUE:

#### BLADESMEN AND CRAFTSMEN



Saving the art of the Bajau blacksmiths

#### COMMUNITY POWER



From waterwheel dynamo to mini-hydroelectric generator system

#### CERAMIC WONDER



Modernising one of the world's oldest forms of art



# MALAYSIA INNOVATIVE 2010



Zone	Date
Northern Zone	27-28 Feb 2010
Sabah Zone	28-29 May 2010
Eastern Zone	19-20 June 2010
Southern Zone	07-08 Aug 2010
Sarawak Zone	16-17 Oct 2010
Central Zone	13-14 Nov 2010

The carnivals will be held according to zones in both Peninsular Malaysia and in East Malaysia as a part of an awareness programme to motivate and encourage Malaysian to be more creative and innovative in their daily living.

Any parties (public or private) who are interested to take part/promote/ market in MI2010 can kindly contact the Innovation and Commercialisation Division, MOSTI.

**FREE Admission**

Secretariat  
Malaysia Inovatif 2010  
Innovation Competition  
Tel : 03-88858300  
Fax : 03-88885969

Emel : pauldevaraj@mosti.gov.my





ADVISOR

Ir. Hj. Yahaya Ahmad

CHAIRPERSON

Hj. Nor Rashid Ismail

MEMBERS

Noraini Kassim  
Rosmina Mustafa  
Zurina Mohd Bistari  
Abdul Aziz Long  
Futom Shikh Jaafar  
Ahmad Faizi Mohd Kamil  
Dr. Neelam Shahab  
Dr. Kartini Noorsal  
Azman Hassan  
Jamaluddin Tukimin

For any enquiries or further information with regards to the articles featured in this magazine, please contact:

Corporate Communications Section  
Group Corporate Affairs  
SIRIM Berhad  
1, Persiaran Dato' Menteri  
Section 2, P.O. Box 7035  
40911 Shah Alam, Selangor  
Tel: 603 5544 6770  
Fax: 603 5544 6745  
Or email to: [publications@sirim.my](mailto:publications@sirim.my)  
[www.sirim.my](http://www.sirim.my)

Published and Printed by:

SIRIM Berhad  
1, Persiaran Dato' Menteri  
Section 2, P.O. Box 7035  
40911 Shah Alam, Selangor  
Toll Free: 1300 88 7035  
Tel: 603 5544 6000  
Fax: 603 5510 8095

Writing, Design and Concept:

Marcus Gomez & Partners Sdn Bhd  
Unit 3A-07, Block B, Cameron Tower,  
Jalan 5/58B, 46500 Petaling Jaya,  
Selangor.  
[www.marcusgomez.com](http://www.marcusgomez.com)

SIRIMLink is an official publication of SIRIM Berhad. The bulletin is published quarterly and is distributed free to our clients, associates, business and research establishments.

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# INNOVATE OR EVAPORATE

**H**ELLO AND WELCOME TO THE Community Innovation Issue of SIRIMLink!

When our Prime Minister Datuk Seri Najib Tun Razak launched Malaysia Innovative 2010 earlier this year, the message was clear: innovate or evaporate.



It is no secret that the most successful economies in the world all progressed to where they are today because of innovation. Our entire civilization consists of products and ideas that were mainly dreamed up and developed in Japan, Korea, United States and some European countries – from the computers on our desks to the clothes on our backs.

For any organisation to succeed in today's world – business, school or government – it must make innovation and creativity central tenets within its organisational philosophy. Therefore, if Malaysia is to achieve Vision 2020, it must make innovation and creativity a part of its culture.

In conjunction with the Malaysia Innovative 2010 (MI2010) Sabah Zone celebrations, we showcase some of SIRIM's proudest contributions towards the Malaysia Innovative concept in this issue. This includes a mini-hydroelectric system in Kg. Libang Laut, Sabah, as well as ceramics industry development projects in Beluran, Sabah and Port Dickson, Negeri Sembilan.

We also speak to Deputy Minister of Science, Technology and Innovation, YB Tn. Hj. Fadillah bin Yusof to find out what the ministry's plans are for the future of innovation in the country, while Chairman of SIRIM Berhad, YBhg. Datuk Hajah Jamaliah binti Kamis shares her thoughts on what SIRIM's role will be in that future.

Happy innovating!



# CONTENTS

SPECIAL ISSUE "INNOVATIVE COMMUNITIES"



Sabah's world-renowned bladesmen are having trouble passing on their craft to a disinterested younger generation. With SIRIM's help, however, the Parang industry will thrive for decades to come.

>> pg. 14



4

## EMPOWERING INNOVATION

How MOSTI is changing the lives of Malaysians through innovation



10

## COMMUNITY POWER

How SIRIM and WAITRO turned a hydroelectric dream into reality



6

## FOR THE PEOPLE, FOR THE COUNTRY

SIRIM exists for the people, says YBhg. Datuk Hajah Jamaliah Kamis



14

## BLADESMEN AND CRAFTSMEN

The Bajau art of blacksmithing lives on, thanks to SIRIM



8

## A PARTNER FOR COMMUNITY

YBhg. Ir. Hj. Yahaya Ahmad on SIRIM Community Innovation



20

## CERAMIC WONDER

One of the world's oldest forms of art is being given a modern twist

# SIRIM BERHAD

## Delivering on its mandates

Some community projects undertaken by SIRIM.



### ← PORCELAIN CERAMICS & CRAFT TECHNOLOGY

Adds value to the community's activities through Pottery and Hydrostone Techniques.

### ◆ ENVIRONMENTAL FRIENDLY ARTIFICIAL REEF PRODUCTION

Developing artificial ceramic corals to help preserve the natural environment.

### ◆ PINTAR LEARNING SYSTEM

A fun and interactive system for schools.

### ◆ ARTS AND CRAFTS TECHNOLOGY

Mechanisation of production for community activities such as weaving machine, songket and batik tjanting.

### ◆ NATURAL VINEGAR PRODUCTION TECHNOLOGY FROM NATURAL RESOURCES

Improving the community's economy through total value chain development with training, production technology and applications using natural resources such as nipah (trunkless palm) and sago.



### ↑ DETERGENT PRODUCTS TECHNOLOGY

Mechanisation of liquid and compact detergent production.



### ◆ RENEWABLE ENERGY TECHNOLOGY

Production of biodiesel from jatropha (inset) and palm oil and also solar energy.



### ← SPIN CASTING TECHNOLOGY

Modernisation of techniques for producing souvenirs, jewellery and other brassware craft.

### ↓ IMPROVING PARANG (BLADES) MAKING

Preserving Bajau blacksmithing in Sabah.



### ◆ HARVEST AND SEA PRODUCE DRYING TECHNOLOGY

Provides value add to agricultural products.

# EMPOWERING INNOVATION

The Ministry of Science, Technology and Innovation (MOSTI) is sparing no effort to demonstrate how technology and innovation can benefit the people. SIRIMLink spoke to YB Tn. Hj. Fadillah bin Yusof, Deputy Minister of Science, Technology and Innovation to find out what the Ministry's plans are for the future.

**W**HEN THE PRIME MINISTER Datuk Seri Najib Tun Razak launched Malaysia Innovative 2010 earlier this year, one could almost hear the collective sigh of relief across all the country's research and development Centres of Excellence. Scientists, researchers and businessmen alike all welcomed the move as a positive sign that the government is serious about its drive to inculcate innovation and creativity among the nation's people.



**YB TN. HJ. FADILLAH:** "For something to be called innovative, it must be commercially viable."

MOSTI, the ministry that largely bears the responsibility of carrying out the Prime Minister's vision for a more innovative country, views innovation through pragmatic eyes that put the people interests first rather than the interests of the technology itself.

"Innovation in the context of MOSTI is about more than just clever ideas or products," explains YB Tn. Hj. Fadillah bin Yusof, Deputy Minister of Science, Technology and Innovation. "It's about systems and processes and I think the end must justify the means. For something to be called innovative, it must be commercially viable."

The Ministry has spared no effort in encouraging innovation amongst Malaysians. Besides recognising the contributions of innovative people towards society and awarding them grants to develop their ideas, the Ministry also holds competitions in schools and universities to encourage creativity and innovation in the young.

Another way that the Ministry promotes the concept of Malaysia Innovative 2010 is through the Karnival Malaysia Inovatif fairs. There will be six such fêtes held at six zones throughout the year and began with Perlis (Northern Zone) in February followed by Keningau (Sabah Zone) in May. They are next scheduled to take place in June (Terengganu, East Zone), August (Johor, South Zone), October (Sibu, Sarawak Zone) and finally Malacca (Central Zone).

"These carnivals are a way for us to showcase the innovations funded by the Ministry," says YB Tn. Hj. Fadillah. "They also provide the communities involved an opportunity to showcase their innovations and thus showing the people how innovation can benefit society."

## CREATIVE, INNOVATIVE MALAYSIANS

The Community Innovation Fund that provided the means for developing most of the success stories told within this magazine are targeted at communities that require assistance in terms of socio-economic development. While the Ministry provides the funds, the expertise itself comes from the 28 agencies under MOSTI including SIRIM.

“We are interested in projects that these agencies run and test which ones are able to benefit communities,” says Tn. Hj. Fadillah. “We go to the people, listen to their problems and try to match their needs with the research efforts within all these agencies. Different communities have different needs – some need technologies to improve the productivity of their farms, while others may need technologies to improve their standard of living.”

Upon being assigned a project, the agency concerned conducts a study to evaluate the type of technology which is most suited to the problem. The technology needs of these communities range from production techniques for herbal, agricultural or even fisheries production, to basic infrastructure requirements such as electricity or water.

“For example: when we ask SIRIM to look into developing an electricity supply for a remote community, the researchers will tell us what type of renewable energy technology is most suitable for the area: wind, sun or water,” says Tn. Hj. Fadillah.

Renewable energy technology is a pet project of the Ministry in line with the government’s push for greener energy resources. The Ministry wants to ensure that communities are not denied basic infrastructure needs such as electricity and clean water, which is why it is particularly interested in SIRIM’s renewable energy projects starting with the city of Kuching which was recently awarded by UNESCO for being a clean and safe city.

“We are working closely with the city council to turn one of its waterfront extensions into a green technology park to showcase renewable energy technologies,” says Tn. Hj. Fadillah. “It will feature windmills, micro-hydroelectric dynamos, solar energy systems and more, where the whole park will be lighted and powered by renewable energy technologies.”

**MALAYSIA NATIONAL INNOVATION CENTRE (MYNIC)**

MOSTI’s next move as far as innovation is concerned is to establish a National Innovation Centre (MyNIC) to act as a central information

exchange hub among all Centres of Excellence under its umbrella. The ministry’s taskforce is currently in the process of preparing the proposal which will be presented to the Cabinet for final approval.

“We have government-linked research centres such as SIRIM scattered across the country, and we have research centres in universities in every state, but all these centres are working in silos,” explains Tn. Hj. Fadillah. “With MyNIC, all these research agencies will be able to share information about their projects with one another and the community, thereby ensuring that everyone knows what the other is doing thus avoiding task duplication.”

Currently, if an agency does have a project that is ready to be commercialised, no one knows about it except the people within that particular agency. MyNIC will thus become a one-stop resource centre for all the research projects in the country that are ready to be commercialised so that interested parties know where to go when they want an innovative solution to a problem. MyNIC will also streamline the efforts of the country’s scientists and researchers and ensure that they have a way of sharing their experience and know-how with each other.

“Ultimately, we want people to realise how technology and innovation can benefit them in their daily lives,” says Tn. Hj. Fadillah. “We want them to know that it’s not just about higher incomes or standards of living. It’s also about sustainable development and preserving our natural world.”

Besides creating awareness about the benefits of science and technology among communities, MOSTI would also like to close the gap between urban and rural communities. Naturally, the Ministry would like to maximise its returns on the funds it gives out. However, Tn. Hj. Fadillah also admits that the Ministry does not always expect to see returns in terms of commercial value, because that is not always possible.

“Sometimes, the only returns we get are in terms of human development,” says Tn. Hj. Fadillah. “Such things are not easily valued in terms of money.” ☺

# FOR THE PEOPLE

**SIRIM's role within the business community is well established and well understood. However, it takes a little more to serve its role within the community at large. YBhg. Datuk Hajah Jamaliah binti Kamis, Chairman of SIRIM Berhad, explains how SIRIM serves the people.**

**A**SK ANY ENTREPRENEUR IN the Klang Valley what SIRIM means to them, and they can spell out SIRIM's role almost word for word: a champion of quality, a partner for innovation, an ally in international business. However, such duties only form part of SIRIM's role to the industry. The challenge is in communicating SIRIM's purpose and abilities to the community at large.

As it stands, most small communities outside of the country's major economic zones are not aware of SIRIM's role as an enabler of technology and innovation. And yet the country has much to gain from these small communities, whose creativity and industrial activities have been around for decades. The trouble is, how does one find them?

## DISCOVERING INNOVATION

YBhg. Datuk Hajah Jamaliah binti Kamis, Chairman of SIRIM Berhad and once Secretary General in the Ministry of Rural and Regional Development, knows a thing or two about such

communities, and is intent on making sure that the benefits of SIRIM's services reach them.

"SIRIM is already well-entrenched within the industrial sector," says Datuk Jamaliah. "Businesses know that if they need help, they can come to us. Unfortunately, communities do not yet realise that SIRIM is also here to serve them. SIRIM wants to empower the country's people through technology and innovation, but for that to happen, we need to know what they need."

The small and medium business (SMB) community is an organized one, with its myriad associations, forums and interest groups. They have various channels through which they can bring up their agendas and needs to the government. In addition, SIRIM hosts regular seminars and workshops with industry leaders, thus allowing the company to discover ways to improve the SMB community's productivity and efficiency.

However, smaller business communities within the rural and suburban areas do not have the benefit of such organized trade facilitation. They have no

formal means of communicating their needs and concerns to government agencies, and reaching out to them takes some patience and a lot of luck.

“Communities producing everything from batik to brassware have undergone a transformation with SIRIM’s help,” says Datuk Jamaliah. “These communities are now much more ready for the challenges of competition and other market forces, but there are still many more communities out there that need help. How do we discover them? Where are they? These are the questions we need to answer.”

It also takes no small measure of diplomacy and tact in order to handle the community’s resistance to technology and innovation, a challenge that Datuk Jamaliah is all too familiar with. Not everyone wants to embrace progress as readily as SIRIM is prepared to offer it.

“The one constant you can count on is that people will resist change, no matter how beneficial it might be to them,” Datuk Jamaliah explains. “Changing the mindset of our smaller business communities will take time and patience, but I am confident that we will get there in the end.”

**FINDING INNOVATIVE COMMUNITIES**

Datuk Jamaliah’s interpretation of an innovative community is succinct: a community that creates something new that improves their economics and quality of life. For example: in the old days, curry puffs were made by hand, one at a time. These days, they can be made by the hundreds, all with a little help from technology. Such simple examples of how technology can improve their businesses are powerful reminders of what these small communities stand to gain from change.

“Typically, these innovations stem from simple observations that the people there make about the world around them,” explains Datuk Jamaliah. “They watch the way things work, improve upon it and innovate upon it.”

One of SIRIM’s mandates is to act as a vehicle for technology transfer – a vital role for SIRIM as



**DATUK JAMALIAH:** “The one constant you can count on is that people will resist change, no matter how beneficial it might be to them. Changing this mindset will take time and patience, but I am confident that we will get there in the end.”

it empowers community development. SIRIM’s scientists and researchers work day and night to produce innovations and products aimed at improving the lives of communities. But, Datuk Jamaliah warns, what is the use of all this effort if the innovations and products stay in the lab?

“We must ensure that our research is translated into practical, tangible benefits for the people,” enthuses Datuk Jamaliah. “Our commercialisation efforts must be geared towards improving the lives of the people, because that is what we are here for.”

While clever innovations and quality services to the formal business community might seem to define SIRIM’s role to the industrial community, SIRIM’s role in the future of the country actually lies within how all these things ultimately serve the people.

“SIRIM does not exist in a bubble,” Datuk Jamaliah says. “SIRIM’s existence is driven by the demands and needs of the community. We exist because the people want us to exist, because they need us to exist. We should never forget that.”

# A PARTNER FOR COMMUNITY

**SIRIM is one of several agencies offering technological and business expertise under the TAPMOSTI@COMMUNITY programme of the Ministry of Science, Technology and Innovation (MOSTI). President and Chief Executive of SIRIM Berhad, YBhg. Ir. Hj. Yahaya Ahmad talks about SIRIM's approach to TAPMOSTI initiatives, and how the company manages to be so successful at it.**

**T**HE COMMUNITY HAS ALWAYS been very close to the heart of SIRIM Berhad. The company's application of technology is and always has been geared towards improving the well-being of society, particularly less economically blessed communities. There are many avenues which it explores to do this, one of which is the technology application programme promoted by the Ministry of Science, Technology and Innovation (MOSTI).

Called TAPMOSTI@COMMUNITY, the objective of the programme is to help these communities realise how science and technology can increase their incomes and standards of living, thereby reducing their resistance towards development and economic advancement.

"TAPMOSTI projects are aimed at modernising the ideas within these communities and to create wealth for them, either by creating new job opportunities within the community itself or by opening up global markets for their products," explains YBhg. Ir. Hj. Yahaya Ahmad, President and Chief Executive of SIRIM Berhad. "Some of Malaysia's brightest talents actually stem from these fringe communities."

The way it works is quite simple: the local Member of Parliament or state representative hears about an innovative idea within his or her community through the grassroots and asks MOSTI to explore the idea of funding a project to develop the idea. If MOSTI agrees, it will identify the agency which is most suited to the task and provide it a grant to execute the project.

"SIRIM's role is to conduct the necessary R&D work on the product or technology involved and find ways of improving it in terms of quality, safety and marketing," says Ir. Hj. Yahaya. "Once we've done the technology work, we look at the whole business model and create the packaging, branding and promotion campaigns. Then, we provide the community with training and guidance on how to keep the venture running profitably."

Ir. Hj. Yahaya draws upon the example of a community that produces budu (a fermented fish sauce) in Kelantan. It used to pack the sauce in recycled soft drink glass bottles with a monotone sticker on the side, making it unfit for sale in supermarkets or city centres. With SIRIM's help, the community developed a process for packaging the sauce in handy sachets not unlike the kind used

in fast food outlets, and can now sell higher volumes of its produce, and at higher prices.

“With proper packaging, you can sell the same product at three or four times higher the price,” enthuses Ir. Hj Yahaya. “That makes good business sense, however you put it.”

While SIRIM does not actually help entrepreneurs formulate the recipes for their food products, the company can help determine how safe the food is for consumption. By putting it through rigid toxicity tests and other biological processes, SIRIM’s researchers can ascertain whether or not a product can be safely packaged, and if so, for how long. They can also help develop cleaner production techniques, as well as the final packaging for the product.

“Take dried sea produce, for example,” elaborates Ir. Hj. Yahaya Ahmad. “These products are usually left out to dry in the sun, exposed to air pollutants and contaminants from stray animals in the area. We’ve created a facility for drying such produce under more hygienic conditions and are working on the packaging to make the product fit for export overseas.”

**MAKING IT WORK**

The target beneficiaries of SIRIM’s community initiatives are future entrepreneurs, single mothers, indigenous folk and other people in need and worthy of guidance and assistance. Largely, these initiatives are dictated by the needs of industry and society. The company organises dozens of workshops and seminars every year to gather feedback from industry associations and find out what their needs are. Some of these result in TAPMOSTI projects, but many are carried out privately with independent investment.

“Sometimes, as was the case in the HYGEN mini-hydroelectric project (see page 8), the innovation does not directly affect the local economy itself, but it does generate socio-economic development based on the natural resources in the area,” says Ir. Hj. Yahaya. “Most of the time, though, there is some business and industry involved.”



**IR. HJ. YAHAYA AHMAD: “With proper packaging, you can sell the same product at three times higher the price.”**

Besides the ones featured in this issue, SIRIM has a few other projects lined up within the areas of ceramic technology, renewable energy and investment casting. This includes Technology Incubator Centres for arts and crafts and detergents as well as natural vinegar production and sea produce drying technology.

“We’ve developed our own technology for producing detergents, and are actively inviting entrepreneurs to explore the possibility of starting a local range of detergent products,” says Ir. Hj. Yahaya. “We’ve also developed a way to produce natural vinegar from sago in Sarawak, and are seeking business people to commercialise it, too.”

SIRIM’s technology incubation centres also serve as a flatbed for developing entrepreneurs and their products. After a couple of years and once the business is up and running and stable, then SIRIM helps them build their own factory. Again, the objective is to create wealth, although Ir. Hj. Yahaya is quick to point out that SIRIM does not discriminate in the way it selects its business partners.

“We don’t care whether you are a budding entrepreneur or a multinational corporation,” says Ir. Hj. Yahaya. “If you’ve got something worth developing, we can help you do it.” ☺

# COMMUNITY POWER

When it comes to ensuring the success of a rural community development project which requires the community's participation in technology-related initiatives, where does one begin? It is no easy task to find a community that has demonstrated its readiness and commitment to technology development. But that is precisely where the journey begins.

**W**HEN WAITRO BEGAN searching for a suitable site for a community development project in Sabah, little did the people in Kg. Libang Laut realise that their long-held dream of free electricity was about to become a reality.

Assisted by SIRIM Sabah state office representatives and the District Offices of Tamparuli, Pitas, Kota Belud and Tambunan, the WAITRO Secretariat conducted a preliminary study on four districts in Sabah in November 2006. Led by WAITRO Secretary General cum PAV Committee Member Dr Rohani Hashim, the team analysed data on each community's infrastructure, socio-economic background and geography besides other relevant information before coming to a decision. After much deliberation, it was decided that Kg. Libang Laut in the district of Tambunan appeared to be the most suitable site for the project.

## **KG. LIBANG LAUT: A UNIQUE VILLAGE**

The achievements of the community in Kg. Libang Laut is commendable.

At the time of the study, the villagers of Kg. Libang Laut had already invented and built their own hydro-generator to supply electricity to nine houses in the village. The hydro-generator was constructed out of recycled materials such as old car gear-boxes and unused oil barrels.

According to Hamid Jasmin, a school gardener who played a major role in the invention, the generator cost less than RM5,000.00 (USD1,323) to build. The money was donated by all the families in the village. Equipped only with his knowledge in welding and vocational school text books as reference material, Hamid managed to oversee the generator's construction on the bank of the nearby Nunukatan River in five weeks.

## MINI HYDRO-GENERATOR SYSTEMS

With the hydro-generator initiative, the community of Kg. Libang Laut had thus proven their readiness and commitment towards participating in technology development. They were obviously self-sufficient and did not depend upon government subsidies. The village is a fine example of a society determined to improve their standard of living without relying on the government. Nevertheless, it needed support to translate their dream into a reality, which is where WAITRO came in.

### COMMUNITY EMPOWERMENT

WAITRO's Poverty Alleviation Project implementation includes elements of technology

and entrepreneurship development activities, which is just what Kg. Libang Laut needed. With a comprehensive technology and socio-economic development programme in place that provided adequate safety measures and optimum efficiency, the community could create business opportunities and platforms using local agricultural products. With electricity, the technology and new economic activities would ultimately lead to a better livelihood for the community.

"We didn't want to just build a waterwheel for the community," explains Dr Rohani Hashim, Secretary General of WAITRO. "We wanted to give the people the opportunity to improve their standard of living. That is what WAITRO's economic empowerment projects are all about." >>

## THE WATERWHEELS OF KG. LIBANG LAUT



**INGENIUS:** Hamid Jasmin welded together used scrap metal from unused oil barrels to form a crude waterwheel. The waterwheel turns a gear-and-chain system that drives a car alternator screwed onto a wooden platform.

The hydro-generator cost less than RM5,000.00 (USD1,323) to build on donations by the families in the village. On a good day, the system can turn out 2 kW of power, enough to light up nine households in the village. All for free.

**THE NEW HYGENS:** SIRIM engineers designed and installed a breastshot waterwheel system connected to the HYGEM system inside a zinc-and-concrete shed built on the riverbank. The design team also added a control system to the set-up to prevent power surges from damaging the household appliances it was connected to. The new system was also built upon sound engineering principles that maximise the potential energy of the Nukakatan River. The result? A new, larger breastshot waterwheel capable of turning out over 15kW of power – enough to serve over 14 households in the village.



## MINI HYDRO-GENERATOR SYSTEMS

Apart from evaluating the readiness and commitment of the community to participate in a technology development programme, WAITRO also looks at the community's leadership. WAITRO wants to ensure the project will continue beyond its initial involvement.

"You need community leadership that is both strong and well-respected," Dr Rohani continues. "Dr Yusof Jasmin, brother of Hamid Jasmin (the constructor of the original hydro-generator), filled that role admirably well."

Impressed with the Jasmin brothers' waterwheel and commitment, WAITRO Secretariat began their mission to identify sponsors for the project. The team met Dr Faiq Billal, Director of Science at the Islamic Educational, Scientific and Cultural Organization (ISESCO), and convinced ISESCO to be the co-funding agency for the project. After one year of negotiations, ISESCO agreed to help turn the community's vision for a mini-hydroelectric generator system into a renewable energy showcase. WAITRO and ISESCO then appointed SIRIM Berhad to execute and implement the project.

### LOCAL POWER

The team of electrical and mechanical engineers from SIRIM was led by Rohaizat Omar and Baharain Abu Bakar from the Machinery Design section of the Advanced Automation and RFID Centre at SIRIM headquarters along with Haji Khairan Untoh and Rommella Osmad at the SIRIM Sabah state office.

Rohaizat says that what impressed him most about the people in Kampung Libang Laut was their determination to improve their standard of living without asking for a government handout – a sure sign that they had the right attitude.

"Kampung Libang Laut is miles off the national power grid," explains Rohaizat. "People did everything by candlelight, and they had no modern electrical appliances

whatsoever. That they dared to dream of building their own power supply says a lot about their character."

Indeed, that is one of the thrusts of Malaysia's renewable energy efforts: to introduce solar, wind or hydro technology generators to remote areas such as Kg. Libang Laut. In doing so, the government hopes to narrow the knowledge divide between urban and rural folk and ensure that the latter enjoy all the benefits of computers, televisions and other electrical appliances. A steady supply of energy will also allow rural folk to use machines in their industrial activities, thereby boosting their per capita income.

The objectives of WAITRO and the Malaysian Government were therefore neatly aligned for the Kg. Libang Laut project.

SIRIM began by constructing a proper site for the waterwheel as well as a hut to house the mini-



**DR ROHANI HASHIM:** "We wanted to give the people the opportunity to develop a sustainable economic model that could improve their standard of living. That is what WAITRO's economic empowerment projects are all about."

hydroelectric generator. The design team also added a control system to the set-up to prevent power surges from damaging the household appliances it was connected to. The new system was also built upon sound engineering principles that would maximise the potential energy of the Nukakatan River. The result was a new, larger breastshot waterwheel capable of turning out over 15kW of power – enough to serve over 14 households in the village.

### LEARNING FOR THE FUTURE

Phase One of the HYGENS project was completed in late 2009, and SIRIM is now in the final stages of training Hamid and his team in operating and maintaining the new system. Although understandably more complex than the crude system before it, the HYGENS is nonetheless safer and far more efficient than the previous one, not to mention a whole lot more reliable.

Phase Two of the project will kick-off the socio-economic programme planned to be developed by WAITRO and SIRIM for the community to improve their economic livelihood. This might involve the planting and farming of herbal or fragrant plants for formulating essential oils used in cosmetics.

Finally, according to the plan, Phase Three of the project will involve setting up the technology and machinery required to support the herb-and-plant post-harvest processing activities. The processed herbs and plants may be sold to manufacturers of cosmetic products, and with the right systems in place, the community could one day prosper.

This is WAITRO's first Secretariat-proposed hands-on project, and the organisation hopes to turn the hydro-generator initiative into a showcase that can be templated in other countries around the world. If WAITRO can demonstrate that the project is successful, then other WAITRO member countries can adopt the model and develop it in their own communities.



Rohaizat Omar: "That they dared to dream of building their own power supply says a lot about their character."

"The Secretariat is very thankful to Dr Zainal Abidin Mohd Yusof, Vice President of R&T at SIRIM Berhad, for his unwavering support and valuable advice during this project," comments Dr Rohani. Dr Zainal is also a Member of WAITRO Poverty Alleviation Committee. "In fact, the Secretariat is grateful for everyone who was involved in ensuring this project's success, including Mr. Thomas Angor, the District Officer of Tambunan as well as the whole community of Kg. Libang Laut."

Meanwhile, Rohaizat believes the HYGENS in Kampung Libang Laut serves as a workable prototype and technology showcase, and he hopes to improve upon its overall design in the future. He also hopes to be assigned in other community projects in which his team will again have the opportunity to demonstrate the HYGENS's capabilities to power rural villages.

"We learned a lot on this project, and now that we've got the basic design down, we are confident of being able to do it again," says Rohaizat. "It would be a waste to not be able to put our experience to good use again." ☺



# BLADESMEN AND

Few people realise that the Malaysian Parang's sharpness and durability among adventurers and the parang is actually a cultural artform of the extinct. With SIRIM's help, however, blacksmiths

**T**HE ETHNIC BAJAU OF SABAH have been making knives for a very long time. Their art of forging blades has been passed down from grandfather to father to son for over three generations, and the parangs (a type of machete) they produce are practically world-famous. Yet the art of blacksmithing in this East Malaysian state has lost its appeal amongst younger Bajau men in recent years, and the entire industry runs the risk of collapsing under the march of time and tide.

Luckily, the dwindling of the parang artform came to the attention of the Ministry of Science, Technology and Innovation (MOSTI), which quickly recognised that something needed to be done to preserve the cultural heritage of one of Sabah's most famous products. In order to save the ancient art's slide into history, the ministry called upon SIRIM's Foundry Technology Programme to help revive the industry by modernising it and making it more appealing to the younger generation of Bajau.



# ND CRAFTSMEN

g is actually world-famous for its exceptional and outdoor enthusiasts. Fewer still know that the Bajau in Sabah, and that it is at risk of going missing may soon become a prosperous industry.

“The forging of parangs is a cultural artform of the Bajau,” explains Mohd Akhir Yeop Kamaruddin, Head of the Foundry Technology Programme at SIRIM. “However, the younger generation are not interested in learning how to manually forge parangs, so there is a risk that the art may vanish within the next few decades.

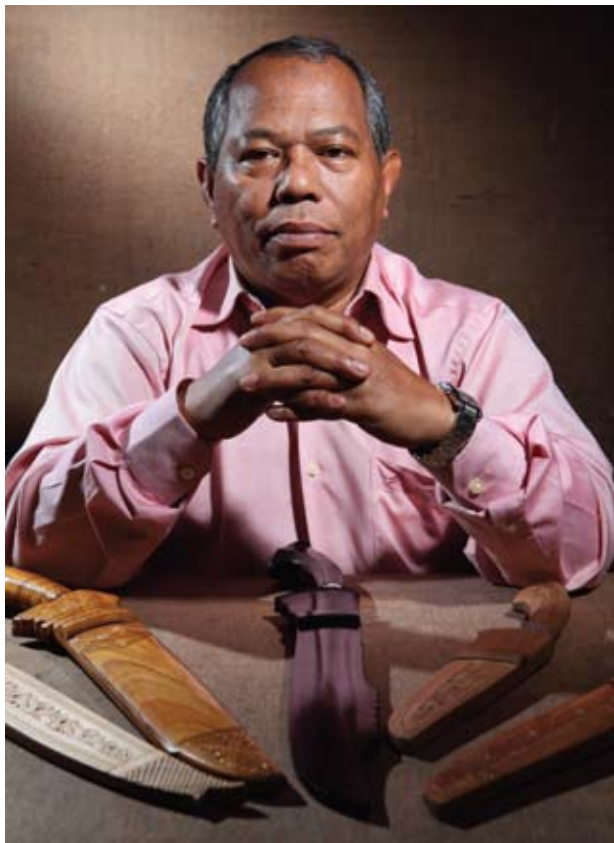
SIRIM’s task was to modernise the industry and make it easier to forge parangs so that the heritage of the Bajau may be retained.

## KNIVES, MACHETES AND MORE

Parang’s come in all shapes and sizes, some barely deserving of the ‘parang’ appellation.

A parang in the true sense of the word is about one foot long and is used for jungle trekking and sacrificial rites. However, the smaller ones are not much longer than kitchen fillet knives, which is precisely what they are used for. Some are up to three feet long and therefore resemble swords >>

## BLADESMEN AND CRAFTSMEN



**MOHD AKHIR YEOP:** “The Bajau have been using hammers and anvils for over three generations, so naturally they were a little hesitant about our modern methods at first. Once they got used to the machinery though, they began to get real excited about it.”

more than machetes, although these are generally only sold as decorative items.

In Kota Belud, Sabah, the parang industry in the sleepy hollow of Kampung Siasai Jaya once depended upon the hammers and chisels of a few aged men to earn a living. Depending upon how well they felt and whether or not they could find



**OVER TO YOU:** YBhg. Ir. Hj. Yahaya Ahmad, President and Chief Executive of SIRIM Berhad (left) handing over the project documents to Jemrin Yusof, Chairman of the Kg. Siasai Jaya Village Security and Development Committee (right).

a suitable piece of scrap metal, the charcoal blower may be fired up once a day or maybe only once a week. Income derived from the sale of parangs at the local market was erratic at best.

Mohd Akhir reckons that the average bladesman is able to manually forge around eight blades a day if he works non stop. However, with the semi-automatic pneumatic hammers and laser wood engravers introduced by SIRIM last year, these bladesmen can now churn out up to 40 blades a day if he wants to.

The modern techniques have also resulted in more attractive and homogenous products that will fetch higher prices, both locally and on the Peninsular – the parangs are shinier, neater and more robustly built, not to mention sharper. SIRIM has also created a brand for the Kampung Siasai Jaya parang and have shown the community how to package their products to make them more appealing as souvenirs for tourists.

“This parang will cost about RM150 out of the factory,” says Mohd Akhir as he holds up a one-foot ebony-wood parang. “It will fetch RM220 at the market in Kota Belud. On the Peninsular, it will sell for as much as RM450. Even if we allow for the odd day off, by quadrupling the village’s production capacity this community is looking at a 50-percent rise in their income from parangs.”

### MODERNISING THE INDUSTRY

Contrary to popular belief, the most expensive part of any parang is not the blade itself, but its sheath and handle – the costliest parangs use a medium hardwood known as Kayu Malam (also known as Marblewood or Sabah Ebony) for these parts, while cheaper parangs may even use discarded construction timber. The sheath and handle is also where the intricate Bajau woodwork carvings are most evident. Some master bladesmen also manage to work their clever art into the steel of larger parang blades.

There are about twenty communities in Sabah that are well-known for their parang craft, and deciding upon which one to choose for this



**WORK OF ART:** These are some of the first blades produced by the bladesmen of Kampung Siasai Jaya with the new gear provided by SIRIM. Notice the “SABAH” branding near the hilt of the parang above, which was done by hand.

Once the bladesmen got the hang to the photoetching process, branding got a lot neater: the image below shows one branded “KOTA BELUD”. The inset shows the “SIASAI JAYA” brand, also made by the photoetching – such fine lines would not be possible otherwise.

particular project was a tough call. Ultimately, however, the master craftsmen in Kampung Siasai Jaya proved to be the ones most open to the idea of modernisation – they had already demonstrated some division of labour in their manual manufacturing processes, and their factory was the best ventilated and most suited to housing the machinery that SIRIM intended to bring in.

Mohd Akhir’s team studied every phase of the parang production process, from the preparation of raw materials to the final polish of the steel blade. Besides the pneumatic hammer and laser wood engraver, they introduced a programmable logic-controlled (PLC) gas-fired furnace to replace the charcoal heating process and a photoetching process to brand the steel blades.

SIRIM is also working on ensuring a steady supply of proper cast tool steel as raw material. Right now, the steel used is generally repurposed

junkyard metal from abandoned automobile parts. While this is admittedly very high quality steel (it’s better than the steel used in any knife found in shops), it is also hard to find – when there is no junk metal, then there is no parang.

“The demand for Bajau parangs is very high, both in Sabah and on the Peninsular. However, the supply is so unpredictable,” complains Mohd Akhir. “Imagine going all the way to Sabah and not being able to buy a parang because they are all sold out!”

### CHANGING MINDSETS

The bladesmen in Kampung Siasai Jaya are just completing their final training with the new equipment and processes introduced by SIRIM. It will not be long before they are able to produce flawless parangs to rival the bolos of England’s Martindale or the kukris of Nepal. >>

### HOW TO MAKE A PARANG



#### 1 SELECT THE RAW MATERIAL

Master bladesmen choose a steel to use. The steel may come from the wishbone suspension springs of trucks or even the steel used on saw blades. SIRIM aims to introduce a supply chain of new cast tool steel.



#### 2 HEAT THE STEEL

The steel is fired up to the eutectic heating point, generally between 650 °C to 700 °C. Charcoal heating (left) rarely reaches this temperature, so SIRIM introduced a gas-fired furnace (right).



#### 5 MAKE THE HANDLE

Parangs do not use the rivet-and-tang handle found on most kitchen knives. Instead, a table splice joint holds the tang in place below the heel of the blade, after which the hilt is bound with steel around the bolster. The handle is made of the same wood as the sheath, and is also intricately hand-carved.



#### 6 BRAND THE BLADE

SIRIM introduced a photoetching process (inset) to replace the old chiselling method of branding the blade, which often resulted in poor quality handiwork, especially among inexperienced bladesmen. The new photoetching process can also be used to draw the intricate patterns on the blade.

It was not like that in the beginning, though.

“The Bajau have been using hammers and anvils for over three generations, so naturally they were a little hesitant about our modern methods at first,” says Mohd Akhir. “Once they got used to the machinery though, they began to get real excited about it. They are still learning how to use it properly, but they are getting better at it every day.”

Already, previously suspicious Luddites in neighbouring villages are slowly coming around to the idea that SIRIM’s technology might be able to help them after all. Several villages have expressed interest in modernising their own parang industry. The problem, as always, is money.

“Our primary objective with this project was to preserve the heritage of parang blacksmithing, and



### 3 SHAPE THE BLADE AND TANG

When the steel is red hot, it is removed from the furnace and literally hammered into shape. The pneumatic drop-forge hammer machine introduced by SIRIM (inset) now does most of this work. The cutting edge of blade is sharpened later.



### 4 MAKE THE SHEATH

Parang sheaths are made from hardwood and are intricately hard-carved. While some may prefer to continue using their hand tools, SIRIM's laser engraver (inset) can ensure homogenous designs for the mass market.



### 7 SHARPEN IT

When the parang is fully formed it is ready to be sharpened. SIRIM's foundry technology team introduced the bladesmen to double-edge grinders and buffing machines to replace their old sharpening waterstones. The blade is also polished to a high shine, as are the handle and sheath.



### 8 PACKAGE IT ELEGANTLY

With the parang complete, all that remains is for it to be attractively presented. The picture above shows the way parangs used to be sold at the market. SIRIM's team came up with a brandname and concept for "SiaSai Jaya Parangs" and created the packaging for it (inset).

in that, we have succeeded," says Mohd Akhir. "But we hope that in the future, the Bajau of Sabah will be able to produce ceremonial swords for our armed forces, which Malaysia now procures from Europe – that's a business worth getting into."

Ceremonial swords such as those described by Mohd Akhir cost upwards of 500 Euros each. If this Bajau community does prove itself capable of

sustaining and improving its parang industry, then it will no doubt attract the interest of private investors interested in turning it into a major business enterprise.

"Modernising this industry will not only preserve the heritage of the Bajau, but also boost the industry of the entire state," says Mohd Akhir. "Private investment will prove it." 🌀

# CERAMIC WONDER

For SIRIM, ceramics technology is about more than just tableware – besides giving one of the world’s oldest forms of art a modern twist, engineers are also using ceramics to save our ocean life.

CERAMICS IS BIG BUSINESS, estimated to be worth about RM1.8 billion per year in Malaysia alone. This covers everything from structural ceramics like roof tiles and pipes, to whiteware ceramics such as tableware and sanitary ware.

It also covers the business of one of the world’s oldest and best-loved forms of art: pottery. Or, in other parlance, ceramics.

Unfortunately, the workhouses of Malaysia’s ceramic artisans are riddled with inconsistencies that make it hard for anyone to take the industry seriously.

“Currently, their production process is very simple,” says Nor Azmah Abdul Kadir, Principal Researcher of the Advanced Polymer and Composites Programme at SIRIM. “They just dig the clay out of the ground, mix it with water and start casting it into a mould. There is no proper method for processing the clay before using it.”

Naturally, this results in poor quality products.

The main reason for the industry’s apathetic approach to production techniques is a lack of knowledge about water-clay ratios and how different mineral content affects the final product.

“Every raw material is different,” comments Nor Azmah. “No two batches of clay are alike, which means you have to change your procedure with each batch of products – more or less water, higher or lower firing temperatures, different glazing methods. *Everything is different.*”

The manufacturing procedures must thus change from job to job according to the mineral composition of the clay, otherwise it is very difficult to maintain a consistent quality of the end product.

“Without consistency, it is very difficult to serve different market segments properly,” explains Nor Azmah. “For example: if we want to produce



**NOR AZMAH ABDUL KADIR: “Without consistency, it is very difficult to serve different market segments properly.”**



**CERAMIC WONDER:** There are basically two types of clay of interest to local potters: ball clay and Kaolin clay, also known as China clay. Ball clay is typically sandy and contains high amounts of silica, while the 'whiteness' of Kaolin clay (picture) depends upon its iron content.

tableware, the ceramic must glaze easily, withstand high temperatures and withstand chipping. If your process is not consistent, how can you be confident that your product will be able to do these things?"

### THE HYDROSTONE TECHNIQUE

Besides conventional pottery, SIRIM is also actively promoting the Hydrostone technique to artisan communities.

Also known as Plaster of Paris, hydrostone's fine, white and exceptionally hard characteristics make it an ideal material for novelty and statuary products such as miniature figurines and pottery. It is also widely used in orthopaedic surgery applications.

"Unlike with clay ceramics, there is very little artistic effort required to make a hydrostone product, which is what makes the technique so appealing to folk with no practical training," says Nor Azmah. "You just mix, pour and wait. And when it's hardened, you paint."

A pilot project for the Port Dickson community was launched last year that will use the hydrostone method to produce souvenirs and novelty items aimed at the town's tourists. Targeted at the community in Kg. Baru Si Rusa, it is hoped that the initiative will become a source of income for

single mothers, youth and housewives, thereby encouraging entrepreneurship among the locals.

Through the programme, SIRIM will provide technical assistance and advice to local entrepreneurs interested in commercialising hydrostone products. They will learn about the raw materials required, designing, modeling, mixing and final decoration and crafting. SIRIM consultants will also teach local entrepreneurs how to make their own rubber moulds and how to use the hydrostone powder.

"This is a good opportunity for the locals to become part of the tourism industry," says YB Tan Sri Mohd Isa Samad, the state representative from Bagan Pinang. "I hope that they can come up with designs that are unique to Port Dickson. It's about time that souvenirs representative of this area are produced."

Tan Sri Mohd Isa points to the rose-and-lavender porcelain of the English as an example of how ceramic products can become world-famous mementoes. With SIRIM's technology and expertise, Tan Sri Mohd Isa hopes that Port Dickson will one day be able to produce souvenirs that are equally distinct and instantly recognisable as the English porcelain sold the world over.

The hydrostone technique requires no additional equipment besides these items and can be completed in the comfort of the artists' homes. Once the product is dry, they can paint it at their leisure, thus allowing them to juggle other commitments. The project's leaders will organise a weekly pick-up to collect the hydrostone products from all the houses in the area and then distribute them at retail outlets throughout the town and along the beachfront.

"What's most important is the design of the products," says Nor Azmah. "We have to make sure that the Port Dickson hydrostone is attractive enough to become a part of the town's identity as a popular tourist destination."

### ARTIFICIAL REEFS

Another one of SIRIM's TAPMOSTI@ Community Innovation projects involves >>

## CERAMIC WONDER

developing artificial ceramic corals that will be used to 'replant' destroyed reefs along the waterlines of Sarawak and Sampoerna in Indonesia. Artificial ceramic corals are ideal for this task because they are natural, porous, non-corroding and very durable.

The project will involve equipping local communities with the technologies and training they need to produce the artificial ceramic corals. It will also require expert deep-sea divers to install the artificial corals in strategic locations.

"The community is excited about the project because of what it means for their environment," says Nor Asmah. "Not only do they get a chance to earn some money, but they get to save their ecosystem, too. I think we'd all like to have the opportunity to do that and get paid for it." ☺



**CERAMICS TO THE RESCUE:** According to the Reef Check Foundation, a non-profit organisation based in the U.S., over 15-percent of the world's reefs have been lost over the past ten years or so. A further 30-percent of reefs are severely threatened. Artificial corals like the ones pictured here will help slow this deterioration.

## THE ART OF HYDROSTONE CERAMICS



The hydrostone powder is mixed with water at a ratio of approximately two parts powder to one part water.



The mixture is poured into the mould a little at a time. The mould should be bounced a little to prevent air from being trapped.



It is sometimes necessary to lubricate the outside of the mould so that it will slide over itself when removing the casting.



Occasionally, a release agent such as soap may be necessary to 'un-stick' particularly stubborn cements.



Sometimes a casting may require some repair work or trimming. Such repairs should be carried out while the casting is still damp.



When thoroughly dry, the surface should first be 'sealed' with a wood sanding-sealer before being painted.

# LEARN SMART

**The Pintar Learning System (PLS) developed by SIRIM is changing the way school children learn by making lessons more fun and interactive.**

**I**N THIS AGE OF FAST-MOVING cartoons and computer games, the attention spans of children are getting shorter and shorter. Ask any school teacher what their greatest challenge is and they will tell you that it is getting their pupils interested in the subject they are teaching.

Recognising the need to adopt a more innovative approach to teaching students, SIRIM developed the Pintar Learning System as a way of bridging the communication gap between teacher and pupil.

The interactive system consists of an electronic whiteboard hooked up to a computer and projector. The teacher can design lectures on the computer, which will then beam the lesson onto the classroom whiteboard. Instructions can then be drawn directly onto the projected images on the whiteboard.

A community project by the Science, Technology and Innovation Ministry, the PLS is implemented through SIRIM to bring technology to the rural communities. It was first adopted by two rural schools in East Malaysia last year, benefitting more than 100 students in the district of Lubok Antu on the outskirts of Batang Ai. In April 2010, four more schools in Hulu Selangor received their Pintar Learning Systems.

“The ministry is playing a strategic role in generating interest and awareness in science, technology and innovation among the young,” said Science, Technology and Innovation Minister YB Datuk Seri Dr Maximus Ongkili at the launch of



**SMARTER LEARNING:** An interactive whiteboard makes learning more fun.

the PLS at Hulu Selangor. “This way, they will get the same opportunity as students in urban schools in using smart learning tools in their classrooms.”

The project is aimed at transferring technology to the community and encouraging students to participate more actively in class.

With the system in place, the schools are now on par with about 50 other schools in the country that have similar systems in place. Under the ministry’s Community Innovation Fund, 11 schools have been identified to receive a PLS system each, six in Sabah and five in Sarawak.

“This is our contribution towards promoting Science and Maths, especially among students in rural areas who must not be left behind,” added Datuk Seri Dr Maximus at the event. “This will also aid in developing our human capital in Science, Maths and Technology.” ☺

# MyKad

## MALAYSIA'S LITTLE GENIUS

MSC Malaysia plays a vital role in helping Malaysians take advantage of one of the country's best technology developments: the MyKad.

**M**ALAYSIA'S MYKAD IS MORE than just an identity card. With its embedded microchip, it can store information such as a person's driving license, passport, and health information. It can also be used for public transport payment systems (Touch 'n' Go) and serve as an ATM card. There are now more than 50 MyKad applications, some of which can be applied to every cardholder.

Text and images: MDeC



**SMART CARD:** There are now more than 50 MyKad applications.

One of the pioneer MyKad projects undertaken by the Multimedia Development Corporation (MDeC) is to work with the MyKasih

Foundation to develop a welfare distribution system for needy families in a community. A fixed amount of cash is credited to the MyKad account of a key member of each household who is responsible for buying essential food items at participating stores. Providing transparency, stakeholders can also keep track of the purchases and ensure that the donations received are properly distributed.

"This shows that the MyKad is more than just a piece of plastic with a chip," explains MDeC Chief Executive Officer, YBhg. Datuk Badlisham Ghazali.

"It is also an invaluable tool that can improve our lives."

MDeC is also currently working with the Federal Agricultural Marketing Authority (FAMA) to increase the efficiency of dealing with farmers nationwide. The e-Pasartani@FAMA system enables FAMA to identify farmers through their MyKads and capture vital information like farmers' locations, farm sizes and types of produce. With this information, FAMA can ensure that there is no over-supply and also eliminate middlemen from the agricultural value chain.

FAMA has taken the programme a step further with the e GeoFarmer@FAMA system, launched at Kota Marudu in Sabah last year. It allows farmers to update their information on FAMA's portal via SMS, thereby making it more convenient to use. The system also groups farmers by parliamentary boundary, thus enabling Parliamentarians to care for their constituencies better.

With so much to go for it, MDeC hopes that more Government ministries and agencies will use MyKad to reach the people in terms of service, distributing aid and subsidies in line with MSC Malaysia's aspirations.

"There are many ways to eliminate red tape by shifting to ICT," says Datuk Badlisham. "Using MyKad is simple, safe and an easy avenue to create innovative solutions for the benefit of the people." ☺

# Handicrafters earn 75% more with ICT

Just like the other Orang Asli (indigenous minority groups), the Mah Meri whom live worlds apart from the modern mainstream, are forced to consider alternatives for extra income. Day in and day out, Maznah anak Unyan diligently makes handicraft products such as bags, storage containers and mengkuang woven mats. The resulting income is however, insignificant – for a month's worth of effort, she only makes 10% of her possible and potential income.

"I used to depend on middlemen and bulk buyers, offering very low prices. But now my group, Tompoq Topoh and I sell our products on the Internet. We can also sell our products all over the world. The value of our products is also much higher compared to what is offered by middlemen. In fact, we even get the remaining 85% of the proceeds after subtracting costs and 5% for our special Mah Meri community development fund. I'm very thankful because ICT has helped us to increase our family economy. I no longer depend on the middlemen buyers. It's very easy with ICT."

**Maznah anak Unyan**  
**Suku kaum Mah Meri**  
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1, Persiaran Dato' Menteri, Section 2, P.O. Box 7035, 40911 Shah Alam, Selangor Darul Ehsan  
Tel : 603 5544 6000 Toll Free : 1-300-88-7035 Fax : 603 5544 6694  
Website : [www.sirim.my](http://www.sirim.my)

