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Chy Pisit, 25, is an Aspire vegetable farmer in Kampong Chhlang Village, Sangkae District, Battambang Province.
The dominance of women attending the recent focus group workshops (73.5% of all participants were women) that aimed to identify adoption constraints conducted by Dr Jay Cummins is reflective of the high participation rates of women in the ASPIRE program. In many instances women undertake the farming operations whilst other family members secure off-farm laboring work to supplement farm household incomes.

If ASPIRE (and other programs) want to influence change in farming practices and management at the farm level, it is important that those farmers who are involved in the training are in a position to influence and manage decisions on-farm.

To achieve these needs, a series of training workshops need to be addressed that aim to raise the farm business and leadership skills required (targeting farming women), whilst a 'farming systems approach' to working with farmer groups should underpin the FNA and development of training and capacity building needs for the groups.

There are a number of other capacity building needs that should be provided to farmers regardless of gender. These include the development of farmer problem solving skills and adopting a ‘farming systems approach’ in terms of how all of the key elements of a successful farm and business management system are developed by farmers.

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Battambang—Chy Pisit, 25, is a vegetable farmer in Kampong Chhlang village, Sangkae district, Battambang province. He does farming on more than 2 hectares of land.

Living with his father and other 8 members in the family, Chy Pisit’s family plants various crops counting from cucumber, long bean, corn, pumpkin and bitter gourd. He is a core person who runs this farm while some others do their own business.

Before joining ASPIRE, he faced many problems such as choosing farming techniques, land preparation, watering systems, pet management, and also to the impact of climate changes. His vegetable production often decline.

“The bad weather makes my production down if comparing with the normal weather,” Chy Pisit said, “I don’t know how to deal with climate change, and it affects to my farm a lot.”

There are 41,046 farmers in Sangkae district, and the ASPIRE programme already selected 766 households or equal to 3,228 farmers [1,530 Females] to provide them with training on agriculture.

“The ASPIRE programme has criteria to select farmers for forming a group: a farmer who volunteers, a permanent resident within the village, enough labor and also must have land for farming,” Chem Chantha, Chief of Sangkae District Agriculture Office, said. “We selected farmers who want to learn new techniques, especially those which are resilient to climate change.”

Chy Pisit is now also a member of ASPIRE programme, and he feels more confidence on his farming business.

Chy Pisit said that after he joined ASPIRE, he has learned how to do a drip irrigation system, prepare land, select seeds, implement integrated pest management, and also how to apply fertilizer.

He mentioned that this new techniques make his life more easier because when he is busy to do other stuffs then even his sister also possibly to help him taking care of the farm.

“My younger sister helps me from time to time. Because of the new techniques that I have applied, espe-

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cially drip irrigation, even a small boy or girl can help using this technique,” Chy Pisit said. Chy Pisit used to grow only two types of vegetables but since he joined the ASPIRE programme, he grows more types of vegetable depending on market demand and his income is also better. “My income also has doubled if comparing between before I joined ASPIRE and since I joined ASPIRE,” said Chy Pisit. In the ASPIRE programme, there are various trainings are provided to farmer, and those trainings are conducted follow to a result coming from a Farmer Needs Assessment. Those training techniques are livestock raising, rice growing, vegetable growing and understanding market demand as well, and the ASPIRE programme wants the farmer to treat farming as a business. “If we are talking about the ASPIRE program, we have clear direction to ensure farmers produce products that can be sold in local and international markets and that farmers are transformed to farming as a farm business,” said Chem Chantha, Chief of Sangkae District Agriculture Office.

Market competition is a big barrier for selling vegetable

BY CHIM LINNA

Around 35 Km from the center of Sihanoukville, most villagers in Tropeang-Sauy village, Andongmor commune, Prey Nob district, Sihanoukville, make their living by growing vegetables.

Mr. Kim Harv, 63, is one of the farmers in the village, and he plants various organic vegetables such as cucumber, long beans, watermelon, morning glory, and winter melon on one hectare of land.

During an Annual Country Portfolio Review from 24 to 26 January 2017, organized by the Royal Government of Cambodia (RGC) and the International Fund for Agricultural Development (IFAD), some participants visited his farm to study more about the market challenges for selling vegetables in his commune.

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• Community shows good opportunities such as infrastructure including access road, nearby local market, and water infrastructure.

• Limited access to agricultural techniques and community using traditional methods for both planting and management are seen as a barrier for them to compete with other vegetable importers in their local market.

• The buyer prefers cheap product, they don’t even care where those vegetables coming from

Based on observations and interviews with some farmers and vegetable sellers, the team concluded that the community shows good opportunities for marketing, such as good infrastructure, including access by road, a nearby local market, and acceptable water infrastructure. Production is diversified; they can plant rice during wet season and other vegetables in dry season.

Limited access to improved agricultural techniques and the use of traditional methods for both planting and management are seen as barriers for these farmers to compete with other vegetable importers (importers) in their local market. Producers can distinguish the higher quality of organic local products from imported products while most of buyers cannot.

There is no mechanism to ensure uniformity of community products even though it affects market price.

“It is hard to sell our vegetables because the imported vegetables from elsewhere, especially neighboring countries, are cheaper than ours,” said Sok Sophart, 29, Vegetable Seller in Andongtmor commune.

“The buyer prefers a cheap product. They don’t even care where those vegetables are coming from,” she added.

Answering the team’s question on how he proves to the buyer that his products are organic, Mr. Kim Harv said that he grows vegetables without using chemical substances, and he can only show this by their better quality compared with the imported product.

“The organic vegetable, if...
talking about the cucumber, it can be harvested after 40 days and is smaller than a chemical one. And its shape is not really nicer than the imported product," Mr. Kim Harv said. So it is difficult to demand higher prices for the organic local product.

Dr. Mak Soeun, Deputy Director General of General Directorate of Agriculture said that Mr. Kim Harv or other farmers can apply to get a Good Agricultural Practices (GAP) certification by asking to the Provincial Department of Agriculture, Forestry and Fisheries (PDAFF).

“If his vegetables meet PDAFF selection criteria, then we will provide GAP stickers to stick on his product. That way the buyer will know his product is an organic vegetable,” Dr. Mak-Soeun added.

There are only 4 middlemen who come to collect vegetables from farmers in the commune and bring them to sell in the local market. Per day, one seller can sell around 200 kg to 300 kg of cucumbers for 1000 riels per Kg.

“Normally, we can sell cucumbers for 1000 riel per Kg, but when there are lots of cucumbers on the market, the price drops to 500 riel,” said Ms. Kim Houn, 33, Vegetable Seller in Andongt mor commune. She also mentioned that between middlemen and 

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During the opening session, H.E. Dr. Hean Vanhorn said that the exhibition should be celebrated at least once a year. And, even without any support from the ASPIRE programme, the exhibition should be continued.

Phnom Penh—Under the Agriculture Services Programme for Innovation, Resilience and Extension (ASPIRE), the General Directorate of Agriculture (GDA) organized a National Agricultural Extension Exhibition in Phnom Penh on December 28, 2016.

Presided over by H.E. Dr. Hean Vanhorn, Cambodian Government delegate in charge of General Directorate of Agriculture (GDA), the exhibition aimed to collect extension materials from relevant stakeholders who have been working on extension service delivery to farmers. There were 25 booths to display the extension materials, set up by different institutions, including Government Institutions, TSSD, IRRI, FAO, CARE International in Cambodia, CE-DAC, SNV, ADB, World Bank.

On the campus of GDA, there were 25 booths to display the extension materials, set up by different institutions, including Government Institutions, TSSD, IRRI, FAO, CARE International in Cambodia, CE-DAC, SNV, ADB, World Bank.
The exhibition proceeded well and it also provided an opportunity to Department of Agricultural Extension (DAE) team to enhance the collaboration with other government agencies, the private sector, local NGOs and International NGOs as well as other extension service providers.

The Agricultural Extension Advisory Committee (AEAC) of the Ministry of Agriculture, Forestry and Fisheries (MAFF) will play major role in the review and endorsement of the extension materials. The important goal is to ensure good quality extension materials are available for Cambodian farmers. The extension materials should integrate climate resilience, farm business, gender mainstreaming, inclusion, etc. A soft-copy of each item of extension material will be uploaded to the extension web portal, www.khera-grri.info.

According to the National Agricultural Extension Policy, improved quality of extension materials is very important for farmers to gain climate-adaptive capacity and profitable farm business.

- They also displayed many extension materials such as banners, books, booklets, posters, leaflets, CD/DVD videos, and so on.
- There were around 250 participants including 93 females participated in this event.
- Improved quality of extension materials is very important for farmers to gain climate-adaptive capacity and profitable farm business.

Vision, Heifer Cambodia, CARDI, Vimean Angkor Vita Co. Ltd, Huy Yun Company, Angkor Green, Village Natural Agricultural Products, ASA, Hoang Long Me-kong Group Plc., Fertilizer Ex-M Cambodia, etc. They also displayed many extension materials such as banners, books, booklets, posters, leaflets, CD/DVD videos, and so on. There were around 250 participants, including 93 female participants.
Increasingly technology is modernizing the agricultural value chain from the field to the table, but there's still room for Cambodia’s agricultural sector.

CE-SAIN will foster education, “cutting edge” agricultural research and training as well as initiate private sector innovation and public sector development with the goal of improving food and nutritional security nationwide.

CE-SAIN’s budget will amount to $3.5 million in funding over the next five years.

By Safiya Charles and with additional notes from Dr. Renato M. Lee, ASPIRE Programme Advisor/Team Leader and Dr. Manuel R. Reyes, Coordinator, Sustainable Intensiﬁcation Innovation Lab (SIIL), Center of Excellence on Sustainable Agricultural Intensiﬁcation and Nutrition (CE-SAIN)

As rice farmers struggle to cope with the aftereffects of one of the worst droughts in Cambodia’s recent history and moribund infrastructure makes it difficult to transport and sell their products across the country, universities here and in the United States are joining forces to help farmers improve and look to the future.

In a bid to improve cross-sector collaboration and strengthen institutional capacity building, the Royal University of Agriculture (RUA) and the United States Agency for International Development (USAID) signed an MoU yesterday recognizing the establishment of a new center aimed at spurring innovation and sustainable growth throughout the country’s rapidly developing agricultural sector.

According to USAID, the Center of Excellence on Sustainable Agricultural Intensiﬁcation and Nutrition (CE-SAIN) will foster education, “cutting edge” agricultural research and training as well as initiate private sector innovation and public sector development with the goal of improving food and nutritional security nationwide.

The project falls under USAID’s Feed the Future (FTF) initiative, which works in 19 countries to help improve food security and fuel agriculture-based innovation. In total, CE-SAIN’s budget will amount to $3.5 million in funding over the next five years.

One important focus of the program will be providing vocational and non-degree training to farmers and professionals in the agroindustry, filling in technical gaps with specialized information.

US Ambassador to Cambodia William Heidt welcomed the occasion as an expansion of the two governments’ partnership in an agricultural sector growing towards modernization.

"Increasingly technology is modernizing the agricultural value chain from the field to the table, but there’s still room for Cambodia’s agricultural sector to grow further and become more competitive in the region and around the world...[it] has the potential to be an engine for economic growth, rural development and to strengthen food security," he said at the launch.

The center will connect a network of FTF’s hubs or innovation labs working in the initiative’s identified zones of influence – concen-
CE-SAIN Collaborates  ...Continued from Page 10

Trated mainly in the provinces surrounding the Tonle Sap – on primary value chains. The six innovation labs include sustainable intensification, nutrition, integrated pest management, horticulture, livestock systems and aqua fish innovation.

Michael Roberts, country director at iDE, which runs an innovation lab focused on pest management and horticulture, said the project had the capacity to help ensure greater collaboration between labs which have faced difficulties connecting and sharing knowledge with innovation labs and Cambodian institutions, among other organizations.

“The creation of this center is a really great idea in terms of bringing together all of the different research activities that are happening because otherwise, they could be very disjointed. This kind of creates an opportunity to coordinate and bring everything together so that things are working in harmony instead of all over the place,” Mr. Roberts said.

Agriculture, Forestry and Fisheries Minister Veng Sakhon gave the ceremony’s opening speech and emphasized the supreme importance of the program’s human resources – the RUA students who will become the country’s next agricultural pioneers.

“Innovation is essential in the potential for fostering national economic growth...the university needs to [educate] students to adhere to a culture of research and innovation – this will be the culture of the new generation,” he said.

Through international academic exchange programs with US universities such as Kansas State, Virginia Tech and Michigan State, CE-SAIN will attempt to foster the exchange of knowledge, research and creativity between agricultural students and faculty from Cambodia and abroad.

“[CE SAIN] is going to help link the Royal University with some of America’s best agricultural universities – and that’s important to bring that scientific expertise, the connection between Cambodian scientists and American scientists so that we can improve research here in Cambodia,” said Mr. Heidt.

In addition to nurturing international cooperation, the program will establish five “technology parks” in agro-ecological zones in Phnom Penh and across the provinces of Battambang, Siem Reap, Kampong Cham and Kampong Thom.

The techno-parks will serve to showcase new and promising strategies and technologies that could benefit small-holder farm production as well as attract interaction between the private-sector, researchers and growers.

While challenges such as building applied research, improving post-harvest infrastructure and increasing financial services in rural areas must be faced as the agriculture sector continues to expand, the ambassador said the center was just what the industry needed.

“That’s where this Center of Excellence will come in, by tapping into the knowledge of premier universities like the RUA. Research centers like the one we are launching today can drive innovation in agriculture by coordinating research, raising funds and connecting [that] research to practical applications.”

CE-SAIN and ASPIRE Partnership

Recently, Dr. Manuel Reyes, Coordinator for CE-SAIN SILL has discussed with Dr. Renato M. Lee, ASPIRE Programme Advisor and Team Leader, on additional collaboration arrangements with CE-SAIN and ASPIRE. Dr. Manuel Reyes commented that “IFAD-ASPIRE

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and USAID CE-SAIN will do good in Cambodia. I am excited with our partnership. The global one just shows the extent of research we have done on CA and vegetable production. The other three are researches we did or are doing in Cambodia (seed broadcaster we succeeded last year but will retest this year). I am very confident that CA will work for Cambodia. Cambodia will be the leader in CA and sustainable agricultural intensification and nutrition in Southeast Asia. I know because I have seen literature and Cambodia is the only country this advanced and with a growing young agricultural professionals being trained or trained in CA.”

IFAD’s ASPIRE and USAID’s CE-SAIN with RUA:

The following are the additional collaboration arrangements between ASPIRE and CE-SAIN as proposed by Dr. Manuel Reyes:

1. “Hands on certification internship training on ‘appropriate scale mechanization’ for small agricultural machineries.

I just visited the CE-SAIN Technology Park at MAFF Bok Knor research station and the successes of lowland rice production under conservation agriculture (CA) no till mulched based systems. As a scientist engaged in this research, I can confidently attest we are ready to conduct training on this technology. A major bottleneck in adoption will be agricultural machinery.

1) For agricultural machinery we need: capacity for Cambodians to experientially learn agricultural machineries for this new agriculture. Also 2) Experiential CA training (science and how to do it, and why) needs to be packaged as a training module.

3) enabling policies must be done for CA adoption in Cambodia. Note we can package CA training for lowland rice, CA training for upland maize and cassava and soybean and CA training on commercial vegetable home gardens. All these can be done through RUA and we can conduct the training in the five CE-SAIN Technology Parks.”

2. “Hands on certification internship training on mechanization for large precision agriculture machinery.

SOMA (Cambodian owned agricultural company) is importing top Trimble laser leveling machinery in Cambodia and it is arriving no later than June. In addition they will have six meter CA-no-tillage planters/drills for lowland rice production. I talked with the Head Agriculture of SOMA (Rod Bassett) and he said private companies (not only SOMA) will need at least 1000 highly trained Cambodians to operate this machineries and also understand CA technology. Hence, we are proposing identifying top graduates from RUA and the University of Battambang and other agricultural universities who can join the private teams. We can conduct an internship module (very experiential and hands-on) and through requirements by private sector, set-up this internships in the companies. The companies can purchase agricultural machineries but who will operate them, hence this training internship provides this opportunities. In the beginning, trainers will be from countries who knows how to operate these machineries (i.e. Australia and USA). They will train Cambodians who will then be certified to do training of other Cambodians satisfying the needs of the private sector.”


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Research has been done in Cambodia by French/Cambodian teams and started in 2004 and Cambodia/French/US team starting in 2010. Hence, we are confident that CA works. We are therefore proposing an ASPIRE and CE-SAIN partnership for certified extension modules to be developed on CA and training trainers to teach these modules. The modules are EXPERIENTIAL/ACTUAL not only classroom. Hence it will be an internship training. MAFF supports CA, hence we can move CA extension training forward through ASPIRE and CE-SAIN partnership. We can package CA training for lowland rice, CA training for upland maize and cassava and soybean and CA training on commercial vegetable home gardens. All these can be done through RUA and we can conduct the training in the five CE-SAIN Technology Parks.”

In summary, the following will be undertaken:

1. ASPIRE and CE-SAIN/RUA collaborate with MAFF on developing training modules on small scale CA, and CA and small machineries for farmers.
2. ASPIRE and CE-SAIN/RUA collaborate with private sector on training modules for large scale CA, and CA and precision agriculture large scale machineries.
3. CA training on lowland rice and upland maize, cassava, soybean and other upland crops; and CA training on commercial vegetable home gardens.

Among other activities, the project will support 1,370 Smallholder Learning Groups (SLGs), with approximately 25 members each, as well as about 2,500 farmers outside of these SLGs. These groups will be selected in three phases, with 360 SLGs already formed as part of the first cohort in 2016. These 360 SLGs are located in five target provinces: Battambang, Kampong Chhnang, Kratie, Preah Vihear and Pursat.

This baseline survey was by

SBK Bares Baseline Study Results for ASPIRE

ASPIRE (Agriculture Services Program for Innovation, Resilience & Extension) is being implemented by the Royal Government of Cambodia (RGC) and the International Fund for Agricultural Development (IFAD) beginning since March 2015. ASPIRE is planned as a seven year national-wide program with the objective that by 2021 an enhanced Cambodian Model of Agriculture Extension (CMAE) adopted as policy and demonstrated as effective for assisting smallholder farmers to contribute to broad-based economic growth through profitable and resilient farm businesses.

Delegation from IFAD and ASPIRE met with farmers at Kampong Chhnang province
conducted SBK Team of Researchers among a sample of these 360 SLG members formed as the first cohort. Baseline surveys will be conducted later in 2017 for the new SLGs formed under the second cohort and again in 2018 for the third cohort. The sampled SLGs for each of the three baseline surveys will be re-interviewed after three years of support from the project (i.e.in 2019, 2020 and 2021 respectively) to assess the impact.

Sample and timing
The TOR for this survey provided for the selection of 340 sample respondents from among the first cohort of 2016 SLG members. A geographical cluster-basis was used; 34 clusters were randomly selected from among the target villages of the SLG members and 10 members were randomly selected from each cluster. A questionnaire was developed, in collaboration with ASPIRE secretariat and with inputs from IFAD. This questionnaire was administered by a team of enumerators, supervisors and quality controllers from the consultancy firm, SBK, in February 2017. The completed questionnaires were entered in SPSS and this report is the output from the data analysis of the responses to the questionnaire.

Summary of key findings

HH assets
A total of 1,714 different types of assets were reported by the 340 SLG members interviewed, giving an average of just over 7 items per HH. The average value per HH for these assets was $2,277. This average value of assets is quite high if compared to the average value of assets per HH from the baseline and mid-term review (MTR) surveys of the PADEE project — at the baseline stage, the average value was $761 and at the MTR it had increased to $1,176.

Land & irrigation
The majority of HHs have agriculture land; only 8 HHs had no land. Most of the agriculture land available to HHs is owned by them (90%), with the remainder leased, borrowed or shared. The average land size owned by HHs is 2.91 hectares and the average land used per HH is 3.09 hectares. Of the 332 HHs with agriculture land, 242 HHs (73%) said they have access to some form of irrigation for at least part of their land. Compared to other surveys conducted by SBK in recent years, this percentage of 73% is quite high. For example, at the base line survey stage of the PADEE project, only 50% of HHs had access to irrigation (and this had dropped to 47% by the mid-term review stage). The majority of HHs irrigate their land from secondary canals. Only 16 of the HHs with access to irrigation water pay for this water (7.8% of HHs with irrigation). The forms of payment vary, with the majority paying by the number of hours of usage.

Agriculture production
Seven types of agriculture production activities were undertaken by the HH members of the SLG mem-

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A total of 979 hectares of rice was produced by the 301 HHs in the last year, an average of just over 3 hectares per HH.

Cash crops were not widely grown by many of the SLG members’ HHs; only 97 HHs (29%).

The average cost per hectare for most crops was similar, at between 800,000 to 900,000 Riels.

The majority of rice grown is low land wet season rice and most HHs only grew one time in the last year. A total of 979 hectares of rice was produced by the 301 HHs in the last year, an average of just over 3 hectares per HH. The average cost per hectare for rice, from land preparation stage to harvesting and transporting to the final destination (home or selling point), was just over one million Riels. Of the 979 hectares planted, 122 hectares (or 12%) was damaged (or partially damaged) before harvesting from a combination of drought, floods and insect damage. Average yields from the rice harvested were 3,173 kg/hectare for the lowland wet season and 3,449 kg/hectare for the dry season rice. These average yields appear to be quite good compared to the overall average yields in Cambodia for wet season rice but low for dry season rice (MAFF annual report 2015-2016 gives these averages at 2,827 kg/hectare for wet season rice and 4,422 for dry season rice). Most of the rice harvested was sold (almost 75%). HHs kept 19% for consumption, almost 6% for seed and a small portion was given to others (less than 1%). The average price for rice sold was relatively low (729 Riels per kg).

**Cash Crop growing**

Cash crops were not widely grown by many of the SLG members’ HHs; only 97 HHs (29%). Five crop types were most prominent among the variety of crops grown—cassava, corn, peanuts, sweet potatoes and sesame. The total area planted in 2016 was 96 hectares. The average cost per hectare for most crops was similar, at between 800,000 to 900,000 Riels, except for peanuts which cost over 1.3 million riels per hectare to produce. The average yields for these five main crops were: cassava 9,272 kg, corn 2,063 kg, peanuts 1,929 kg, sweet potatoes 6,688 kg, and sesame 479 kg.

**Vegetable growing**

As mentioned above, 116 HHs (34%) grew some...
kinds of vegetables. Twenty six different types of vegetables were grown by these HHs. However, nine vegetable types account for the majority of vegetables grown. These are Cucumber, Morning Glory, Cabbage, Long beans, Sponge gourd, Pumpkin, Eggplant, Chi Neangovong (a leafy herb), and Wax gourd. On average HHs spent relatively small amounts of money on vegetable growing, about 270,000 riels (less than $70 per year). A total of almost 90 tons of vegetables were harvested, giving an average yield of about 1 kg for each m² planted. In spite of relatively low expenditure, but due to low sales prices, profits made from each of the main vegetable types were quite modest, averaging at about 700,000 riels per HH over the last year.

**Fruit production**

Fruit production was relatively small scale. Only 42 HHs (12%) grew some fruit and only 10.95 hectares was planted in total. The average expense per HH was relatively small, just under 350,000 riels ($85) per year. A total of 29 tons of fruit was harvested which averaged at over 2 tons per hectare. The average income per HH was almost 800,000 riels, giving an average profit per HH of almost 450,000 riels ($112) for the year.

**Fishing/fish raising**

Only 48 HHs (14% of all HHs) engaged in some forms of fishing or fish raising. The majority of them fish from natural water sources (only 3 HH had ponds). As those fishing from Natural water sources did not spend money on market food, the cost of raising fish to them was low (just over 200,000 riels per HH). They got average income of 650,000 riels per HH in the last year; it was less profitable for those with ponds at only 370,000 riels/HH.

**Livestock production**

Of the 340 HHs interviewed, 296 of them (87%) raise some types of livestock. The type of animal most commonly raised is chickens; the next is cows. There was a big drop in stocks of chickens and ducks over the year due to high mortality rates (33% for chickens and 20% for ducks). HHs raising pigs had the highest average expenditure (1.3 million riels/HH) but those HHs also go the highest income from livestock sales (average of 3.2 million riels/HH in the last year). The average income for all HHs raising livestock was 2.6 million riels.
A pioneering agricultural institute based in the Philippines, developed higher-yield varieties of grain and introduced new systems of irrigation and fertilizer.

A rice variety that had a yield double that of normal rice, was less susceptible to disease and more responsive to fertilizer.

Today, experts say, Cambodia's yields have risen from 1.35 tons per hectare to 2.5 tons per hectare.

The kernel of that research was first planted in the 1960s, when scientists at the International Rice Research Institute (IRRI), a pioneering agricultural institute based in the Philippines, developed higher-yield varieties of grain and introduced new systems of irrigation and fertilizer. Thus was born the Rice Revolution.

Of particular importance was IR8, a rice variety that had a yield double that of normal rice, was less susceptible to disease and more responsive to fertilizer. Dubbed the "miracle rice," it has been credited with averting massive famine in India, Africa, and throughout the developing world in the 1970s.

Cambodia is home to one of the Green Revolution's greatest successes. In 1969, Cambodia's annual rice production was 4 million tons a year, a healthy output. But by 1980, the 6 million people who had survived the Communist Khmer Rouge era, from 1975 to 1978, were on the brink of starvation. By 1997, however, Cambodia had been virtually reborn: its rice fields were producing nearly as much rice as they had in 1969, but on half the land, making the country rice self-sufficient once again.

The rebound was the result of a collaboration between the Cambodian government, the IRRI, and the Australia government, which together invested millions of dollars in irrigation, infrastructure, and fertilizer beginning in 1987. They also trained 1,300 scientists and support staff to revitalize the country's agricultural system. And the new high-yielding rice varieties allowed farmers to produce more on less land.

Today, experts say, Cambodia's yields have risen from 1.35 tons per hectare in 2006 to 2.5 tons per hectare in 2007. It produces...Continued from Page 16
Although Cambodia's yields have doubled in the last 30 years, they are only almost half that of Thailand and Laos.

The recent global food crisis has sharply underlined that, despite the Green Revolution's benefits, many countries are simply not able to produce enough food for their exploding populations.

Even if the biggest production advances have already been achieved, that doesn't mean scientists are giving up.

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The Green Revolution: As world grasps... Continued from Page 17

enough to export – more than a million tons during that year – but recently imposed export controls to ensure it has enough for its own people.

Still, as Cambodia also illustrates, scientific advances will only take rice production so far. Although Cambodia's yields have doubled in the last 30 years, they are only almost half that of Thailand and Laos (where better soil conditions, seed varieties, climate and management make for higher outputs). Meanwhile, weeds here still cause rice yield losses of up to 30 percent, and poor seed quality in some areas means that 160,000 tons of rice rot every year, according to a report by the IRRI.

"There are still many problems that need to be addressed – problems from climate change and market changes," say Mr. Sarom. Scientists also warn that the amount of land being farmed – especially in the developing world – has not increased substantially in the last two decades. Urban sprawl and industrial development continue to compete for farmland.

"Even here in Thailand [the world's largest exporter of rice], even if they wanted to, they can't produce more rice. There isn't much more farmland, and the production level is also already pretty high," says Paul Risley, a spokesman for the World Food Program in Thailand.

The recent global food crisis has sharply underlined that, despite the Green Revolution's benefits, many countries are simply not able to produce enough food for their exploding populations.

But even if the biggest production advances have already been achieved, that doesn't mean scientists are giving up.

CARDI, continues to develop new varieties that can produce better quality rice and withstand inclement weather. Sarom says research is already pointing the way to higher rice yields. "In America and Australia, you have yields of six to eight tons of rice per hectare. Why not here? We still have the potential to increase productivity," he says.

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And around the world, research still offers the promise of better yields. For example, hybrid rice, a blend of three kinds of rice, grows faster, is more disease resistant, and produces 20 percent higher yields. Hybrids are only just starting to catch on: 800,000 hectares were planted in Asia outside of China between 2001-02, but only 1,000 in Indonesia, for example, and only 20,000 in Bangladesh, according to the Food and Agricultural Organization of the United Nations (FAO). The expanded use of hybrids has particular promise for food security, the FAO adds.

The current food crisis may be creating an investment environment for a second Green Revolution, some analysts say. By averting massive famine, the first Green Revolution helped create an impression among world leaders that investments in agriculture were no longer as vital. Many countries stopped spending on agricultural development. That may be starting to change as Malaysia, the Philippines, and China have in recent weeks announced plans to boost...
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Six FtF Innovation Labs (ILs) are currently active in Cambodia and working in the identified zone of influences (ZoI) on primary value chains identified the FtF-Cambodia. These include: Sustainable Intensification Innovation Lab, Horticulture Innovation Lab, Integrated Pest Management Innovation Lab, AquaFish Innovation Lab, Nutrition Innovation Lab, and Livestock Systems Innovation Lab. The common goal of the ILs is to conduct research and capacity building activities to address food and nutritional security in Cambodia. Some of these ILs have proven technologies that are ready for scaling by developmental partners. However, there is a lack of coordination between ILs, USAID/Cambodia, and Cambodian institutions and other partners to communicate and share knowledge. This has been due to the limited scope of the ILs’ activities, which did not include resources for the transaction costs associated with communicating and collaborating with ILs and organizations outside of their primary partnerships. Local universities and research organizations also have limited resources to better utilize and leverage IL activities to improve their own research and training capacity. Therefore, CE-SAIN will be the hub for leveraging, synergizing, and coordinating of Innovation Labs, other donor projects and public and private institutions on ‘sustainable agricultural intensification and nutrition’ theme.

2. Build human and institutional capacity of the Royal University of Agriculture

As Cambodia’s primary agricultural university, RUA provides an important focal point for capacity development on research, education, and administration. CE-SAIN will draw on the expertise and outputs of the ILs, that could strengthen the capacity of RUA in several areas:

i. Increase faculty education, research and extension capacity through long term training and degree enhancement.

ii. Create a business/innovation incubator associated with RUA to better train and connect students and faculty to private sector agri-business networks. The mission-supported innovate project, primarily focused on capacity building activities, could provide essential support.

iii. Foster a rich opportunity for strengthening RUA’s capacity to deliver vocational and non-degree training to extension professionals, government and NGO employees, and

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farmers through the many US universities involved in Innovation Lab activities. This would fill specific gaps in the knowledge of working professionals and farmers.

iv. Provide technical expertise and research opportunities in the areas of sustainable agricultural intensification and nutrition related to horticulture, rice, livestock and aquaculture production. Technical areas will likely include geospatial analysis (GIS), mechanization, nutrition, pest management, agricultural economics and marketing, and soil health.

v. Develop educational programs (courses, curriculum, and training) for secondary and tertiary students.

3. Establish a Technology Park to showcase high-potential strategies and technologies that sustainably intensify smallholder agriculture production systems

Technology Parks have been successfully established by other USAID projects to demonstrate new and promising technologies and strategies, attract private-sector participation within research and farmer networks, and to organize innovation fairs, field days, and workshops. Technology Parks offer the opportunity to demonstrate individual technologies within a systems context in a field setting. CE-SAIN will build five technology parks in different agro-hydro-ecological zones in Cambodia located in Battambang, Kampong Thom, Kampong Cham, Siem Reap and in Phnom Penh.

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