

The Ministry of Education, Youth and Sport of the Kingdom of Cambodia has given approval to the Maddox Jolie-Pitt Foundation (MJP) to create 'Eco-Ranger Clubs' in four target schools in the district of Samlaut, Battambang province.

This book is part of the 'Eco-Ranger Club' initiative and will teach children about integrated pest management (IPM) in crops and the positive impact on the environment. IPM is aimed at reducing pesticide use, which will benefit the environment and human health. Children are very good at understanding environmental issues like this and take the messages home to their parents.

Further books in the series are planned to teach the environmental benefits of reduced cultivation and burning in crop production, and also the value of preserving wildlife that live around the village.

Stop the buying of illegal timber and wildlife. Help preserve Samlaut Protected Area for all generations.

Stephan Bognar, Executive Director MJP



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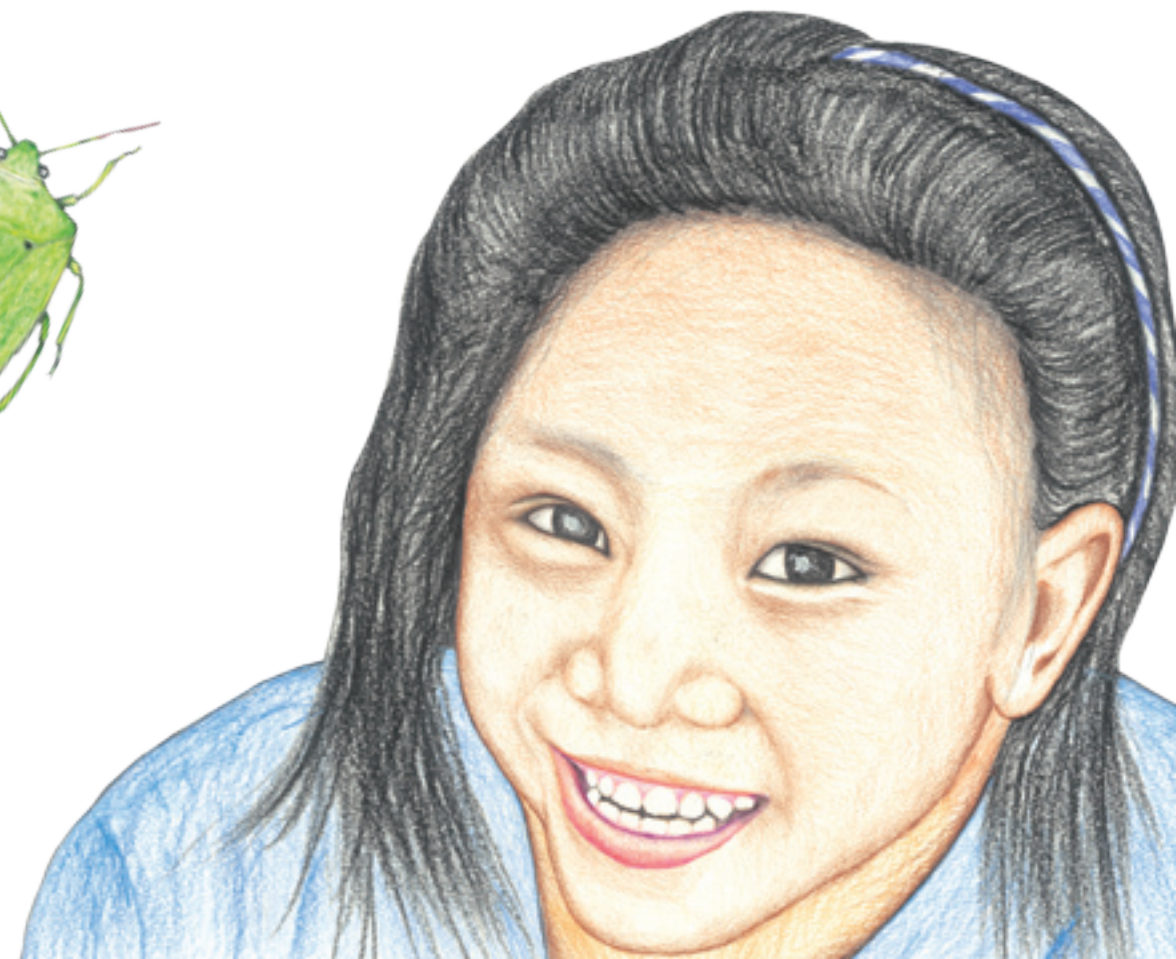
Jorani and the green vegetable bugs



**Bob Martin
and
Deborah White**



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GPO Box 1571, Canberra ACT 2601, Australia
Telephone: 61 2 6217 0500
aciarc@aciarc.gov.au

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INTRODUCTION

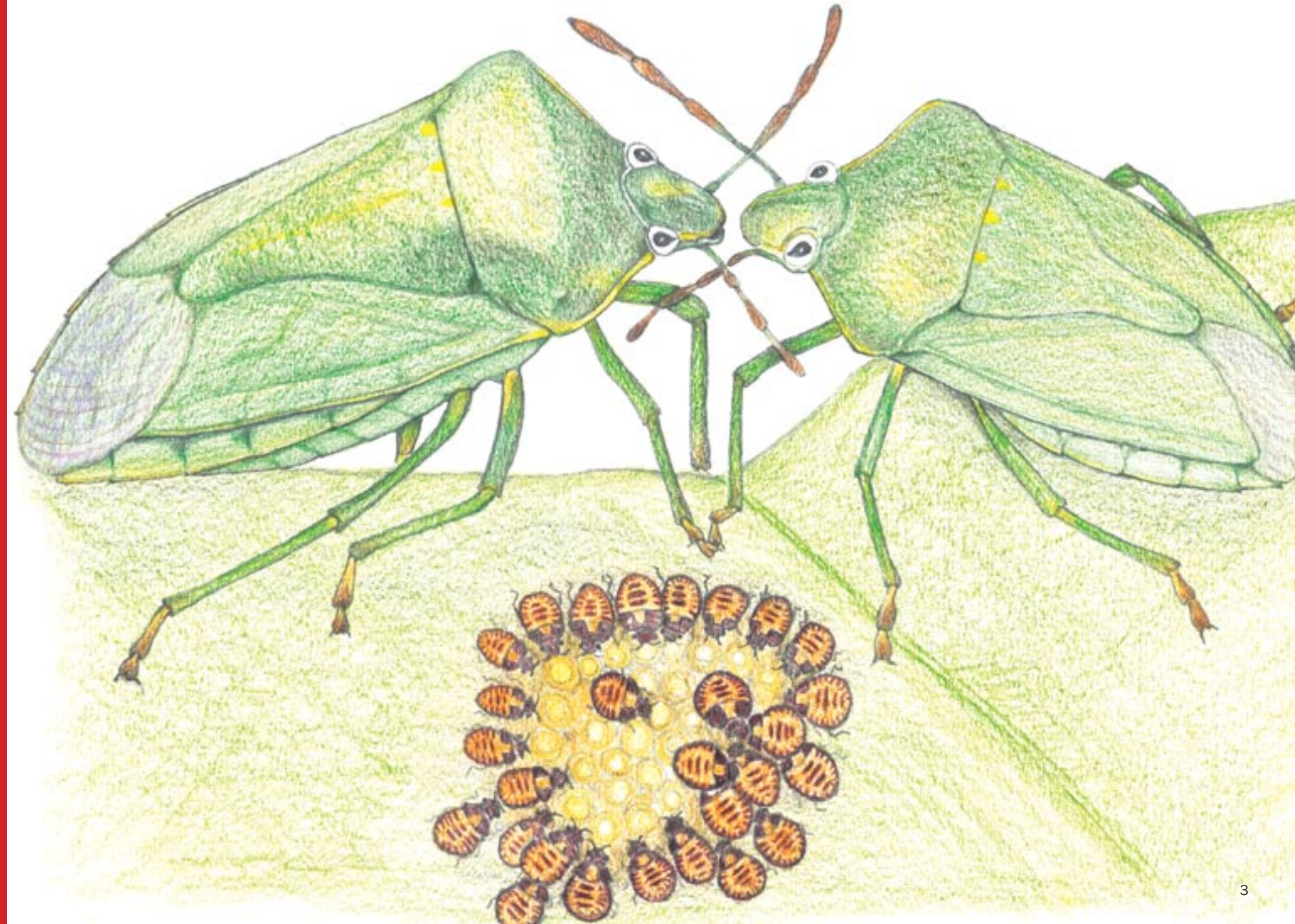
Many Cambodian farmers grow soybean crops. Problems occur when insect pests infest these crops. Among the worst pests are green vegetable bugs, which suck the sap from soybean pods.

Farmers often turn to pesticides, but they do not always use them safely because the labels are usually not written in the local language, Khmer. As a result, many farmers are unsure of how much chemical to use or how often they need to spray their crops. They also don't know what protective clothing to wear or what precautions to take to avoid contaminating themselves and the environment.

The problem is made worse because few farmers regularly tend their crops to check if the insects they can see are actually causing damage. Instead, they spray all insects. This can cause more harm than good if beneficial insects that eat crop pests are also killed.

This story, set in the village of Samlaut in north-western Cambodia, is about an alternative to excessive spraying of soybean and other crops. Called integrated pest management (IPM)*, it can reduce the need for pesticides to control insects in crops.

* See page 47 for more information on IPM.





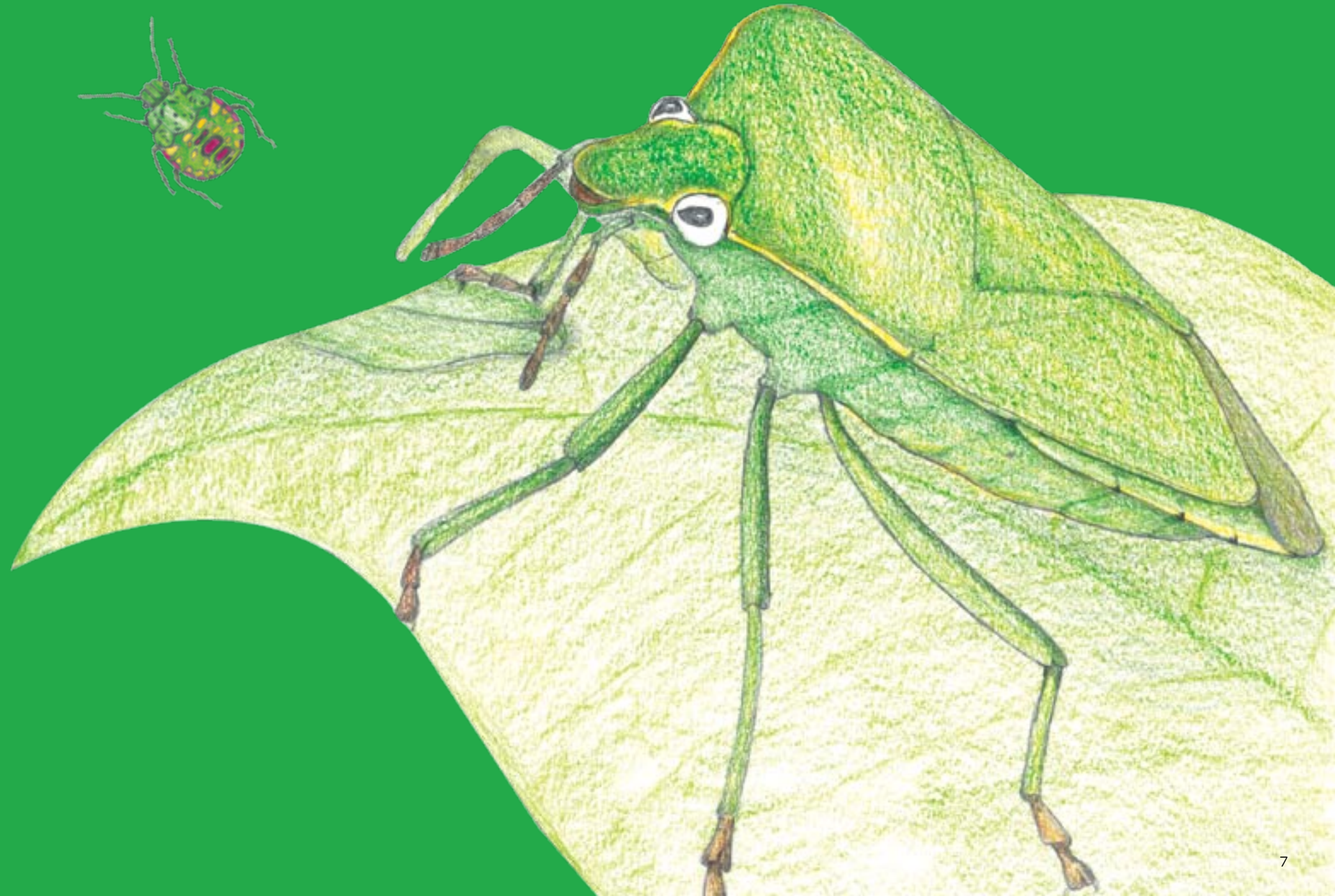
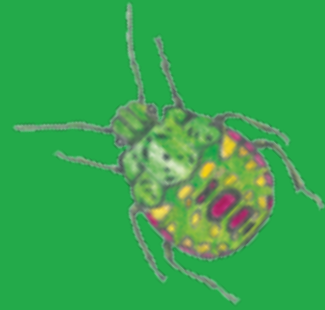
'What have you found Sareth?' asked his older sister, Jorani.

Sareth showed Jorani and their friend Ratanak a little green bug he had found in their soybean crop. It was running around and around in a small plastic container. He held the container up so that everyone could get a good look.



'Ahh, this is a green vegetable bug!
I haven't seen many of these
since we changed the way we look
after our fields. Dad used to spray
to get rid of these bugs because
they would ruin our soybean crop
every year.'

'Does this mean our crop is going
to be ruined?'



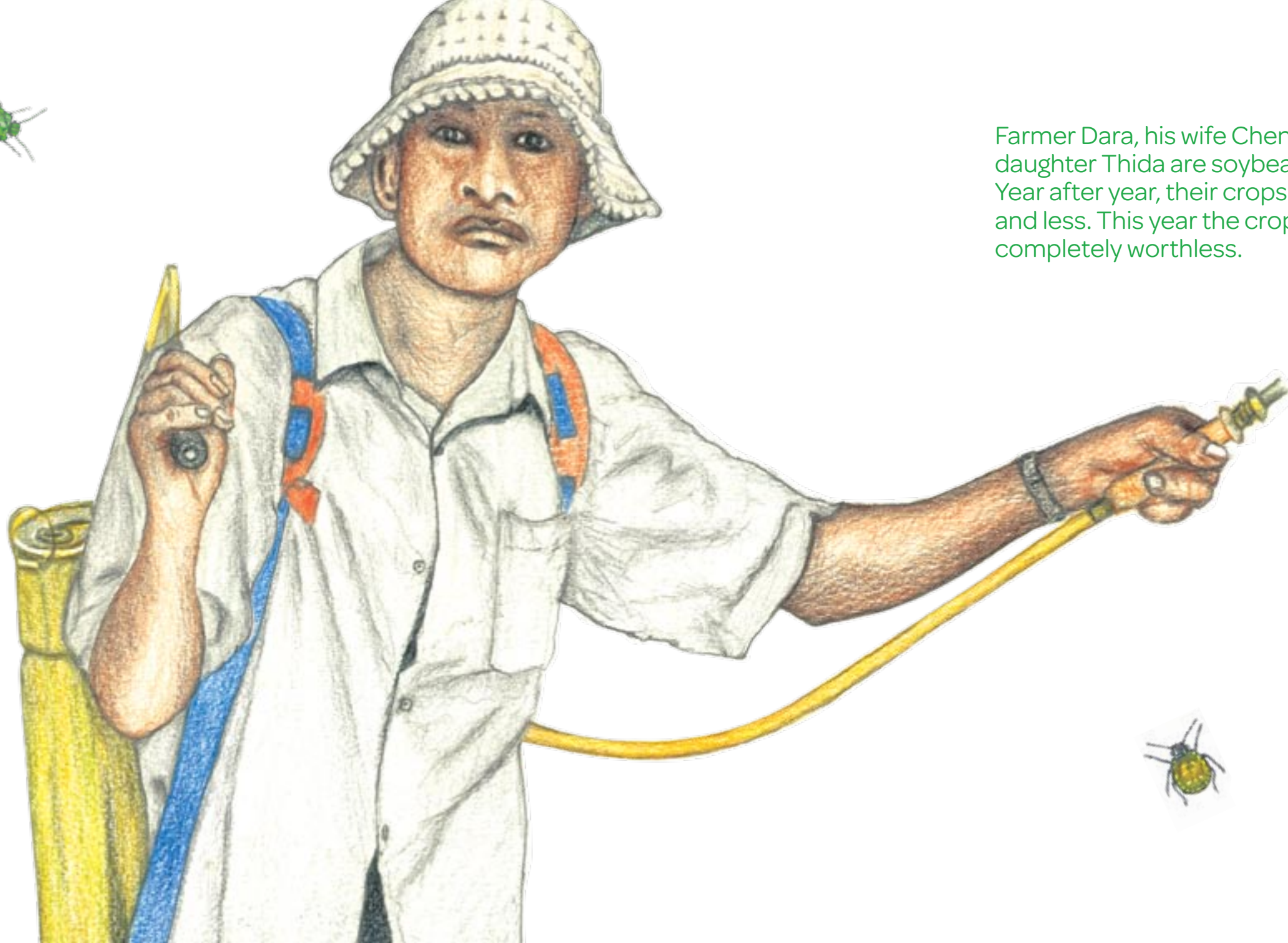


'No, Sareth. Our crop is safe. Let me tell you why.

'Our village, Samlaut, is home to many families who farm soybeans. But Samlaut is also home to many insects, like this one, because they like to suck on the soybean pods.

'Many families spray their crops to kill the insects but this doesn't always work. Mum and Dad thought that spraying was best but, after one very bad year, they started to wonder if there was a better way.

Luckily, one of our neighbours had a good crop that year and offered to give us some advice. She told us a story we will never forget...'



Farmer Dara, his wife Chenda and their daughter Thida are soybean farmers. Year after year, their crops yielded less and less. This year the crops were almost completely worthless.



Farmer Dara did his best in the fields. He sprayed as often as he could to get rid of all the bugs that were making their soybean pods look unhealthy and shrivelled.



As the rainy season approached, Farmer Dara got very sick. He coughed a lot and wasn't strong like he used to be. Late one night, an ambulance pulled up outside and took Farmer Dara to the hospital.



In the morning, Thida woke up to see her mother standing over her.

'Thida, last night, daddy was taken to hospital because of his sickness,' Chenda said.

Thida didn't know what to say. She was very worried.

For many days, Thida had pain in her heart. She missed her dad so much. But she still worked hard on her chores at home so her dad would be comfortable when he came back.

While looking after her baby brother one afternoon, Thida suddenly thought: *what are we going to do now that dad is not here to care for the fields?*



'It's time to sow the crop,' said her mum one day when Thida came home from school.

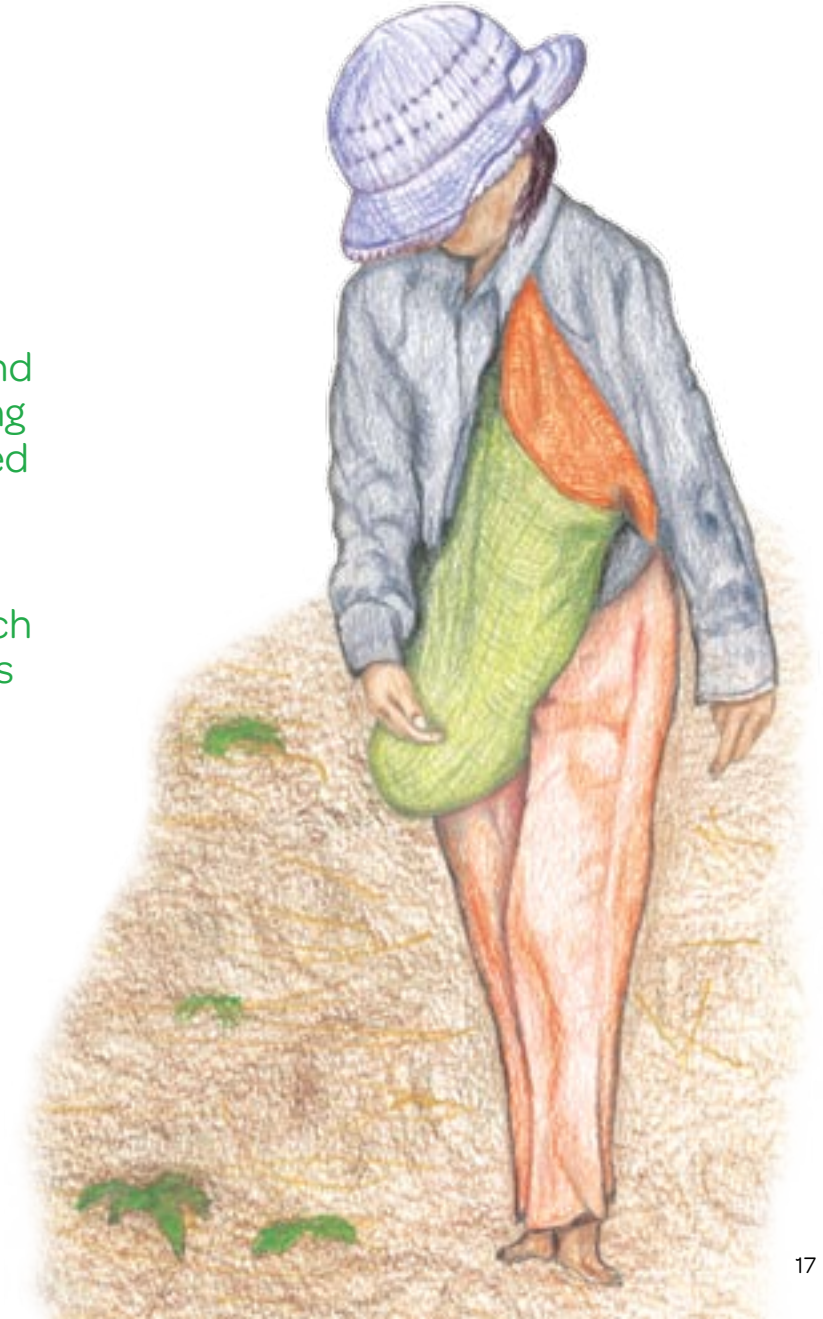
'But the bugs will ruin it. We have no spray,' protested Thida.

'Thida, listen to me. We must sow. We have no other way to earn money.'



Thida obeyed her mother and helped for many days, sowing the seeds they had harvested from last year's crop.

'I won't let you down, little seeds,' said Thida, 'I will watch you grow and find out what is harming you.'





Thida spent hours every day looking at the insects crawling on each plant in her crop. None of them seemed to be doing much at all.





When the time came for her crop to receive its first spray, she thought of her dad. She imagined him in his white hat, loose shirt and baggy trousers, a large knapsack strapped to his back.



He would hold a long spray gun in his left hand while his right hand pumped up and down, up and down, sending the deadly liquid squirting out of the gun. He would do this for hours, walking up and down the rows of plants, sweeping the spray gun side to side.

But not this year.

Later that night, Chenda showed Thida something. It was a sweep net.



'I got this for you, Thida. I know you want to find out which bugs are ruining the soybean pods. Perhaps you can catch them with this net,' Chenda said.



As soon as Thida woke up, she grabbed the sweep net and headed for the fields. She walked up and down the rows of plants, sweeping the net from side to side. It was hard work. Thida grew tired and hot.



When she got home, she looked at what she had caught. Some very strange bugs were living in those fields—bugs she had never seen before. Some looked like ants and some looked like flies. Others looked like beetles and there were many that were just tiny specks.



‘Which ones do you think are ruining the pods, Mum?’

‘I’m not sure, Thida. Let’s use the sweep net again in two more weeks. The pods will be bigger then.’



It was a long wait. Thida spent time every day looking at the bugs. One morning, while she sat still and quiet in amongst the plants, she saw something.

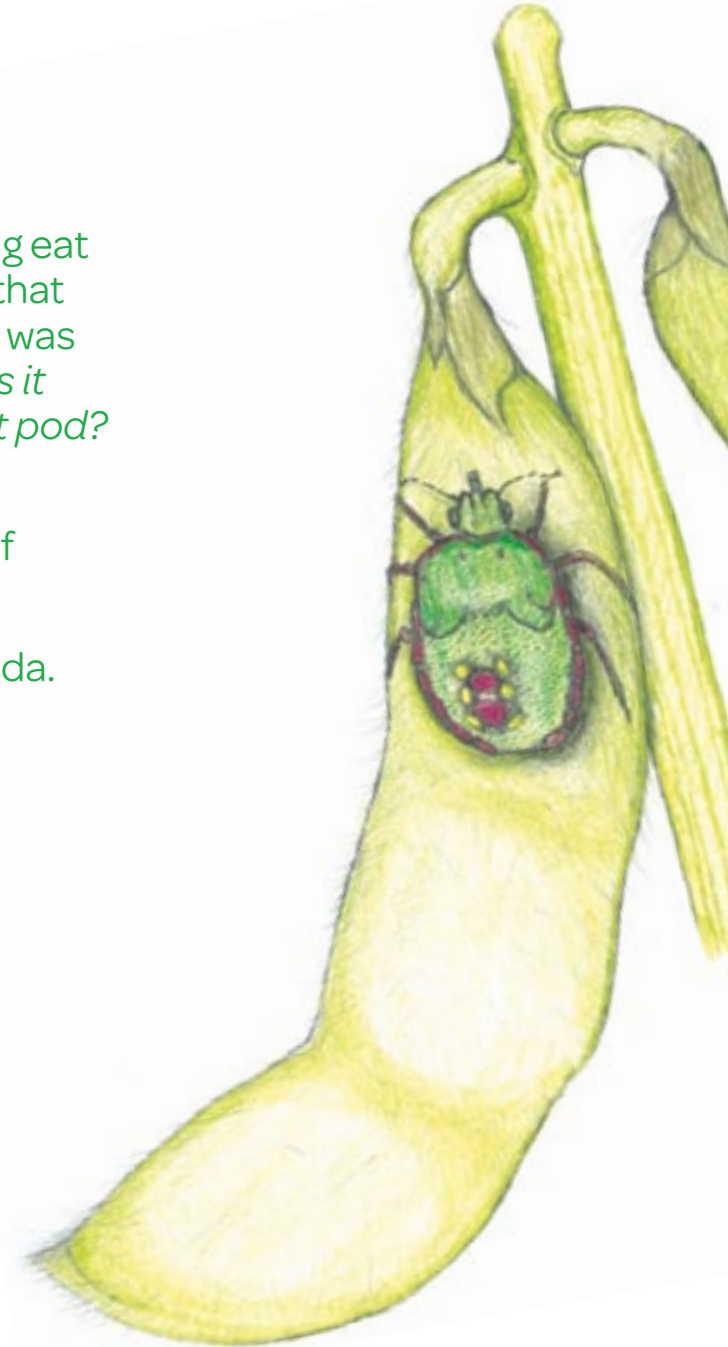


Right in front of her, Thida saw one bug eat another bug! She felt sad for the bug that became lunch but she realised that it was sitting on a growing soybean pod. *Was it just about to suck the juice out of that pod?* she wondered.

She looked around. It was true. Lots of those bugs were sitting on the pods.

'So you're the culprits,' whispered Thida.

She couldn't wait to tell her mum.

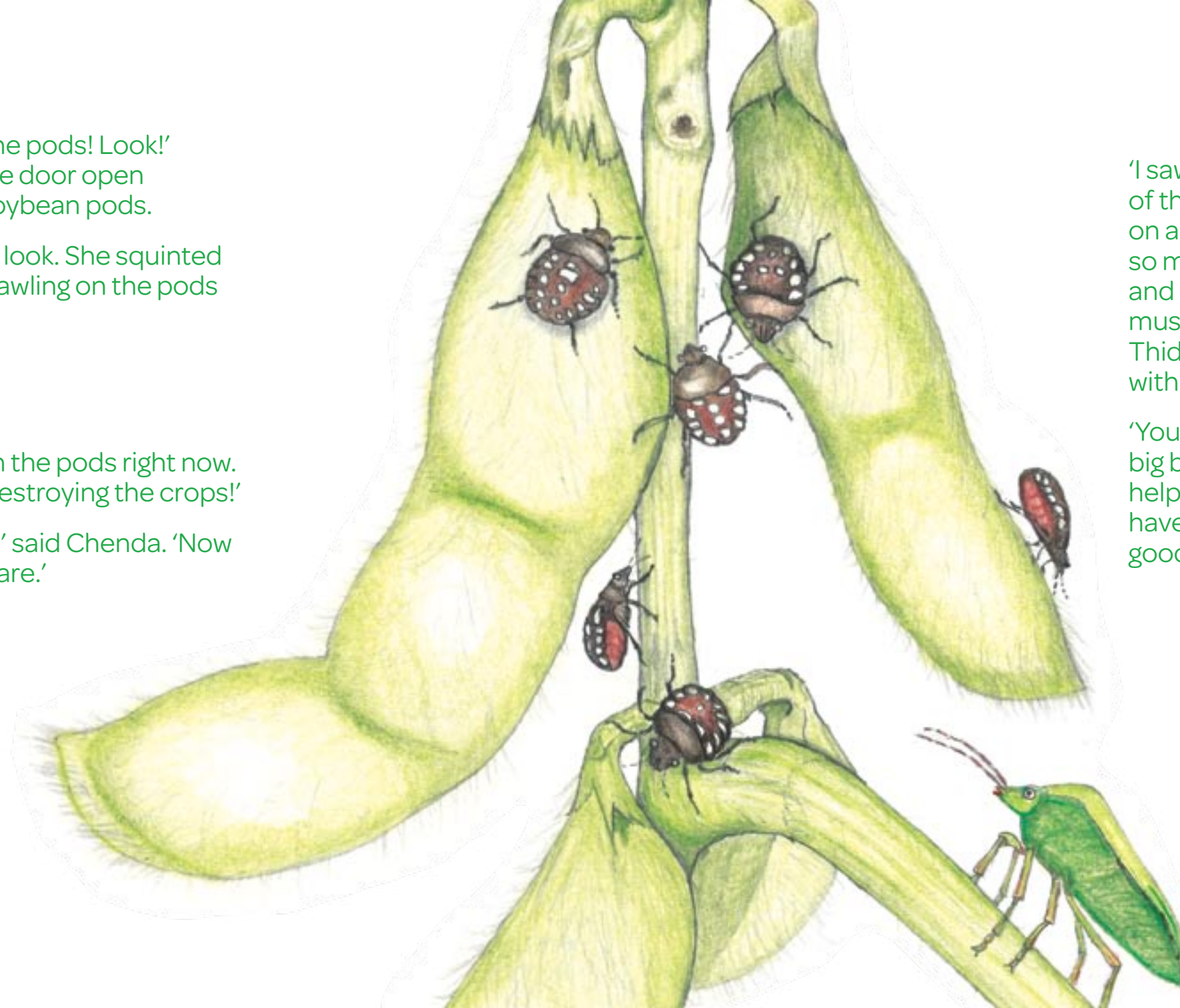


'Mum! I know what's damaging the pods! Look!' shouted Thida as she pushed the door open and held up a bunch of plump soybean pods.

Chenda stood up to get a better look. She squinted and saw a bunch of little bugs crawling on the pods in Thida's hand.

'These bugs are sitting on the pods right now. They must be the ones destroying the crops!'

'Well done, my clever girl,' said Chenda. 'Now we know who the villains are.'



'I saw a big bug bite one of these while it was sitting on a pod, and there were so many different bugs and I think the big ones must eat these ones!' said Thida, talking way too fast with excitement.

'You are right, Thida. These big bugs seem to be our helpers. Our spray must have been killing all the good bugs too.'



Thida and Chenda were very curious about their find. They had heard about a farmer field school being held in Samlaut so they decided to go along to find out more information.

Just as they suspected, they were told that the little bugs that Thida found suck the juices from the soybean pods.



They have enemies though. There are parasites that harm or kill green vegetable bugs and there are predators that eat them.

Farmers need to check what insects are living in their crop before they decide to spray because they could be killing these predators and parasites along with the green vegetable bugs.

If this happens, any bad bugs that escape the spray can return to the crop and increase in numbers quickly because there are no longer any predators or parasites close by.

Thida and Chenda tended their fields regularly, weeding it and checking what insects were living there. Their soybean pods grew fat and the seeds inside became round, smooth and creamy-coloured. This was going to be their best harvest yet.



Our fields are being cared for after all, thought Thida.



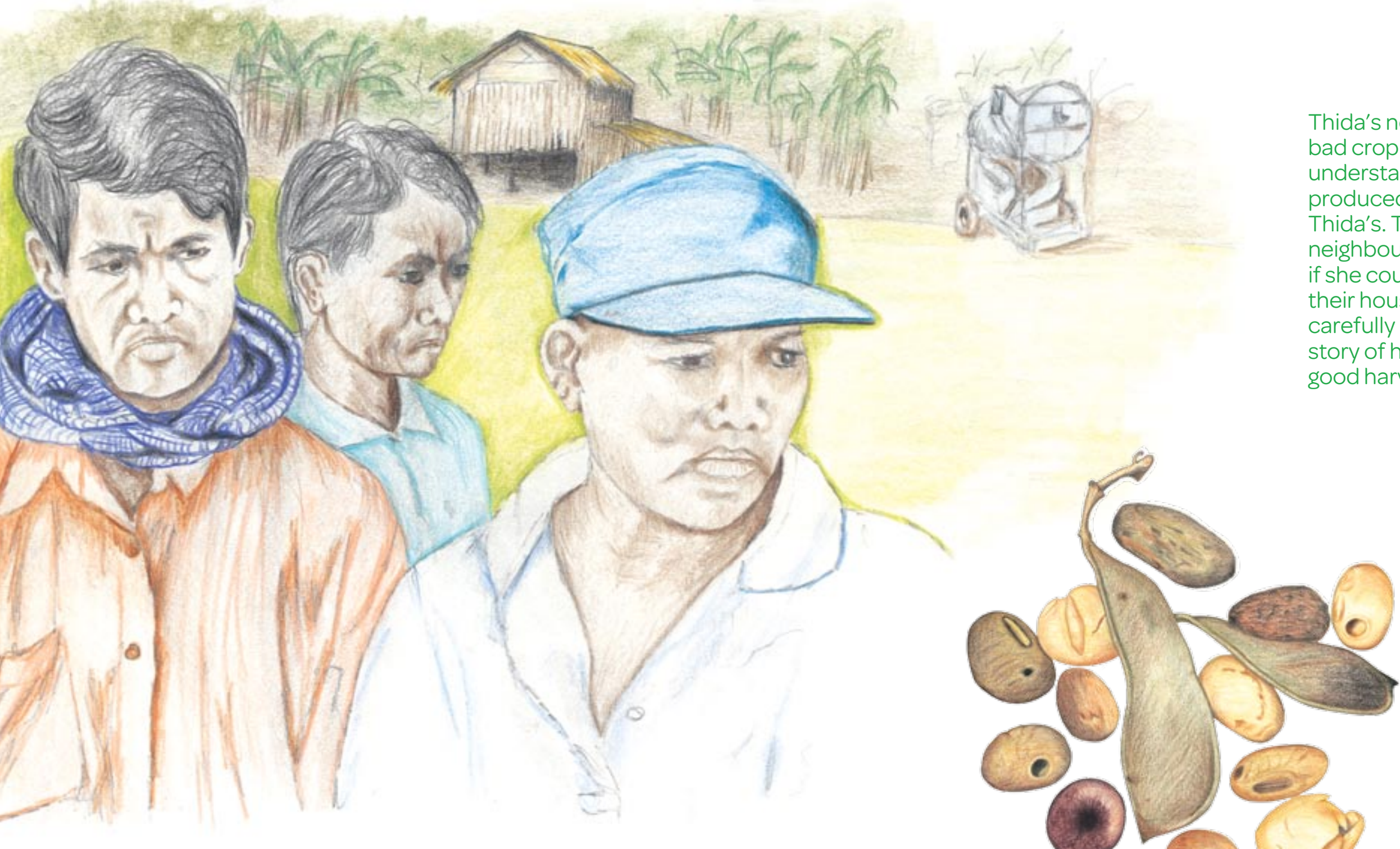
At last the soybeans were ripe. Chenda asked her friends and family to help her harvest the crop.

On harvest day, everyone was up bright and early, laughing and joking. It was a very happy day.



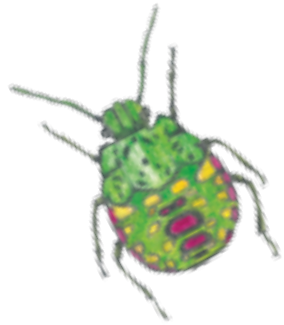
People were amazed at how large the yield was. But Thida and Chenda knew it was because they had carefully looked after their crop and let the good bugs live in the fields and eat the bad bugs.

Not everyone was happy, though.



Thida's neighbours had another bad crop that year. They couldn't understand why their fields hadn't produced as well as Chenda and Thida's. Thida wanted to help her neighbours so she asked her mum if she could invite them over to their house. They all listened very carefully as Thida told them the story of how they came to have a good harvest.

She explained to them how they had learnt that not all insects are bad. Some are useful and farmers should try not to kill them with spray. She showed them what was attacking their crops.



Everyone had a good look at a green vegetable bug that she had trapped, passing the little container around the crowd.

They learnt how to get rid of green vegetable bugs by not killing the good insects. Chenda told them that this way of looking after their crops is called 'integrated pest management' or IPM.

* See page 47 for more information on IPM.





'So, Sareth, you have no need to worry. We use IPM in our fields. A few little green vegetable bugs won't do much damage,' said Jorani reassuringly.

'Are there good insects in our fields right now?'

'Yes, Sareth, but some are so tiny you might not be able to see them.'

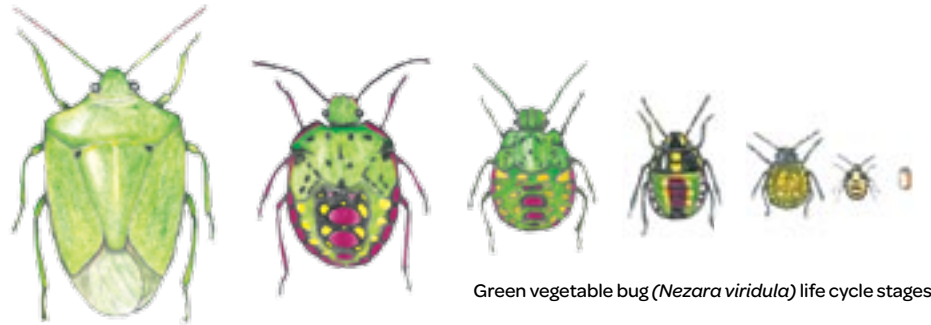
'How did our parents learn about IPM?' asked Sareth.

'Don't you remember? You were very little when we were invited to Thida's house that night.'

THIS IS WHAT THIDA AND CHENDA TOLD THEIR NEIGHBOURS.

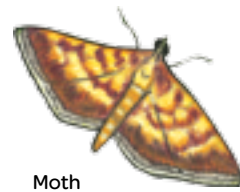
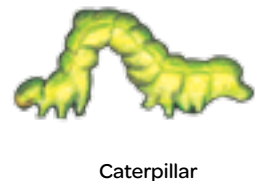
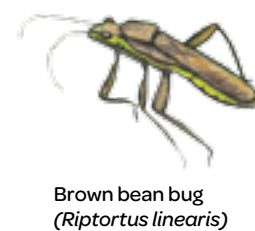
BAD BUGS

As well as the green vegetable bug, which sucks sap, there are many other kinds of insect that can damage the crop.



Other insects that suck sap include the brown bean bug and aphids.

There are also many types of caterpillar that hatch from eggs laid by moths. Caterpillars eat leaves, bore holes in pods or fruit, and eat the seeds.



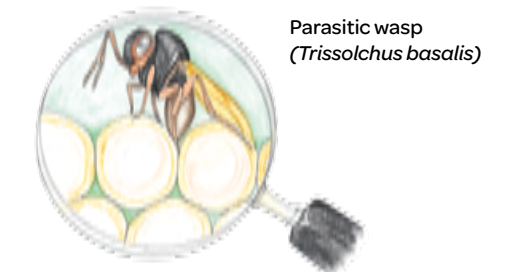
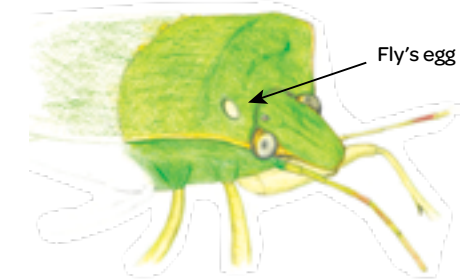
GOOD BUGS

There are many insects and spiders that eat other insects. Some eat them directly (predators); others lay their eggs on or inside them (parasites). These are called beneficial insects or 'good bugs' because they do not usually damage the crop.

There are flies that lay their eggs on green vegetable bugs so that the fly's larva develops inside the insect.

There are also small wasps that lay their eggs inside the eggs of green vegetable bugs, so that baby wasps hatch instead.

Other good bugs are not so fussy and eat a wide range of insects (mainly bad bugs). These include spiders, wasps, praying mantids, ants, lady beetles and shield bugs.





NOW IT'S YOUR TURN.

Tell your neighbours about IPM so we can encourage all of Samlaut to let the good bugs live to fight those nasty green vegetable bugs!



INTEGRATED PEST MANAGEMENT (IPM)

IPM uses a combination of methods to control bad bugs so that farmers can reduce their use of pesticides. Some of the control methods for soybean crops include:

- ensuring the crop is as healthy as possible
- planting early to avoid the high insect populations that are often experienced with late sowings
- monitoring pest levels to find out how much damage they are causing
- preserving good bugs to help control bad bugs
- using pesticides only if a lot of damage is being caused, and varying the types of pesticides to lower the risk of bad bugs becoming resistant to specific chemicals
- controlling weeds, which may also attract bad bugs to the crop
- avoiding alternative crops in the crop-rotation program that attract the bad bugs
- planting a trap crop (a crop that the bad bugs prefer) to attract the bad bugs away from the soybean crop
- talking with neighbours and other farmers in the area so that they use the same methods at the same time to control bad bugs on a large scale
- selecting crop varieties that display good pest and disease resistance.

FARMER FIELD SCHOOLS

Farmer field schools are 'schools without walls' composed of up to 30 farmers who meet once a week for the whole duration of the cropping season. They are designed to help farmers learn about IPM so they can reduce the use of pesticides and improve the sustainability of their crop yields.

You can learn more about IPM and farmer field schools from the Department of Agronomy and Agriculture Land Improvement in the Cambodian Ministry of Agriculture, Forestry and Fisheries (www.maff.gov.kh/eng/depts/daald.html).

ACKNOWLEDGMENTS

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