

SCIENCE AND ENVIRONMENT FORTNIGHTLY

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Down To Earth

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OUT OF THE TRAP

Andhra farms show the future of pest management.
It doesn't have pesticides



Clues from a lost tribe

Waste and the underworld

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Farmers can save crops without pesticides. And they can earn more in the deal. SOPAN JOSHI records a great change sweeping through Andhra Pradesh. It's called non-pesticidal management, or NPM

NO PESTICIDES

Laxma Jarpula, farmer, hasn't met agriculture scientists who say India's food security and agricultural production rely heavily on pesticides. Three years ago, he decided to risk his cotton crop with pests, rather than pesticides. "I'd put the insects in the pesticides, and they wouldn't die. The more pesticide I used, the greater the pest attack. I decided to save the cost of pesticides. And there was no difference in yield," says the resident of Sitarampur village of Kothagudem *mandal*, Khammam district. He is only following a trend.

Down To Earth interviewed people in three *mandals* of Khammam: Palavanacha, Kothagudem and Tekulapalli. It seems farmers in more than 5,000 acres (2,000 hectares, ha), perhaps 10,000 acres (4,000 ha), have stopped using pesticides on cotton, without anybody asking them to do it. "You won't find a single farmer in this area using pesticides on cotton, though we still use pesticides on paddy, redgram and chilli," says Islavat Sakru of Regulathanda in neighbouring Tekulapalli *mandal*. "Pesticides on cotton mean a guaranteed loss. It's suicidal. There is no difference in yield whether you use pesticides or not. If you do, the cost of cultivation becomes unaffordable," says Islavat Chandi, his wife. Farmers here have figured out the pesticide treadmill, though they have their own way to explain the resistance that pests acquire.

To understand the real drama here, consider some statistics. Cotton is the main crop in these *mandals*, occupying more than half the cropped area. (It occupies about 25 per cent of the total cropped area in the entire district.) Pesticide consumption in Andhra Pradesh has been among the highest in all states of India. In Khammam dis-

trict, pesticide use is very high as compared to other districts, and it has reported a large number of suicides by indebted cotton farmers in the past 10 years. In India — as across the world — more than half of pesticides used go into one crop: cotton. Only 5 per cent of India's total cropped area grows cotton.

In 2004, a village called Punukula in Palavanacha *mandal* became the first in the state to completely implement non-pesticidal management (NPM) of crops and free itself of pesticide use (see 'Village Punukula's different', *Down To Earth*, July 15, 2004). Even now, almost all farmers in Punukula don't use pesticides on cotton. In fact, a large section of farmers here has given up pest protection entirely, letting natural enemies of pests save their crops.

But very few farmers in the district know about Punukula or NPM — it is a small project run by a small NGO in a small village. Then what explains the changing trend in Khammam? It's not that the cotton farmers of Khammam are driven by environmental concerns, or the threat of pesticide residues. Their motive is pecuniary: profit. And pesticides don't help them earn well. They are driven by frustration — pesticides cost the earth, and yet fail to protect their crops.

Other developments are even more dramatic. NPM is catching on across the state (see box: *This is NPM*), and the state government's department of rural development has adopted the programme. That's a huge, huge shift. Because NPM is inimical to all that the same government's department of agriculture has promoted for four decades. Besides, the state's agriculture university doesn't buy NPM. So, does NPM work? Finally, only the farmers can tell.

PHOTOGRAPHS: SOPAN JOSHI / CSE

Shankaraiah's two acres of Kurnool's famous biryani-grade paddy is free of pesticides. Here, he checks a pheromone trap to catch male insects



A new paradigm is called for

For more than two decades, government strategy on pest control has talked of *minimising* pesticides. Its centrepiece is integrated pest management (IPM). Andhra Pradesh's agriculture university swears by IPM. There is no doubt that IPM is a sensible approach that combines a range of pest control options. But its applicability to Indian farming conditions is now doubted. Even in the 1990s, it was obvious that IPM had failed to deliver (see 'Abetment to suicide', *Down To Earth*, February 28, 1998). Why? Depends on whom you ask.

"That IPM hasn't caught on is an extension failure," says Raghava Reddy, director of research at the state agriculture university. G V Subbaratnam, professor and head of entomology at the university, says IPM depends on farmers' knowledge, and that's where the job of extension staff becomes critical.

There is another view: that IPM regimes are devised in experimental farms, far away from ground realities. And that extension staff can't implement it because they look down upon farmers, rather than understanding their needs. IPM includes pesticide use as a last resort. Most Indian farmers are not well versed with the ever-changing dictionary of 'scientific' pest protection. So even IPM practitioners end up using more pesticides than they need to.

"Scientists promote pesticides because it is an easy option. They don't have to do anything except recommend dosages," says a government scientist, requesting anonymity. "When group action is required, government efforts don't seem to work too well. Technologies that require group action don't get pushed," says N K Sanghi, former zonal coordinator of the Central Research Institute for Dryland Agriculture.

And then, it is said, IPM has failed to bring down the cost of plant protection (see interview: "*IPM doesn't bring down costs*"). Andhra Pradesh has been reeling under high costs of cultivation, with deeply indebted farmers (see 'Inevitable tragedy', *Down To Earth*, July 15, 2004). Faced with this situation, a group of agriculture scientists in the public sector decided to make an intervention through a voluntary organisation, beginning in the late 1980s.

Thus began NPM

In 1986, the Centre for World Solidarity (CWS), an NGO in Hyderabad, ran a programme on rural livelihoods. It realised that the red hairy caterpillar was ruining the redgram crop in



When smeared with glue, this yellow board attracts and kills pests

This is NPM

And how it compares with IPM and organic farming

Environmental pollution is not the only problem with pesticides. Pests develop resistance to synthetic pesticides, making it necessary to constantly develop newer and more powerful (hence more costly) pesticides. What's worse, pesticides are more damaging to friendly insects and natural predators of pests; pesticide use strengthens pests. This vicious cycle is called the pesticide treadmill. Integrated pest management (IPM) combines several approaches including pesticides. It strives to prevent or delay resistance.

Non-pesticidal management (NPM) uses techniques developed and proven under IPM, but completely does away with synthetic pesticides. So, how does it protect crops? In two ways: by promot-

several districts of the Telangana region. It formed a scientific advisory committee of 15 members, headed by M S Chari, director of the Central Tobacco Research Institute in Rajahmundry. M A Qayum, former joint director of the state agriculture department, took over as director of CWS's agriculture programme. The red hairy caterpillar menace was controlled between 1988 and 1991 without the use of any pesticides,

"IPM doesn't bring down costs"

M S Chari, the architect of NPM, advises the Centre for Sustainable Agriculture (CSA)



Has Integrated pest management (IPM) delivered results?

No. A 1995 paper showed IPM covered only 2 per cent of India's cropped area. There is no group action for IPM, and it is fully loaded with pesticide recommendations. The cost of cultivation with IPM is very high as compared to

non-pesticidal management (NPM). In the 10 years of IPM implementation in Andhra Pradesh, more than 3,000 indebted farmers killed themselves due to high cost of cultivation.

NPM is labour-intensive. Is that a deterrent?

It is job-oriented. We encourage women's groups to open NPM shops, create rural employment. We want the prime minister's Bharat Nirman scheme to be used for this. Young farmers, who know about WTO and pesticide residues, are dead keen on NPM.

What is the way forward for CSA?

The next step should be towards social aspects of soil and water management. The role of the local government in sustainable agriculture is critical, and needs attention.

What is your best NPM experience?

When we started NPM work with farmers, men would sit in the front row and women would sit behind. Now, the women take the front row. They are NPM's torchbearers, the new village leadership. Nothing gives more satisfaction.

ing the sharing of know-how on crops and pests; and by utilising locally available, low-cost inputs.

Insects have a four-stage life cycle, and they damage crops only in the larval stage in most cases. Effective control is that which prevents the insect reaching the larval stage. There is a range of options to do this, depending on insect behavior and crop ecology:

- Deep ploughing in summer exposes pupa of insects
- Promoting natural predators and friendly insects
- Light traps or bonfires attract and kill adult insects
- Trap crops (like marigold or castor in cotton) attract bollworms to lay eggs on them instead of the main crop
- Pheromone traps attract male insects
- Simple shaking of plants like pigeonpea helps shed bollworms
- Spraying the extract of neem seed kernel (or chilli-garlic paste) helps control insects at larval stage
- Spraying the extract of cow dung and urine repels insects as well as retards their growth

All these methods have been validated and accepted by the scientific community under IPM. Indian agriculture scientists commonly believe that farmers cannot understand these 'alternative' methods. NPM developers claim farmers can understand these approaches — and improvise them according to local needs. But only if the communication strategy used is not 'product-centric' (revolving around marketable commodities) but 'knowledge-centric'. So, replacing synthetic pesticides with biopesticides doesn't solve the problem; it has to be a paradigm shift. NPM developers say alternatives work only when pesticides are eschewed completely.

NPM differs slightly from organic farming, which requires that farmers do away with *all* chemical inputs. NPM doesn't require farmers to give up chemical fertilisers, though it does tell them that their use makes crops more susceptible to pests. NPM is driven by economics and farmer self-reliance. In fact, it is a good entry-level exercise for organic farmers.

RAMCHANDRAPURAM VILLAGE

Julurpad *mandal*, Khammam district

Crop: cotton/paddy in kharif; maize/groundnut in rabi

If you want to know what it means to work as casual labour on your own land, meet P Venkateswarlu in this village of 70 households of the Koya tribe. He has four acres; his two brothers have two acres each. "We ran up debts of Rs 30,000 with dealers of seeds and pesticides five years ago. After repeated crop failure, the creditors asked us to give them five acres of our land, and the credit would get adjusted in the land lease. They would pay me Rs 50 a day to work my land, and they'd walk away with the produce," he says. With his two sons, he would go out to find work most days. "Half the families here have their lands leased out to pesticide/seed dealers, who also double as monopoly buyers of our produce and cheat us on price," says Easam Narasimha, 50. "We'd heard of Pudukula's success with NPM, and thought a similar turnaround was possible here," says Nageshwar Rao of the Chapel Rural Development Society, the NGO assisting NPM here. In 2005, M Lakshmi, the representative of the village women's group, travelled to Kosgi in Mehbubnagar to see and learn NPM methods. After her training, she and her husband Rajulu became the village coordinators of NPM, her house the NPM secretariat. Venkateswarlu was the first to enrol for NPM: "I was making a loss anyway. I decided to try it out on the remaining land. Lakshmi taught us what she had learnt, with great patience and commitment." In 2005-06, he spent Rs 2,000 on one acre of cotton, earning Rs 13,000 for the produce. "This year, we'll get our five acres back. This entire village will stick with NPM," says his brother Sitaramulu. Others are also getting their land back. This village is already an example, and it is used for extension work across the state.

Lakshmi has brought prosperity to her village. She got NPM training in Mehbubnagar, and has helped farmers make a dramatic change



Venkataiah's family celebrated this year's Sankranti festival like they haven't in a long time

BOGARAM VILLAGE

Kosgi mandal, Mahbubnagar district

Crop: redgram (dryland; single crop)

Venkataiah, 30, is a *dhobi* by caste and has one acre of cultivable land. He irons clothes to substitute his meagre and seasonal farm income. His dream is to have his own kiosk by the main road, where customers are aplenty. In 2004-05, he says he spent Rs 2,660 on pesticides for his redgram crop. (He spent more than the market price as he bought them on credit). He got 200 kg of pulses that sold for Rs 3,200. Earning: Rs 500. While he made a loss, his neighbour Bugappa had a good crop without using any pesticides. Bugappa was one of 20 farmers who had registered for the NPM programme in the first year. When the women's group of Bogaram was registering NPM farmers in 2005, Venkataiah's mother, Bamma, got him enrolled among the 50 new entrants. They got extension advice from Krishnaiah, the village NPM coordinator who gets a monthly honorarium of Rs 700 for rendering extension advice. "He taught me the life cycle of insects and how to use pheromone traps and dung-urine sprays. This year, the pest incidence on my field was lower than neighbouring farms. My total cost of cultivation was down to Rs 300," he says. Untimely rains affected his crop, but he still got 300 kg, which got him Rs 5,325. The profit was unprecedented. "This Sankranti, we bought mutton and prepared biryani," beams Bamma. "Another year like this, and I'll make my kiosk. There will be work and money through the year then," hopes her son.

VENKATAIAH'S CROP PROTECTION EXPENDITURE

WITH PESTICIDES (bought on credit)	
Endosulfan	Rs 500
Endoseal	Rs 400
Gamaxine	Rs 700
Tracer	Rs 1,060
Total	Rs 2,660
WITH NPM	
Neem and other NPM inputs	Rs 140
Pheromone traps	Rs 30
Chilli powder	Rs 20
Garlic	Rs 20
Kerosene	Rs 10
Miscellaneous	Rs 80
Total	Rs 300



innovating with methods farmers knew. The methods became quite popular, even winning official approval, says Chari.

The discipline of plant protection is crop specific, so moving to other crops took time. CWS started working with grass-roots NGOs, and carried out trials on managing groundnut and pigeonpea without pesticides from 1993 to 1996. The results were encouraging, but for this system to be accepted, it had to work on the crop that is the biggest challenge in plant protection: cotton. Trials on it began in 1996. The term NPM was devised in 1998 by Chari. The system was tested for efficiency, economics and feasibility on fields in seven districts.

But it took another six years to prepare an entire village to accept NPM and make it work on cotton, says M V Sastry, convener of CWS. That village was Pudukula, which showed very good results by 2004. In that year, CWS created a separate organisation: the Centre for Sustainable Agriculture (CSA). Its executive director is G V Ramanjaneyulu, an agriculture scientist specialising in extension and decision-making of farmers, who left the Directorate of Oilseeds Research to join CSA (see interview: "It's an open-source technology"). "Pudukula showed us NPM could work, that it was possible to step out of the pesticide treadmill," he says. The next step was to spread it out. But CSA is a small NGO. NPM needed a bigger vehicle.

Ready for upscaling

"We are bound by the university's recommendations. They recommend IPM, so that's what we promote," says Poonam Malkondiah, Andhra's commissioner and director of agriculture. "We recommend only IPM because it is tried and tested, and there is data to support it," says the director of research at the state university. Subbaratnam says till the university has a

proven alternative, it is bound to recommend the use of pesticides to farmers: "We can't deny the farmers any means of pest control; pest incidence has to be kept below the threshold of economic injury." Given that insects are developing resistance to pesticides he agrees that a paradigm shift is needed in pest management. But the university's research profile is tied up across the board in its own history.

Not everybody was in wait-and-watch mode. In 2004, WASSAN, an ngo under the CWS umbrella, wanted funds for an NPM project in Kosgi *mandal* of Mahbubnagar district. It approached the Society for Eradication of Rural Poverty (SERP), a special vehicle of the state's rural development department. The society runs a scheme, funded by the World Bank, which provides rural credit through a network of self-help groups (SHGs). This scheme was called Velugu by the previous state government. The Congress government has changed the name to Indira Kranti Patham (IKP). SERP accepted the proposal to implement NPM in about 400 acres.

"We had a working relationship with WASSAN," says T Vijay Kumar, chief executive officer of IKP. "Our mandate is to increase rural income. We already had several interventions in marketing of agricultural produce, and were familiar with the high costs of cultivation. NPM seemed to make sense, so we tried it out." IKP gave the NPM programme to its women's groups to implement, with CSA providing technical training to the women. The results, says the IAS officer, were unbelievable: "In January 2005, I visited Kosgi. The women in IKP groups, who had taken the programme to the villages, told me plant protection costs were down from Rs 1,200-1,800 per acre in the previous year (when pesticides were used) to Rs 300 per acre. And because the crop residue had no pesticides, it made better fodder for animals. The excitement was palpable."

What impressed Kumar further was that NPM made women the input suppliers for plant protection — the farmers were coming to them instead of going to the pesticide dealers.

AMLIKUNTLA VILLAGE

Kosgi *mandal*, Mahbubnagar district

Crop: redgram

"We'd enrolled for NPM in 2004," recounts Lalamma, 30, who has 2.5 acres and has leased another acre. "But we didn't take it seriously that year, and sprayed endosulfan. We saw farmers who hadn't sprayed any chemicals get better yields. That year, our bullock died after eating residues of pesticide-sprayed crop. Last year, we took NPM seriously." Her plant protection cost came down to Rs 250 per acre from Rs 1,500. The yield, too, has improved: 400 kg per acre. "The quality of the grain has improved," she says. Anjalaiah, another farmer in the village, says he was hospitalised due to poisoning after spraying pesticides: "First I spent Rs 1,000 on the endosulfan, and then Rs 4,000 in the hospital." He says he didn't take up NPM as he is short of labour — his children are too young and can't help on the farm. "It requires labour, but it saves the cost. Imagine, no dependence on pesticide dealers," he wonders. This year, he plans to enrol for NPM. Lalamma says other farmers in the village are quite excited about NPM: "This year should see a bigger turnout."

For Lalamma, it's not just the cost but also the improved grain quality



Poisoned by pesticides last year, Anjalaiah will try NPM this time



CHINNAJALALAPURAM VILLAGE
 Singanamala mandal, Anantapur district

Crop: groundnut

Agriculture scientists sometimes say it is the farmers' wives that make them spray pesticides unscrupulously. They should come here. "A farmer who had signed up for NPM with a women's group brought a bottle of chemical pesticide. The women seized and it threw it away," says V Kistappa of the Rural Integrated Development Society, the NGO helping the government's IKP programme implement NPM here. The greatest proponent of NPM here is a farmer who hasn't adopted it. "After nine years in the Central Reserve Police Force, I returned to do farming in my village, armed with the latest 'scientific' information that I'd picked up during my travels," says N V Narayana, 36. He takes three crops in his seven acres irrigated with a borewell. "I laughed when my brother Narsimhulu enrolled for NPM. He used neem powder and cow-dung urine on his four acres. I used pesticides worth Rs 20,000. I put in the best seed available in the market to his seeds saved from the previous harvest — and I put them in greater concentrations. I was expecting a yield of 60 bags. I got only 30, making a loss of Rs 15,000. He got 50 bags and a profit of Rs 32,000. I feel like a fool," he says. "My cost of plant protection has come down from Rs 1,400 to Rs 600," says Narsimhulu. But groundnut doesn't have too many pests. Why has the response to NPM been the strongest in this groundnut district? "I've never got such good quality yield," says farmer C Prasad; better quality will get him a better price. His neighbour Ramesh Reddy used the same seeds, but used pesticides instead of NPM. His yield is lower and the quality of the nuts is poorer.

"It is a system-based approach which puts women in a position of strength. NPM helps farmers assert themselves as creative individuals, who can think and decide for themselves. That is a greater objective than food security, because if the farmer is earning well, the nation will be fed," says Kumar.

Promising partnership

CSA's search for a partner for upscaling NPM was over. It was no less than the government's department of rural development. "NPM was good entry-level activity for us to win the confidence of farmers. CSA needed outreach, which we have in the form of the country's largest network of women's groups. The women were attracted by lower costs of cultivation and a safety net of extension services. Everybody was a winner," says Kumar.

A system was devised in which each party contributed its core competence. CSA was to train the women's groups and village coordinators, and bring in its network of 30-odd grassroots NGOs across the state. IKP was to provide funds for training, travel and inputs, and get its groups to own and run the programme. Members of the women's groups were to travel to Kosgi, where those practising NPM would train them. Every mandal with NPM villages was to have two extension coordinators — one employed by IKP and the other employed by the grassroots NGO. The NGOs were to get only a facilitation charge of Rs 50 per acre serviced by their coordinators.

Initially, the plan was to extend NPM to 8,000 acres in 11 districts. But the farmers' response to the women's groups was overwhelming. By the time the agricultural season was completed in March 2006, NPM had been practised on 23,381 acres



Narayana (right) has learnt from his mistakes and his brother Narsimhulu's (middle) profits

Minister ready



"NPM works"

Raghuveera Reddy, farmer and agriculture minister, Andhra Pradesh

What is your priority?

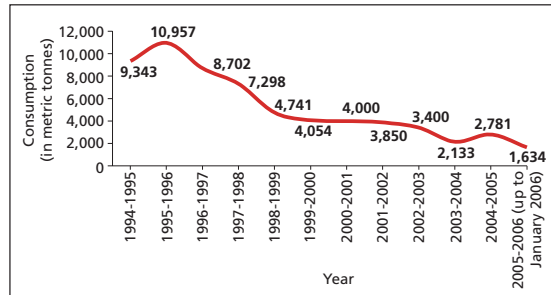
Greater income for the farmers at a reduced cost of cultivation. We've put all officials to work on this.

What's your take on pesticides?

We want our farmers to move away from pesticides slowly. We don't want export consignments to come back due to pesticide

Half the truth

New pesticides are low-volume high-cost. So the farmers might be spending more money on less



Source: Office of the Commissioner and Director of Agriculture, Hyderabad

residues. Our pesticide consumption has come down (see graph).

What will pesticide companies do?

I suggest they get into biopesticides.

Does NPM work?

Yes. I've tried it on my fields in Anantapur on 13 acres of redgram and four acres of groundnut. The cost of cultivation came down.

Why do your department and the agriculture university avoid NPM?

They don't. They have their own version, which is IPM. But if there is such a gap, it is my duty as a political leader to bridge it. I will make all experts meet, sort things out, and work together.

owned by 12,000 farmers across 62 mandals of 11 districts. Among them was the state's agriculture minister (see interview: "NPM works"). IKP says it spent Rs 4.4 crore on upscaling NPM, which saved Rs 4.5 crore for the farmers (see tables: *Upscale and save* and *Good riddance*). It was tried on several crops, and the yields have been stable. A few farmers interviewed by *Down To Earth* experienced slight drops in yield, but they say there are no losses — the cost of cultivation is much lower.

The difference is also felt by the extension staff. Several NPM coordinators are young people who were earlier employed on contract by the agriculture department as multi-purpose extension officers, and then laid off. "When I worked in the department, there was no work, only reports to file. NPM work is tough and challenging. IKP's monitoring is tough. This is a truly multi-purpose programme," says an IKP village coordinator who earlier worked with the agriculture department.

Based on last year's success, IKP plans to upscale NPM to 250,000 acres in 2006-07. In the coming six years, it wants to expand NPM operations to 2.5 million acres, or 10 per cent of the state's total cultivable area. Given the promising start, IKP has successfully roped in the State Bank of India to provide credit to farmers who adopt NPM in 2006, providing surety for loans. IKP is also trying to develop marketing support, and it claims to have a system in place for purchasing NPM produce. But not everything is rosy; there are some pressing questions.

The neem factor

In 2005-06, most NPM farmers purchased *neem* seed kernel and neem oil in the open market through SHGs, which goes against the NPM ethos. IKP officials say this was because it was

Upscale and save

Expenditure and savings on NPM upscaling in 2005-06

District	Budgeted expenditure (Rs)	Total acreage (acres)	Total savings (Rs)
Adilabad	25,07,290	775	22,80,000
Anantapur*	59,29,000	8,029	61,84,000
Karimnagar	15,00,000	565	18,64,000
Khammam	42,00,000	2,200	86,88,000
Kurnool	23,00,000	1,331	12,31,000
Mahbubnagar	58,32,000	4,828	67,00,000
Medak	23,93,700	540	47,40,000
Nalgonda	43,10,000	1815	38,85,500
Nellore	14,00,000	698	**12,25,000
Warangal	14,06,800	2,400	88,40,000
Total	4,41,71,990	23,381	4,56,37,500

*For rabi and kharif, **Projected

Good riddance

Replacing pesticides with NPM works for several crops

Crop (and area for average drawn)	Cost of plant protection (Rs / acre)		Savings (Rs / acre)
	With pesticides	NPM	
Cotton (Khammam)	5,000	1,000	4,000
Chilli (Warangal)	15,000	2,000	13,000
Redgram (Nalgonda)	1,500	300	1,200
Groundnut (Anantapur)	1,500	300	1,200
Castor (Nalgonda)	2,000	400	1,600
Paddy (Kurnool)	2,000	225	1,775

Source: Society for Elimination of Rural Poverty, department of rural development, Hyderabad, Andhra Pradesh



Sambasiva Reddy
hopes to tap the
organic market.
His family wants
higher yields



Ravindra Reddy
likes the safety
net of lower costs

the first year of upscaling, and farmers hadn't collected enough seed in May, which is when the *neem* tree bears seeds. This year, they insist, SHGs have been alerted that they should collect seeds and process them for sale to farmers. They say this will bring more employment— *neem* seeds are typically collected by the landless labourers and *dalits*.

But there is conflict of interest. IKP has an older income-generation programme under which its groups sell *neem* seeds to the agro-business arm of the ITC group. Will the SHGs sell to ITC or NPM farmers? Is there enough *neem* to service such a demand? "There are no real-time estimates of how much *neem* seeds will be required. There are already places where getting *neem* is difficult," says Saurabh Arora, an academic working on his doctoral thesis on NPM technologies at a Dutch university. In the coming year, the state is going to witness an unprecedented market for *neem* seeds. Even if there are enough trees — realistic estimates are required for that, too — it is difficult to plan the *neem* supply.

There is a sense that IKP is so overwhelmed with the success of NPM that it thinks nothing can go wrong. For one, officials can't recount any teething problems, quite unlikely in a project of this scale. The institutional framework has problems, too. In places where NPM is led by the women's groups, villagers have taken the programme as their own. But in places where the initiative rests with NGOs, sustainability is doubtful.

Case in point

Warangal district, for example, has the Rashtriya Sam Vikas Yojana, a central government scheme. It is meant to speed up development in tribal districts with Naxalite influence. Then, Warangal has an organic farming project from Oxfam. The NGOs that implement NPM have also taken up organic farming projects. Farmers here are confused; they think NPM and organic farming are one and the same. Actually, the driving force behind the two is very different. Organic farming will

RAMKISTAPUR VILLAGE

Parakal mandal, Warangal district

Crop: cotton, turmeric, chilli, paddy

With a considerable tribal population and a lot of influence from Maoist groups, this district gets special attention from the Union government. The villages and NGOs that have taken up NPM also run projects to promote organic farming. Here, the initiative rests squarely with the NGOs — not the women's group, as is the case across the state. Yara Raj Reddy, 50, a registered NPM farmer, thinks NPM is about organic manure and vermicomposting. Farmers have stopped using chemical fertilisers under the organic farming project, and think that's what NPM is about. R Sambasiva Reddy has 12 acres and was harvesting chilli when he spoke to *Down To Earth*: "I've learnt that my soil is zinc deficient. I'm doing organic/NPM for my soil's health. They also say that I'll get a premium price for my produce after certification." His mother-in-law Suguna, though, is unhappy. "The yield is too low," she says. But there are others, like D Ravindra Reddy, who know NPM is only about avoiding pesticides: "Yields are lower as I didn't use chemical fertiliser, but the cost of cultivation is also low. There is no loss."

“It’s an open-source technology”

G V Ramanjaneyulu, extension scientist and executive-director, Centre for Sustainable Agriculture

Why NPM? Why not IPM or organic farming?

We consider pesticides the costliest input in farming. NPM conveys a direct message to the farmer: that they don’t need pesticides. It is a communication strategy. Government scientists — I was one — talk about IPM. But farmers don’t understand what they mean, how IPM is different from using pesticides. They say pesticide is the last resort. But the emphasis is typically on the so-called last option. When combined with pesticides, non-chemical approaches become ineffective.

Organic farming is now well established, but its recent fad is driven by the need to export to the high-end market in the West. It externalises the know-how and trust. The consultants tell the farmers how and what to grow, and the certifying agencies provide the consumer the trust that their conditions have been met. Much of the profit goes to these agencies. The government subsidies actually line the pockets of these agencies. There is no support for the farmer who wants to switch to organic voluntarily.

What ails public sector research?

I took part in several studies on the agrarian crisis 1997 onwards. I found public sector research had little to do with the ground realities. The problem is clearly with pesticides and the seed market, but the scientists never talk about these. They love to blame the extension system, never acknowledging the inherent problems with the technologies they promote. The agribusiness industry sponsors lunches and



Ramanjaneyulu talks of a shift in paradigm

dinners in most workshops and seminars, like in the recent Indian Science Congress. So nobody does a critical assessment of what industry does. Research institutions have found a legal way to accept industry funds: paid-up trials. These funds influence the direction of research.

Will the agriculture university take up NPM?

Yesterday it seemed impossible. Today it looks likely. Working with IKP has proven that the government and voluntary agencies can work together. All of us have our strengths and weaknesses. It is said there are difficulties in integrating knowledge from sources other than university and industry. But if a system works, they’ll have to work on it sooner or later. As for the agriculture department, it is bound by what the university recommends. Its officials think they have to learn from ‘experts’ and teach the ‘illiterate’ farmers. They struggle to learn from farmers. They can’t move forward due to innate problems with the technologies they are saddled with. The present agriculture minister and commissioner have shown seriousness and a sense of purpose in dealing with pressing issues. There is good reason to hope.

What problems do you fear for NPM?

As the emphasis is on local resources, there could be limitations on their availability. For example, if all the *neem* fruit available in the state is collected, it might serve 500,000 acres. What after that? We’ll have to think of other sources. On the other hand, as area under NPM increases, ecological balance would be restored faster. Input requirement would decrease. NPM has evolved as an open-source technology. As more agencies get in, especially government ones, it would only improve. The key is investment on knowledge, on human resources.

work for the farmer only when there is certification and access to a market willing to pay a premium on organic produce.

In Warangal, the women’s groups don’t own the NPM programme. “The NGOs might be committed, but what will happen after their project gets over? Only when villages own the programme will it work,” says B Venkateshwar Rao, academic at the Kakatiya University in Warangal, who has been tracking agricultural programmes for a few years. This raises another issue. Andhra has a long history of parallel bodies working at the village level, without any real communication. At any point, there can be up to eight bodies working independently on different issues in a village. Can NPM deliver on a larger scale without support from the agriculture department, which has the largest reach in the state? Will the agriculture scientists accept NPM? They could. And there is a shining example.

The Hanumantharaya Krishi Vigyan Kendra (KVK) in Yagantipalle, Banganapalli *mandal*, Kurnool district, is run by a charitable trust. But it is part of the countrywide network of the Indian Council of Agricultural Research. It agreed to implement NPM in 2005. “We have been recommending pesticides for years. We didn’t want to take up NPM, but Vijay Kumar of IKP pressured and persuaded us,” says G Dhana-

laxmi, training organiser at the KVK. “We picked up 22 villages to try NPM. Our focus was paddy, which is affected by several diseases.” The cost of plant protection came down, even as the yield was the same as the previous year, when pesticides were used. “We are really impressed by the results. It works. This year, we will expand NPM services to 12 *mandals*,” she says.

Attesting her claims is Shankariah, 30, who owns seven acres in Kunidedu *mandal* of Kurnool district. He grows the famous long-grained Kurnool paddy that is an essential ingredient of the Hyderabad *biryani*. “KVK set up a trial plot in this village in the *kharif* season, and the cost of plant protection on it was Rs 300 per acre. I’d spent Rs 8,000 per acre on a range of pesticides. In the *rabi* season, I switched to NPM,” he says, proudly showing his field which is full of friendly insects — natural predators of pests.

It seems NPM has hit the right chord with all — except the state agriculture university and the agriculture department that runs on its advice. How long will they stay away from such a dramatic success story? ■

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