

Leading the Vision

Stewardship in the Crop Protection Industry

CropLife
INTERNATIONAL

Brazil Leads World in Container Management



Flexible bags destined for a collection center.



InpEV president
João Rando

Actors perform for school children on Campo Limpo Day.

Since 2002, Brazil has collected 400,000 tons of empty pesticide containers from 1.3 million farms for proper disposal or recycling. That's equivalent to filling the Maracanã — Brazil's national football stadium — 26 times. These impressive statistics represent the largest and most successful container management program in the world.

It's a crop protection industry initiative run by the [National Institute for Processing Empty Containers \(InpEV\)](#) and supported by the Brazilian government. Operational in 2002, InpEV is a non-profit organization that represents the industry in its responsibility to properly dispose of crop protection product containers. InpEV has more than 100 member companies representing the entire value chain in Brazil, including 100 percent of all crop protection product manufacturers, the Brazilian farmers' federation, distribution channels and national crop protection associations such as [ANDEF \(Associação Nacional de Defesa Vegetal\)](#).

The program, aptly named Campo Limpo ("Clean Field" in Portuguese), goes like this: By law, farmers are required to properly rinse (pressure or triple rinse) all rigid crop protection product containers and puncture them to prevent reuse. Flexible bags are not rinsable, but they must be returned to collection centers. Growers take all empty containers to the local collection center indicated on their product invoice. Then InpEV collects the containers and dispatches them to their final destination: a recycling center (rinsed) or incinerator (unrinsed).

"Dealers and cooperatives must provide the address to which to return containers on crop protection product invoices and offer collection sites," says João Cesar Meneghel Rando, president of InpEV. "The legal responsibility belongs

to these distributors as the law states that whomever sells the products, must recover them."

Crop protection product manufacturers sell their products through about 4,500 distributors and cooperatives or directly to farmers throughout the country. Farmers must deliver empty product containers within one year of purchase to designated receiving units. More than 400 collection sites are managed by about 270 regional cooperatives and distributor associations. The latter distributors also have to manage the collection sites and issue proof of delivery of empty containers, as well as guide farmers on container management procedures. InpEV supports the operational processes of the receiving units and also provides guidance to farmers about their responsibilities via a good operational practices manual. About 45,000 tons of empty crop protection product containers were recovered in 2015, representing 94 percent of all such containers made of plastic.

This high level of compliance began with a very effective law: In 2000, the proper disposal of empty crop protection product containers became obligatory under the Brazilian federal government with shared responsibility among stakeholders. The government grants licenses to receiving units, inspects all elements of the Campo Limpo system and fines stakeholders who don't comply. In addition, it supports public education initiatives to spread knowledge of the legislation.

"There are penalties for non-compliance from fines to prosecution as it is considered a crime against the environment," explains Rando. "All stakeholders are subjected to these penalties. There have been only a few cases of prosecution with growers — we have nearly 100 percent compliance." ↓

Adding Value Through Recycling

The Campo Limpo system has partnerships with 10 recycling and four incineration companies located in six states. At least half of the recycling plants manage plastic, while the others handle paper and metal, Rando says. Run by InpEV, the majority only recycle crop protection product containers. Recycled plastic is used to make corrugated tubes, cables, construction materials and even new crop protection product containers. Metal goes to construction materials. Recycled paper goes into barrel cartons used by other industries or packing materials for incineration.

Creating a closed loop system, one recycling company produces plastic resin for new crop protection product containers. In fact, InpEV founded it — Campo Limpo Reciclagem e Transformação de Plásticos S.A. (Recycling and Transformation of Plastic) — in 2008 with 29 shareholders who are all InpEV affiliates. The company produces three-layered jugs called Ecoplástica Triex® with an external layer made with 85 percent recycled plastic. These jugs are the first crop protection product containers made with recycled plastic resin that have [United Nations' certification for ground transport](#).

“The objective of recycling empty product containers is to generate value to reduce costs of the system,” says Rando. “It’s environmentally advantageous as well because preventing new container production reduces carbon dioxide emissions.”

Depending on the technique, plastic product containers can be recycled up to three times.

“If you have a good recycling process that maintains plastic quality, you can recycle the containers more than one time,” notes Rando. “Recycling plastic jugs is most cost-efficient because liquid formulations need jugs but there are other materials that could be recycled as well. We’re focusing on



Sacks of recyclable materials ready for collection.

a closed loop system to turn containers as well as caps into new ones. In addition, the industry is always looking for new ways to produce jugs that are easier and safer to handle.”

Another InpEV start-up, Campo Limpo Tampas e Resinas Plásticas LTDA (Caps and Plastic Resins), produces caps with recycled material for a range of products, including other chemicals and motor oil. This company belongs to the same 29 shareholders as the plastic container recycling operation.

Campo Limpo Evolution

The Campo Limpo system evolved from a voluntary pilot project on container management that was started by ANDEF in 1992-93 with a cooperative government, distributor and grower collaboration. Its success led to the passage of the Brazilian law and founding of InpEV.

“The mission of InpEV is to represent pesticide manufacturers in this system and their responsibilities by law: collection, transportation and environmentally correct disposal of empty product containers,” Rando notes.

“CropLife International is involved with 60 container management programs around the world but Brazil’s is one the most advanced,” he adds.

In Argentina, a bill was passed in mid-2016 to create a National Program for the Recovery of Pesticide Containers. Other countries may also follow suit based on the successful Brazilian model.

“We run a mature program, with 94-95 percent of containers collected, so there is little room for growth,” explains Rando. “We are expanding at the same rate as the agricultural industry. Around 31 million hectares of soybeans are grown per year in Brazil — that’s already a very big area! But Brazilian agriculture is important so it is expanding.”

Shared Costs and Responsibilities

InpEV is funded by crop protection product manufacturers, which bear 85 percent of the total Campo Limpo system costs, including education. Growers only account for 3 percent of system costs and dealers/cooperatives 12 percent to maintain receiving units. Currently, 35 percent of costs are recovered from income generated within the Campo Limpo system.

“All stakeholders have shared responsibility,” Rando notes. “We are aiming for a self-sufficient system that will pay for itself in the future. By 2019-20, we may subsidize 45-50 percent of the costs.”

In order to fulfill their legal obligation, InpEV’s member companies invest on an annual basis according to the profile and volume of crop protection product containers they place in the market. Since 2002, these companies have spent more than R\$900 million (US\$280 million) on the Campo Limpo system.

National Campo Limpo Day

Not only is Campo Limpo very effective, it has its own annual day of recognition (August 18). This day is all about public education on recycling. There are 120 collection centers participating nationwide, which host people in their communities. Educators also travel to 2,060 schools in rural areas close to the centers to teach 210,000 kids 9-10 years old about how to care for the environment and properly dispose of and recycle household containers. There is even an annual contest for kids to draw or write something about environment, according to Rando.





Campo Limpo Day education about recycling.

“This year is the 12th observance of National Campo Limpo Day,” he notes. “The law requires this education, including national and local governments. Besides, we have a lot to celebrate.”

The secrets to Brazil’s success? Rando picks out four things: 1) the law, 2) integration of the whole stakeholder chain, 3) education, and 4) good technological systems and processes.

“We have a very proper governance model as well,” he concluded. “In Brazil, all sectors — but especially ours — have a very good container management story. Campo Limpo is good for our industry’s image as we comply 100 percent with the law. It’s also very positive for agriculture in general. It’s socially correct. Plus it generates 1,500 jobs. All of us in the Campo Limpo are very proud of what we’re doing.”

Perspective

Precision Farming and Drones Enhance Application of Crop Protection Products

By Ulrich Adam



Agriculture today is about high speed and high precision. In the past 10 years, [precision farming](#) has experienced unprecedented growth around the world: Around 80 percent of new farm equipment sold today has some form of precision farming component.

Precision farming is all about doing the right thing in the right place at right time with the right amount. It leads to higher profitability, improved sustainability and increased productivity. Plus, it saves farmers time and enhances their well-being. Applying crop protection products with precision equipment, including integrated electronic communication and variable rate technology, demonstrates the power of digital technology on the farm. It also shows the benefits of like-minded industries working together — in this case, where agricultural equipment meets crop protection.

Precise Applications

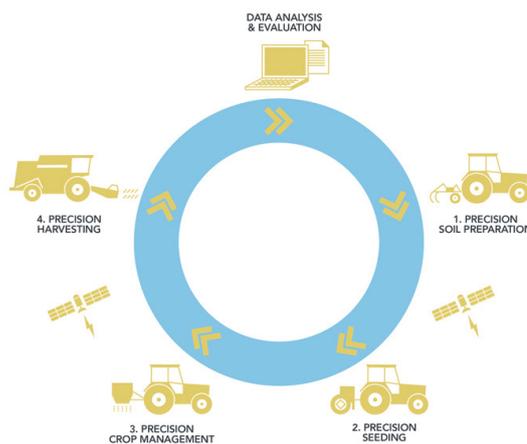
Modern, more efficient farm equipment allows farmers to 1) improve their crops through more targeted input applications; 2) reduce input costs; 3) benefit the environment due to fewer inputs; 4) reduce work and increase comfort for farmers (i.e., self-driving tractors can operate in bad weather and at night); and 5) improve profits. For example, farms in Germany using advanced digital, precision technology have reported higher yields per hectare with reduced herbicide and diesel use by 10 and 20 percent, respectively.

Modern agricultural machine technology specifically helps farmers with crop protection by:

- protecting crops from pests with exact doses and targeted applications of products;

- allowing for responsible product use with less exposure;
- efficiently using scarce agricultural area; and
- maximizing harvest results.

CEMA (Comité Européen des Groupements de Constructeurs du Machinisme Agricole), the European Association of Agricultural Equipment, has a partnership with the European Crop Protection Association (ECPA) to produce a state-of-the-art, universal industry standard for Closed Transfer Systems, which will allow crop protection products to be put in sprayers without opening them so farmer exposure will be minimized.



In addition, CEMA and ECPA are planning to launch a dedicated website about the benefits of new sprayer technology. It will inform farmers how to purchase new equipment or retrofit old equipment. Better, safer and more precise application of crop protection products is our mutual goal.

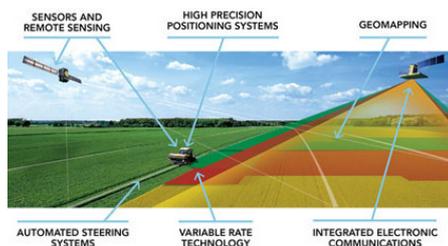




From Data to Drones

Thanks to digital connectivity, smart farm equipment can connect the “dots” of data and put them into an optimized order by consulting, for instance, field-specific information from cloud-based farm management software. Sensors and remote sensing collect data from a distance to evaluate soil and crop health, such as the presence of pests or diseases.

The big question is when and how will drones and robots be used in the field to apply crop protection products and improve crop production? While field robot prototypes exist, they are not yet being used in fields. Drones, however, are already taking off in agriculture.



Used mainly for capturing images and providing data, drones allow for permanent monitoring of a crop from planting to harvest. They can also help farmers react faster to threats, such as weeds, insects and fungi; save time crop scouting to take appropriate actions; and improve the application of variable input rates in real time. This data is processed in the cloud and translated into useful information, such as plant health and pest infestations. This data can then be entered into smart machinery to adjust the amount of

inputs, such as crop protection products, for a field accordingly.

In addition to determining pest outbreaks, drones can be used to apply crop protection products. In Japan, for example, drones do aerial spraying. While they are not allowed to spray in Europe, drones are being used there to distribute biological agents like wasp eggs. But the potential for drones is sky-high around the world.

Water-resistant, drones can monitor any type of crop in any geographical area under any weather condition. They can also get higher quality and more precise images in real time as they fly below the clouds and have high photo resolution — far superior to satellites, which only take pictures once a week or month and don't work well when it's cloudy.

It is expected that the use of agricultural drones will grow significantly in the coming years as they offer a wide range of applications that improve precision farming. In addition, they can potentially replace human application of crop protection products, minimizing farmer exposure. That's some high-flying technology. 💧

Ulrich Adam is secretary general of [CEMA](#), the European association of agricultural equipment manufacturers based in Brussels. CEMA represents 4,500 manufacturers that produce 450 different types of machines ranging from tractors to precision seed drills.

Partnership Profile

Growing Better Crops in India with Pollination Services and Stewardship Training

Who:

CropLife India has partnered with the [Indian Council of Agricultural Research \(ICAR\)](#) and one of its extension facilities, [Agricultural Development Trust \(KVK\) Baramati](#).

What:

This pilot project, called “[Madhu Sandesh](#)” (meaning “honeyed message” in Marathi language), consists of providing subsidized beehive rentals and training in both Integrated Pest Management (IPM) and the responsible use (RU) of crop protection products to pomegranate growers and onion seed producers. It aims to improve crops by promoting awareness and utilization of pollination services as well as good stewardship.



Why:

In many cases, farmers who are dependent on pollinators for crop production do not fully realize the benefits they yield. Through this project, CropLife India is promoting a holistic understanding of the need for crop protection products and the environment to co-exist. It is also incentivizing farmers to use these products responsibly.



How:

By establishing an apiary and starting a hive rental program with crop-specific training in one of India's leading farmer institutes, this project has made pollination services available to farmers planting pollination-dependent crops. It has also promoted the tangible benefits of pollination and RU/IPM to the broader farming community.

Outcomes:

Pomegranate farmers who rented beehives saw their yield increase by 35 percent, while the training they received helped them reduce inputs, resulting in higher margins. Additionally, 90 percent of farmers reported a better quality crop with more even maturation. Fruits with even coloring and shape fetch a higher market price, boosting farmers' income. As a result, the net income of pomegranate farmers has increased by 42 percent. Onion seed producers who participated in the project also saw their yields increase by 17 percent, increasing income overall by more than 18 percent.

An impact assessment also found that farmers involved in Madhu Sandesh have better knowledge of pollinator benefits and of RU/IPM. They are more willing to rent beehives in the future and pay for protective equipment. 💧

Madhu Sandesh Impact on Crop Yield and Income

		Before	After	% Change
Pomegranate	Yield (t/acre)	6.22	8.39	34.89%
	Net Income (Rs)	4,08,739.68	5,80,518.65	42.02%
Onion Seed	Yield (kg/Acre)	388.58	455.47	17.21%
	Net Income (Rs)	6,74,930.5	7,99,839.8	18.51%

Assessment done by: KVK Baramati, validated by third party (MASM).

Methodology: Baseline survey and yield reporting of all participating farmers (150 pomegranate farmers, 34 onion seed producers).

Sharing the Story

Maintaining High Standards on Pesticide Residues



It's a pleasure to eat good food, but we need to know that our food is safe. Maximum Residue Levels (MRLs) provide a measurable trading standard that help ensure food produced with

crop protection products is suitable for consumption. Dr. Monika Roth, senior global product stewardship manager for BASF and head of the European Crop Protection Association's (ECPA's) residue management project, tells us more.

Q What are pesticide residues?

They are measurable traces of crop protection products on harvested food crops like apples, lettuce and corn. These residues are very, very low if present at all. A typical residue could correspond to one kernel of maize in three tons of wheat or one aspirin tablet in an Olympic swimming pool.

Q To what extent do pesticide residues exist?

The European Food Safety Authority (EFSA) publishes a monitoring report on residues every year. It shows that in the European Union (EU), about half of all samples are free of detectable residue traces. In the remaining half (45%), residues found were within the legal limits (maximum residue levels or MRLs). Only about 2 percent of items tested exceed these limits, which still do not pose a safety issue. ⬇️

Q How and why do pesticide residues occur?

Pests that attack close to harvest can lead to spraying and, therefore, residues. Another cause is the misuse of products, like not paying attention to label instructions. But if farmers follow instructions, resulting crops should not exceed MRLs established in their country of use.

Q How can pesticide residues be minimized?

The farmer is number one in minimizing residues with good agricultural practices. Moreover, Integrated Pest Management (IPM) supports the reduction of residues. The ECPA is looking to further improve the already good situation in Europe via IPM in our residue management project. We ultimately want to improve consumer confidence. There is always room for improvement.

Q What are MRLs and how are they set?

MRLs are trade standards based on residue trials set by regulators. They are set below toxicological safety limits. Demonstrated consumer safety is an indispensable pre-condition for granting MRLs; they are also about trade and marketability of produce. Ultimately, MRLs verify if farmers have used crop protection products correctly. If an MRL is exceeded, it is against the law and in theory, the produce cannot be sold. But some produce slips through the cracks as not every apple tree can be tested.

Q Are MRLs harmonized around the world?

Unfortunately, there are no globally harmonized MRLs. There are many different MRL systems around the world, such as in the United States and EU, as well as Codex Alimentarius internationally. Crop protection product manufacturers start the process of getting MRLs in the country of use by submitting local data packages. In a local market, an MRL is set routinely before a product is registered but not automatically in export

markets. If a product is not registered in an export market, the company should submit to regulators for an import tolerance to be set, which should be similar to the MRL in the local market.

Q How do MRLs impact trade?

MRLs are the cornerstone to trade. A crop is not legally tradeable if it exceeds MRLs. There are no globally harmonized MRLs and this is sometimes a challenge because farmers must comply with MRLs in both exporting and importing countries. For example, if South African grapes are sent to the EU, they must comply with both South African and European MRLs. Thus, farmers need to be well informed about what MRLs are in export markets. There is no guarantee that following label instructions locally will meet an importing country's residue requirements.

Q Do all trading countries comply with MRLs?

Exceeding MRLs is the exception, not the rule. Exporters are typically aware of MRLs around the world as exports that don't meet import tolerances may be rejected at the border. Traders advise farmers and monitor produce along with supermarket chains. For the few exceptions, the ECPA residue management project aims to help exporters meet EU MRLs.

Q What is the ECPA doing about MRL exceedances?

A few years ago, we started a pilot project with partners in Spain and Turkey. We transfer best practices on residue management from Almeria, Spain to Turkey in a train-the-trainer program. We have seen a major improvement in residue management in Almeria, and this should also work in Turkey. Compliance with EU MRLs and food safety is key for Turkey as it exports a lot of produce to the EU. Greenhouse tomatoes and peppers are a focus because they are grown in large quantities in both countries.

Q Should consumers be concerned about pesticide residues?

No, as there is a huge gap between perception and reality. Even if the legal maximum limit for residues is exceeded, it is not necessarily a risk because of the huge safety margins. For example, one would have to eat [28,000 strawberries in a single day](#) to come close to exceeding the safety limit.

Q How is consumer safety ensured?

It starts with us as an industry. We test products extensively and do not submit for registration unless we are confident in their safety. Authorities then run independent assessments and concur or not. Then there is monitoring in the food chain from traders to supermarkets. Hundreds of thousands of samples worldwide are analyzed for residues year after year. In developing countries, there is still a gap, but standards have gotten higher worldwide and continue to be better.

Q How can consumers protect themselves from pesticide residues?

Most residues are on the skin of fruits and vegetables; therefore, peeling largely removes them. Consumers can also take precaution by removing the outer leaves of heads of lettuce and washing unpeeled produce under running water, gently scrubbing, and then drying it. Ultimately, consumers should use good handling practices rather than pay attention to "watch lists." 💧

