ICRISAT
Science with a human face

Inclusive Market-Oriented Development (IMOD)




IMOD: Innovate ● Grow ● Prosper ●

The Rationale for IMOD

During 2010, we conducted an in-depth review of ICRISAT's strategy vis-a-vis dryland agriculture in Asia and sub-Saharan Africa, with its marginalized, resource-poor and perennially shock-prone communities. ICRISAT challenged this pessimistic view and found that the ingenious and resourceful dryland farmers can indeed increase their crop productivity and incomes by several-fold while improving the resilience of their lands and livelihoods by applying scientific innovations backed up by adequate policy, marketing and other support services.

The result was a recognition of the need for market connections to extricate the highly vulnerable subsistence farmers out of poverty. It was strongly felt that harnessing markets for smallholder farmers combined with research for development to improve systems for managing risks would bring them into the mainstream to take part in and benefit from development. Thus was born our Inclusive Market-Oriented Development or IMOD strategy to 2020.

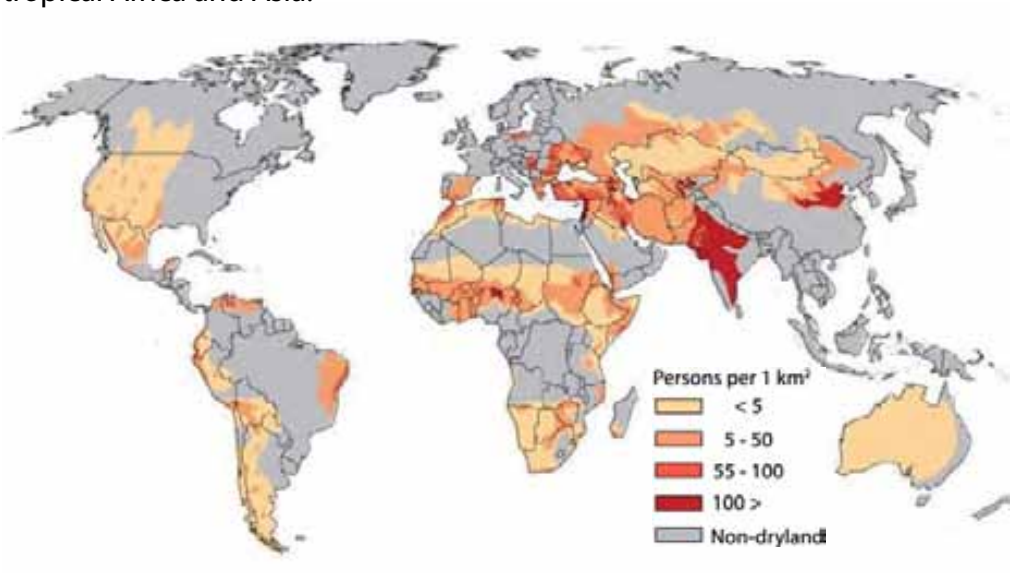
IMOD is about producing surpluses that can be stored as food to serve as a buffer in times of hunger and sold to markets. Income from marketed produce enables farm families to purchase more food when needed, including inputs such as seeds, fertilizer, labor, tools, livestock, insurance and education. These will further raise farm productivity, triggering a series of investments leading to economic growth. As this is sustained, it creates a self-reinforcing pathway to prosperity.

ICRISAT's mission is to help the world to reduce poverty, hunger, malnutrition and environmental degradation in the dryland tropics of the developing world. We do this through partnership-based agricultural research-for-development. What follows is a detailed account of what made us re-examine our strategy, and the exciting renewal that our new strategy represents.

Where are the Drylands?

The drylands are defined by what is called the Aridity Index, which is the ratio of precipitation to potential evapotranspiration. In the tropical latitudes, you can see that very large areas of Africa are dryland, surrounding the Congo Basin and just south of the Sahara.

The darker red color indicates higher population density, which in the tropical latitudes is most noticeable in dryland India. As an international institution, we act as a research-for-development bridge between dryland tropical Africa and Asia.



Cause for Concern

First, we need to ask why these dryland areas need the world's help. We reviewed the available data*, and it was sobering. Three hundred million people in the dryland tropics live on less than one dollar a day, a level that experts call "absolute poverty".

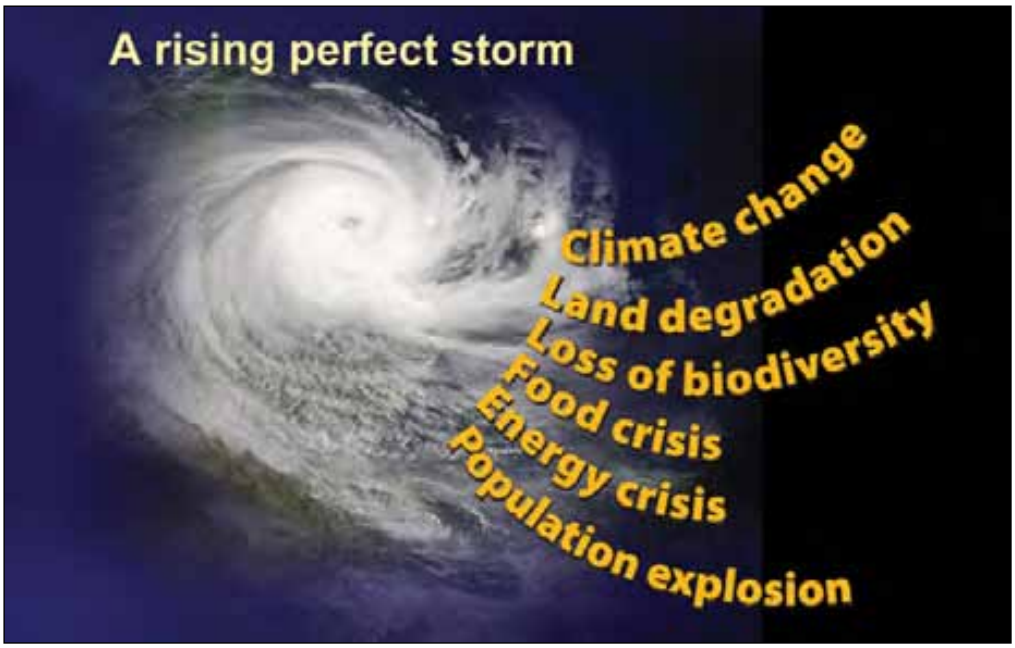
[*Source: *Report by Prof. Tom Walker, Michigan State Univ., available at ICRISAT website; it updates the comprehensive analysis of Ryan & Spencer (2001)].

Seven hundred million live on less than two dollars a day. People who are this poor live in a constant state of hunger and insecurity. They spend their days working hard in the fields, but get little for it because their lands are depleted and drought-prone.

One of the most disturbing statistics in the tropical drylands is the high rate of childhood malnutrition. Nearly 42% of the children of dryland Asia and nearly 27% in dryland Africa are malnourished. This permanently affects their growth and mental abilities. This is a staggering and unacceptable tragedy.

A Rising Perfect Storm

These areas are facing a convergence of pressures that we call "a perfect storm". The poor are the most vulnerable to the storm; they have the least resources to cushion these shocks. If the poor are to survive the perfect storm, it won't be through piecemeal, band-aid type approaches. We need a long-term, holistic strategy for reducing their vulnerability.



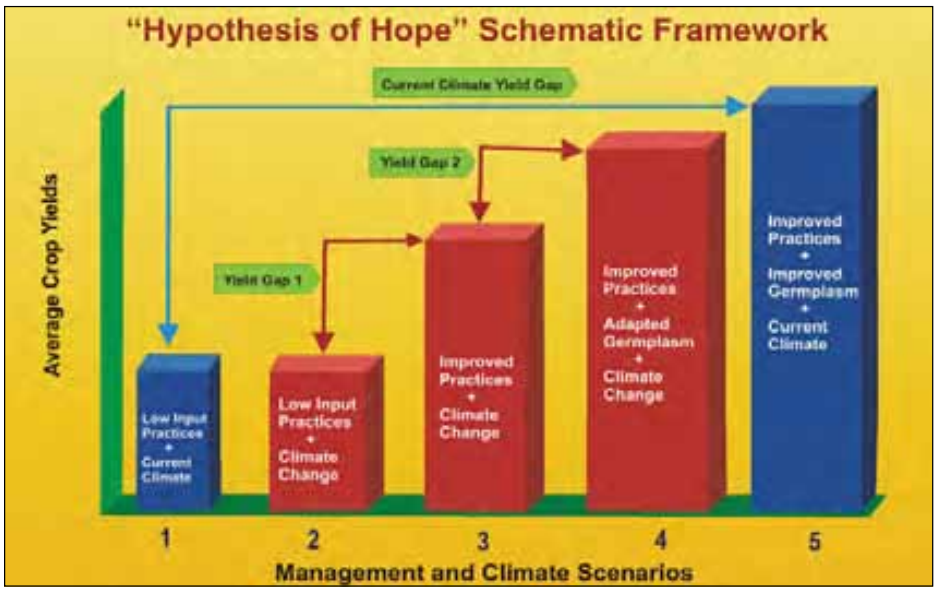
Hypothesis of Hope

Our analyses of the likely impacts of changes in climate on crop yields led us to what we call the "Hypothesis of Hope".

What the figure below shows is that the yield gap between agricultural practices presently used by poor smallholder farmers, shown by the small blue bar on the left, leave a huge unfilled yield gap compared with what is possible today with good management and varieties in the large blue bar on the right. This humongous yield gap swamps out the small yield losses expected due to climate change to 2050 for most poor farmers. That predicted small climate change yield loss is the difference between the red and blue bars on the right.

We call this the Hypothesis of Hope because the models are telling us that these hardy dryland crops and systems can be largely climate-proofed through better management practices and genetically improved crops. However, achieving that resilience will require investment in both research and in development for farmers to gain access to these improved management inputs. IMOD is our strategy for increasing this access.

This can be achieved more with capacity building of the smallholder farmer, including women and youth.



The World Cares

We see the suffering of the dryland poor and hungry on our TV screens again and again as they are struck by droughts, famines and wars. Famous celebrities have organized campaigns to help them. Despite all these good efforts, there seems to be no end to the problem.

Even Dr Norman Borlaug found it difficult

"They can't eat potential… Africa needs inputs, access to markets, infrastructure and credit…"

Even our hero Dr Norman Borlaug, father of the Green Revolution in irrigated Mexico and Asia, found that plant breeding alone could not achieve the same result in Africa. Too many other systems were dysfunctional. Fertilizer wasn't available or was too expensive; credit and infrastructure were lacking; and markets were unable to smooth out the yearly variations in grain production.

Many Successes by ICRISAT & Partners – but Wider Impact Needed

Likewise, at ICRISAT we attempted the Green Revolution approach. We bred many varieties that showed outstanding performance when well-managed with fertilizer and good soils and weed control. But when they reached the farm, these varieties rarely received such good treatment. They could not express their yield potential.

We trained fifteen thousand scientists, and many are playing important roles now, but many were also shifted into non-agricultural assignments by their governments.

A sample of our successes:

- 680 varieties released by countries
- 119,000 genetic resources conserved and studied
- Improved water & soil management methods devised
- Improved policy understanding
- 15,000 scientists trained
- 190 current partnerships.

Lesson Learned from 38 Years of Effort

Over nearly four decades, we've learned a lot. We haven't found a single "magic bullet" technical solution to solve hunger and poverty or to stimulate a Green Revolution in the drylands.

And we don't think there is one. Instead, we've learned the importance of adapting solutions to the diversity of cultures and environments found in the drylands. We used this learning in formulating our new Strategic Plan to 2020.

Strategic Questions

So we asked ourselves: what do we need to change in order to become more effective in helping these hundreds of millions of desperately poor people?

Stakeholder Consultations

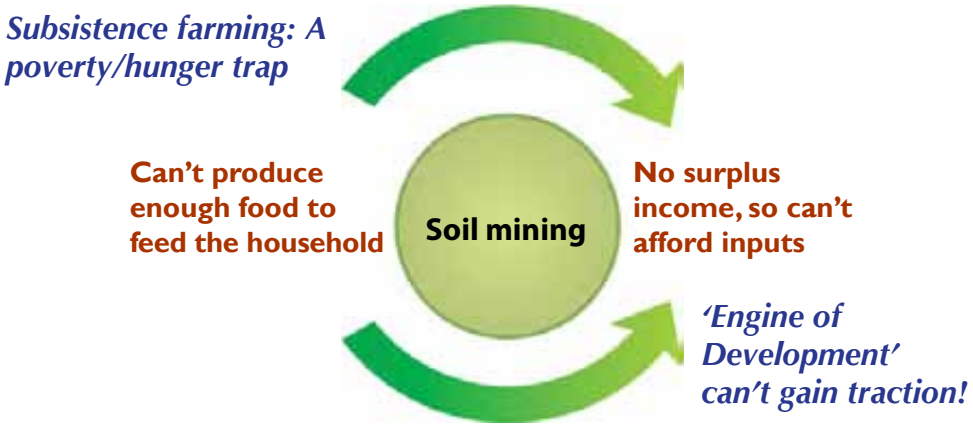
We spent a lot of time in 2010 consulting with partners on this question. We held four intensive three-day workshops across our three regions. We also heard from 190 stakeholders worldwide who responded to our online survey of views about the main elements of our emerging strategy. And we consulted with our Governing Board and major development investors.

From "Magic Bullet" Thinking, to a Development Perspective

We realized that we needed to go beyond "magic bullet" simple solutions. We needed to take a systems perspective, following Dr Borlaug's wise advice. We needed to understand better how development actually happens in drylands. How can it be triggered? How can it be sustained, so that these regions need not always depend on emergency relief aid? How can the poorest be involved? And given the diversity of dryland settings, how could diverse solutions be scaled-up for wide impact?

What's Wrong with Current Development Dynamics in Drylands?

We began by asking what was not working at present. We realized that the poorest farmers are really stuck in a poverty trap. Because they have no money, they can't buy any of the essential inputs that Dr Borlaug mentioned. And since they can't buy those inputs, they can't raise their farm productivity. They can't even grow enough food to feed the household over



the course of the whole year. And because they generate no surplus, they have nothing to sell… once again leaving them without cash and unable to buy inputs the following year. So the poverty cycle just repeats itself. Meanwhile, without inputs their crops mine the soil of native nutrients, causing productivity to decline to a very low level. If we think of agriculture as an engine of development, it is clear that in subsistence farming, this engine is not gaining traction. It is just spinning its wheels.

The Strategy

How do we help poor farmers get out of that trap? Through our discussions, we came up with a strategy that we think offers a lot of hope.

In all our regional consultations, scientists pointed out the need for market connections to pull subsistence farmers out of poverty. This point echoed the well-regarded global analysis of the World Bank in 2008. Referred to here is the World Development Report on 'Agriculture for Development', from which three quotes strongly influenced our new Strategy:

"Agriculture operates in three distinct worlds—one agriculture-based, one transforming, one urbanized."

"… the growth strategy for most agriculture-based economies has to be anchored on getting agriculture moving."

"The private sector drives the organization of value chains... The state… corrects market failures… and support the greater inclusion of smallholders and rural workers."

Applied to ICRISAT's Dryland Mission Context

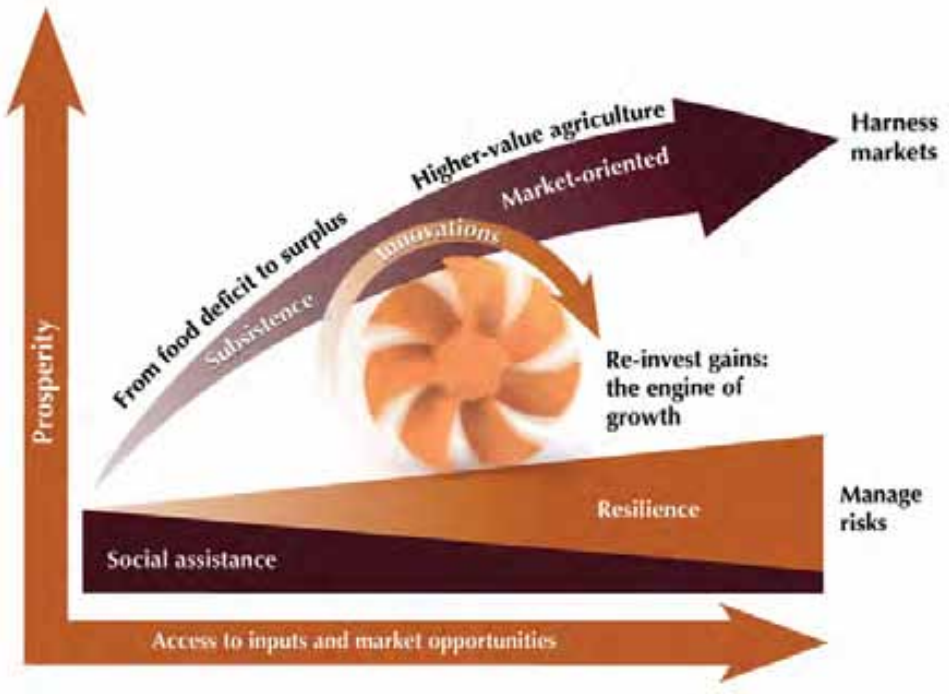
So we recognized that our new development-oriented Strategy needed to have two major dimensions.

First, we needed a dimension of research-for-development that helped to harness markets for smallholder farmers.

Second, knowing that the poor are highly vulnerable to risks, we needed research-for-development to improve systems for managing risks that could otherwise keep the poorest from participating in those market opportunities.

Inclusive Market-Oriented Development (IMOD)

Through a lot of discussion, we came up with this way of picturing our Strategy in a nutshell. We call it 'Inclusive Market-Oriented Development', or IMOD. There are two major dimensions. The curve is the power of market opportunities that offer prosperity to smallholders. The platform is the risk management dimension. There we see a need for more effective social assistance programs to help the poorest connect to markets, but in a way that builds their own resilience rather than creating dependency.



In the center of this diagram we've tried to represent the 'engine' that drives this development pathway. Research-for-development and other innovations open up more and more profitable market opportunities. Re-investing some of these profits enlarges those opportunities even further, and also builds resilience. So the 'engine of growth' contributes to both the market and resilience dimensions of the strategy. This engine is fueled by investment, and oiled by innovation.

There are a lot of interesting angles to this model, but just to mention a couple of critically important aspects:

If we can successfully implement this model, it should be self-sustaining and able to scale up without massive increases in relief aid, because it runs largely on the 'fuel' of private investment. The public sector, however, must ensure that the poor are part of the picture. We can help them through policy and institutional innovations.

Also very important, this model takes us beyond talk of merely 'alleviating' poverty. We're talking here about an approach to escape poverty, not just to live with it.

What has Changed?

So how does this new IMOD strategy differ from what we've done in the past? How does it change business-as-usual?

Systems Perspective, Oriented to Markets

In the past we tended to design innovations that just eased poverty a little bit, made it more bearable but did not escape it. There was no major change of state. But IMOD is dynamic. It's about helping the poor move from their current state, to a more prosperous state. The inclusiveness focus of IMOD moves us beyond lumping all the poor in the same average dollar-a-day basket. Different types of poor need different approaches.

Risk management is something we probably under-appreciated in the past. We assumed that farmers would invest in high-yield technology and like Dr Borlaug we were disappointed when that didn't happen. By improving risk management, we make investment much easier for the poor.

Here is an example of how one of our innovations has had impressive impacts in Africa. Food products contaminated by aflatoxin can affect human and animal health and reduce product marketability, causing economic losses. ICRISAT's simple and cheap (US$ 1 per sample) aflatoxin testing kit using cELISA test has stimulated interventions that enhance safety of food and human health, trade and consequently farmers income in India, Malawi, Mozambique, Mali and Kenya. For instance, Malawi's groundnut industry which was rocked by aflatoxin contamination in the

1970s saw it unable to meet international standards of quality as a major groundnut exporter. Recent times have seen a reversal of fortunes, thanks to the collaboration between ICRISAT and the National Small Farmers' Association of Malawi (NASFAM).

The 108,000-member NASFAM provides agricultural advisory services for groundnut production and assures farmers a market for their produce. Through NASFAM, farmers can access improved technologies (made available by ICRISAT) by participating in on-farm trials and demonstrations. Farmers participate in adaptive trials for aflatoxin control and management. Groundnut farmers hope to double their income from using higher yielding, disease resistant varieties such as ICGV-SM 90704, which is also well accepted in the EU market.

Increased Attention to Women

Thinking about the inclusiveness dimension of IMOD, we came to realize the need for a special focus on women. They are the largest group of poor in the drylands. Not only that, but they hold the keys to the future, because the welfare of the next generation – the children – is largely up to them.

When we see those tragic faces of famine on our TVs, it is always women and children. If we can include them in IMOD, this could have a huge impact

on poverty and hunger. But we know this will present quite a number of challenges. So we're taking this on as a major goal and opportunity.

ICRISAT's watershed management model is clued in on women empowerment apart from improving the overall condition of natural resources and the livelihoods of people involved. It is being scaled up/ expanded at several locations in Andhra Pradesh, Madhya Pradesh, Rajasthan and Gujarat.

Income-generating options for the landless and women at the Adarsha Watershed in Kothapally in Andhra Pradesh and other benchmark watersheds have included the setting up of village seed banks through self-help groups, value addition through seed material, product processing such as dhal making, grading and marketability, poultry rearing for egg and meat production and vermi-composting.

An average household income of US$ 1066 was generated from crop diversification and other systems in the watershed compared to US$ 734 in the non-watershed, reflecting an increase of 45% due to interventions. The development of community watersheds in China and India has resulted in increased crop yields (up to four-fold) and increased incomes by 45% and 77%, respectively.

Increased Attention to Resilience

When discussing environmental issues in the past, the CGIAR and ICRISAT most often talked about reducing land degradation. Now we are growing into a more holistic concept, the concept of building resilience. Resilience is the ability to withstand and recover from stress. In the drylands, this especially includes stresses like drought, but also market stresses such as price collapses, input supply and price variations, etc. So we see resilience as being about more than just biophysical factors.

As with any complex concept, we immediately face the problem of how to measure it. We are still struggling with this, but one tool that we find quite useful is the Sustainable Livelihoods Framework advocated by DFID. By helping the poor to build livelihood capital – human, social, physical, natural and financial – we help them create a buffer that makes them more resilient against a wide range of stresses.

ICRISAT's resilient pigeonpea varieties ICEAPs 00040 and 00053 are becoming very popular in Babati district of Tanzania, with adoption levels reaching 60% and contributing more than 50% of cash incomes for smallholder farmers. The development of large-seeded, cream-colored and fusarium-wilt resistant varieties that give 6-8 bags per acre (each bag weighs 120 kg), take a shorter period to mature, and whose grains cook

faster and taste much better than the traditional "Babati white" variety, has proved to be winners.

Private seed companies in Tanzania are now investing in producing commercial seed of pigeonpea and selling it through agro dealers to farmers. Producer marketing groups have been developed and strengthened as a way of ensuring that farmers get high farm price and ensuring inputs and information.

Breeding for short-duration, fusarium wilt-resistant desi and kabuli chickpea varieties developed through partnership have contributed greatly to increases in crop area and productivity in central and southern India. Among the innovations that have made a significant difference in improving agriculture and the livelihoods of the poor are short-duration chickpea cultivars ICC 96029, extra-early ICCV 2 and early-maturing JG 11 and KAK 2 that can withstand high temperatures.

Between 1973-74 and 2008-09, adoption of ICCV 2, KAK 2 and JG 11 varieties led to an 11-fold increase (974%) in area, a 45-fold increase (4387%) in production and a 4-fold increase (318%) in productivity of chickpea in Andhra Pradesh.

Increased Attention to Diversification

Another change that our IMOD strategy brings about, is to increase our emphasis on the diversification of crops and cropping systems. Higher profits are the fuel that fires the IMOD engine of growth, so we must look at high value crop and product opportunities. Crop diversification also increases the nutritional quality of the diet in farm households, combating malnutrition. Thirdly, diversification is about 'hedging your bets' – it reduces risk, helping to achieve the risk management dimension of IMOD.

In the Sahel of western Africa, ICRISAT has been working on increasing the income of rural communities with emphasis on regional and international exports. ICRISAT in collaboration with AVRDC – the World Vegetable Center – is continuously selecting heat-tolerant vegetable varieties to optimize the performance of the African Market Garden (AMG). The AMG is based on a low-pressure drip irrigation system combined with a comprehensive crop husbandry package that has enabled the commercial integration of fruits, vegetables and trees. It generates income for small producers, contributes to better nutrition and mitigates the effects of climate change through the use of irrigation.

For example, the Icrixina variety allows rainy season production of tomatoes where none was produced before. Maya is a high-yielding, non-bolting lettuce variety allowing year-round production. ICRISAT improved the Violet de Galmi onion for high quality, high yield and long shelf life.

Rethinking Mandate Crop Strategy

IMOD also forces us to think in a fresh new way about our five mandate crops. These are staple food crops of the dryland poor. But like Dr Borlaug we've faced some difficulties in achieving major impact with these crops, especially the cereal crops sorghum and pearl millet, due to low profitability.

In IMOD, we view these as the first stage of the development curve. Smallholders want food sufficiency before they are willing to take the next step to connect to markets. So these crops form the first step in the transition from subsistence to market orientation. They also pose some interesting opportunities for value addition post-harvest and as livestock feed.

Pearl millet

Groundnut

Sorghum

Pigeonpea

Chickpea

Delivering on the Promise

So far we have talked about the big strategic ideas and concepts. But how will we translate those into practice so that they deliver impact?

IMOD Development Outcomes

At our recent global workplanning meeting in Hyderabad, all our scientists gathered here to formulate our plans of action. We started with our four Mission Goals – to reduce poverty, hunger, malnutrition and environmental degradation in the tropical drylands – and worked back from there. We identified what would be needed to deliver towards those Mission Goals.

The step closest to reaching the Mission Goals is the delivery of what we call ICRISAT Development Outcomes. We defined six such high-level Outcomes that we believe will help the poor to move along the IMOD path.

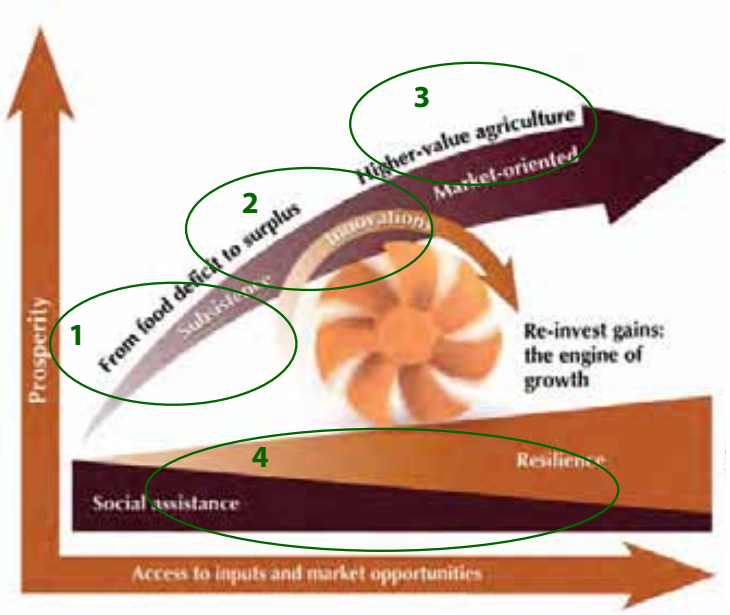
The first Outcome is food sufficiency. Once household food sufficiency is achieved, farmers feel secure enough to take the next step – to intensify production and generate food surpluses that they can store or sell.

Development Outcomes:

1. Food sufficiency
2. Intensification
3. Diversification
4. Resilience

Crosscutting:

5. Nutrition & Health
6. Empower women



Once intensification succeeds, farmers are able to move still further up the curve – to invest in high value crops that boost their incomes even further.

As they progress, they will need to be safeguarded by resilience measures that reduce risks. This is our fourth Outcome.

Lastly, we have two cross-cutting Outcomes: improving nutrition & health, and empowering women. These address the horrific malnutrition situation in the drylands, and the crucial need to include women in IMOD.

Outputs > Outcomes > Goals

In a logframe tracking system, we start by generating Research Outputs. With partners, we translate those into six Development Outcomes. Finally, these Outcomes make a big difference in improving lives and livelihoods as per our four Mission Goals.

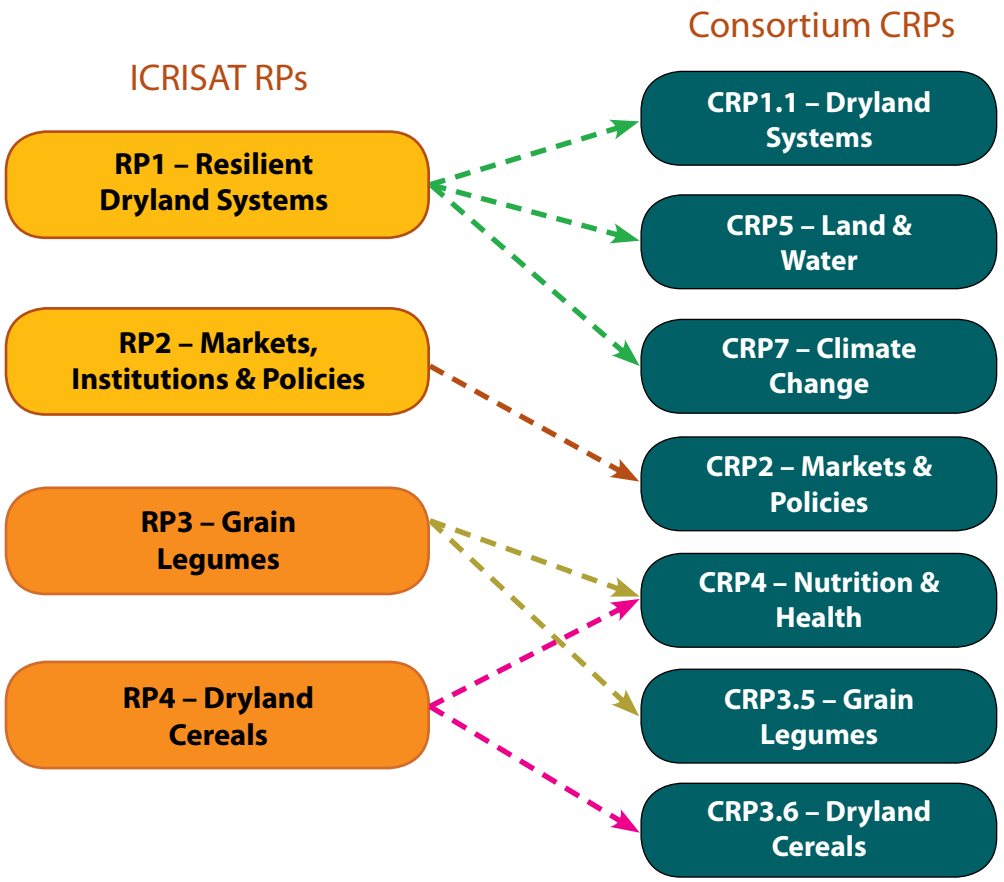
We track our progress in generating the Research Outputs by monitoring 150 milestones that we've committed ourselves to achieving over the next three years. This gives us a high degree of accountability, and helps us learn from our experiences.

Research Outputs (39) → **Development Outcomes (6)** → **Mission Goals (4)**

1. Food sufficiency	***reduce:***
2. Intensification	1. Poverty
3. Diversification	2. Hunger
4. Resilience	3. Malnutrition
5. Nutrition & Health	4. Environmental degradation
6. Empower women	

Outputs Delivered by Four Programs

To deliver the 39 Research Outputs and six Development Outcomes, we organized ourselves into four Research Programs. These Programs also track to the new Consortium Research Program (CRPs) in a reasonably simple way, as shown here.



Partnerships with Purpose

All along the impact pathway – from Outputs to Outcomes to Mission Goals – we absolutely need partners to succeed. IMOD requires more diverse partnerships, including private sector partners along the value chain in addition to public sector partners that help ensure inclusiveness.

We're already well known as a pioneer in developing self-funding partnerships with the hybrid seed industry in India, and in developing agri-incubator partnerships to get research results off the shelf through business entrepreneurs.

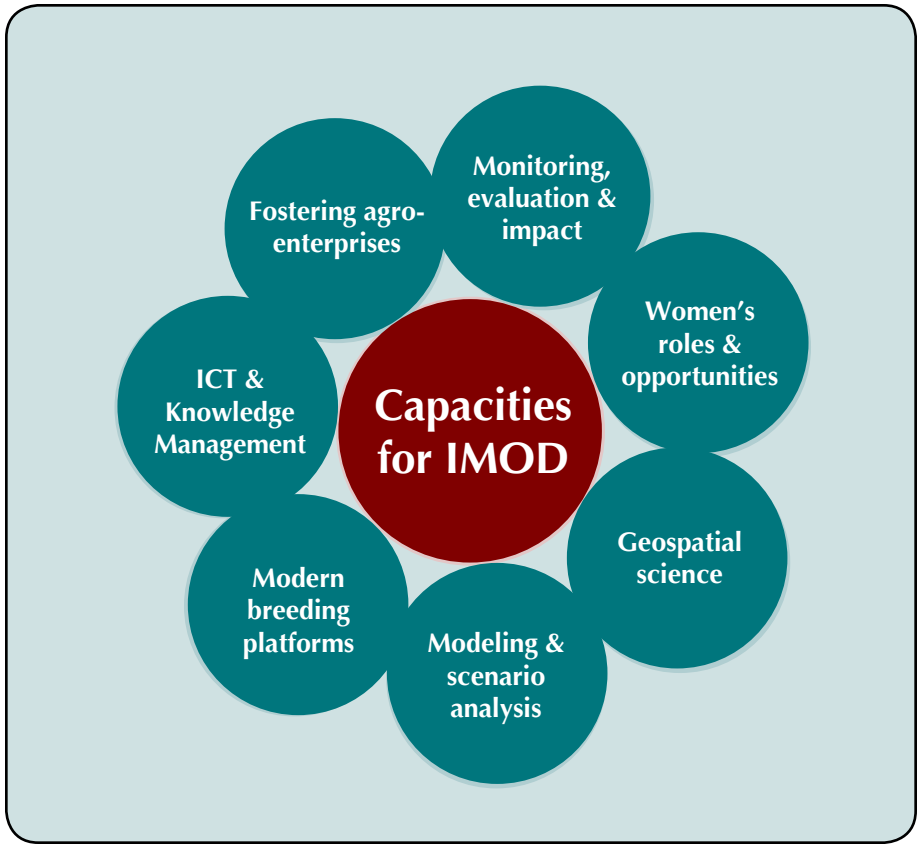
At the first global GCARD Conference last March, we were honored for the outstanding partnership that we've established with AVRDC. This partnership brings vegetable research capacity into our dryland systems. It directly supports our Diversification Outcome.

Strengthening Critical Capacities

We recognize that many of the new science areas and new focus areas called for by IMOD, require strengthened capacities at ICRISAT. This strengthening may be achieved through internal staff strengthening, or through partnerships, or through a combination of those. We are currently developing Plans of Action to strengthen the seven critical capacities shown here.

To sum up, we've moved beyond a 'magic bullet' mentality to focus on how we can foster and accelerate IMOD development pathways. We've made the bold assertion that we can help enable poverty escape, not just poverty alleviation. We've moved beyond 'mandate' thinking to a more valuable focus on Mission-driven Outcomes.

We've raised the concepts of crop and systems diversification and resilience to the forefront. And we've placed special focus on helping women improve their livelihoods, and on making headway against the pernicious problem of childhood malnutrition in the dryland tropics.



We sum up IMOD in three simple words: Innovate. Grow. Prosper. Through the right kinds of innovations, we can help poor smallholders escape poverty for good.

These are the major elements of our new strategy. We're all excited about it. It opens up new vistas, new challenges, and new opportunities.

Let us walk down this exciting road together!

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About ICRISAT

ICRISAT
Science with a human face

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is a non-profit, non-political organization that conducts agricultural research for development in Asia and sub-Saharan Africa with a wide array of partners throughout the world. Covering 6.5 million square kilometers of land in 55 countries, the semi-arid tropics have over 2 billion people, and 644 million of these are the poorest of the poor. ICRISAT and its partners help empower these poor people to overcome poverty, hunger, malnutrition and a degraded environment through better and more resilient agriculture.

ICRISAT is headquartered in Hyderabad, Andhra Pradesh, India, with two regional hubs and four country offices in sub-Saharan Africa. It belongs to the Consortium of Centers supported by the Consultative Group on International Agricultural Research (CGIAR).

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