The Import of 'Gaon, Garib and Kisan'

Bhutan Grapples with Global Warming...

FARMERS' FORUM

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Issues and Ideas for Indian Agriculture

FARMING...
AS GLOBAL WARMING BURNS US UP

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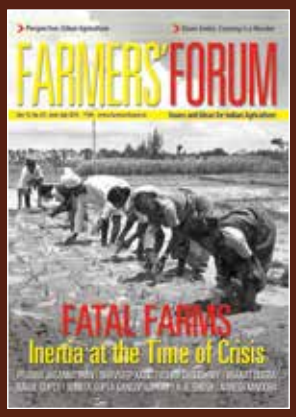

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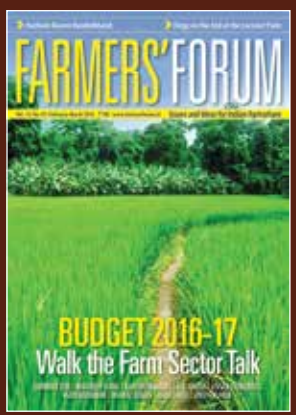

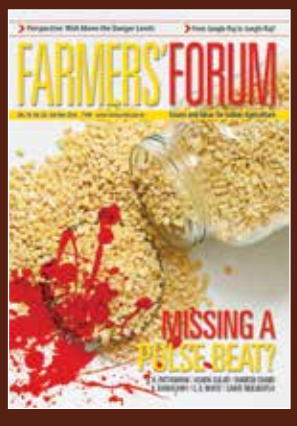

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Shift Farming Paradigm to Arrest Climate Change Impact

"If you are thinking one year ahead, sow seed. If you are thinking ten years ahead, plant a tree. If you are thinking 100 years ahead, educate the people."

– Chinese proverb

It was pleasing indeed to hear the Indian Prime Minister, Narendra Modi, making an impassioned appeal for the reduction in the use of chemicals in agriculture in Parliament. It is difficult to be delighted though because, as Mr Modi himself must realize, as do many who understand the complexities afflicting Indian agriculture, that it is easier to announce new approaches than to get the agriculture system to embrace the appeal.

Even so, it is possible to drive the change, which the Prime Minister so desires, provided he ensures that it is backed by political commitment down the line, supported by public policy and incentivized by allocation of funds, which alone could change the trajectory of the anti-agriculture movement. Only personal commitment from the top can play a critically decisive role. It is the role of the proselytizer who convinces people that the biggest threat to this country is climate change. Indeed, history bears evidence to the many civilizations that have disappeared and empires that have collapsed due to shifting rainfall patterns or prolonged droughts.

The run-up to the latest climate change summit saw the point repeatedly raised by the Intergovernmental Panel on Climate Change, the intergovernmental body of the United Nations, dedicated to providing the world with an objective, scientific view of climate change. Regrettably it needed a Greta Thunberg, the 16-year-old activist from Sweden to shame the world's leadership about its indifference to the risks posed by global warming.

CIVILIZATIONS HAVE DISAPPEARED AND EMPIRES HAVE COLLAPSED DUE TO SHIFTING RAINFALL PATTERNS OR PROLONGED DROUGHTS

In India too the numbers tell a tale of catastrophe. More than 100 million hectares in the country are in the process of seriously suffering degradation, desertification and salinization. India, situated in the tropics, has witnessed a manifold increase in extreme weather events since 1950 and will be grievously impacted by production variability. Soils are being lost up to 100 times faster than they can form and high temperatures increase the incidence

Photo: Dinodia

IT IS IMPERATIVE TO INVEST BILLIONS IN AWARENESS CAMPAIGNS TO REDUCE FOOD WASTAGE AND CHANGE CONSUMER BEHAVIOUR IN FAVOUR OF ALTERNATIVE APPROACHES. IF NOT, CLIMATE CHANGE PROPHESIES WILL COME TRUE

of pests and diseases. All of this has devastating impact on the agricultural sector that represents 35 per cent of India's Gross National Product (GNP) and is crucial for any plans for inclusive growth in the country.

The fact of the matter is that foodgrain production has quadrupled in the post-Independence era and is projected to continue but not if impacted adversely by climate change. This can affect crop yields (positively and negatively), determine the types of crops that can be grown in certain areas by impacting agricultural inputs such as water for irrigation or the amount of solar radiation available, for instance.

It can equally cause prevalence of pests or the disappearance of friendly bugs and here lies a major problem. Pests prompt use of chemicals and there has been an aggressive increase in fertilizer use in India, which cannot be combatted without the active participation of stakeholders. Such participation must be informed and be based on thorough knowledge of both local conditions and indigenous practices. Without such consciousness and determined efforts to address climate change, productivity will be impacted. This will mean major consequences vis-à-vis food security and may further threaten the livelihood activities on which much of the Indian population depends. It thus becomes imperative to invest billions in a decade-long awareness campaign to reduce wastage of food and change consumer behaviour in favour of alternative approaches. If not, climate change prophesies will come true.

These alternative approaches require a paradigm shift, based on principles of agroecology. This means weaning farmers by repurposing subsidies for ecosystem services and demands a combination of different crop planting practices, different forms of mechanization, aggregation and distribution of commodities. Any change is complex and more so in the fields of Indian agriculture that cannot be achieved with the traditionally myopic outlook of policymakers.

Their outlook discourages them from believing that change is necessary and is feasible. Even as a society, India is not yet ready to commit to lifestyle trade-offs. More significantly, commoditization of the food systems will impose stiff barriers in changing the status quo.

The bull run in commodity prices ended by 2013. Since then, food prices have generally remained subdued, instilling a sense of complacency amongst the public and those that influence policy. Consequently, there has been a steady but subtle shift in the narrative from agriculture to food, from yield to sustainability, from productivity to prosperity and from quantity to quality.

Policies are being formulated such that rather than support agriculture production, farmer livelihoods are targeted for support by schemes like PM-Kisan Samman Nidhi. This seems to be belying the expectations of both the farm sector and the farmer livelihoods. Making matters worse is that public funding for research and the subsequent deployment of funds for fundamental research and human resources has been reduced in real terms.

This is worrying as it comes at a time when scientists are warning of impending challenges in food availability arising from climate change. Knowledge and technology born from professional research hold the key to informed action at the grassroots if India has to be food secure. However, starved of funds, the exhausted public research system has taken to the easy path of maximizing farm yields by mono-cropping and use of chemicals, encouraging agricultural practices that emit human-induced greenhouse gases.

The hapless consequence is that millions of acres of a few cereal crops are planted. This is at variance with conserving biodiversity, which is essential for safeguarding the global commons. Worse, higher yielding seeds are quickly adopted by farmers — now over 80 per cent of most crop production comes from a handful of varieties in each crop type. Additionally, growing ecologically unsuitable crops in particular ecosystems is literally killing the planet. Policy makers, however, fail to grasp that food systems are breaching a breaking point of unsustainability and policies for food production do not reflect the exigency for change.

Blissfully ignorant of their own inadequacies, policymakers, nevertheless, make wild claims of achieving 20 per cent surplus production in two decades. India's population will peak in 20 years and the recent surges in food surpluses are deceptive and too meagre to justify such smug satisfaction. Ironically, decision-makers are also targeting a 50 per cent increase in food production by 2050. Sadly, this has become the cornerstone of India's national policy and the metric for measuring farmer prosperity.

To expect a system that nurtures the problem to transform itself is as ridiculous a notion "zero budget farming", actively propagated by certain policy influencers for this country while they demonize "organic farming". This is ill-conceived at best and retrograde at worst.

Also, irrespective of what poorly informed economists argue, farm-gate prices have to rise substantially to account for the real cost of growing food for farmers to change practices and for agriculture to sequester carbon.

Present day practices extract a heavy environmental footprint, completing a vicious circle that makes agriculture more problematic while agriculture itself also intensifies climate change, creating a compulsion for yields to be maximized. It is almost as if India is keen to make the grim prognostications around climate change impact come true. ●

PRESENT DAY PRACTICES EXTRACT A HEAVY ENVIRONMENTAL FOOTPRINT, COMPLETING A VICIOUS CIRCLE THAT MAKES AGRICULTURE MORE PROBLEMATIC WHILE AGRICULTURE ITSELF INTENSIFIES CLIMATE CHANGE, CREATING A COMPULSION FOR YIELDS TO BE MAXIMIZED

Ajay Vir Jakhar
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To the Editor

Policy Muddle and the Farmer

How long is the Indian farmer expected to navigate a world of agriculture policy infested with contradictions and remain shackled by policy-makers who, perhaps with the best of intensions, often without the 'backing of political will, capacity and the consistency', fail to meet their expectations, as you rightly point out in your editorial "Time to 'Unrig' The Farmers' World" (*Farmers' Forum*, August-September 2019)? Despite the noise around climate change and global warming where is the evidence of action? Is anyone even aware how farmers and farming are being pushed to the brink?

Harish Mehra
Chandigarh

Meaningful Dialogue

Bharat Krishak Samaj deserves to be congratulated for organizing the workshop on "Securing living incomes for farm households" in collaboration with Alliance for Sustainable & Holistic Agriculture (ASHA), facilitated Socratus and Fields of View". It is not everyday that people talk wisely about Indian agriculture and one is pleased to see the formidable list of participants. With so much erudition around why is Indian farming in the dumps? Hopefully, Bharat Krishak Samaj will continue to run these excellent workshops and keep us informed about them through the *Farmers' Forum*.

Lalit Bisht
Dehradun, Uttarakhand

Whither Biodiversity

Apropos of your editorial "Time to 'Unrig' The Farmers' World" (*Farmers' Forum*, August-September 2019), I could not agree more that policies on food production show neither understanding nor respect for the exigencies of the situation that demand a drastic change in attitude and understanding. We have the alarming spectacle of millions of acres of a handful of cereal being planted, which contradicts the need to respect biodiversity, which continues to be ignored in our country.

Preetam Singh
Meerut, Uttar Pradesh

***Farmers' Forum* website www.farmersforum.in provides free access to all editions for a comprehensive understanding of Indian farmer concerns**

Workable Solutions

Farm Strategies for Dignified, Secure, Minimum Living Income (*Farmers' Forum*, August-September 2019) makes several interesting points and I refer to three: Price support and income support are both required without compromising on any public welfare schemes and in-kind subsidies should be moved to direct cash support to allow farmers to directly purchase inputs based on their needs. Also, at least 25-40 per cent of present production should be brought under the MSP procurement regime. There are other constructive thoughts as well that deserve serious consideration. I found the report of the proceedings most educative and informed. Hopefully, someone in government is paying attention.

Rupak Sinha
Patna, Bihar

Farmer as Puppet

Praveen Kulkarni's report, 'Agro-imperialism and the Indian Farmer' on the three decades of neo-liberalism in India and the corporatization of agriculture, organized by Focus on the Global South in partnership with Alternative Law Forum and Rosa-Luxemburg-Stiftung South Asia on June 27-28, 2019 (*Farmers' Forum* August-September 2019), brings home a powerful point about who really controls Indian agriculture. Are we to remain mere puppets in their game? I see questions. I am not sure that I really see answers.

Mukul Rohatgi
Ghaziabad, Uttar Pradesh

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Ben Riensche & Ajay Vir Jakhar

Waiting, Watching... As Climate Change Becomes Catastrophic

Ben Riensche & Ajay Vir Jakhar

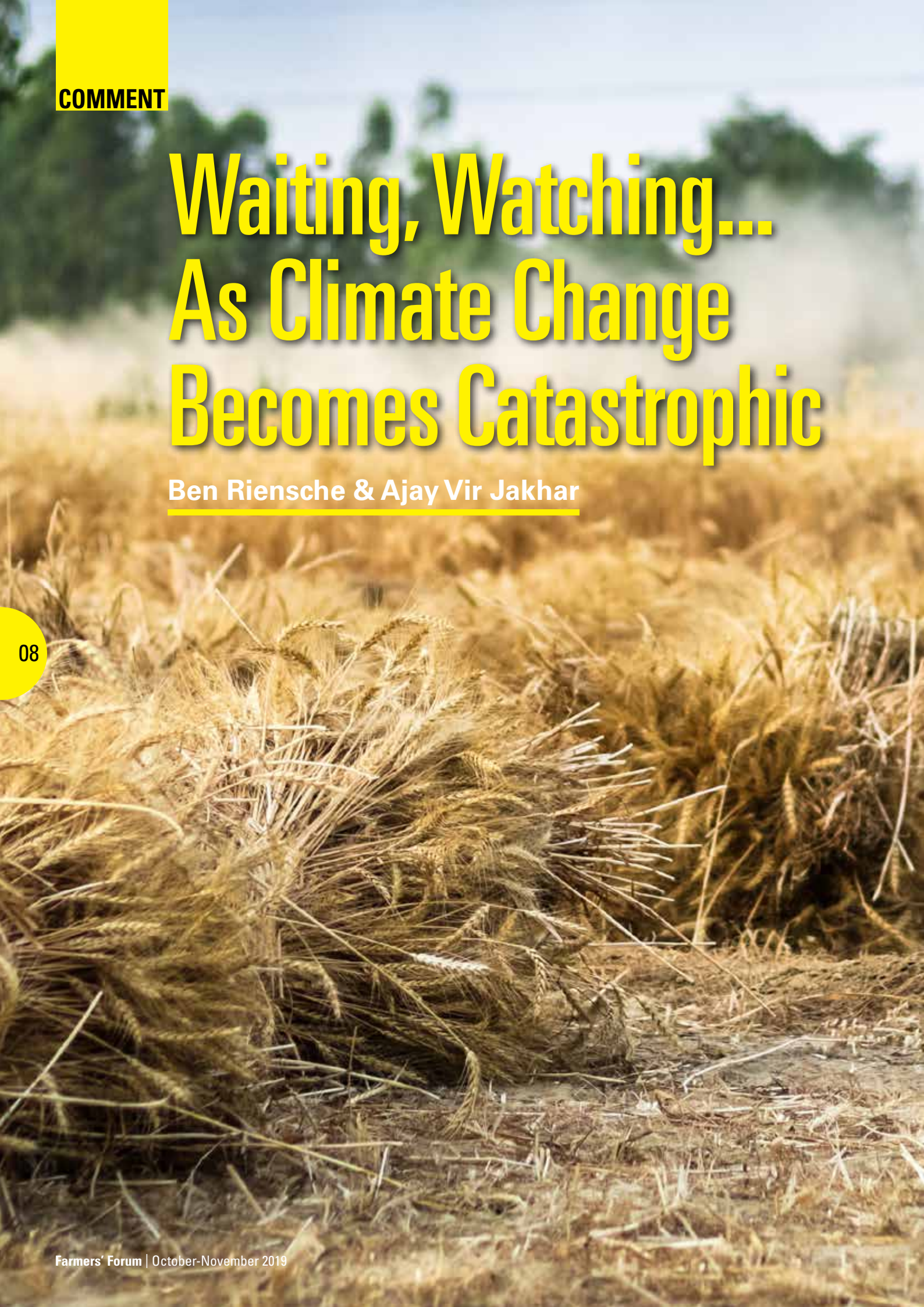


Photo: Pixabay

BEN RIENSCHE
Owner and Manager, Blue Diamond Farming Company, Iowa, USA

AJAY VIR JAKHAR
Chairman, Bharat Krishak Samaj and Editor, *Farmers' Forum* India

Photo: Pixabay

2019 will go down in history as the most difficult planting season for North American farmers, with over 10 million acres of crops going unplanted due to extreme weather conditions. At the same time, farmers in Punjab, in India, are experiencing rain showers almost every month and, for the first time in its history, more humid air is leading to greater pest infestations.

The effects of climate change can be felt daily, especially by farmers, but very few solutions have been discussed to address this catastrophic threat. However, there is one, widely unknown solution to reducing the amount of greenhouse gases trapped in the atmosphere: agriculture.

Reducing tillage, expanding crop rotations, planting cover crops and reintegrating livestock into crop production systems provenly reduce agriculture's own footprint and also capture the excess carbon generated by other industries. This captured carbon is then converted into plant material and/or soil organic matter, improving soil health and increasing the ability to produce food on the land in the future.

These practices often reduce input costs as well. Adopting these practices seems like the obvious choice, so you might be curious why a majority of farmers globally have continued using traditional agriculture practices.

We have an answer to that. As lifelong farmers in two different geographies, we reflect on our difficult journeys as we begin to adopt these management practices and the multiple barriers we are facing along the way.

Pursuing a greener production system requires farmers to embark on uncharted territories with no guarantee of immediate success. Farmers usually experience decreased yields during the transition process, as they gain the required experience to learn and perfect the implementation of more regenerative and beneficial practices.

A decrease in production poses a difficult financial challenge to overcome – especially for Indian farmers, who already have a hard time competing with developed nations, where subsidies have artificially driven down the price of agriculture produce. The government's import and export policy decisions, which heavily favour consumers over producers by keeping prices artificially low, also have a large impact on the ability of farmers in India to adopt more sustainable practices.

In the US, farmers face systematic financial challenges, like difficulty accessing sustainable

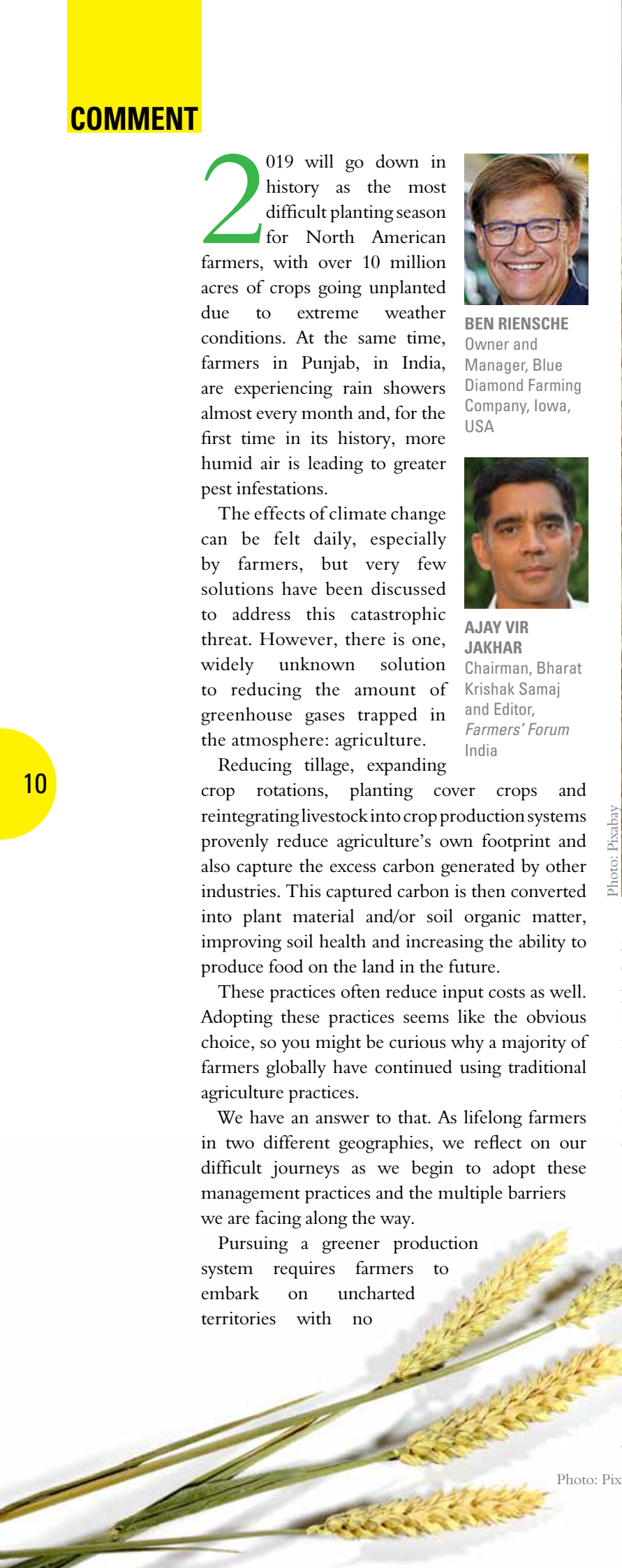


Photo: Pixabay

Generally the systems that are least regenerative, emit the most greenhouse gases and result in the most land degradation, are the most likely to have access to capital

inputs at a reasonable price. Farm input suppliers are highly concentrated, exerting significant pricing power and making systems innovation unattractive to their bottom line. The resulting high operating costs, along with the required upfront costs, increase the need for access to external capital.

However, capital is most available to farmers with the most traditional, low-return production systems. In short, generally the systems that are least regenerative, emit the most greenhouse gases and result in the most land degradation, are the most likely to have access to capital.

Subsidies and regulations play a role in the availability of external capital, since these cash streams serve as a de-risking mechanism for finance players. The US government's policies, such as a federally-subsidized crop insurance, focus on ensuring a stable food supply rather than on the nutritional value or environmental impacts of the food being produced.

This focus on quantity over quality is the same in India, where decision makers have rolled out an initiative to increase food production by the year 2050. This goal has become the cornerstone of India's national policy and the metric for measuring farmers' success.

Another key challenge that we face is the lack of data and available information on these management practices as well as the lack of ways to measure which of these new, innovative systems store the most carbon in the earth's soil.

Such a tool would open the door to private parties compensating farmers for sequestering carbon.

In the meantime, governments' regulations, along with growers' low profit margins, stifle farmer innovation, limiting the ability for new, creative thinkers to join the industry or for current farmers to test new practices.

For example, subsidized crop insurance in the US inflates the value of farmland and locks producers into a low risk, low reward system, making it hard for new small holder farmers to enter the business or current farmers to walk away from the easy revenue.

Additionally, in the US, the tax code makes it financially efficient to sell or exchange farms and farmlands only after death. Also, farmland investments may be used to shelter gains realized on non-agriculture real estate, further increasing the barrier to entry.

In both the US and India, there is a lack of financial incentives for farmers to pursue innovation, while public funding for fundamental research and the application of research to agricultural practices have been reduced in real terms.

Starved of funds, the public research system has taken the easier path and focused on identifying ways to maximize farm yields through mono-cropping and chemical usage, both of which increase agriculture emissions. This research further dissuades farmers from adopting sustainable practices.

One way to incentivize farmers to focus on increasing soil health is through de-commoditizing production and making it easier to identify and track producers, as food makes its way from farm to table. Doing so would unlock consumer demand as an incentive for greener farming. If consumers are willing to pay a higher price for food products that have been grown in an environmentally-friendly manner, the economics of the system could be turned on its head.

Photos: Pixabay

Given India's limited disposable incomes, increasing food price could limit the individual's ability to purchase foods, amplifying the fear of food inflation, which the government dreads

Unfortunately, US crop buyers currently blend and commoditize production, leaving no pathway for consumers to reward farmers for establishing more favourable production systems. In India, where disposable income is fairly limited, increasing the price of foods could limit individuals' ability to purchase foods, amplifying the fear of food inflation, a problem the government dreads.

As we have experienced first hand, farmers face a variety of misaligned incentives when trying to adopt sustainable management practices, some of which require the whole ecosystem of actors to work together to successfully reform.

Each country, climate and a plot of land pose their own set of challenges and it is clear there is no "one-size-fits-all" solution. However, addressing these barriers is critical to unlocking agriculture's ability to solve a portion of the climate change problem.

We have not heard of a more compelling solution. Have you? ●

The article was first written as a part of the Sustainable Development Impact Summit (*https://www.weforum.org/agenda/2019/09/here-s-how-we-can-use-agriculture-to-fight-climate-change/*)

2019 GLOBAL HUNGER INDEX

The Challenge of Hunger & Climate Change

A *Farmers' Forum* Report based on the 2019 Global Hunger Index Report

It is a terrible global indictment that after decades of sustained progress in reducing global hunger, climate change and conflict are now undermining food security in the world's most vulnerable regions. With the number of hungry people rising from 785 million in 2015 to 822 million in 2018, we can no longer afford to regard the 2030 Agenda and the Paris Climate Agreement as voluntary and a matter for each member state to decide on its own. Instead, the full implementation of both has become imperative in order to secure a livable world for our children and grandchildren. This requires a change of mindset at the global political level.

– Mary Robinson Adjunct Professor of Climate Justice, Trinity College Dublin Former UN High Commissioner for Human Rights and Former President of Ireland

Photo: Pixabay

The 2019 Global Hunger Index report (GHI) — the 14th in an annual series — presents a multidimensional measure of global, regional and national hunger. The latest data available shows that, while we have made progress in reducing hunger on a global scale since 2000, we still have a long way to go. Of the 117 countries with GHI scores, levels of hunger are still serious or alarming in 47 countries and extremely alarming in one country. This year's report focuses on climate change — an increasingly relevant threat to the world's hungry and vulnerable people that requires immediate action.

The Global Hunger Index (GHI) scores are based on a formula that captures three dimensions of hunger — insufficient caloric intake, child under-nutrition and child mortality — using four component indicators:

- Under-nourishment: the share of the population that is under-nourished, reflecting insufficient caloric intake
- Child-wasting: the share of children under the age of five who are wasted (low weight-for-height), reflecting acute under-nutrition
- Child-stunting: the share of children under the age of five who are stunted (low height-for-age), reflecting chronic under-nutrition.
- Child mortality: the mortality rate of children under the age of five

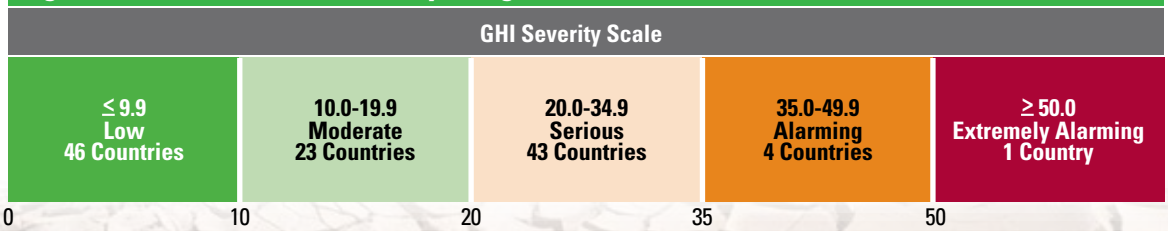
While the report highlights that increasing ranks of undernourished in the world, the India story is particularly worrisome (*See box*). India is in the "serious" category on the GHI severity scale (*See Figure 1*). A meager 9.6 per cent of children between ages six months and 23 months are fed a minimum acceptable diet in India. Elsewhere, in the many countries in the midst of violent conflicts, there are precipitous increases in their hunger levels. Extreme weather events are jeopardizing food production and food security and are only expected to increase in number and severity in conjunction with global climate change. It will take humanity's ingenuity, dedication and perseverance to ensure that Zero Hunger is collectively achieved, while tackling the unprecedented challenge of climate change.

Nevertheless, the world and the practicing farmers and farm policy-makers are far from understanding the impacts of climate change, which directly and indirectly affect food security and hunger through changes in food production and availability, access, quality, utilization and stability of food systems.

Food production is likely to fall in response to higher temperatures, water scarcity, greater CO_2 concentrations in the atmosphere, and extreme events such as heat waves, droughts and floods. Already, yields of major food crops such as maize and wheat are declining owing to extreme events, epidemics of plant diseases and declining water resources.

Weather anomalies and climate change, particularly extreme events, can contribute to rising food prices and thereby jeopardize people's access to food. They can also threaten people's nutrition. Recent studies show that higher CO_2 concentrations reduce the protein, zinc and iron content of crops. Moreover,

Figure 1: Number of Countries by Hunger Level



Source: Authors.

climate change may make the lean seasons before harvests longer and more severe.

A changing climate may worsen food losses in a global food system in which massive amounts of food are already lost or wasted. Given that the current food system contributes between 21 per cent and 37 per cent of total net anthropogenic emissions, these losses exacerbate climate change without contributing to improved food security or nutrition.

In addition, climate change can contribute to conflict, especially in vulnerable and food-insecure regions, creating a double vulnerability for communities, which are pushed beyond their ability to cope. The combined impact of conflict and climate change destroys livelihoods, drives displacement, widens economic and gender inequalities, and undermines long-term recovery and sustainable development.

Current actions are inadequate for the scale of the threat that climate change poses to food security. Countries' existing mitigation efforts — as defined by their own pledges, which extend only to 2030 — are collectively projected to result in a warming of 3-4°C over pre-industrial averages by 2100. This is a massive overshoot of both the 1.5°C and 2°C targets that have been set and will lead to substantial impacts on food and nutrition security.

More ambitious actions are required to reduce the risks of climate change (mitigation) and to cope with its impacts (adaptation) on food and nutrition security. Small or incremental changes will not deliver the scale or pace of change needed to remain within the 2°C warming threshold as defined by the Paris Agreement. Transformation — a fundamental change in the attributes of human and natural systems — is now recognized as central to climate-resilient development pathways that address the goals of Agenda 2030, particularly the Sustainable Development Goal 2 of Zero Hunger and the Paris Agreement. These pathways must include actions for mitigation, adaptation and sustainable development. More broadly, they demand a profound and deliberate shift toward sustainability, facilitated by changes in individual and collective values and behaviours and a fairer balance of political, cultural and institutional power in society.

Photos: Pixabay

Mitigation and adaptation measures must be combined with safety net policies to protect the most vulnerable people from hunger and food insecurity

Both mitigation and adaptation measures need to be combined with safety net policies that protect the most vulnerable people from hunger, food insecurity, and other adverse impacts of these measures. Furthermore, good governance, capacity building, participatory planning and downward accountability are essential to help people and institutions negotiate and define measures that are fair and sustainable for the benefit of the food security and nutrition of all people. ●

SOUTH ASIA AND INDIA: OF UNDER-NUTRITION AND CHILD-STUNTING

South Asia's high GHI score is driven by its high rates of child under-nutrition. The child-stunting rate for the region is 37.6 per cent and the child-wasting rate is 17.5 per cent; both are the highest levels of any region in the GHI report. In South Asia, the key factors that contribute to stunting are poor infant and young child feeding practices, poor nutrition among women before and during pregnancy and poor sanitation practices.

A study of six South Asian countries found that a lower maternal body mass index was significantly associated with child wasting in five of the six countries. Inadequate access to improved water sources and low family wealth were also associated with child wasting in some countries, but not systematically so. Because a reduction in poverty does not necessarily imply adequate access to improved water sources and sanitation, poverty alleviation policies may not be sufficient to reduce child-wasting.

Because of its large population, India's GHI indicator values have an outsized impact on the indicator values for the region. India's child-wasting rate is extremely high at 20.8 per cent — the highest wasting rate of any country in the report for which data or estimates were available. Its child-stunting rate, 37.9 per cent, is also categorized as very high in terms of its public health significance.

In India, just 9.6 per cent of all children between ages six months and 23 months are fed a minimum acceptable diet. As of 2015-2016, 90 per cent of Indian households used an improved drinking water source while 39 per cent of households had no sanitation facilities.

In 2014 the prime minister instituted the "Clean India" campaign to end open defecation and ensure that all households had latrines. Even with new latrine constructions open defecation continue. This situation jeopardizes the population's health and consequently children's growth and development as their ability to absorb nutrients is compromised).

Outside of India, two countries in South Asia have made significant advances in child nutrition, and their experiences are instructive. A 2015 study sought to identify the reasons behind the decline in stunting in Bangladesh at the national level from 58.5 per cent in 1997 to 40.2 per cent in 2011. The study attributed the decrease primarily to rising household wealth associated with pro-poor economic growth and gains in parental education, as well as health, sanitation, and demographic factors reflecting decreased fertility rates.

The authors conclude that success in this area can be achieved with robust economic growth and attention to "nutrition-sensitive" sectors such as education, sanitation, and health. Nepal's remarkable reduction in child-stunting from 56.6 per cent in 2001 to 40.1 per cent in 2011 is associated with, and likely attributable to, increased household assets (a proxy for household wealth), increased maternal education, improved sanitation, and implementation and use of health and nutrition programmes, including ante-natal and neo-natal care.

Photo: Pixabay

POLICY RECOMMENDATIONS

Prioritize Resilience and Adaptation Among the Most Vulnerable Groups and Regions

- Governments and donors must invest in vulnerable communities in the Global South, such as small-scale farmers, to develop and carry out context-specific adaptation strategies that will strengthen food and nutrition security and food sovereignty. Actions can include supporting and diversifying agricultural production; improving farmers' access to extension services, resources, and markets; and creating non-agricultural jobs in rural areas.
- Governments must facilitate public participation in climate decision making. Adaptation strategies should be developed together with affected communities based on local needs. These strategies should integrate indigenous and traditional knowledge — particularly of women — and be supported with access to additional research, technologies, and agricultural and meteorological data.

Better Prepare for and Respond to Disasters

- Donors and governments must increase investments in disaster prevention and disaster risk reduction, especially in vulnerable regions prone to extreme weather events. This includes investing in early warning and response systems, forecast-based financing mechanisms, and adapted infrastructure. Donors must make rapidly dispersible and flexible funding available to tackle food crises and respond to disasters when they occur.
- Because climate change poses risks to peace and stability, governments and donors must invest in resilience building to prevent conflicts related to the use of natural resources, such as water and land, in fragile contexts.

Transform Food Systems and Address Inequalities

- A radical transformation of production and consumption patterns, especially in high-income countries, is crucial to reduce emissions and ensure people's access to healthy and sustainable diets. Governments must promote sustainable production systems, consumption of nutritious foods, and reduction of food loss and waste.
- Measures to reduce poverty and existing inequalities are key to building resilience to the effects of climate change among the most vulnerable people. Therefore, governments and donors must significantly increase investments in rural development, social protection, health services, and education.
- As climate change increases competition for natural resources, governments must secure the land and water rights, including customary rights, of indigenous peoples and rural communities, for example, by following frameworks such as the Voluntary Guide lines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGT).

Photo: Pixabay

- Governments must enact and enforce regulatory frameworks to ensure that production of globally traded agricultural commodities does not impede the right to food or infringe on land rights in areas where those commodities are produced. Private companies must act in compliance with these regulations and guidelines such as the UN Guiding Principles on Business and Human Rights.

Take Action to Mitigate Climate Change Without Compromising Food and Nutrition Security

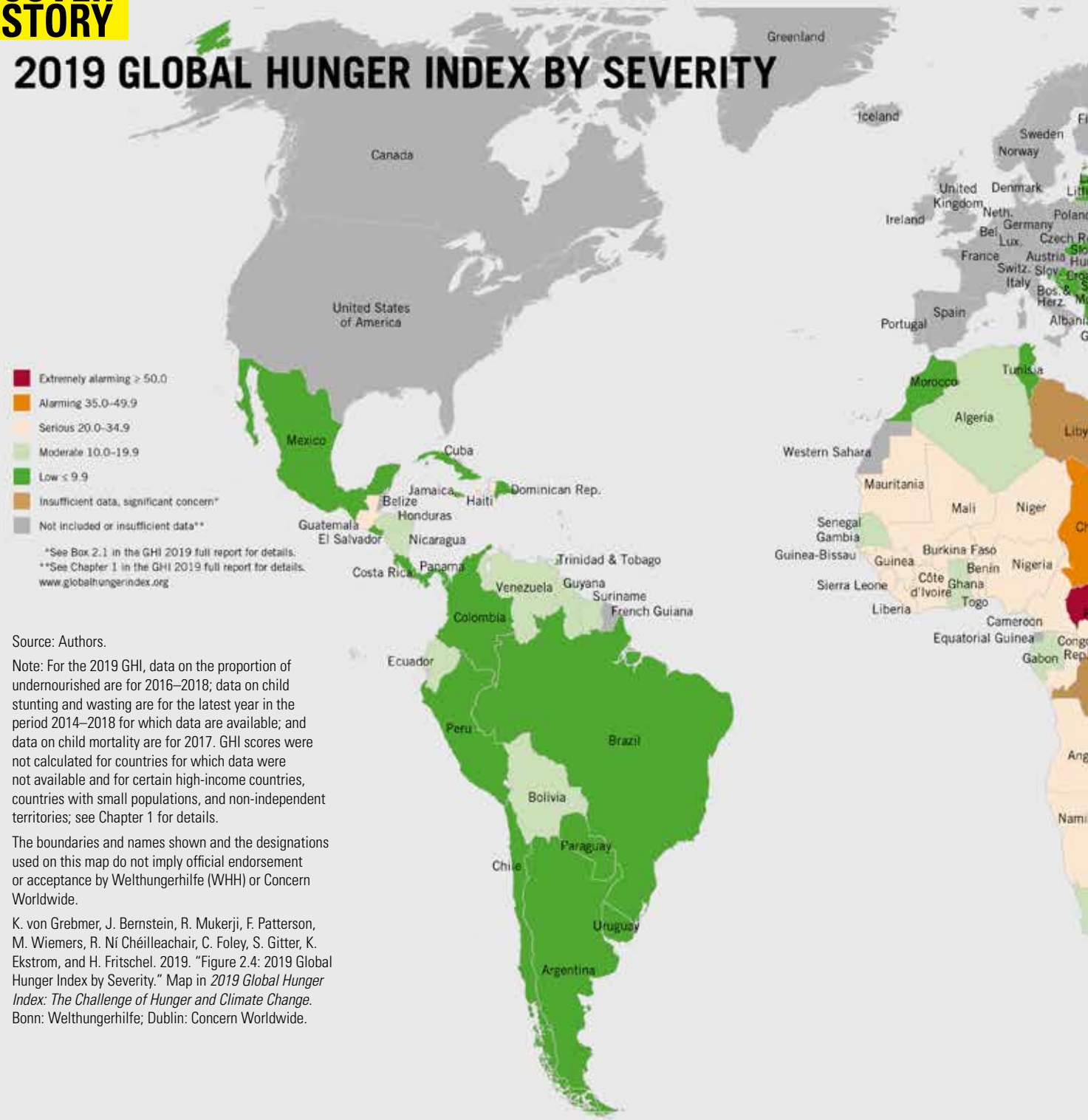
- All countries, particularly high-income countries, must urgently meet their commitments to Agenda 2030 and the Paris Agreement. They must implement more ambitious measures, such as decarbonizing their energy sector, building green infrastructure, and boosting carbon sequestration.
- Countries must harmonize climate policy with food and trade policies to prevent mitigation and CO_2 removal measures — such as the use of scarce agricultural land for bioenergy production — from harming people's food and nutrition security.

Commit to Fair Financing

- Governments must increase their financial support to the most vulnerable people and regions. Financing for climate change adaptation needs to receive the same importance as mitigation.
- Financing for climate change mitigation and adaptation must especially support least-developed countries (LDCs) and must be in addition to official development assistance (ODA) to ensure that resources for sustainable development are not reduced.

Authors of the report: Welthungerhilfe: Fraser Patterson (Policy Advisor), Miriam Wiemers (Policy and External Relations); Concern Worldwide: Réiseal Ní Chéilleachair (Head of Global Advocacy), Connell Foley (Director of Strategy, Advocacy, and Learning); Independent Consultants: Klaus von Grebmer, Jill Bernstein, Heidi Fritschel; Towson University: Seth Gitter and Kierstin Ekstrom; Guest Author: Rupa Mukerji (Director, Advisory Services, and Senior Advisor, Adaptation to Climate Change, Helvetas). A Peer-Reviewed Publication

2019 GLOBAL HUNGER INDEX BY SEVERITY

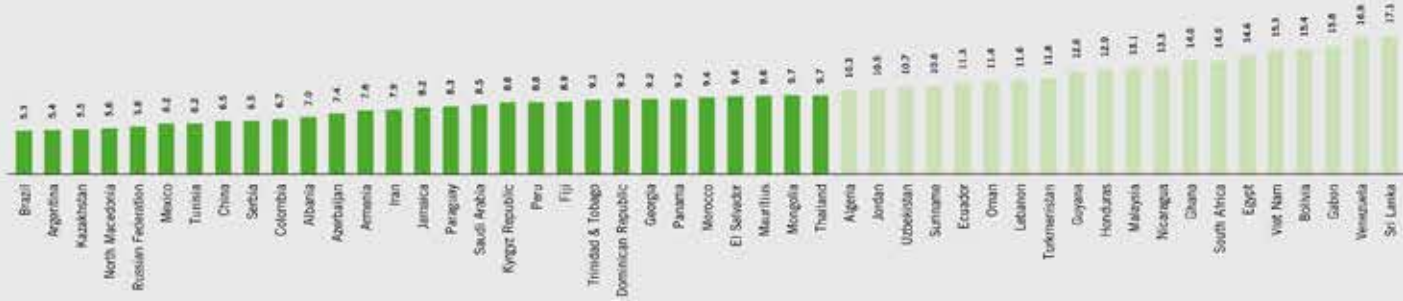


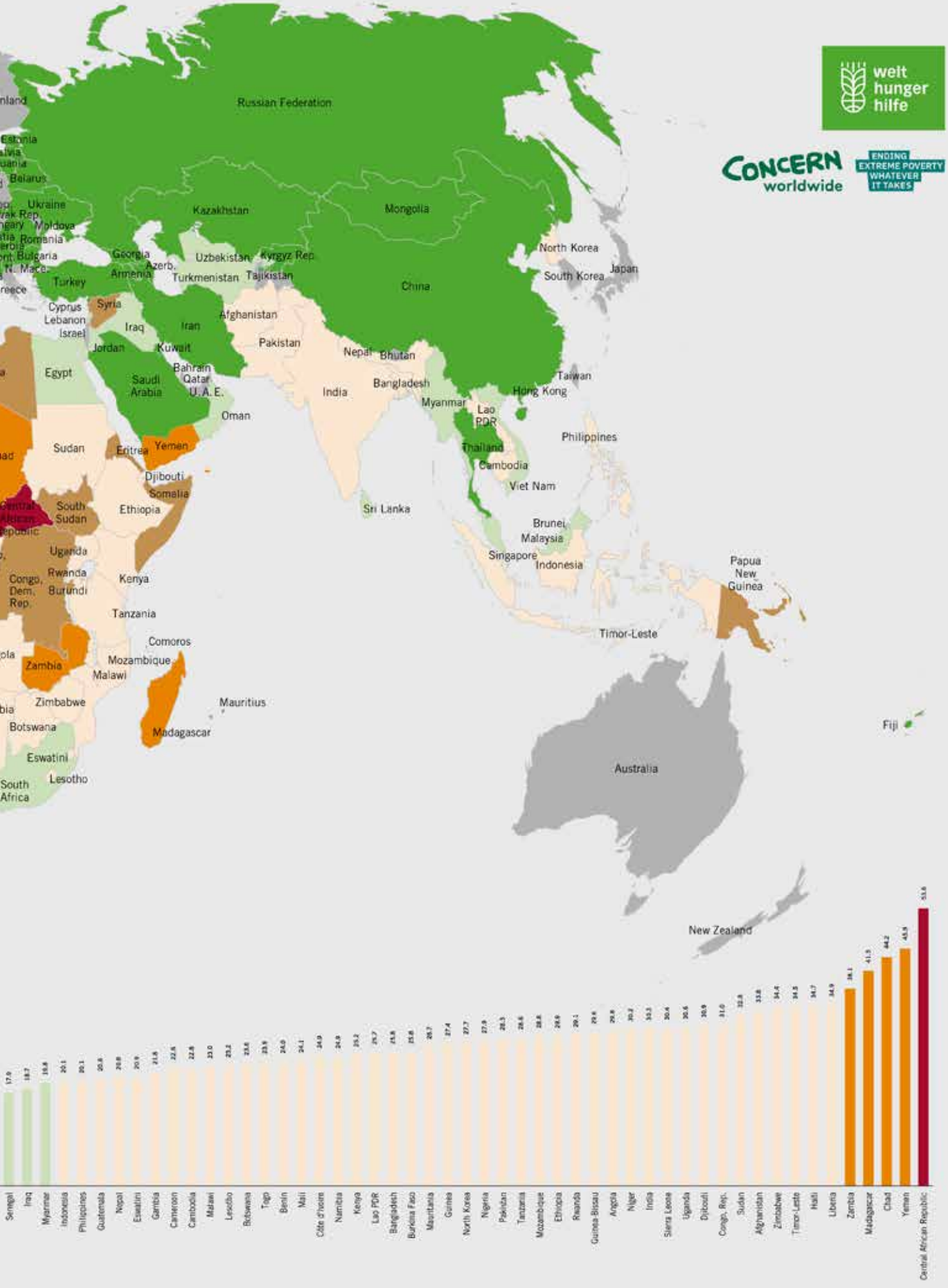
Source: Authors.

Note: For the 2019 GHI, data on the proportion of undernourished are for 2016–2018; data on child stunting and wasting are for the latest year in the period 2014–2018 for which data are available; and data on child mortality are for 2017. GHI scores were not calculated for countries for which data were not available and for certain high-income countries, countries with small populations, and non-independent territories; see Chapter 1 for details.

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by Welthungerhilfe (WHH) or Concern Worldwide.

K. von Grebmer, J. Bernstein, R. Mukerji, F. Patterson, M. Wiemers, R. Ní Chéilleachair, C. Foley, S. Gitter, K. Ekstrom, and H. Fritschel. 2019. "Figure 2.4: 2019 Global Hunger Index by Severity." Map in *2019 Global Hunger Index: The Challenge of Hunger and Climate Change*. Bonn: Welthungerhilfe; Dublin: Concern Worldwide.




Russian Federation
Kazakhstan
Mongolia
China
North Korea
South Korea
Japan
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Belarus
Moldova
Romania
Bulgaria
Georgia
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Armenia
Uzbekistan
Kyrgyz Rep.
Turkmenistan
Tajikistan
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Pakistan
Jordan
Kuwait
Bahrain
Qatar
U. A. E.
Saudi Arabia
Egypt
Nepal
Bhutan
India
Bangladesh
Myanmar
Taiwan
Hong Kong
Lao PDR
Thailand
Cambodia
Viet Nam
Philippines
Brunei
Malaysia
Singapore
Indonesia
Papua New Guinea
Timor-Leste
Sri Lanka
Oman
Yemen
Eritrea
Djibouti
Somalia
Sudan
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Ethiopia
Uganda
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Kenya
Tanzania
Congo, Dem. Rep.
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Mozambique
Zambia
Malawi
Zimbabwe
Mauritius
Madagascar
Botswana
Eswatini
Lesotho
South Africa
Australia
New Zealand
Fiji

FOOD SYSTEMS DIALOGUE

Collectively Making Food Systems Work

A *Farmers' Forum* Report

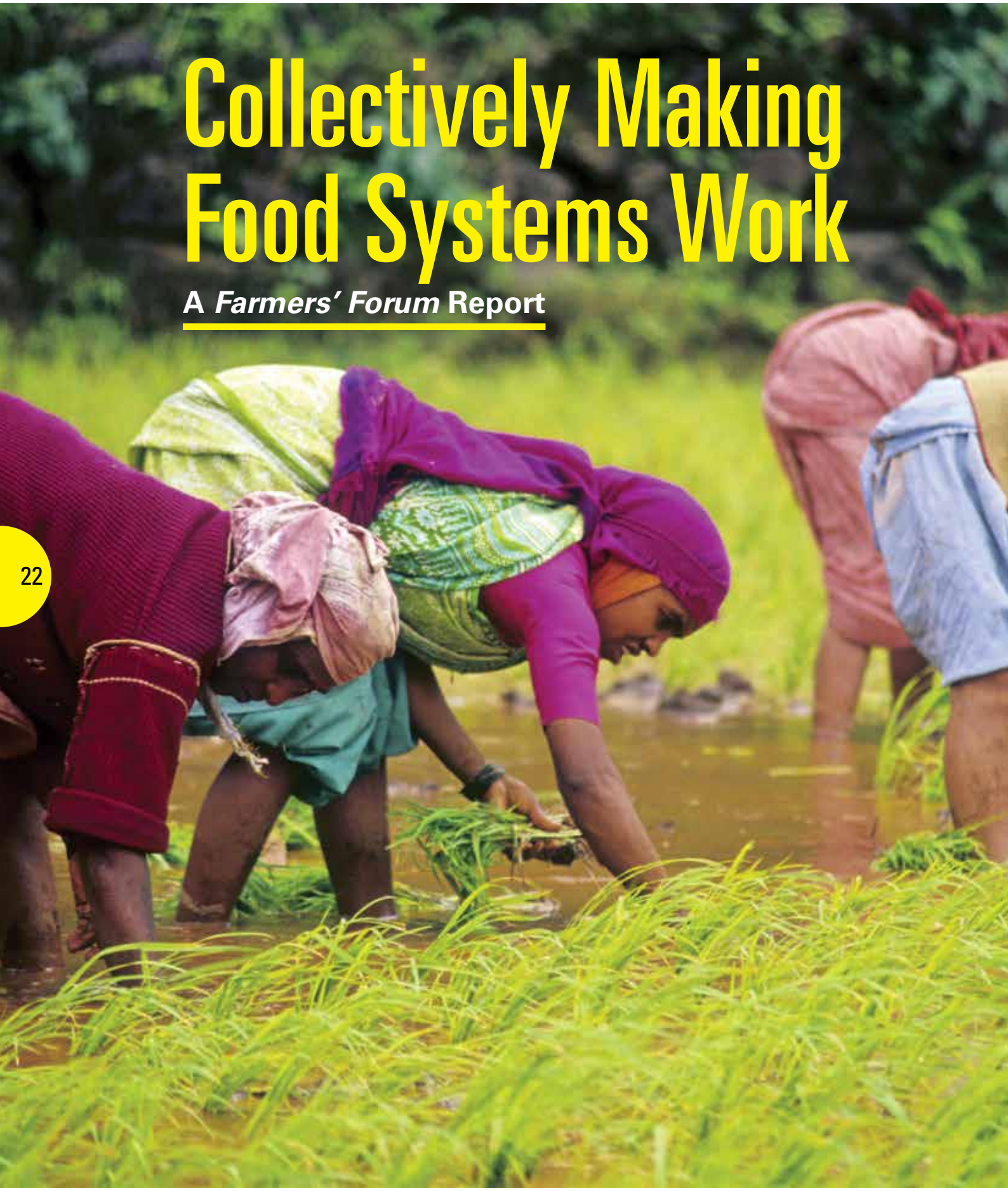


Photo: Dinodia

"The 2030 Agenda for Sustainable Development – and the future of our planet and its people – depend on well-functioning food systems everywhere. They should be sustainable, produce foodstuffs that are affordable, safe and nourish people".

– Food Systems Dialogues

Most current food systems work inadequately for people, for the planet and for mankind's common future and need to be significantly transformed to feed a growing global population nutritiously and within planetary boundaries.

Although there may be a shared vision of a food system that delivers for all, leaving no one behind, there are a broad range of views on how to make that happen because the diversified food systems community has different approaches to weighing up evidence and devising programmes.

Understandably, efforts to encourage rapid and joint actions that transform food systems have been hampered by deep disagreements among different stakeholders. These can be reduced through greater interaction between the different actors working for sustainable food systems.

Interaction helps different actors to reach a better understanding about reasons behind their different positions and enables them to identify ways to align. There are insufficient mechanisms currently available that encourage all stakeholders to have opportunities for meeting, talking, agreeing and acting together. Such mechanisms are necessary for more rapid transformation to sustainable food systems in local and global ("glocal") settings, across all nations.

Food Systems Dialogues (FSDs) are thus being organized across the world, India included. The second edition of the New Delhi Food Systems Dialogue event, co-organized with Bharat Krishak Samaj will take place on November 11 at the Kamladevi Complex, India International Centre, New Delhi. The first was held in October 2018. The FSD New Delhi Workshop is facilitated and supported by Dr David Nabarro, recipient of "2018 World Food Prize". In India, the Food Systems Dialogues are organized by Bharat Krishak Samaj.

Stakeholders have realized that if they are able to appreciate each other's points of view, they are in a better position to align efforts and make a lasting difference together. This requires careful framing and, when necessary, reframing of issues.

The dialogues are thus designed to be interdisciplinary involving leading thinkers from government, industry, NGOs, academia, food and agriculture sector to work together on complex challenges, trade-offs, examining opportunities, risks and principles. Participants do not shy away from identifying and seeking to understand areas of no agreement. Dialogues will succeed if different actors attempt to align and, where possible, combine their efforts, because they better understand and appreciate each other.

The first Food Systems Dialogues (FSDs) New Delhi, India, co-organized by Bharat Krishak Samaj October 25-26, 2018 discussed a range of issues specific to the food systems context in India. The focus was on how to address the urgent issue of poor farmer livelihoods in India, where smallholder farmers were frequently unable to produce adequate yield to provide for their families and make a living, leading to an alarming rate of suicide in the farmer population.

There were around a hundred participants from field workers in farmer welfare, to government officials, to NGO representatives. The dialogue was organized in the form of a series of presentations from participants nominated by Bharat Krishak Samaj, followed by question-answer sessions with all participants and interspersed with opportunities for discussion.

As is the norm at FSDs events, ideas outlined in this 2018 Summary Report of the New Delhi event are not attributed to any particular individual or organization.

Every idea did not necessarily receive universal support from all participants. The report thus seeks to capture key recommendations in order to allow continuity and consensus – a 'red thread' – to emerge across all FSDs events.

Given that the event largely comprised presentations by individuals, the proposals and views in this document often reflect the opinions of an individual, rather than consensus from a group

Proposal 1: Farmers could form collectives to increase their influence Farmers will be empowered if they work through producer organizations and there is scope for more: such cooperative arrangements enable farmers to

Photo: Dinodia

Evidence suggests that Minimum Support Prices are not achieving their original purpose and should be reviewed, reconsidered or reformed

pool resources and increase their agency and bargaining power both at the marketplace and in exchanges with authorities. This approach has been successful in India. For example, milk farmers have successfully exerted influence over monopolistic market players to overcome their price dominance. More could be done to support individual farmers so that they can band together to become serious players in the market.

Proposal 2: The Minimum Support Price scheme could be reviewed There is evidence to suggest that Minimum Support Prices (MSPs) are not achieving their original purpose and, therefore, this scheme should be reviewed, reconsidered or reformed. MSPs, which are a protection from market price fluctuations that hurt growers, are only helpful if the farmer actually produces a surplus of grain that can be sold on the market. Given the small quantities of food which most Indian farmers produce on their small holder farms, for many agriculture households (~40 per cent), the majority of food is consumed by the farmers and their family, with only trivial amounts sold for profit.

Where farmers do produce a surplus, the usefulness of MSPs in protecting livelihoods in India depends on the combined effect of international prices and market prices in India; if the international market price is lower than the MSP in India, then it will be more difficult to sell Indian produce. Therefore, MSP policy should consider strategies to mitigate the risk of stock piling of unsold goods in India. Lessons could be learnt from China's experience with MSPs.

Proposal 3: Technology could be leveraged to improve livelihoods. A new approach could be taken to using technology to support farmer livelihoods, given that trials of advanced technologies have not always worked in the past. The government should consider developing new technologies, not necessarily modelled on what is being used

70 per cent of labour that goes into producing crops in India is provided by women. Despite this, farmers are generally referred to as 'he' and imagined as men, not women

overseas and simultaneously encourage time-tested practices that have been successful specifically in the Indian context. Given the high penetration of mobile phones among farmers, there is a lot of potential in leveraging mobile phone technology to deliver messages to farmers.

Proposal 4: The government should invest in the infrastructure that is needed for farmers to achieve their potential for income and prosperity. A key part of reforms should be increased investment in infrastructure to enable farmers to sell their produce for a good price. Significant investment is required to ensure that all farmers (both grain and livestock) have fair access to markets. For example, a greater number of cool storage and transport trucks are required in order for milk to make its way to the consumer without curdling. Consumers are now often thousands of kilometers away from the location where food is produced. The government should consider different models to support investment in infrastructure, including the use of government funds, public-private partnerships and incentivizing private investment.

Proposal 5: The visibility and significant role of women farmers should be increased. Numerous studies have shown that 70 per cent of labour that goes into producing crops in India is provided by women. Despite this, farmers are generally referred to as 'he' and imagined as men, not women. The first thing that needs to change is the visibility of women farmers. We need women farmers to be explicitly talked about, acknowledged and identified. Gender disaggregated data needs to be collected and utilized in policy discussions and decisions.

Photo: Dinodia

Only when the existence of women farmers is acknowledged one can turn to the substantial issues that need to be addressed such as land ownership and ownership of other resources.

Proposal 6: There is a good case for targeting uniformity in India's agriculture and food policies to achieve a greater focus on nutrition, ecosystems and livelihoods. Agriculture policy changes should be encouraged by the central government by providing fiscal incentives. At present the disarray in state government policies and implementation is creating inefficiencies. The primary justifications for uniformity in agriculture policy approach are:

- That differences in agriculture taxation schemes in the different states cause market distortions
- The ability to implement uniform standards in production and marketing, helping both producers and consumers. On the consumer side, this could give people more reliable tools to differentiate between real healthy food and food that is simply being marketed as healthy
- The ability to promote a strong grasp of key principles across all actors in food systems, given that it is easier to disseminate standardized information than piecemeal information

Proposal 7: There could be increased access to technology that permits more precise use of fertilizers, and adjustments to fertilizer subsidies. Farmer productivity could be improved by enabling farmers to access technologies that permit the use of microbiomes, bio-fertilizers, precision fertilizers (such as nano-fertilizers). Patterns of subsidy must be changed in regards to fertilizers. There are currently certain subsidies given in the fertilizer industry; these could be transferred from industry to farmers to empower farmers to better manage nutrients and soil themselves.

Proposal 8: Farmers could be encouraged to adjust their practices to use water more efficiently Measures should be put in place to promote a change in behaviour among farmers towards using less water. India is a water-starved country, yet water is misused and not properly recycled. The government could create a system of incentives to better manage water and fines to penalize those who misuse water or promote drip irrigation for more efficient water use.

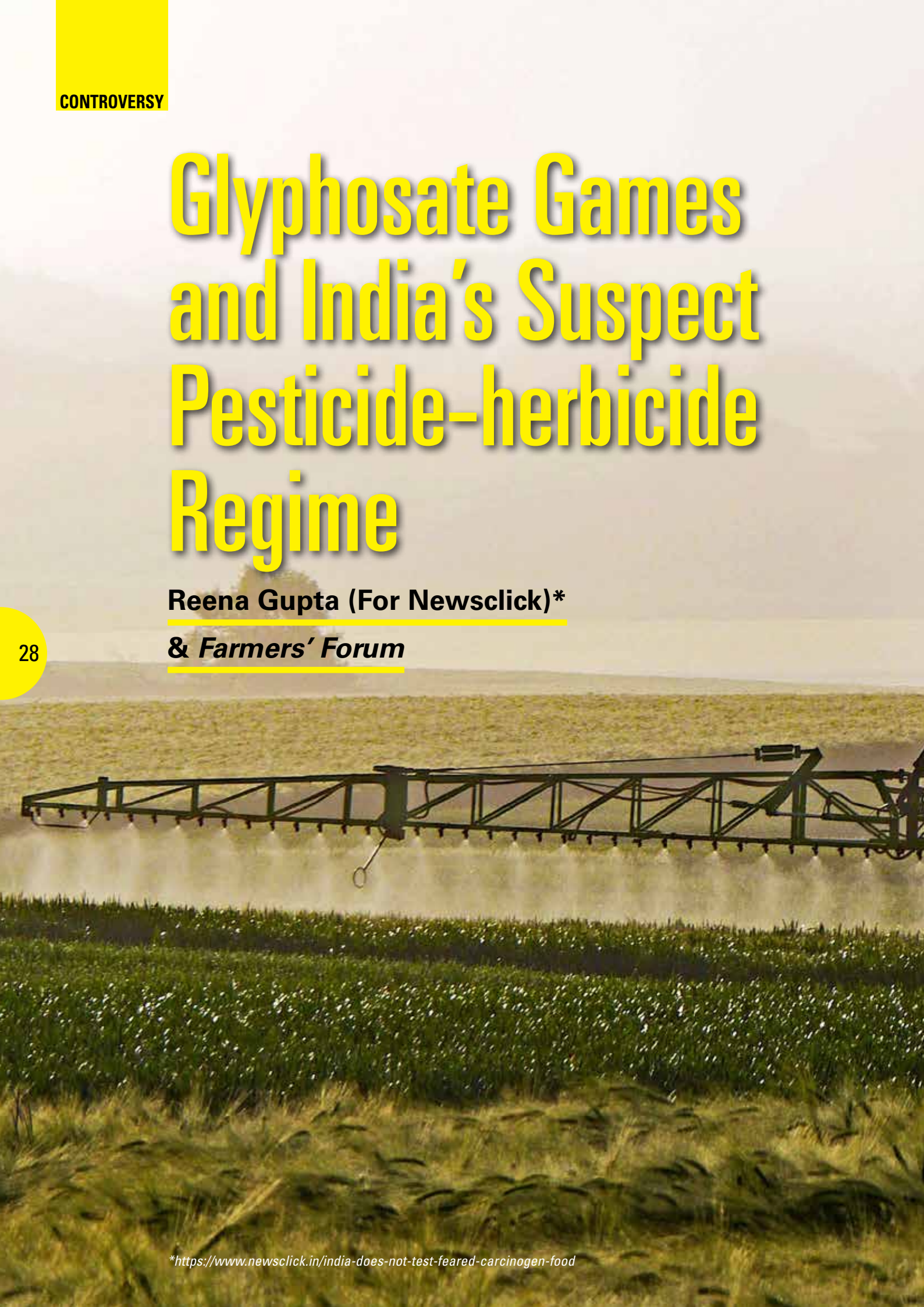
Proposal 9: Diversity of insects needs to be maintained on farms. Chemical farming should be better managed because at present it is leading to a decrease in diversity of insects and, consequently, an increase in the incidence of resistant pests affecting farmers' crops. Currently, 75 per cent of insects have gone as a result of chemicals used on the farm and pollutants generated due to lifestyle choices. Maintaining biodiversity for future generations is paramount.

Proposal 10: Actors working on food need to adopt a systems approach. Those involved in food production and consumption need to think in terms of systems because sustainability and nutrition are outcomes that can only be achieved by different sectors working together. In India, there is a shift in policy making from using food security as the primary objective to seeing well-functioning food systems as the desirable outcome, contributing to health for everyone, sustainable climate-compatible environments and providing opportunities for prosperity for those who provide the food eaten by Indians. ●

Glyphosate Games and India's Suspect Pesticide-herbicide Regime

Reena Gupta (For Newsclick)*

& *Farmers' Forum*



*https://www.newsclick.in/india-does-not-test-feared-carcinogen-food

Photo: Pixabay

For the first time, a California couple has establish in court that the herbicide glyphosate has been responsible for causing cancer. The chemical has been in the news for the past few years for all the wrong reasons. In recent times, three separate verdicts in California, courts have held the herbicide as the cause for cancer and in the latest case, the jury awarded in May 2019 more than $2 billion to a couple alleging that exposure to glyphosate triggered their cancer. The award was for $1 billion a piece for the Pilliods in punitive damages in addition to a combined $55 million in compensatory damages.

Subsequently, however, Alameda County Superior Court Judge, Winifred Smith, cut a jury award from $2.055 billion to $87 million on grounds that the punitive damages were much higher than constitutional limits set by the U.S. Supreme Court and should generally be no more than four times the amount of damages awarded as compensation to victims.

While, this is the third time a judge has reduced an award in a lawsuit over the disputed chemical, Associated Press reported that the judge agreed that the evidence supported the jury's conclusion that Roundup was "a substantial factor" in causing non-Hodgkin's lymphoma in Alva and Alberta Pilliod.

Alva Pilliod, 77, was diagnosed with non-Hodgkin's lymphoma, a sometimes-fatal form of lymph cancer, in 2011, and Alberta Pilliod, 74, was diagnosed in 2015. They had used Roundup for more than 30 years to kill weeds on three properties that they owned. Doctors say their cancers are in remission but could recur. Their trial had been expedited due to the risk of a relapse and potentially short life expectancy.

The plaintiffs had alleged that Monsanto had known about the herbicide's cancer risk for decades but had not warned consumers and instead attempted to influence scientists and regulators to receive favourable assessments of its products. While Bayer denies those allegations, Judge Smith, said that the evidence supported the finding that Monsanto knew the herbicide's active ingredient, glyphosate, could be dangerous and failed to warn the couple from Livermore, California.

Attorney for the Pilliods, Brent Wisner, said in a statement, "the judge rejected every argument Monsanto raised and sustained a very substantial verdict." Monsanto's parent company, the German pharmaceutical firm Bayer AG, said it would appeal. The reduction in damages is "a step in the right direction," the company said in a statement while insisting that the verdict and damages "conflict with the extensive body of reliable science and conclusions of leading health regulators worldwide" that both Roundup and glyphosate are safe, Los Angeles Times reported *(https://www.latimes.com/business/story/2019-07-26/monsanto-roundup-cancer-lawsuit-award)*. Experts argue that many such conclusions are company sponsored!

Regrettably, India does not have any independent mechanism to study the long-term impact of these pesticides on human health despite enough scientific evidence available from reputed international research organizations for

The Johnson Verdict

Dewayne Johnson, a school groundskeeper who alleged that his Non-Hodgkin's Lymphoma was brought about by an accidental exposure to Roundup, was initially awarded $289 million in early 2018, which was cut to $39 million on October 22, 2018.

Photo: Dinodia

IARC Research

In March 2015, IARC classified glyphosate as "probably carcinogenic to humans" (Group 2A). This was based on "limited" evidence of cancer in humans (from real-world exposures that actually occurred) and "sufficient" evidence of cancer in experimental animals (from studies of "pure" glyphosate). IARC also concluded that there was "strong" evidence for genotoxicity, both for "pure" glyphosate and for glyphosate formulations.

The IARC Monograph's evaluation is based on the systematic assembly and review of all publicly available and pertinent studies, by independent experts, free from vested interests. It follows strict scientific criteria, and the classification system is recognized and used as a reference all around the world. This is because IARC evaluations are based on independent scientific review and rigorous criteria and procedures.

To reach these conclusions, IARC reviewed about 1,000 studies. Some of the studies looked at people exposed through their jobs, such as farmers. Others were experimental studies on cancer and cancer-related effects in experimental systems. *https://www.iarc.fr/featured-news/media-centre-iarc-news-glyphosate/*

Regrettably, India does not have any independent mechanism to study the long-term impact of these pesticides on human health

the government to prohibit the sale of glyphosate in India.

Insisting that glyphosate poses no problems to humans, Bayer says: "At our core, we are committed to delivering better solutions for farmers and providing more choice for consumers to help them and our planet thrive. As part of our portfolio, glyphosate-based herbicides will continue to play a key role in helping agriculture meet pressing environmental and food security challenges as the global population grows by an expected two billion people through 2050."

Matters have been heating up ever since a Reuters investigation *(https://www.reuters.com/investigates/special-report/who-iarc-glyphosate/)* in 2017 exposed that a draft of a key section of the International Agency for Research on Cancer's (IARC) assessment of glyphosate – the report that has prompted international disputes and multi-million-dollar lawsuits – underwent significant changes and deletions before the report was finalized and made public.

IARC, based in Lyon, France, wields huge influence as a semi-autonomous unit of the World Health Organization. It issued a report on its assessment of glyphosate – a key ingredient in Monsanto Corp's top-selling weed-killer RoundUp – in March 2015 and ranked the chemical as a Group 2A carcinogen, a substance that probably causes cancer in people, based on its experts' view that there was "sufficient evidence" glyphosate causes cancer in animals and "limited evidence" it can do so in humans.

The allegations in the Pilliod case that saw a favourable verdict specifically said that Bayer AG's glyphosate-based Roundup weed-killer caused Alva and Alberta Pilliod, to contract Hodgkin's lymphoma. Experts have for long raised concerns about the safety of glyphosate and several other

chemicals that are continuously being pumped into the food chain. A Reuters report said in May 2019 that the German chemicals giant faces more than 13,400 U.S. lawsuits over the herbicide's alleged cancer risk.

Activist against glyphosate insist that big corporations, with their close ties to governments and mainstream media, can ensure that that any research that impacts their interests remains out of the public domain. For the first time these charges have been upheld. When corporations such as Monsanto (bought over by the Bayer group) introduce a new pesticide into the market, the government are expected to ensure that all the research data involved in the decision to allow this is out in the public domain. Usually, this data is kept secret and is immensely difficult to access for anyone wanting to know the safety standards of these chemicals.

Why is there such secrecy? Many attempts to access the data presented by Monsanto to gain approval to bring glyphosate to the Indian market have failed and the information is not available in the public domain. While the reason is for anyone to guess, the history of this weedicide (chemical weed-killer) and the pattern followed by Monsanto to hide information from the public and mislead the consumers is worth perusing.

Glyphosate was first patented by Stauffer Chemicals as a cleaner for industrial boilers and

German Response

Germany will phase out the controversial weed-killer glyphosate because it wipes out insect populations crucial for ecosystems and pollination of food crops.

The chemical, also suspected by some experts to cause cancer in humans, is to be banned by the end of 2023 when the EU's approval period for it expires. – *https://www.theguardian.com/environment/2019/sep/04/germany-ban-glyphosate-weedkiller-by-2023*

Photo: Dinodia

Monsanto Position

Glyphosate interferes with the Shikimate Pathway, a vital process involved in the synthesis of important amino acids in plants, microorganisms and fungi. Since humans and animals do not have this pathway, glyphosate is non-toxic to humans, which is what Monsanto claims. Monsanto adds that because they use a measure called the LD50 (lethal dose, 50 per cent). The LD50, a measure of acute toxicity, is the concentration of a chemical needed to kill half of the people or animals that are exposed to it.

Attempts to access the data presented by Monsanto to gain approval to bring glyphosate to the Indian market have failed

pipes in the 1960s. When Monsanto realized that it was killing all plants that it came in contact with, the company bought the patent and began to market it in the form of a weed-killer called Roundup. This became a very popular product and, by the late nineties, was being sold in 125 countries and helped Monsanto reap huge profits.

Since, the glyphosate patent was expiring in America, it meant that many generic versions would soon be available and Monsanto would lose its monopoly over the sale of Roundup. The corporation, therefore, came up with another "path-breaking idea" of producing a new kind of seed – genetically-engineered – "Roundup-ready seeds".

What this meant was that the herbicide could be directly sprayed on genetically engineered corn, soyabean and such others without harming the main crop. Since only Monsanto was manufacturing these seeds, farmers had no option but to buy them from this company. More than 90 per cent of soyabean currently being sown in the US is of this genetically-engineered kind.

Glyphosate, to be sold under the brand name, Roundup, was first registered in the United States by Monsanto. For the registration of pesticides, American law requires that a registrant – in this case Monsanto – conduct health and safety tests and submits the data to the Environment Protection Agency (EPA). There are protocols and laboratory practices that must be followed for conducting these tests.

According to the petition in the Johnsons' case in California, the EPA first classified Roundup as "possibly carcinogenic to humans" (Group C) in 1985. However, it was alleged that under pressure from Monsanto and on the basis of studies that Monsanto provided to EPA, the classification changed to "evidence of non-carcinogenity in humans" (Group E) in 1991.

This is where it gets really interesting. Even though EPA changed the classification, it clarified that "the designation does not mean that the chemical does not cause cancer." Further, it emphasized, "that designation of an agent in Group E is based on the available evidence at that time of evaluation and should not be interpreted as a definitive conclusion that the agent will not be carcinogen under any circumstances."

On two occasions, the EPA found that the laboratories used by Monsanto to conduct safety research (used to gain EPA approval) had

Photo: Pixabay

On two occasions, the EPA found that the laboratories used by Monsanto to conduct safety research (used to gain EPA approval) had committed fraud

California Caution

Despite anti-glyphosate developments, California has no state-wide ban on the chemical though, on July 7, 2017, it issued a warning on glyphosate by adding it to its 'Proposition 65' list of chemicals and substances known to cause cancer. Prop 65 requires California to publish a list of chemicals known to cause cancer, birth defects or other reproductive harm.
This decision to warn consumers about glyphosate followed the requirements of the Safe Drinking Water and Toxic Enforcement Act, better known as California Proposition 65, a ballot initiative approved by voters in 1986 to address toxic chemical exposure concerns.
Earlier this year, the University of California announced that glyphosate would be temporarily banned on all 10 UC campuses, citing "concerns about possible human health and ecological hazards, as well potential legal and reputational risks associated with this category of herbicides." – *https://www.baumhedlundlaw.com/toxic-tort-law/monsanto-roundup-lawsuit/where-is-glyphosate-banned/*

committed fraud. EPA observed that in two of these labs, IBT and Craven labs, there was "routine falsification of data" and that "it was hard to believe the scientific integrity of the data". The top executives of both these labs were convicted for fraud. What is absolutely shocking is that in spite of these disclosures, Monsanto was not only allowed to flourish in the US but was also marketing Roundup in at least 115 countries, including India, by the early 1990s.

Monsanto claimed that glyphosate is "practically safer than table salt" and "non-toxic" to mammals, fish and birds. It also claimed that glyphosate is "biodegradable". In 1996, the New York District Attorney's office filed a lawsuit against Monsanto for its false and misleading advertising of Roundup and other products. As a result, the corporation entered into an "assurance of discontinuance" with the county, which meant that it would not run ads in New York claiming that its products containing glyphosate were "non-toxic, safe, harmless or biodegradable". Monsanto altered its advertising only in New York.

The lawyers in the last California case had also argued that internal Monsanto emails uncovered during the litigation suggested that the corporation has repeatedly worked to stifle critical research over the years while funding "ghost writers" to publish scientific reports favourable to glyphosate. Nevertheless, Monsanto continues to sell Roundup, touting it as safe for humans and the environment. In 2009, the highest court of France ruled that Monsanto had not been truthful in its advertisement about the safety of glyphosate.

The IARC has an extensive procedure to review and classify chemicals. In 2015, it reviewed glyphosate after analyzing hundreds of studies from all over the world. IARC classified glyphosate as 2A. The IARC working group concluded that cancers most associated with glyphosate exposure are Non-Hodgkin's lymphoma and other hematopoietic cancers, including lymphoma and multiple myeloma. IARC had also noted that glyphosate produces genotoxic, enzymatic and hormonal effects in mammals, including human beings.

Over the years, several countries have tried to ban glyphosate. There is a complete ban in the Netherlands, while France has proscribed its private sale. Sri Lanka imposed a ban in 2014 due to an increase in kidney failure cases among agricultural workers. However, it partially lifted the ban and limited use of glyphosate is now allowed in tea plantations. There are proposals to ban or restrict sales in Argentina, Brazil, Columbia and a number of other countries, especially after the 2015 classification of IARC. Recently, Germany announced it has plans to phase out glyphosate by 2023. This is the reason why Monsanto has been using all its might in the California cases.

Though glyphosate is approved only for tea plantations and non-crop areas in India, there are reports of it being used for many crops because farmers find it far more economical than manual weeding. India is a large market for the agrochemical industry. According to industry reports, herbicides are the fastest growing agrochemical in the country. They are currently being sold by Monsanto and several other companies including Pesticides India, Dow, Excel and some others.

The glyphosate story epitomizes India's suspect pesticide and herbicide regulatory framework. In spite of continued deaths of farmers due to pesticide poisoning, India allows the sale of several chemicals classified by UN-mandated bodies as carcinogenic. It currently does not have any standards for the Maximum Residue Limit (MRL) for glyphosate. India does not test for glyphosate residue in food items because it does not have any standards for testing either.

The Indian government put out a draft notification on December 27, 2017, according to which the MRL was set at 1 mg/kg, 0.01 mg/

Photo: Dinodia

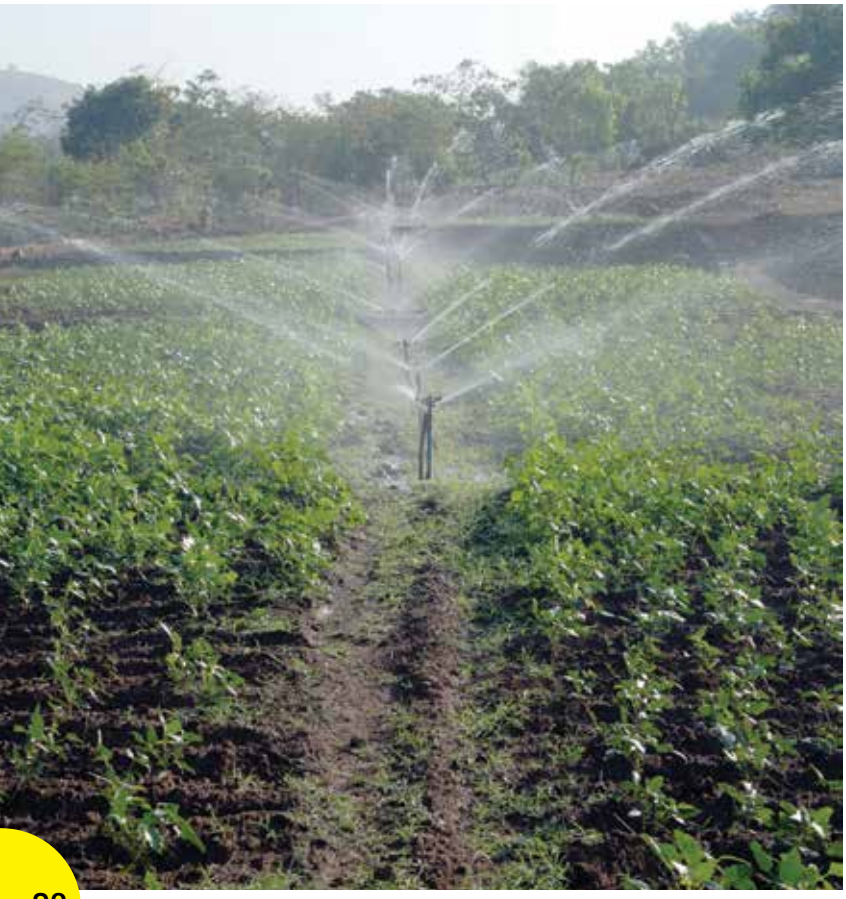


Photo: Dinodia

kg and 0.05 mg/kg for tea, rice, meat and meat products, respectively. The final notification is yet to be issued. However, the Kerala Agriculture Department had cancelled licences for distribution and sales of glyphosate in the state because, though it was approved for use only in tea plantations and non-crop area, it was been widely used across all crops in Kerala. Such rampant and indiscriminate use of glyphosate in the state was induced by dubious marketing methods. Kerala became the fifth state to ban glyphosate following Punjab, Maharashtra, Telangana and Andhra Pradesh.

The Food Safety and Standards Authority of India (FSSAI) has stated that since India does not have any set standards for maximum residual limits for glyphosate, it may use the standards set by Codex Alimentarius, a joint committee set up by the WHO and Food and Agriculture Organization (FAO). These standards allow MRL of 2 mg/kg in beans and 5 mg/kg for lentils and peas. These are much higher than the ones indicated in the government's draft notification of 2017.

Under the current Insecticides Act, the states have limited powers to restrict/ban any pesticides/ herbicide that has been approved by the union

The question of glyphosate safety has been raised in Parliament even by the RSS-affiliated Swadeshi Jagran Manch

government. The question of glyphosate safety has been raised in Parliament. Even the Swadeshi Jagran Manch, an RSS-affiliated body, which has raised a strong voice against glyphosate, has not found a favourable response. Indeed, India does not have any independent mechanism to study the long- term impact of these pesticides on human health and the government has been accused of misleading Parliament on glyphosate.

Member of Parliament, Pratima Mondal's questions on whether glyphosate only killed weeds or also caused cancer along with other harmful effects, what steps were being taken by the government to regulate its use, whether several countries have banned the carcinogenic herbicide and whether the government intended to ban glyphosate in India had the Minister for Agriculture and Farmers' Welfare, Narendra Tomar, saying that "glyphosate is a herbicide, which kills weeds and is registered for use in our country".

The minister said that glyphosate has been reviewed by the World Health Organization's Joint Meeting on Pesticide Residues (JMPR), which in 2016 concluded that glyphosate is unlikely to pose a carcinogenic risk to humans from exposure through the diet.

Last year, there were reports of "high levels" of glyphosate in imported pulses. The Swadeshi Jagran Manch told the minister: "The response that was drafted by your officials and read out by you is incorrect and is meant to hide true facts around this deadly chemical called glyphosate". The Manch National Co Convenor, Ashwani Mahajan, has piloted a petition on Change.org demanding a ban. In a letter to the minister, the manch has demanded an inquiry into the matter: "We request you to initiate an inquiry into this matter and ensure that officials work in public interest and not succumb to private lobbies", the manch says. ●

SUSTAINABLE PULSE LIST ON COUNTRIES BANNING OR RESTRICTING USE OF GLYPHOSATE

AFRICA

Malawi

Malawi's Ministry of Agriculture, Irrigation and Water Development announced the suspension of import permits for glyphosate in April 2019.

ASIA

Vietnam

Vietnam announced that it banned the import of all glyphosate-based herbicides with in March 2019 following a cancer trial verdict from San Francisco.

Sri Lanka

In 2015, a full import ban on all glyphosate-based herbicides was put in place by President Maithripala Sirisena and partly lifted in July 2018 for use on tea and rubber plantations.

SIX MIDDLE EASTERN COUNTRIES BANNED THE IMPORT AND USE OF GLYPHOSATE-BASED HERBICIDES IN COORDINATION WITH EACH OTHER IN 2015 AND 2016:

- Oman
- Saudi Arabia
- Kuwait
- United Arab Emirates
- Bahrain
- Qatar

CENTRAL AMERICA

Bermuda

Bermuda's Environment Minister Cole Simons confirmed the ban on glyphosate-based herbicides at a public meeting in January 2017.

St Vincent and the Grenadines

In August 2018 Agriculture Minister Saboto Caesar called on all stakeholders to be understanding of the new suspension on glyphosate-based herbicides "in light of the nation's quest to promote a safe working environment and good agricultural health and food safety practices."

EUROPE

Austria

In July 2019 the Austrian Parliament voted in favor of banning glyphosate completely in the country.

Belgium

In October 2018 the ban on the sale of broad-spectrum herbicides (including glyphosate) to non-professional users entered in to force across Belgium.

Czech Republic

In 2018 the Czech Republic put strict restrictions on the use of glyphosate and banned pre-harvest spraying; "These substances (glyphosate-based herbicides) will only be employed in cases when no other efficient method can be used", Agriculture Minister, Miroslav Toman, said.

Denmark

In July 2018, the Danish government implemented new rules banning the use of glyphosate on all post-emergent crops to avoid residues on foods.

France

In 2017 France banned the use of glyphosate and all other pesticides in public green spaces. In November 2018, President Macron said he would take all measures necessary to ensure that glyphosate-based herbicides are banned in France as soon as an alternative is available and at the latest within three years. However, he has since stated that this deadline may only be 80 per cent met.

Italy

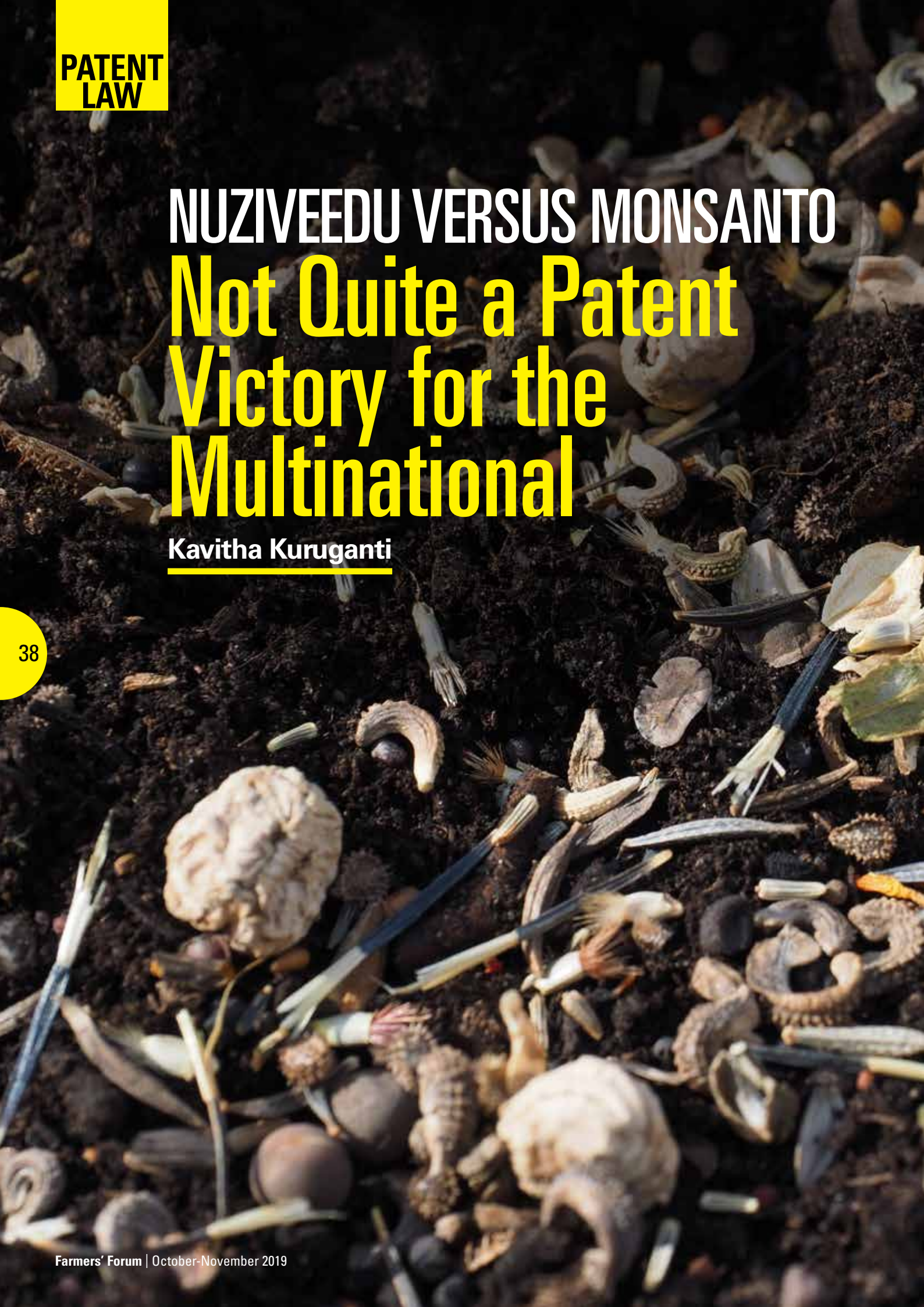
In August 2016 Italy's Ministry of Health banned the use of glyphosate in public areas and also as a pre-harvest spray.

The Netherlands

From the end of 2015 the sale of glyphosate-based herbicides has been banned to all non-business entities.

https://sustainablepulse.com/2019/05/28/glyphosate-herbicides-now-banned-or-restricted-in-17-countries-worldwide-sustainable-pulse-research/#.XZ4D2pMzYdU

Photo: Dinodia



NUZIVEEDU VERSUS MONSANTO

Not Quite a Patent Victory for the Multinational

Kavitha Kuruganti

Photo: Pixabay

KAVITHA KURUGANTI
One of the Convenors of Alliance for Sustainable & Holistic Agriculture (ASHA)

In January 2019, the media headlines, especially business media houses and the American media, had screaming headlines that said that Monsanto has had a "patent victory" in the Supreme Court of India that would, in turn, boost biotech investment in India.

The news stories claimed that Monsanto won a patent-related legal battle and that the court had ruled that Monsanto could claim patents on its GM cotton seeds. This was even after five full days after the judgement was uploaded on to the court's website showing that was not quite the case.

On January 1, 2019, the Supreme Court of India had overturned the Delhi High Court division bench judgment of April 11, 2018 but had not pronounced its own stand on Monsanto's patent. Speaking about Monsanto's Patent No. 214436, pertaining to the (Bt Cry2Ab) genetic sequence, which is the basis of its Bollgard II Bt cotton business, Justice S. Ravindra Bhat and Justice Yogesh Khanna of the Delhi HC had recorded one of their conclusions thus: "The subject patent falls within the exclusion spelt out by Section 3 (j) of the Patents Act; the subject patent and the claims covered by it are consequently held to be unpatentable".

The division bench, incidentally, upheld a single judge's directions (in the same court) to Monsanto to continue with its obligations that caused Monsanto to appeal against the March 2017 single judge's orders in the first instance. To the extent that the Supreme Court overturned the division bench judgement, which pronounced the patent and its claims unpatentable, the patent of Monsanto can be assumed to be restored.

However, the Supreme Court's Justices Rohintan Fali Nariman and Navin Sinha had not pronounced that Monsanto can claim patents on its GM cotton seeds. They had only pointed to the lacunae in the division bench's pronouncement on patentability of a genetic sequence and asked the parties to get the original suit heard by the single judge bench of Delhi High Court. *(See box What the Supreme Court said)*

Photo: Dinodia

What the Supreme Court Said

The SC judgement said the following about the division bench judgement: "Summary adjudication of a technically complex suit requiring expert evidence also, at the stage of injunction in the manner done, was certainly neither desirable or permissible in the law. The suit involved complicated mixed questions of law and facts with regard to patentability and exclusion of patent which could be examined in the suit on basis of evidence…. There is no gainsaying that the issues raised were complicated requiring technological and expert evidence with regard to issues of chemical process, biochemical, biotechnical and micro biological processes and more importantly, whether the nucleic acid sequence trait once inserted could be removed from that variety or not and whether the patented DNA sequence was a plant or a part of a plant etc., are again all matters which were required to be considered at the final hearing of the suit…. The Division Bench ought to have confined itself to the examination of the validity of the order of injunction granted by the Single Judge….The order of the Division Bench is set aside. The order of the Single Judge dated 28.03.2017 is restored and the suit is remanded to the learned Single Judge for disposal in accordance with law".

The Supreme Court merely ordered that the dispute(s) be taken back to the single judge bench of the Delhi High Court, while showcasing what it pronounced as procedural/legal lapses

Therefore, the Supreme Court merely ordered that the dispute(s) be taken back to the single judge bench of the Delhi High Court, while showcasing what it pronounced as procedural/legal lapses by the division bench. By no stretch of imagination can it be claimed that the Supreme Court has pronounced its stand on the validity of Monsanto's patent and even upheld it.

At the time of writing this piece, the hearings are continuing in the Delhi High Court, though the earlier single judge bench has changed now.

The dispute between Monsanto and Nuziveedu goes back a long way; to around 2003. Nuziveedu had to face India's de-facto patent regime in the form of its biosafety regulatory regime under the Ministry of Environment & Forests, which compelled Nuziveedu to get into a sub-licensing agreement with Monsanto (Monsanto Mahyco Biotech), to be able to use the Bt technology in Nuziveedu's cotton hybrids. That was for Bollgard I technology or Cry1Ac gene, which did not even have a patent in India. Trouble has been brewing since then.

The original disputes that brought the parties to the Delhi High Court in 2016 pertained to the fact that Monsanto contends that Nuziveedu is still to pay its dues with regard to trait/licence fees, while Nuziveedu contends that Monsanto has illegally terminated its sub-licence agreement on November 14, 2015 in an unjustified manner and that it is not bound to pay anything more than the trait value fixed by states and centre. There was also the matter of whether trademarks of Bollgard can be used or not or even the use of abbreviations like "BGII" by Nuziveedu, which denies any infringement.

The single judge bench of the Delhi High Court, while adjudicating on an application for injunction, did not actually decide on the patentability question and kept it for examination until after the pleadings were complete. On March 28, 2017, Justice R.K. Gauba only ordered that, during the pendency of the suit, the parties shall remain bound by their respective obligations under the sub-licence agreement that the parties got into. Monsanto et

The dispute between Monsanto and Nuziveedu goes back to around 2003. Nuziveedu had to face India's de-facto patent regime in the form of its biosafety regulatory regime under the Ministry of Environment & Forests, which compelled Nuziveedu to get into sub-licencing agreements with Monsanto (Monsanto Mahyco Biotech), to be able to use the Bt technology in its cotton hybrids. That was for Bollgard I technology or Cry1Ac gene that did not even have a patent in India. Trouble has been brewing since then

Photo: Pixabay

al preferred an appeal against the injunctive relief provided by the single judge bench.

The Supreme Court has now pointed out that even though the single judge bench did not deal with or consider the counter claim of Nuziveedu Seeds (defendants) with regard to the patentability, the division bench's judgement that the patent of Monsanto was subject to patent exclusion under Section 3(j) of Indian Patents Act thereby invalidating the patent, in effect, made the defendants counter claim succeed.

The other question is whether this is merely a mercantile matter that is being debated in India's courts. The issue of patentability of nucleic acid sequences came up in the context of whether there is a patent infringement by Nuziveedu and the legal debate between the two (groups of) parties makes it look as though it is a matter of mercantile laws whereas the core of the issue affects farmers and their livelihoods.

Going by an affidavit filed by the Union of India in a related case in the Delhi High Court, wherein it states that farm suicides were caused by Bt cotton, with high seed prices and losses incurred by farmers, it is a matter of life and death for them. At the end of the day, the disputed royalties, licence and trait fees and such others are all being paid by farmers of this country and not coming from the pockets of Monsanto or Nuziveedu.

In the USA and Canada, it is well known that Monsanto had sued, fined and jailed farmers in the name of patent infringement. The recent Supreme Court judgment records Monsanto's counsel submitting in the court that the plaintiffs (Monsanto et al) have no intention to sue any Indian farmer for violation of patent. That Monsanto cannot and will not is obvious; not without a riot breaking out on the streets of India.

That is not the only black and white way to look at patents on ostensible "nucleic acid sequences, which are chemical compounds" as though they have no bearing on seeds, seed monopolies and exorbitantly high prices of such seeds, which have a direct bearing on farmers' net returns and livelihoods.

Elsewhere, it is well documented that farmers have limited choices with regard to seeds and planting material due to patent enforcement and resulting monopolies. In the end, seed companies benefit enormously at the expense of farmers. It is reported that Monsanto would have realized trait value of around $240 millions between 2010-2015 and it is obvious that this came from poor Indian

The recent Supreme Court judgment records Monsanto's counsel submitting in the court that the plaintiffs (Monsanto et al) have no intention to sue any Indian farmer

farmers' pockets. It would, therefore, be useful for Indian courts to keep this in mind and not look at it as a mere mercantile matter.

The other question is whether the genetic sequence patented under Patent No. 214436 is merely a chemical compound, which leads to an examination of Patent No. 214436 vis-à-vis the Indian Patents Act. A look at the entire patent filing episode by Monsanto shows very clearly that the claims were manipulated opportunistically between process and product claims, so that it somehow fits into the Indian patent laws that were prevalent at a particular point of time.

While looking at Monsanto's claim that its Patent No. 214436 is essentially about a "nucleic acid sequence", which is a chemical created in a laboratory, the court has to remember that if that is the case, this chemical compound would be regulated within the pesticides regulatory regime

Photo: Dinodia

The only way justice can be meted out to farmers caught in this seed industry war is by getting the appellants and respondents to collectively pay back what they have collected from our farmers

in India, not the GMOs regime. It is after all this genetic sequence, which makes ordinary cotton varieties into Bt cotton, which consequently get regulated as living organisms, under the EPA 1986 and not as a pesticide.

The nucleic acid sequence is indeed heritable when embedded into a plant cell and heritability is a trait connected with a living organism. However, it is not capable of reproducing itself and, therefore, is not a micro-organism that is specified as a patentable matter in the Indian law.

The Indian Patents Act had a sub-section (2) added under Section 5 in 2002, which gave an explanation for "chemical processes" allowing for patenting of chemical processes, which was significantly deleted when the Parliament amended the Act in 2005. The legislative intent of the Indian Parliament is clear. It denied protection under Patents Act for such genes and genetic materials, and brought such seeds under the Protection of Plant Varieties and Farmers Rights Act of 2001, and is reflected also in the National Seeds Policy of 2002. This is consistent with India's international stand too that, the Indian Patent Office did not always uphold since it began granting several patents on genetic materials.

Claims with regard to the disputed patent show that it is both about a DNA sequence as well as its linking to other sequences (process) and placement in a plant cell (process). Claim 25 in this patent is not merely describing a product but is about a process for making a product of certain functions. The said nucleic acid sequence can be functional only after becoming a part of the plant cell.

Amongst the many parties that intervened and are on the defendants' side in the case, the argument is that the patented product is an inherent, intrinsic and integral part of a plant as it exists at the sub-cellular level (and a part of a plant is excluded from patentability) and that the claim is not about a chemical sequence in a vial but about having a plant produce a high level of expression of an endotoxin protein and such others.

The third question that emerges is whether there be a patent without fulfilling the "industrial application" criterion. For any invention to be patented, an essential criterion to be fulfilled is that of industrial application. Monsanto's NAS (nucleic acid sequence), described by it as a chemical product, is not capable of industrial application until it is first integrated into a plant

cell where it can express itself through essentially biological processes of transcription, translation and replication; until it stabilizes into the plant through repeated back-crossing processes, which are also essentially biological processes and until the NAS is heritable to the next generation of seeds, which are sold as F1 hybrids, which happens through essentially biological processes. There is no industrial application of a mere NAS by itself without essentially biological processes, which then make the NAS unpatentable under Indian law.

There is also the precedence of citing public interest and revocation of patents. It is clear that there is no reason for grant of patents that have even an indirect bearing on plants, because the Indian law has explicitly kept them out of patentability. Giving patents on genes and nucleic acid sequences will have such an indirect bearing and should, therefore, not be allowed.

Incidentally, Section 66, which allows for revocation of a patent in public interest, has indeed been used in the past in the case of revocation of Indian Patent No. 168950 granted initially to Agracetus Inc for a "method of producing transformed cotton cells by tissue culture". The then director general of the Indian Council for Agriculture Research argued that the patent was incontrovertibly detrimental to our farmers and our people at large. The Law Ministry had concurred.

One of the grounds was safety of such genetically engineered cotton. The revocation was not on technical grounds of process versus product or non-patentable subject matter and such others but on the simple fact that certain patents are generally prejudicial to the public. The same approach should be applied to Monsanto's disputed patent as well as all other such patents in India and such patent grants be revoked.

The fact of the matter is that inventions that are prejudicial to public interest are not patentable. This approach is reinforced by Section 3(b), which also specifies 'inventions not patentable'. Section 3(b) includes, "an invention the primary or intended use or commercial exploitation of which could be contrary to public order or morality or which causes serious prejudice to human, animal or plant life or health or to the environment". Given the government of India's own admission in a court of law on the lack of efficacy of Monsanto's proprietary technology

Photo: Pixabay

(which is the patent subject matter), that farmers were being forced to commit suicides and given that Bt cotton farmers (90-95 per cent of India's Bt cotton is planted to this "event" of Monsanto) are incurring large scale losses due to uncontrollable pest attacks, this 'invention' is a fit case to be declared as "not patentable".

Finally, there is the issue of refunding collections from Indian farmers. While the Delhi High Court case continues to look into the "patentability" of a particular genetic sequence, which Monsanto claims is a chemical compound created by it, the Competition Commission of India held in May 2019 that Monsanto abused its dominant position in the country by charging an unfair licence fees and to extract as much surplus as possible from farmers who are the end consumers of Bt cotton. The final ruling of the commission is still awaited in the matter.

Meanwhile, it is not just a revocation of the patent that is called for but a refund of the amounts collected from Indian farmers as part of seed prices from the seed companies involved in the sub-licences. The only way justice can be meted out to farmers caught in this seed industry war is by getting the appellants and respondents to collectively pay back what they have collected from our farmers, as fund to be returned to them, for local seed systems to be established that will restore resilience in cotton farming. ●

ITC's 'SAB SAATH BADHEIN' PHILOSOPHY

The Import of 'Gaon, Garib and Kisan'

A Farmers' Forum Report

The ITC Chairman, Sanjiv Puri talks of the importance of rural India in its 'Sab Saath Badhein' triple bottom line philosophy. This report excerpts some highlights of his speech at the annual general meeting to shareholders that are of relevance to the farm sector.

Photo: Unsplash

Agriculture is the mainstay for more than 50 per cent of the workforce in India. Vibrant agri and forest value chains have large employment potential and can play a pivotal role in creating a virtuous consumption cycle to unleash a new trajectory of economic growth. Despite the potential in this sector, growth is constrained by a triad of key challenges: lower productivity, vulnerability due to water stress and inefficient market access.

The Prime Minister's clarion call to revitalize agriculture and conserve water resources as well as the speedy action taken by the government in the implementation of schemes like PM-KISAN, formation of a Jal Shakti Ministry, new initiatives like Nal se Jal, setting up of PM-led Cabinet Committees on Investment & Growth as well as Employment & Skill Development, augurs well for the economy". The budget also presented a comprehensive roadmap to a $5 trillion economy with a sharp focus on 'Gaon, Garib and Kisan', which will go a long way in shaping a "New India with social equity and climate resilience".

The government's vision of 'Sabka Saath, Sabka Vikas' resonates deeply with ITC's commitment to sustainable and inclusive growth and provides inspiration to pursue our triple bottom line philosophy of 'Sab Saath Badhein' with even more passion and vitality. This aspiration finds expression in the innovative business models pursued by ITC to enable competitive growth whilst simultaneously generating sustainable livelihoods and enriching the environment, "a paradigm we call Responsible Competitiveness."

ITC Limited

ITC seeks to be an engine of growth for the Indian economy through a vibrant portfolio of future-ready businesses that are well poised to serve the emerging needs of a growing market through world-class Indian brands. These businesses also anchor competitive value chains that empower millions of farmers and trade partners, generating livelihoods for more than six million people in the country.

"When corporates make societal value creation a bedrock of corporate strategy, powerful drivers of innovation emerge to make growth more enduring as well as responsive to the needs of environment and society. It is my firm belief that by pursuing such a growth model, we can create stronger foundations to build a resilient Enterprise of Tomorrow – an enterprise that generates sustained value for its shareholders whilst contributing to national priority goals that accelerate job creation, replenish the

environment, especially water resources and combat climate change".

ITC's century-old linkages to the agrarian and rural economy have substantially intensified over the years with its growing presence across vibrant value chains extending from farm to fork, tree to textbook, livestock to dairy as well as bamboo to agarbatti anchored by its FMCG, agri and paperboards businesses, which add significant value to agriculture, thereby empowering farmers and support millions of livelihoods.

Agriculture is the mainstay for more than 50 per cent of the workforce in India. Vibrant agri and forest value chains have large employment potential and can play a pivotal role in creating a virtuous consumption cycle to unleash a new trajectory of economic growth. Despite the potential in this sector, growth is constrained by a triad of key challenges: lower productivity, vulnerability due to water stress and inefficient market access. ITC's interventions in agriculture have striven to address each of these challenges through the globally acclaimed ITC e-Choupal ecosystem.

To enhance productivity, substantive investments have been made in R&D to develop new varieties, implement extensive farmer training with best practices in large-scale demonstration farms and introduce mechanization. ITC also acquired Technico Agrisciences Limited, a leader in early generation seed potato, to provide superior inputs to enhance farm yields. The digital and physical infrastructure backbone provided by the e-Choupal network enables hand-holding of farmers to orchestrate a variety of services including access to expert knowledge, superior agri-inputs and demand-driven value chains anchored by ITC brands.

This is amply demonstrated in ITC's newly-launched initiative, 'Baareh Mahine Hariyali' programme that is being progressively rolled out to one million farmers and aims to multiply rural incomes through a wide spectrum of interventions. These include agronomic practices such as zero tillage, introduction of right varieties, cropping intensity and diversification as well as shared mechanized farming equipment.

This pilot programme covered over 2,00,000 farmers, out of which 35,000 have already doubled incomes while others are making encouraging progress. ITC is collaborating with the NITI Aayog to progressively build capacity of two million farmers in 27 Aspirational Districts to help enhance rural incomes.

Water shortages can cripple agricultural growth and the government has focused on regeneration and conservation of this precious natural resource. ITC's large-scale Integrated Watershed Development initiative helps strengthen the availability of water resources across 16 states. This year, it crossed a milestone with its soil and moisture conservation programme cumulatively covering more than a million acres of water-stressed areas.

In addition to the initiative on doubling farmer incomes, a pilot programme at scale on 'water use efficiency in agriculture' is being promoted to

Photo: Pixabay

enable effective demand-side management. This initiative has yielded water savings of 20 per cent to 45 per cent in crops like sugarcane, wheat, rice and banana. This points to the huge potential for reducing water consumption in agriculture.

The agri-sciences vertical at ITC Life Sciences and Technology Centre (ITC-LSTC) is engaged in research to develop new varieties with higher yields, better quality and specific traits to further enhance farmer incomes and build resilience of value chains.

ITC's world-class Indian brands anchor competitive and inclusive agri-value chains, providing efficient market linkages that also help align production to consumption trends. Over the years, its intensive engagement in agriculture has built capacity of farmers to offer superior produce to a wider section of buyers. ITC's agri-exports, including value-added attribute-specific products, help in effectively linking small farmers with international markets, contributing further to the rural economy.

ITC's agri-business also provides vital support to ITC's Foods Businesses by enabling sourcing of high-quality agricultural raw material directly from farmers, ensuring their traceability and identity preservation, thereby providing a unique source of competitive advantage.

Its Farm-to-Fork Value Chain encompasses several agri-commodities, including wheat, potatoes, spices, milk, fruits and vegetables providing immense vitality to its brands such as 'Aashirvaad' Atta, 'Aashirvaad Svasti' Dairy products, 'Bingo!' Snacks, 'B Natural' Juices, 'Aashirvaad' Spices and so on. The integrated fruits, vegetables and perishables value chain has enabled ITC to foray into new segments with a wide range of offerings including frozen vegetables, potatoes, mango pulp, prawns and so on. These forays also help address the issue of huge agri-wastages in the country, estimated at ₹92,000 crores, depriving farmers of a potentially large source of income.

ITC's paperboards business has championed ITC's large-scale afforestation programme by creating a competitive Tree-to-Textbook value chain that provides it with a sustainable source of fibre, helping substitute imports whilst generating large-scale livelihoods and a green cover.

ITC is also building a Bamboo-to-Agarbatti value chain anchored by the 'Mangaldeep' brand that will contribute to reducing imports whilst simultaneously creating livelihoods by promoting

Photo: Pixabay

ITC's initiative, 'Baareh Mahine Hariyali' programme is being progressively rolled out to one million farmers and aims to multiply rural incomes through a wide spectrum of interventions

bamboo cultivation in India. To empower economically needy women, ITC has set up an all-women nursery in Tripura that can be replicated in other states where such plantations are feasible.

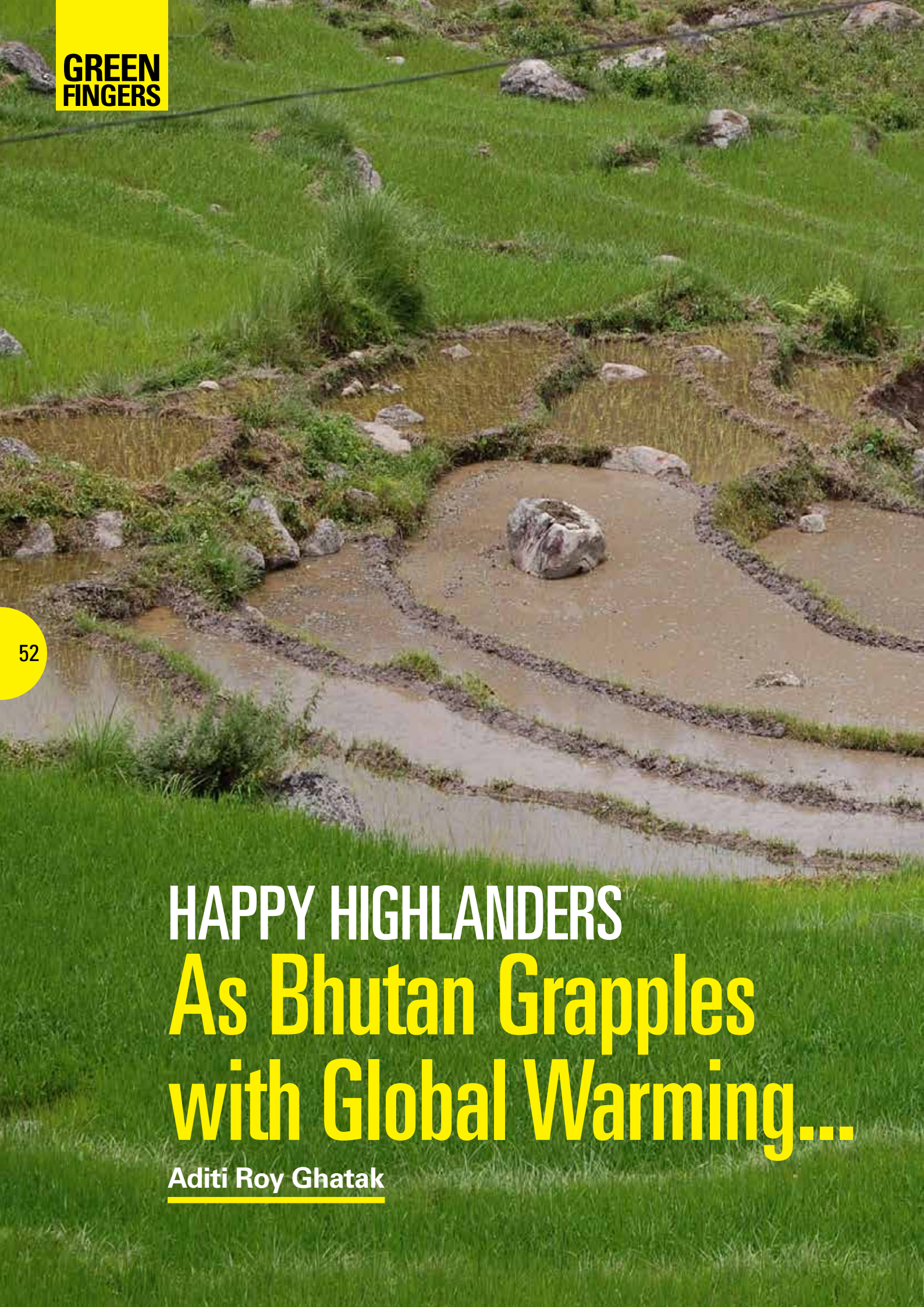
Currently, 180 billion bamboo sticks are imported into India for the agarbatti industry. Substitution of bamboo imports with domestic cultivation has the potential to generate employment opportunities of around 22 million person days per annum, translating to additional farmer income of around ₹1,300 crores.

ITC's Sab Saath Badhein' philosophy underlines its "core belief in building a globally competitive and profitable Indian enterprise that makes an exemplary contribution to creating larger societal value. Its social investment programme engages with rural communities through a large portfolio of interventions to strengthen their capacity to be more economically stable and climate-resilient." These initiatives, several of which are also implemented through 61 public-private-people partnerships, are aligned to the government's priority areas and focused on sustainable agricultural practices, building water security and livelihood generation. In addition, the health and sanitation programmes contribute to the Swachh Bharat mission. Other noteworthy developments include:

ITC's e-Choupal initiative has empowered more than four million farmers

- Its afforestation programme has greened over 7,30,000 acres, whilst generating over 135 million person days of employment
- The animal husbandry programme has covered over 17,75,000 milch animals
- Initiatives in women empowerment have reached over 64,000 beneficiaries
- Vocational training has covered over 67,000 youths
- The primary education programme has benefitted over 6,90,000 children
- More than 35,000 toilets have been built
- Its Well-being Out of Waste programme (WOW) comprehensively addresses the problem of solid waste management, of which plastic waste is a significant component, provides an end-to-end sustainable and scalable solution that has reached out to 89 lakh citizens in the country.

Whilst these programmes are being scaled up progressively, some recent interventions are also demonstrating immense promise. A recent initiative on building climate-smart villages aims to reduce the vulnerability risks faced by poor farmers. Supporting women empowerment, ITC has enabled the creation of all-women nurseries in Tripura, Telangana, Karnataka and Andhra Pradesh. These nurseries support different crops such as subabul and other native species, guava, eucalyptus, silver oak and bamboo. ●



HAPPY HIGHLANDERS

As Bhutan Grapples with Global Warming...

Aditi Roy Ghatak

Photo: Pixabay

"The ultimate goal of Bhutan's development efforts is Gross National Happiness, (but) to be happy, we can't go hungry... We have to start our happiness by producing sufficient food for all."

– Bhutan's Minister for Agriculture and Forests Lyanpo Yeshey Penjor

Beyond the scenic splendour of the lofty clouddraped peaks and primeval forests or the felicitous gross national happiness accomplishments that overwhelm the world, land-locked Bhutan is grappling with problems common to many agrarian economies in an era of climate change. (See Bhutan's Food security snapshot, FAO). The sinister phenomenon along with its evil offspring, global warming, has a more critical impact on this fragile eastern Himalayan ecosystem because, apart from impacting Asian's cleanest air region, it plays havoc with the country's commitment to sustainably develop the region to provide wholesome livelihood for the Bhutanese.

Bhutan's green cover is a sight for sore eyes with an impressive 70 per cent of land forested, principally by primary forests, though there is evidence of afforestation all around. The tourist is doubly delighted by the gambolling rivers that accompany visitors everywhere – the glistening Drangme Chhu, Mo Chhu, Wang Chhu and Torsa Chhu – and their many tributaries, blissfully unaware of the monstrous GLOF (Glacial Lakes Outburst Floods) threat that looms large, thanks to the "formation of supra-glacial lakes due to the accelerated retreat of glaciers with increasing temperatures", in the glacial lakes approaching "critical geostatic thresholds", which means rising water levels. (*https://www.adaptation-undp.org/explore/bhutan*).

Indeed, glaciers in Bhutan are receding at a rate of almost 30-60 meters per decade. The melting ice from these receding glaciers is increasing the volume of water in glacial lakes and the melting of ice-cored dams is destabilizing them, pushing the hazard risk for GLOFs to critical levels. This can hardly please an otherwise happy nation, which has successfully beaten extreme poverty. Yet, food insecurity persists mostly in rural areas, especially in eastern and southern parts of the country. The 2018 Country Strategic Plan of the World Food Programme (WFP), about 40 per cent of Bhutan's rural households "rely on diets of poor quality, mainly due to inadequate access to the food markets", says the FAO.

Bhutan is striving to stay prepared but is far from equal to its dreaded enemy. Apart from affecting

Food Security Snapshot

- Favourable prospects for 2019 minor winter crops
- Aggregate cereal output in 2018 estimated above average
- Cereal import requirements in 2018/19 marketing year (July/June) forecast below average
- Food insecurity conditions persist in most rural areas

https://reliefweb.int/report/bhutan/giews-country-brief-bhutan-27-march-2019

Photo: Aditi Roy Ghatak

Bhutan glaciers are receding at around 30-60 meters per decade; the melting ice is increasing the volume of water in glacial lakes as are the melting ice-cored dams

the base flow of Bhutan's rivers, the rapidly melting of glaciers will dramatically increase the risk of GLOFs. That Bhutan's extensive forest cover, rich biodiversity and clean water resources will be affected by climate change are a given. Also acknowledged is the potential negative impact of the tourism and service sectors.

Not every simple Bhutanese soul can understand the nuances of nature's ways and the complexities that the country's climate variations invest its dramatically changing topography – spanning three climatic zones – with. The southern plains are subtropical and characterized by high humidity and heavy rainfall and no different from the northern West Bengal. Jaigaon on the India side of the border is identical to Phuentsholling on the Bhutanese side, save for the fact that roads turn smooth and free from trash the minute one crosses over to Bhutan.

The central belt of flat valleys, which visitors flock to, is characterized by "cool winters and hot summers", with moderate rainfall while the high valleys have severe winters and cool summers because the country is at the periphery of the tropical circulation in the north and on the periphery of the Asian monsoon circulation in the south. Summer monsoons typically last from late June to late September, at times causing flash floods and landslides; monsoons generate approximately 70 per cent of the annual rainfall in Bhutan.

Photo: Aditi Roy Ghatak

Rural Revitalization

The IFPRI insists that rural revitalization is key to food security but the young in Bhutan may no longer find farming charming. Karma Chopel, is a dashing tourist vehicle driver, taking people around in his ₹35 lakh Hyundai. He comes from an army family and while both his parents have returned to their farming roots in a village some 200 kilometers from Haa, he chooses a different lifestyle.

Bhutan's National Adaptation Programme of Action (NAPA), which is constantly being updated, had correctly anticipated that an increasing trend of precipitation will occur. This is consistent with climate modeling for South Asia as a whole, which project that the region will a median increase in temperature of 2.3°C by 2100; that the greatest amount of warming will take place at higher altitudes; precipitation during the dry season will decline by five per cent by 2100. In the remainder of the year precipitation will increase by a median of 11 per cent.

The Food and Agriculture Organization emphasizes that "food insecurity conditions persist in most rural areas" and the encroaching climate change poses fresh threats for some 80 per cent of the country's population that depends on subsistence farming. This is particularly vulnerable and will be directly affected by temperature changes and monsoon patterns that are less predictable as a result of climate change.

The NAPA has identified Bhutan's agriculture vulnerabilities, amongst others: possible crop yield instability; loss of production and quality (due to variable rainfall, temperature and such others; decreased water availability for crop production; and increased risk of extinction of already threatened crop species (traditional crop varieties):

- Loss of soil fertility due to erosion of top soil and runoff; loss of fields due to flash floods; and loss of soil and nutrients;
- Crop yield loss (flowers and fruit drop) to hailstorms; deteriorated produce quality (fruit and vegetables) due to unanticipated heavy rains and hailstorms;
- Delayed sowing (late rainfall), as well as damage to paddy and potato crops due to sudden early and late spring frost respectively; and
- Outbreak of pests and diseases in fields and during storage where they were previously unknown.

Bhutan has a rural poverty rate of 11.9 per cent as of 2017; its small-holder mountain farmers constitute 57.2 per cent of the population practicing system of integrated farming by growing crops, rearing livestock, and use of forest resources mainly leaf litter, fodder and fuel wood, says a 2019 International Food Policy Research Institute (IFPRI) report and food is becoming scarce. Fresh local produce is luscious and in great demand as traditional farmers pack their produce of fruit and vegetable and display them along mountainous roads for local commuters.

Bhutan is 61 per cent self-sufficient in staple cereals and 47 per cent in rice. Exports of fruits and seasonal vegetables have increased, food and nutrition security remain as key challenges with a food trade deficit, where it imports six times the value of food exported, says the IFPRI. Bhutan's agriculture development is challenged by terrain, fragmented land holdings, labour shortage, human-wildlife conflict, lack of access to markets and credits and coupled with frequent erratic weather patterns.

While the visitors to the country are charmed by the vast expanses of rice fields, often in

Green Climate Fund Approves $25.3 Million for Climate-resilient Agriculture in Bhutan

At its 23rd Board Meeting, the Green Climate Fund (GCF) approved $25.3 million in support of Bhutan's efforts to prepare and adapt to climate change and ensuring that Bhutan is heading towards low carbon and climate-resilient developments. "As a mountainous agricultural country, climate change is proving extremely disruptive and expensive for Bhutan. Flooding and landslides during monsoon have caused extensive damages to vital infrastructure like roads, access to market and rural livelihoods. Conversely, during the dry season, there has been an increasing pressure on drinking and irrigation water", said Thinley Namgyel, Secretary of the Gross National Happiness Commission and GCF National Designated Authority in Bhutan. He added that the financing support has come at the right time in helping to bridge the resource gap of the 12th plan and addressing climate change issues, particularly in the agriculture sector, which is one of the priority sectors in the 12th plan.

The Royal Government of Bhutan, in partnership with the United Nations Development Programme (UNDP), accessed the Green Climate Fund. "The Gross National Happiness Commission acknowledges the GCF Secretariat, UNDP and all other relevant government agencies, including Royal Government of Bhutan Mission Offices for the solidarity and team work in successfully securing the fund," the commission said. "Bhutan's National Adaptation Programme of Action (NAPA) highlights that the rural poor will be hit the hardest by climate change and its related impacts. This project, therefore, directly responds to the rural communities' needs and address their challenges in the agriculture sector," said Azusa Kubota, Resident Representative of UNDP Bhutan. "With a long history of strong partnership with the GNHC, both at the policy and community levels, UNDP is pleased to support this project and concretely contribute to the Government's top priority and Sustainable Development Goals."

The project will primarily benefit rural communities through provision of sustainable land and water management, more climate-resilient irrigation and agriculture, and climate-resilient roads. The project will also work with government agencies to mainstream climate change risks into land and water management planning. In addition to supporting the 12th plan, the project is in coherence with the Sustainable Development Goals or SDGs – including no poverty (SDG 1), gender equality (SDG 5), reduced inequalities (SDG 10), sustainable cities and communities (SDG 11) and climate action (SDG 13) – and aligns well with Bhutan's Nationally Determined Contribution under the global Paris Agreement. By the end of the project, it is anticipated that over 400km of roads will be climate-proofed, 8,000 hectares of farmland will have reliable climate-resilient irrigation schemes, and crop yields would be increased by 30 per cent.

GNHC and UNDP will provide strategic and oversight roles to the project while local governments and agencies like the National Centre for Hydrology and Meteorology, Department of Agriculture, Department of Industry, Department of Forest and Park Services, and Department of Roads will implement the project. Project implementation is expected to begin from January 2020 and complete by December 31, 2020.

Source: https://www.adaptation-undp.org/green-climate-fund-approves-253-million-climate-resilient-agriculture-bhutan

picturesque terraced farming, the fact is that Bhutan has to import more than one third of its cereals. Fortunately, the crop has been favourable in recent years. The FAO's end-March 2019 report says: "Production prospects for the 2019 minor wheat and barley winter crops, for harvest in June, are currently favourable. Near average and well-distributed rains since October 2018 have supported planting activities and early crop development. Recent remote sensing data exhibits favourable vegetation conditions throughout the country"

The aggregate cereal production, mostly rice and maize, is estimated at 187,100 tonnes, virtually unchanged from the above-average output in 2017. The 2018 paddy and maize outputs are estimated at 88,000 and 90,000 tonnes, respectively, reflecting higher yields supported by favourable weather conditions since May through October 2018 and near-average plantings. The output of other minor crops such as millet, barley and wheat, is estimated at near-average levels. Yet there was need for substantial imports.

In the 2018-19 marketing year (July-June), total cereal import requirements are forecast at 82,500 tonnes, seven per cent below the five-year average. The decrease mainly reflects a slowdown in rice imports, which are expected at 70,000 tonnes, 10 per cent below the average, due to ample local produce from the bumper paddy output in 2018. By contrast, wheat import requirements are forecast at an average of 9,000 tonnes, the FAO says.

One definitive response to adversity has been Bhutan's Nu one billion (equivalent to ₹1 billion) National Organic Flagship Programme, which has taken a decade to prepare. "The framework was developed in 2008. It has taken this long for us to actually get such a big support. It is not easy. It requires a lot of work", according to the programme director with the Agriculture Research and Development Centre in Yusipang, Thimphu, Kesang Tshomo.

Red Rice

Bhutanese red rice is a medium-grain rice grown, which is the staple. This red japonica rice is semi-milled and some of the reddish bran is left on the rice.

Photos: Aditi Roy Ghatak

One definitive response to adversity has been Bhutan's Nu one billion (= ₹1 billion) National Organic Flagship Programme, which has taken a decade to prepare

"Our target at the end is to have a holistic, integrated system where we have the supply system of all the inputs, we have people producing it, trading and marketing... supplying and distributing inputs not only to organic farmers but also to all farmers in the country," she said. The government invested Nu 1 billion in this programme and expects to "generate at least three times the value", at the end. The programme will be implemented in 20 dzongkhags (districts) covering crops such as rice, maize, buckwheat, quinoa, asparagus, ginger, turmeric, cardamom, legumes, honey, egg, trout, chugo (hardened yak cheese) and bamboo shoot.

The good news is that the Gasa Dzongkhag region has been fully organic since 2004 and its experience can be critical for the success of Bhutan's ambitions vis-à-vis transforming the future of its farming and food system. Commentators Adrian Von Bernstorff and Hannes Lorenzen, talking about food sovereignty and organic farming recommend concentration on the many smaller domestic crops like the "nine national cereals" that could help overcoming dependence on rice and potatoes and boost a process of diversification of food choice and farming resilience. (*http://www.arc2020.eu/bhutan-food-sovereignty-and-organic-farming/*)

"Bhutan could become a place of innovation of organic breeding, which is only very slowly developing in western countries. Co-operation with breeders in this field could become the source of intensive co-operation and an emerging market for organic seeds and could provide very attractive opportunities for Bhutanese farmers and breeders".

Alongside, a greenhouse initiative, well supported by the Ministry of Agriculture and Forestry (MoAF), has taken roots in Bhutan. Visitors are treated to large green house farms dotting the green mountains thanks to the state agriculture extension office that helps the

Photo: Aditi Roy Ghatak

Photo: Pixabay

households to set up Poly houses (greenhouse) that were, for the first time, tried/piloted successfully in Lunana, 4,100 meters above sea level, by a teacher Namgay Dorji of Lunana school.

He organized the plastic with his own resources and won the 2016 Annual Good to Great Gasa Award for this outstanding achievement that ensured a Royal visit to Lunana. Poly houses were gifted to schools and other government offices. Thereafter, Dzongkhag pursued this programme and there are more than 150 poly houses in operation in Lunana. Suddenly, from a meagre produce of radish, potato and spinach, Lunana became a producer of beans, cabbage, chilies and even maize with vegetables growing well into November.

"In winter we can't grow anything. In summer, from March till August, we grow radish, potato and spinach. And now with the greenhouse, we grow onions and other vegetables as well", according to Rinzin Dema from Tenchoe village (*http://www.gasa.gov.bt/news/greenhouses-enable-lunaps-grow-more-varieties-vegetables*). The rest of the country seems to have been inspired too as visitors can see many such polyhouses on the tourism track.

The third interesting development features entrepreneurial experimentations with medicinal plants and aromatherapy and essential oils that any

Photo: Aditi Roy Ghatak

visitor to Bhutan will get familiar with. The spas in the country are now using Kingdom Essences with six essential oils — caraway, cypress, mugwort, pine, juniper and thingye (Zanthoxylum armatum) — herbal salves and hydrosols. The young start-up with trained entrepreneurs has roped in a village co-operative of 150 households, all farmers who cultivate caraway and thingye for them. They grow their own lavender, rosemary, thyme, oregano, chives, lemongrass, chillies, cereals (local red rice, buckwheat, perilla) and some vegetables. Supported by India, Bhutan's Start Up Centre incubates some 36 startups, featuring an "eclectic and motivated bunch".

28-year-old Thinley Namgay, works with a farming community in Punakha valley. The Drachukha Flower Group, grows edible flowers like the calendula, pink, blue and red cornflower, and cereal grains that are processed under his brand Druk Metho (Dragon Flower) to create beautifully packaged risotto and salt mixes, prepared for export to Switzerland but also sold locally. "The idea is to help reverse the trend of rural-urban migration by developing more lucrative and diverse livelihoods for rural farming communities and empowering women and young people in the villages", Namgay told the Mint (*https://www.*

Bhutan wants to reverse the rural-urban migration by developing more lucrative and diverse livelihoods for farming communities

Gasa Dzongkhag Goes Organic

Making virtue out of necessity, Gasa dzongkhag, without access to much of the country for want or roads, chose the organic way. It was not till 2004, however, when the former agriculture minister, Sangay Ngedup, visited it and realized that Gasa farmers used no chemical fertilizers or pesticides that moves towards the organic certification began. Khatoed Gewog (village block) is at an altitude of 2,300-2,900 metres above sea level, with no more than 60 households. Gasa was certified to produce and sell organic produce only last year with a farmers' group, Rangshin Sonam Detshen, from Khatoed gewog, gaining formal recognition earlier, as Bhutan moved towards the vision of going 100 per cent organic.

The Bhutan Agriculture and Food Regulatory Authority (BAFRA) certified it as the first organic group in Bhutan in 2016. Rangshin Sonam Detshen a local group from Khatoed Gewog, has epitomized Bhutan's vision of going 100 per cent organic with its 25 acres of land for potatoes and garlic and then going on to grow red carrots as well.

The group with 52 members has demarcated land for production with each member working on 20-30 decimals and gathers produce at the gewog centre (year 2017 figures). The members pay Nu 100 each every month as membership fee and 56 households are actively engaged in farming; 51 of them grow organic potatoes. Desiree (Red), the popular potato variety grown by this group is sown in February and harvested about 5-6 months later. Garlic is sown in October and harvested 8-9 months later. Apparently high-end hotels in the country are prepared to pay well for the produce and the group has the capacity to produce more than 92 MT potatoes and 3 MT garlic each year with scope for expansion. (*http://www.moaf.gov.bt/gasa-from-good-to-great-selling-organic-produce-from-gasa/*)

Photo: Pixabay

Photo: Aditi Roy Ghatak

livemint.com/mint-lounge/features/kickstarting-made-in-bhutan-11570792751047.html).

To get back to the telling comment by the Bhutanese minister, "The ultimate goal of Bhutan's development efforts is Gross National Happiness, (but) to be happy, we can't go hungry... We have to start our happiness by producing sufficient food for all", food holds the key to sustained happiness despite other favourable parameters. Bhutan's essential stability is highlighted by its single-digit inflation, a stable exchange rate and accumulating international reserves attest to the stability and its successful poverty reduction programme.

Extreme poverty has been almost eradicated, with the rate falling to two per cent in 2012 using the international poverty line of $1.90 per person a day. As the World Bank overview of the country says: "Nevertheless, structural challenges remain, including large current account deficits, high public debt, an underdeveloped private sector, and a high youth unemployment rate". The transition out of agricultural jobs will continue to be slow, due to challenges in accelerating private sector development. (*https://www.worldbank.org/en/country/bhutan/overview*).

Till such time the Bhutanese will need to innovate, adapt and fight to preserve the pristine quality of the country. ●

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