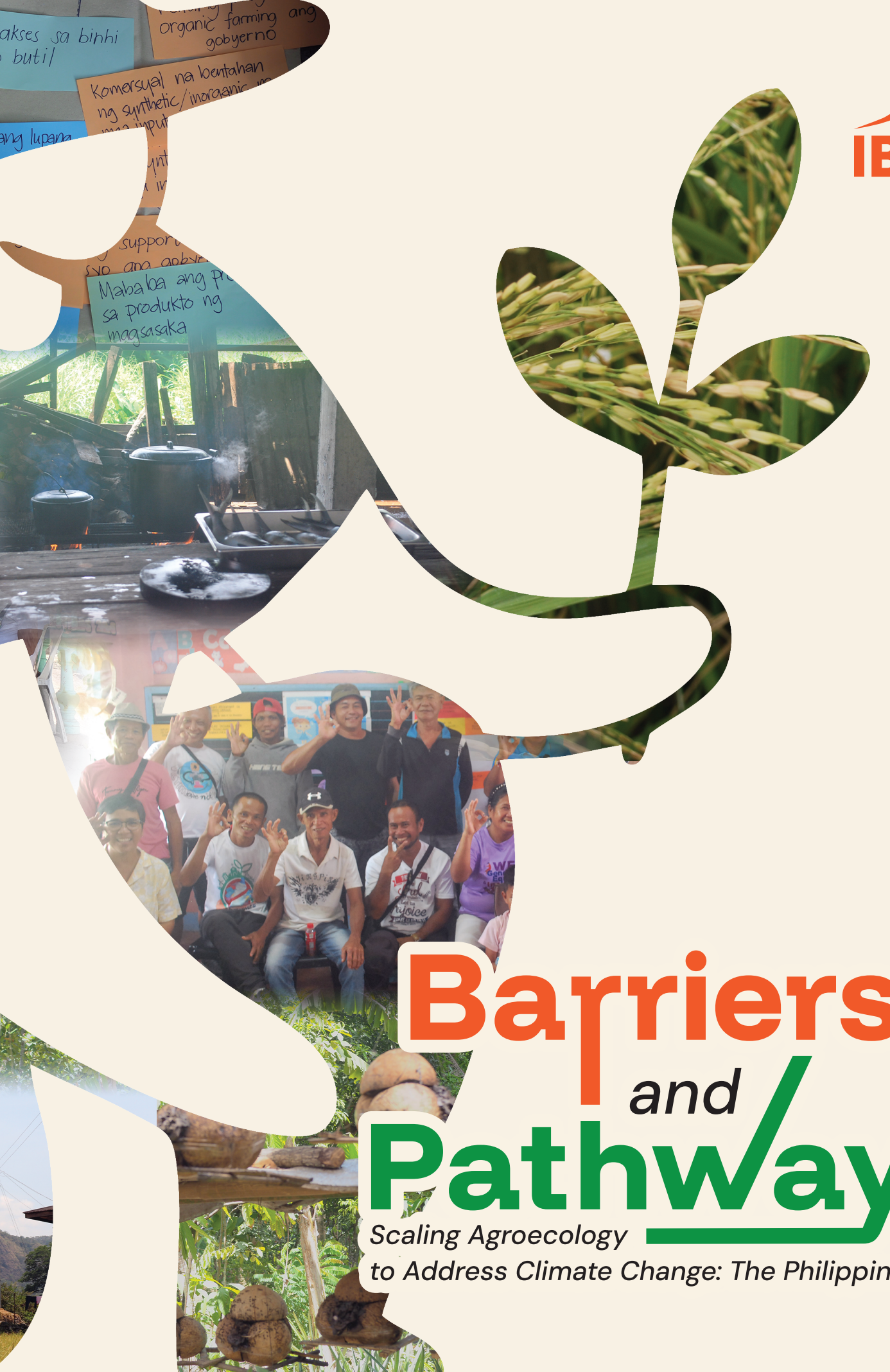

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Barriers and Pathways

Scaling Agroecology to Address Climate Change: The Philippine Case

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Content

Acronyms and abbreviations

°C	centigrade
ABM	Accountancy, Business and Management
ACT	Agroecology Criteria Tool
AFMA	Agriculture and Fisheries Modernization Act
ALCADEV	Alternative Learning Center for Agricultural and Livelihood Development, Inc.
AMMBO	Asosasyon sang mga Mangunguma kag Mamumugon sa Bgy. Orong
AMMCAO	Asosasyon sang mga Mangunguma kay Mamumugon sa Barangay Camigauan kay Oringao
AMMLU	Asosasyon sang mga Mangunguma kag Mamumugon sa Lupni nga Naga-updanay
AMO	Atlantic Multidecadal Oscillation
AOA	Agreement on Agriculture
AOFA	Anoling Organic Farmers Association
APEX	Asian People's Exchange
ASEAN	Association of South East Asian Nations
ATI	Agriculture Technical Institute
ATL	Anti-Terror Law
AVA	Agribusiness Venture Agreement
BAKAS	Buhi nga Aksyon para sa Kauswagan kag pag Amlig sa Seguridad sa Mangunguma kag Mamumugon
BARMM	Bangsamoro Autonomous Region in Muslim Mindanao
BPO	business process outsourcing
CAF	Census of Agriculture and Fisheries
CALABARZON	Cavite, Laguna, Batangas, Rizal, Quezon (Region IV-A)
Camsur	Camarines Sur
CAR	Cordillera Administrative Region
CARP	Comprehensive Agrarian Reform Program
CDPC	Center for Development Programs for the Cordillera
CIDSE	Coopération Internationale pour le Développement et la Solidarité
CLOA	Certificates of Land Ownership Award
COP	Conference of Parties
DA	Department of Agriculture
DAR	Department of Agrarian Reform
DENR	Department of Environment and Natural Resources
DIFS	diversified integrated farming system
DRR	disaster risk reduction
ENSO	El Niño Southern Oscillation
F-ACT	Farmer Level ACT
FAO	Food and Agriculture Organisation
FARMER Inc.	Farmers' Assistance for Resource Management, Education and Rehabilitation, Inc.
FGD	focus group discussion
FLCCI	Farmers Learning Center for CARAGA, Inc.
GCA	Global Commission on Adaptation
GDP	gross domestic product
GHG	greenhouse gas
GMO	genetically modified organism
ha	hectare
HLPE	United Nations High Level Panel of Experts
HUMSS	Humanities and Social Sciences
HYV	high-yield variety
IFOAM	International Federation of Organic Agriculture Movements
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
IPM	Integrated Pest Management

IRRI	International Rice Research Institute
Kabuhian	Kauswagan sa Bino para sa Buhi kag hilway nga Pangabuhian
KAMALEG	Katilingban sang mga Mangunguma kag Mamumugon sa Malasbalas kag Labamba
KCFA	Kidadayeg Community Farmers Association
KII	key informant interview
KJWA	Koronovia Joint Work on Agriculture
kph	kilometers per hour
LGU	local government unit
LIBACUFA	Little Baguio Community Upland Farmers Associaion
LPA	low pressure area
MASIPAG	Magsasaka at Siyentipiko para sa Pag-unlad ng Agrikultura – Farmers-Scientists Partnership for Development
MIMAROPA	Mindoro, Marinduque, Romblon, Palawan (Region IV-B)
mm	millimeters
MMT	million metric tons
MOFA	Mayon Organic Farmers Association
MT	million tons
NAMRIA	National Mapping and Resource Information Authority
NEMSU	Northeastern Mindanao State University
NFA	National Food Authority
NGO	non-government organization
NIA	National Irrigation Administration
NPAAAD	network of protected areas for agricultural and agro-industrial development
NTF-ELCAC	National Task Force to End Local Communist Armed Conflict
OML Center	Oscar M. Lopez Center for Climate Change Adaptation and Disaster Risk Management Foundation, Inc.
ONI	Oceanic Niño Index
OPAG	Office of the Provincial Agriculturist
OFW	overseas Filipino worker
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services
PAMANGAS-CA	Paghiliusa sang mga Mangunguma kay Mamumugon sa Salong kag Camansi
PANAP	Pesticide Action Network Asia Pacific
PAR	Philippine Area of Responsibility
PAWIS	Paghiliusa sa Agricultural Workers and Small Fishermen nga may Inisyatiba sa Barangay San Juan
PCB	Provincial Consultative Body
PCFS	People's Coalition On Food Sovereignty
PDG	Paghida-et sa Kauswagan Development Group
PhilMech	Philippine Center for Postharvest Development and Mechanization
PO	people's organization
PPP	public-private partnership
QR	quantitative restriction
R&D	research and development
RAIN	Roadmap to Address the Impact of El Niño
RA	Republic Act
RCEF	Rice Competitiveness Enhancement Fund
RSBSA	Registry System for Basic Sectors in Agriculture
RTL	Rice Tariffication Law
SAFDZ	strategic agricultural and fisheries development zone
SAP	structural adjustment program
Soccsksargen	South Cotabato, Cotabato, Sultan Kudarat, Sarangani, General Santos City
sq km	square kilometers
SRI	System of Rice Intensification
STEM	Science, Technology, Engineering and Mathematics
STS	severe tropical storm
STY	super-typhoon
TABI	Tarabang para sa Bicol Inc.
TAPE	Tool for Agroecology Performance Evaluation

TC	tropical cyclone
TD	tropical depression
TESDA	Technical Education and Skills Development Authority
TNC	transnational corporation
TRIPSS	Tribal Filipino Program of Surigao del Sur
TS	tropical storm
TY	typhoon
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organisation
WTO	World Trade Organization

Tables, graphs and infographics

Barriers and Pathways

Scaling Agroecology to Address Climate Change: The Philippine Case

Introduction

The Intergovernmental Panel on Climate Change (IPCC) has acknowledged that today's agriculture and food systems are both a contributor to climate change and among its most vulnerable casualties. Unsustainable agricultural production is responsible for the bulk of greenhouse gas (GHG) emissions from land use change, land degradation and unsustainable use of freshwater resources. It is also responsible for accelerating biodiversity loss. On the other hand, according to the Food and Agriculture Organisation (FAO), if rates of GHG emissions are maintained, there will be a 17% decline by 2050 in the production of coarse grains, oil seeds, wheat and rice—the staple food for billions of people.[1]

Still, mainstream and global responses to climate change remain fixated on techno-fixes and climate financing, all while greenwashing corporate agriculture and deflecting attention from the need for systemic change. The official approach, after more than 30 years of the IPCC, has remained limited, lacking in systemic initiatives, and encumbered by the dominant neoliberal economic policymaking that has only worsened the climate crisis.

In recent years, however, a growing body of evidence—along with farmers' clamor—has urged policymakers to recognize that agroecology can contribute to a systemic solution—that it does have technical and policy potentials to build adaptive and resilient agriculture and food systems.

At the 21st Conference of Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC) in 2015, the Paris Agreement recognized the vulnerability of food systems to the adverse impacts of climate change. Two years later, at COP23 in Bonn, the international community adopted the Koronovia Joint Work on Agriculture (KJWA), which recognized agroecology as having a strong potential for climate change adaptation and mitigation.

The FAO is now calling for more scientific researches and documentation from different contexts and perspectives to strengthen the links between agroecology and climate change mitigation and adaptation. It is now urging for a "transformation" in agriculture, a word that should only mean a radical shift from business as usual.[2]

The challenge is for agroecology farmers and scientists to provide further evidence that agroecology is indeed a viable climate change strategy, and more importantly, that it can be scaled up to be a comprehensive approach. This research aims to provide evidence that agroecology can foster climate change mitigation, adaptation and resilience in the Philippine context.

Despite contributing only 0.33% of the global GHG emissions, the Philippines is the riskiest country in the world when it comes to climate change impacts. In terms of contribution, agriculture is next to the energy sector as contributor, but it is the hardest hit among all sectors. The damages to Philippine agriculture cannot be explained alone by its exposure to climate hazards; its vulnerability is rooted in its crisis and the aggravation of this crisis by government's neoliberal policies.

A growing number of Filipino farmers have made agroecology an integral part of their struggle to transform agriculture into a democratic and sustainable system. However, they remain a marginalized minority. This research aims to identify the barriers to scaling up agroecology to realize its potentials as a holistic approach and to recommend ways to overcome these barriers.

Riskiest in the world

The Philippines ranked number one among 193 countries in the World Risk Report in 2024. The report uses a World Risk Index that is composed of exposure, vulnerability, susceptibility, lack of coping capacities, and lack of adaptive capacities.[3] The country has held the top position for 16 straight years.[4]

The country is highly exposed and vulnerable to extreme weather events. In terms of number of such events, the Philippines ranked eighth globally and second in Asia in 2021. By its location in the Northwestern Pacific Basin, which is the most active tropical typhoon basin in the world, an average of 20 typhoons hit the country annually, with about 8 making landfall. In recent years, these typhoons have become more intense, with maximum sustained wind speeds exceeding 170 kilometers per hour (kph), often accompanied by heavy rainfall, leading to devastating floods, landslides and storm surges. By the country's low adaptive capacity, these extreme weather events have had severe human, social, and economic consequences, affecting 9 of the 17 Philippine regions and around 5 million people, with 850 individual casualties each year for the past decade.[5] [6]

Worrying climate changes

The country's climate has undergone immense changes from the 1990s to 2020s, which are characterized by higher temperatures, increased rainfall, and sea level rise.

The Philippines has warmed significantly over the past 65 years (1951–2015), with an average annual temperature increase of 0.68°C (about 0.1°C/decade). While maximum temperatures (hottest time of day) have risen at a slower rate, annual minimum temperatures (coolest time of day) have increased more rapidly at 0.15°C per decade. This means that warm nights have increased while cool nights have decreased. Most areas of the country now experience air temperatures above 26°C, with cooler areas in mountainous regions. Future projections indicate a consistent, though minimal, temperature increase across the country.[7]

Rainfall patterns in the Philippines have also shifted over time. Some areas, such as northern Luzon, Palawan, western Visayas, and parts of Mindanao have experienced decreased rainfall. Meanwhile, other regions, including central Luzon, eastern Visayas, and northeastern and southwestern parts of Mindanao, have seen significant increases, ranging from 10 to over 40 millimeters (mm) per decade. These shifts in rainfall patterns are connected to more frequent and extreme rainfall events.[8]

The country is also experiencing significant seasonal and regional rainfall variability. During the Northeast Monsoon or Amihan (December to February), increased rainfall is observed in northeastern Mindanao and eastern Visayas, implying a higher risk of flooding in these areas. Increasing rainfall trends are also observed in central Luzon and northeastern Mindanao from March to May. In contrast, southern Ilocos Region and northeastern and southern Mindanao experience increased rainfall from June to August and September to November, respectively. However, a significant drying trend is evident in northeastern Luzon and central and northwestern Mindanao during most seasons.[9]

Satellite data from 1993 to 2015 show that sea levels have risen at a rate of 5.7-7.0 mm/year, which is significantly faster than the global average of 2.8-3.6 mm/year. This accelerated rise may be linked to natural climate patterns like the El Niño Southern Oscillation (ENSO), which directly affects the tropical Pacific region. Coastal areas including east of Leyte and Samar, southwestern Central and Western Visayas, east of Mindanao, and south of Zamboanga are experiencing particularly rapid sea level rise, with rates as high as 4.5-5.0 mm/year.[10]

Sea level rise is a significant threat to the Philippines, with potential impacts on millions of people and extensive land areas. A one-meter rise could affect 7,000 square kilometers (sq km) and 1.8 million people. A two-meter rise would impact 8,000 sq km and 2.3 million people. A three-meter rise would be catastrophic, affecting over 15,000 sq km and 3.4 million people. Furthermore, sea level rise harms natural ecosystems, leading to mangrove degradation, coral bleaching, and saltwater intrusion.[11]

Stronger typhoons

The country has seen climatological extremes, such as record-breaking temperatures and rainfall intensity, highest heat index, and shear line (or tail-end of the cold front) that causes wind gusts and heavy rainfall. But the events of tropical cyclones are the ones that have had the most devastating impacts.

Around the mid-2000s, there has been an observed rise in tropical cyclone activity for the Philippines. A study published in the Asia-Pacific Journal of Atmospheric Sciences shows that the shifts are primarily linked to the positive phase of the Atlantic Multidecadal Oscillation (AMO).[1] A positive AMO strengthens the Pacific Walker Circulation, leading to increased rainfall, reduced temperature fluctuations, warmer sea surface temperatures, and more intense typhoon activity in the Philippines.[2] [12]

1 AMO is a long-term natural climate pattern characterized by fluctuations in sea surface temperatures of the North Atlantic Ocean. This oscillation occurs on a timescale of several decades, typically 60-80 years, with alternating warm and cool phases.
2 The Pacific Walker Circulation is a climate system that is characterized by a large-scale atmospheric circulation pattern over the tropical Pacific Ocean. It plays a crucial role in global weather patterns and is closely linked to the El Niño-Southern Oscillation (ENSO) phenomenon.

There has been an observable trend of increased strong typhoons with maximum sustained wind speeds greater than 170 kph. There are five tropical cyclone (TC) categories, namely tropical depression (TD), tropical storm (TS), severe tropical storm (STS), typhoon (TY), and super-typhoon (STY). The Philippine Atmospheric, Geophysical and Astronomical Services (PAGASA) revised the threshold intensities in March 2022 to conform with the standards of meteorological centers within the Northwest Pacific region. (**See Table 1**) In the last 30 years, TY and STY have accounted for half of the number of TCs.[13]

TABLE 1. Tropical cyclone categories

TC Category	Maximum Wind Speed	
	Old	Starting March 2022
Tropical Depression (TD)	≤ 61 kph	≤ 61 kph
Tropical Storm (TS)	62-88 kph	62-88 kph
Severe Tropical Storm (STS)	89-117 kph	89-117 kph
Typhoon (TY)	118-220 kph	118-184 kph
Super Typhoon (STY)	> 220 kph	> 184 kph

SOURCE: Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)

STY Yolanda (Haiyan) in 2013 was the strongest recorded in recent years. It severely affected communities along Leyte and Samar islands, displaced thousands of people, and claimed more than 6,300 lives. Cost of damage reached Php89 billion.[14]

Before that, in 2009, TS Ondoy (Ketsana) poured 455 mm of rain over a 24-hour period in Metro Manila, Central Luzon, and Southern Tagalog. It had 464 casualties and Php11 billion damage. In the following month after Ondoy, TY Pepeng (Parma) caused flashfloods in Northern Luzon, specifically in Pangasinan. San Roque Dam, the country's largest dam, released water to prevent dam breach. Pepeng claimed 465 lives. In 2011, TS Sendong (Washi) triggered flashfloods in Iligan City and Cagayan de Oro, claiming 1,268 lives and costing Php2.1 billion in damages. TY Pablo (Bopha) the following year in 2012 destroyed villages in Mindanao, had 1,067 casualties, and sustained Php37 billion damage.[15]

After Yolanda, TCs have become more severe, with more frequent occurrence of notable events. The non-government organization Oscar M. Lopez Center for Climate Change Adaptation and Disaster Risk Management Foundation, Inc. (OML Center) also refers to these events as climate anomalies. (**See Table 2**)

A total of 22 TCs entered the Philippine Area of Responsibility (PAR) in 2017, more than the long-term average of 20 per year. Eighteen out of the 22 entered PAR within the second half of 2017.

TABLE 2. Tropical cyclones: Notable climate anomalies and extreme events

Year	TC Type	Local Name	International Name	Maximum Sustained Winds/Gusts (kph)	Affected Areas	Total Damages (Php)	Affected Population	Months
2017	STS	**Odette**	Khanun	110/140	Region I, II, CAR	4.4 million	4,700	October
	TS	**Maring**	Doksuri	85/10	Quezon, Metro Manila, Central Luzon, Southern Luzon	267 million	41,000	September
	TS	**Urduja**	Kai-tak	80/120	MIMAROPA, CARAGA, Visayas, Bicol	3.6 billion	1.8 million	December
	TY	**Vinta**	Tembin	120/145	Zamboanga Peninsula, Northern Mindanao, BARMM, Davao Oriental, Southern Palawan	2.1 billion	800,000	December
2018	TY	**Ompong**	Mankhut	205/330	Benguet, Northern Luzon, Central Luzon, parts of Visayas and Mindanao	34 billion	3 million	Mid-July
	TY	**Rosita**	Yutu	200/245	Isabela, Northern Luzon, Central Luzon	3 billion	304,000	Late-July
2019	TY	**Tisoy**	Kammuri	165/275	Bicol	5.9 billion	2.4 million	December
	TY	**Ursula**	Phanphone	140/200	Biliran, Capiz, Cebu, Eastern Samar, Iloilo, Leyte	3.5 billion	3.2 million	December
2020	STY	**Rolly**	Goni	225/280	Catanduanes	17.9 billion	2 million	November
	TY	**Ulysses**	Vamco	155/255	Luzon, Metro Manila	20.2 billion	5.2 million	November
	TY	**Quinta**	Molave	155/190	Albay, Quezon, Marinduque, Oriental Mindoro	4.2 billion	888,375	May
	TY	**Ambo**	Vongfong	155/255	Visayas	1.6 billion	578,571	October
2021	STY	**Odette**	Rai	195/270	Siargao	51.7 billion	10.6 million	December
	STY	**Bising**	Surigae	215/265	Eastern Visayas, Bicol, Southern Quezon	273 million	450,195	April
	STY	**Kiko**	Chanthu	215/265	Batanes	37 million	46,678	September
	STS	**Maring**	Kompasu	100/125	Cagayan, Benguet, MIMAROPA, Western Visayas	7.4 billion	1.2 million	October
	TY	**Jolina**	Conson	120/165	Eastern Visayas, Panay Island, Sorsogon, CALABARZON, MIMAROPA	1.4 billion	354,613	
2022	STY	**Karding**	Noru	195/240	Quezon, Aurora, Central Luzon, Metro Manila, CALABARZON	3.3 billion	1.5 million	April
	STY	**Henry**	Hinnamnor	195/240	Northern Luzon	61.4 million	2,442	September
	STS	**Paeng**	Nalgae	100/140	Catanduanes, Camarines Sur, Quezon, Marinduque	13 billion	6 million	September
	TS	**Agaton**	Megi	75/105	Eastern Visayas, Panay Island, Bicol, CARAGA, BARMM	2.3 billion	2.3 million	September
	STS	**Florita**	Ma-on	110/185	Northern Luzon, Central Luzon, CALABARZON, Bicol	2.4 billion	131,235	August
2023	STY	**Betty**	Mawar	240	Batanes, Cagayan, Sta. Ana	201,695	104,305	May-June
	STY	**Goring**	Saola	195	Northern Luzon	2.4 billion	85,185	August
	STY	**Egay**	Doksuri		Regions I, II, III, CALABARZON, MIMAROPA, V, VI, VII, VIII XI, XII, CAR, NCR	15.3 billion	3.5 million	July
	TY	**Falcon**	Khanun	175	Central Luzon, Metro Manila, portions of Southern Tagalog		2.6 million	August

SOURCES: Various issues of the State of the Philippine Climate, The Oscar M. Lopez Center for Climate Change Adaptation and Disaster Risk Management Foundation, Inc. (Oscar M. Lopez Center) and Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)

There were climate anomalies, such as STS Odette (Khanun), TS Maring (Doksuri), TS Urduja (Kai-Tak), and TY Vinta (Tembin). In total, these affected 2.6 million residents, claimed 238 lives, and incurred Php6.4 billion worth of damages.[16]

In 2018, TY Ompong (Mangkhut) and TY Rosita (Yutu) were the most extreme. Ompong is the strongest typhoon that made landfall in the country since Yolanda. Ompong triggered a massive landslide that covered a mining community in Bgy. Ucab, Itogon, Benguet. More than 3 million people were affected, 82 fatalities were recorded, and Php34 billion worth of damages were incurred. Rosita, on the other hand, made landfall in Dinapigue in Isabela, bringing strong winds and heavy rains that resulted in flooding and landslides.[17]

There were also TCs in 2018, such as TS Henry (Son-tinh), STS Inday (Ampil), and TD Josie, which either traversed Northern Luzon (Henry) or did not make landfall (Inday and Josie) but enhanced the Southwest Monsoon (Habagat) and brought heavy rains in western Luzon. Their combined impact resulted in more than 2 million people affected, 16 deaths and over Php4.6 billion worth of destruction. The last TC in 2018, TD Usman, entered PAR on Christmas Day, made landfall in Borongan, Eastern Samar, weakened in four days, but brought significant rainfall in Bicol, Eastern Visayas, and portions of MIMAROPA and CALABARZON. It affected more than a million, recorded 28 deaths, and incurred Php5.4 billion worth of damages.

In 2019, 21 TCs entered PAR, 7 made landfall in the country. TY Tisoy (Kammuri) and TY Ursula (Phanfone) affected the largest population and caused the largest damages. The tracks of both typhoons were fairly similar to Yolanda's—Tisoy affected the Bicol region the most, while Ursula impacted central portions of Visayas, including Biliran, Capiz, Cebu, Eastern Samar, Iloilo, and Leyte. PAGASA retired the names Tisoy and Ursula in its practice to retire names of significant typhoons that caused at least Php1 billion in damages or at least 300 deaths.[18]

In 2020, at the height of the pandemic lockdown, 22 TCs entered PAR, 10 made landfall—7 reached TY category and one developed into STY category. STY Rolly (Goni) developed from TD to STY fast, sustained by warm sea surface temperature, making its first landfall on Bato, Catanduanes. It gradually weakened as it interacted with the rugged terrain of the Bicol region and made successive landfalls in Luzon and exited in the West Philippine Sea. The cost of Rolly's damage reached Php18 billion.[19]

TY Ulysses (Vamco), which affected Luzon, including Metro Manila, was the most destructive in 2020. It accounted for 46% of the total cost of TC-related damages amounting to Php20 billion and affected around 5.2 million people. Other typhoons that caused huge damage over Php1.5 billon were TY Ambo (Vongfong) which affected a portion of the Visayas and TY Quinta (Molave) which made landfalls in Albay twice and traversed Quezon, Marinduque, and Oriental Mindoro. PAGASA retired all four names (Rolly, Ulysess, Ambo, and Quinta) in 2020.[20]

In 2021, there was below-average activity with only 15 TCs entering PAR and 8 making landfall. There were three super-typhoons, although, as mentioned, PAGASA revised the threshold

intensities in March 2020. STY Bising (Surigae), affecting Virac, was the strongest. But it was STY Odette (Rai), which made landfall on Surigao, which was the most devastating, affecting 10.6 million people and incurring damages worth Php51.7 billion. STY Kiko, on the other hand, made landfall in Batanes and had lesser damage.[21]

STS Maring (Kompasu) was even more devastating than Bising and Kiko, assimilating with the remnants of TD Nando and moving to the east then west then northwestward towards Babuyan Island over five days. It made landfall over Fuga island, Aparri, Cagayan. Most rains were accumulated in Benguet during its passage, which led to catastrophic landslides and flooding in northern Luzon. Maring's huge wind field also enhanced the Habagat, resulting in gusty winds and intense rainfall over MIMAROPA and the western sections of Visayas. Cost of damages reached Php7 billion.[22]

Another devastating typhoon in 2021 was TY Jolina (Conson), which in a day developed from TD to TY rapidly. Jolina made landfall over nine different locations across Eastern Visayas, Panay Island, Sorsogon, CALABARZON, and MIMAROPA. More than 300,000 individuals were affected, and damage was estimated at Php1.4 billion.

In 2022, most TCs traversed Luzon and the northwestern quadrant of PAR, making the frequency of landfalls below average and rank 5th lowest since 1991. Out of 18 TCs that entered or developed in PAR, only 5 made landfall. The strongest were STY Karding (Noru) and STY Henry (Hinnamnor), with Karding sweeping across central Luzon and Henry briefly skimming through the northern boundary of PAR. Although Karding was the most powerful upon landfall, it was STS Paeng (Nalgae) that inflicted the most extensive damage. PAGASA attributed this disparity to Paeng's diagonal trajectory that traversed a larger expanse across Luzon, unlike Karding's almost horizontal path.[23]

PAGASA retired four TC names in 2022. Apart from Karding and Paeng, Agaton and Florita were already retired due to their devastating impact. TS Agaton (Megi) brought the highest recorded rainfall and greatest casualty. It also triggered widespread landslide and flooding across Eastern Visayas, Panay Island, Bicol, CARAGA, and the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM), resulting in 214 lives lost and affecting 600,000 families and Php2.3 billion worth of damages. STS Florita (Ma-on), on the other hand, moved towards northern Luzon, developing from low pressure area (LPA) to TD, then STS, and made landfall in Maconacon, Isabela. It affected Northern Luzon, Central Luzon, CALABARZON, and Bicol. It affected 131,235 individuals and left Php2.4 billion worth of damage.[24]

In 2023, only 11 TCs entered PAR, four made landfall, three intensified to super-typhoon. STY Betty (Mawar) and STY Goring (Saola) had maximum sustained winds of 195 kph within PAR, although Betty gained its lifetime maximum intensity of 215 kph outside PAR. Both indirectly affected the country by intensifying the Habagat, which resulted in widespread rains over Luzon and western Visayas. STY Egay (Doksuri) and TY Falcon (Khanun), though slightly less intense than Betty and Goring, incurred the highest combined damage cost. As Egay exited the PAR after significantly enhancing the Habagat, Falcon entered further strengthening the prevailing wind system. The intensified Habagat resulted in Php14.8 billion damages, leaving 30 dead, 171 injured and 9 missing persons.[25]

ENSO

The El Niño-Southern Oscillation (ENSO) is a significant climate phenomenon influencing the Philippines. It is characterized by fluctuations in sea surface temperatures in the central and eastern equatorial Pacific Ocean. The fluctuations are coupled with atmospheric changes. It consists of three phases: El Niño (warming of sea surface temperatures), La Niña (cooling of sea surface temperatures), and a neutral phase.

ENSO occurs in irregular cycles of 2-7 years and significantly influences weather patterns, leading to extremes like droughts, floods, and TCs. It has profound socioeconomic impacts, especially in agricultural regions.

There have been four unforgettable El Niño episodes in the country in the last four decades. In 1982-1983, widespread drought pushed the Angat Dam to significantly low water levels. Global damages reached an estimated US$13 billion, with the Philippines suffering approximately US$450 million in losses, primarily agriculture and water resources.[26]

The 1997-1998 episode is known as the strongest El Niño of the 20th century. It caused extreme drought across 68% of the Philippines, severely affecting rice, corn and coconut production. Agricultural losses amounted to billions of pesos, with production dropping by 43.6% for rice and 26.6% for corn. Fisheries also incurred losses of Php7.24 billion due to dried ponds and poor water conditions. Hydroelectric power generation dropped drastically as reservoirs reached critically low levels. The government formed Task Force El Niño to coordinate relief efforts, but responses were criticized for being slow and ineffective.[27] [28]

The 2015-2016 El Niño lasted for 18 months and affected over 85% of the Philippines' territory. It caused severe droughts, particularly in Mindanao, where 27 provinces were impacted. Agricultural production losses totaled US$325 million, with 1.48 million metric tons of crops like rice, corn, cassava, and bananas destroyed. Over 413,000 farming households required assistance to restart their activities.[29] The government implemented the Roadmap to Address the Impact of El Niño (RAIN), which included measures like food distribution, water system improvements, and financial aid to affected farmers.[30] But the episode ended tragically in the Kidapawan Massacre, which started as a peaceful protest by thousands of drought-stricken farmers and indigenous Lumad communities calling for government aid.

The 2023-2024 event is comparable in severity to the 1997-1998 event. The event caused significant agricultural damage, water shortages, and led to several provinces and municipalities declaring a state of calamity. The effects were particularly severe in regions such as Northern and Central Luzon, MIMAROPA, and the Cordillera Administrative Region (CAR). Temperature forecasts indicated heat indices exceeding 40°C in Northern Luzon during April-May 2024. The government focused on preparedness measures such as conserving water resources and distributing drought-resistant seeds to farmers.[31] [32]

On the other hand, there were La Niña conditions that started in late-2020, took a break in August 2021, persisted in 2022 until January 2023. The year-round La Niña episode contributed to the

above-normal rainfall experienced by the country in March, April, September, and October. The three-year cool ENSO phase was unusual because a typical cycle lasts for 9 to 12 months. The event is thus called "triple-dip" La Niña. Aside from lasting for three consecutive years, there were also noticeable dips of the Oceanic Niño Index (ONI), which measures anomalies in the sea surface temperatures.[33]

Food and agriculture systems are worst hit

Agriculture has always taken the heaviest damage from climatological extremes. The sector accounted for an average annual of 60% of damages from TC from 2017 to 2022. Bicol, Cagayan, Eastern Visayas, and Quezon are always among the most battered areas. (See Table 3) The figure is consistent with the figure from 2010 to 2019, when damage to agriculture comprised approximately 63% of the estimated damages from climate-related disasters, including climatological extremes.[34] It also does not help that most of the devastating climate anomalies in the Philippines in the last five years, as shown in Table 1, occurred in the last quarter of the year, the harvest season for Filipino farmers.

Rising temperatures, droughts, and erratic rainfall can damage crops, livestock and poultry, farmlands, fisheries and aquaculture, and rural infrastructure. These climate risks can also increase pest infestations and reduce worker productivity. Along with TCs, these will reduce crop yields and limit suitable growing areas in the long term.

TABLE 3. Typhoon damage cost, top areas, and % of agriculture damage

Year	Top Areas Affected	Total Damage Cost (Php million)	Agriculture % to Total Damage
2017	**OVERALL**	**6,300**	**68%**
	Samar	1,160	
	Leyte	1,040	
	Biliran	875	
	Eastern Samar	701	
	Camarines Sur	268	
2018	**OVERALL**	**48,700**	**73%**
	Isabela	9,500	
	Cagayan	6,000	
2019	**OVERALL**	**11,300**	**69%**
	Albay	1,900	
	Capiz	1,400	
	Sorsogon	775	
	Quezon	627	
2020	**OVERALL**	**44,200**	**36%**
	Albay	6,000	
	Quezon	1,000	
	Cagayan	1,000	
	Camarines Sur	1,000	
	Isabela	1,000	
	Oriental Mindoro	1,000	
	Batangas	1,000	
2021	**OVERALL**	**62,500**	**45%**
	CARAGA	24,000	
	Surigao del Norte	19,000	
2022	**OVERALL**	**22,000**	**67%**
	Cagayan	2,000	
	Capiz	1,000	
	Isabela	1,000	
	Nueva Ecija	1,000	
	Iloilo	1,000	
	Maguindanao	1,000	
	Quezon	1,000	
	Camarines Sur	1,000	

SOURCES: Various issues of the State of the Philippine Climate, The Oscar M. Lopez Center for Climate Change Adaptation and Disaster Risk Management Foundation, Inc. (Oscar M. Lopez Center) and Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)

For the Philippines, the World Bank projects that by 2030, maize, sugarcane and rice are expected to experience decline in yield and production. In 2050, maize, bananas and rice will be the most affected.[35] The Climate Change Commission of the Philippines projects that between 2030 and 2040, rice and corn yields could decline by 6% and 19%, respectively. Approximately 7.5% of agricultural land and 15% of fishponds are at risk of flooding and sea-level rise by the 2030s.[36]

Areas with vegetable and perennial crops as well as irrigated rice and vegetable combinations are at risk due to shortened rainy seasons. These areas constitute 21% of the annual crop zone and irrigated rice zone, respectively.[37]

On the other hand, large portions of the country's rice and vegetable production areas are highly vulnerable to flooding. These are provinces like Pangasinan, Nueva Ecija, Pampanga and Bulacan in the north, and regions like Maguindanao, Cotabato, Sultan Kudarat and South Cotabato in the south.[38]

Meanwhile, increased temperatures may result in increased water consumption and decreases feed intake of swine and poultry, leading to poorer meat quality and weaker immune system. Reproduction of farm animals, including production of eggs, may also decline.[39]

The World Bank furthers that decreased agricultural production will lead to higher food prices, particularly for corn, rice, fruits, and vegetables. This will hugely impact the poor, and disproportionately impact women, who spend a larger portion of their income on food. Climate change is expected to worsen food insecurity, with a projected 8% increase in the number of people at risk of hunger by 2030 and a 12.8% increase by 2050. Moreover, the number of malnourished children is projected to increase by 1.5% in 2030 and 2.7% in 2050.[40] The Philippines is not only the riskiest in the world—the impacts of climate change are also most staggering.

Rooted in crisis

Philippine government planners have habitually focused on the country's exposure to extreme weather events as the main issue for agriculture—shifting most of the blame to nature and the response toward resilience projects. But agriculture's vulnerability stems from the basic crisis of the sector, which is what worsens the impacts of climate risks on the country. Agriculture is in deep crisis, and this is the root of the country's high vulnerability to climate disasters.

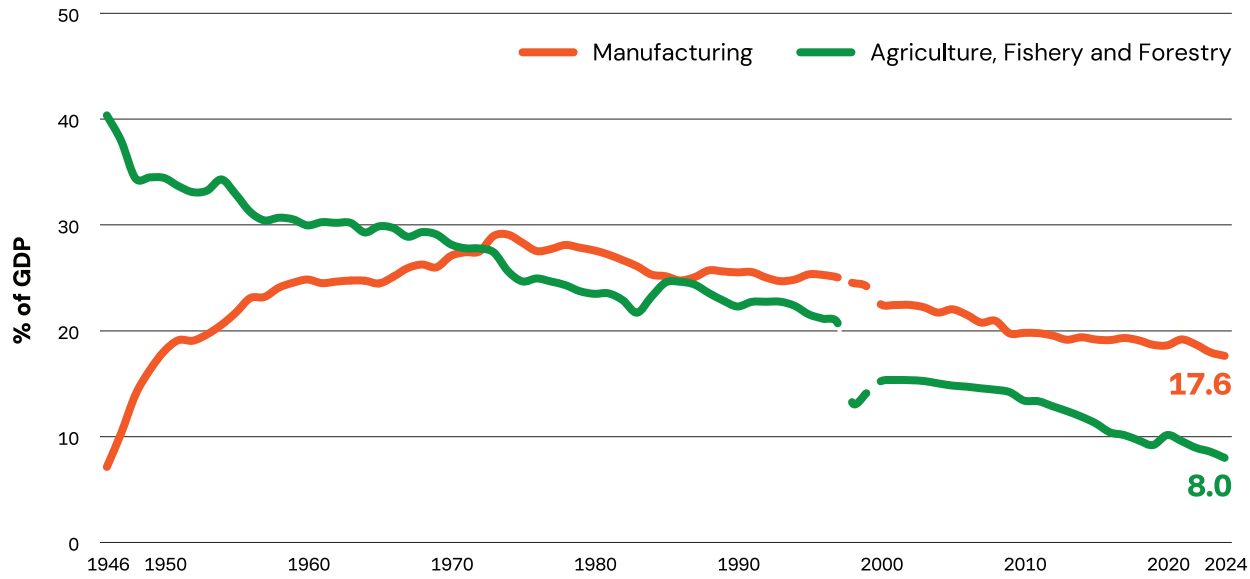
Agriculture's share of the economy and employment is diminishing, and peasants are the poorest of the poor. Agricultural production has remained small-scale, mainly family farming, dependent on rain, and harnessed using hand tools and animal brawn. The country relies on imported agricultural inputs and machinery and remains captive to chemical farming. *Haciendas* and corporate plantations that produce export crops at low agricultural wages still exist. Land monopoly has persisted for centuries, and exploitative feudal relations have prevailed.

There are no backward and forward linkages between farming and industries, no local makers of agricultural inputs and machines, no processing and storage facilities, no sufficient agricultural extension services, and no manufacturing of raw materials into other useful products. Rural industrialization is far-fetched. Over time, the country has only become increasingly dependent on imported food and agricultural products.

Bleeding the sector

Agriculture's share of the economy declined from a peak of 40.4% of the gross domestic product (GDP) in 1946 to just 8% by 2024, the lowest on record in the country's history. Manufacturing likewise shrank from 29.1% of GDP in 1974 at its peak to 17.6% by 2024, the smallest share in 50 years. (**See Graph 1**)

GRAPH 1. Agriculture and manufacturing share of the GDP, 1946-2024* (in %)



Data for 1946-1997 were computed using GDP at constant 1985 prices, 1998-1999 at constant 2000, and 2000 onwards at constant 2018.

SOURCE: Philippine Statistics Authority National Accounts of the Philippines

Neoliberal policies implemented in the past half a century have unequivocally diminished the aggregate share of production sectors of the Philippine economy, from 59.2% in post-Second World War to 33.3% in present day. Inversely, the share of the services sector grew from 35.9% to 50.5% in the same period. The economy is mainly service-oriented driven by few economic activities, while its production base has weakened. To illustrate, trade and real estate are given more importance than farming, or tourism and business process outsourcing (BPO) are prioritized over manufacturing, and so on.

Agricultural employment has declined from 48% in 1987 to 20.6% in 2024. The decline has been continuous, from an average of 43% in 1987-2000 to 35% in 2001-2011 and 27% in 2012-2020. It continued to shrink from 2021 to 2024, from 10.7 million to 10.1 million. (**See Graph 2**)

Job creation in the sector has always been erratic. In 2013-2019, agriculture in fact shed jobs every year, totaling 2.7 million jobs lost during the period. There was some recovery in 2020, but average annual job creation has not been steady since then, in fact 1.1 million agricultural jobs were lost in 2024 and another 471,000 in March 2025. (**See Graph 3**) The government changed the frequency of the labor force survey from quarterly to monthly starting in 2021, but the method cannot conceal that the sector has been bleeding.

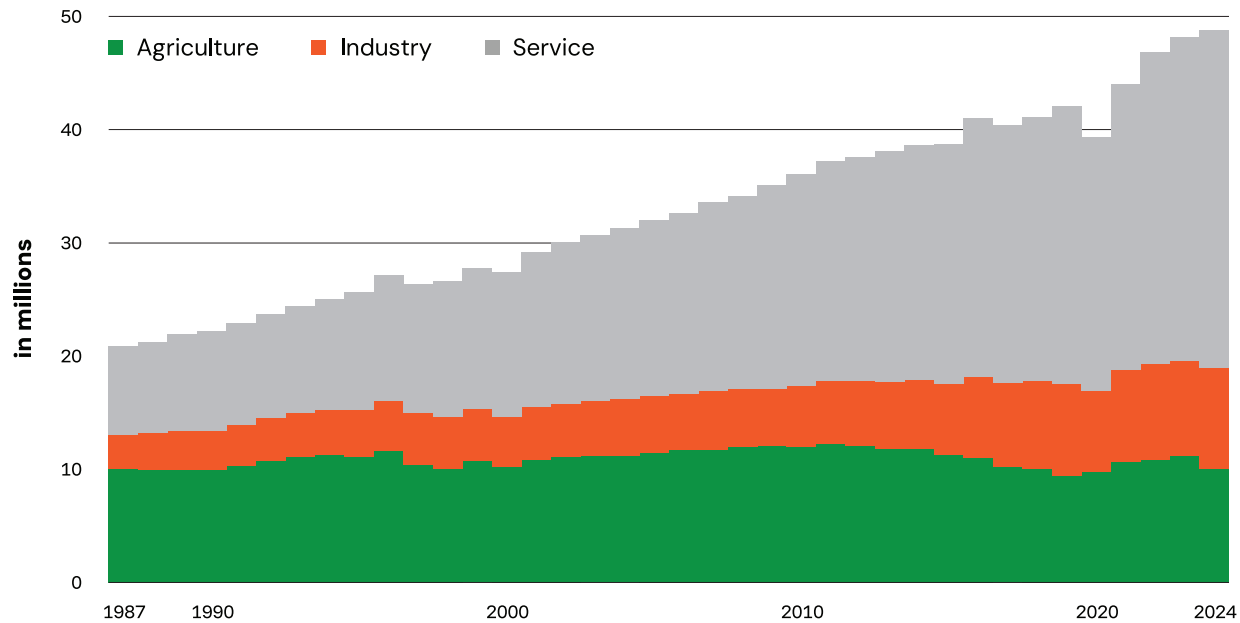
Still, these figures do not show how farmers move from agricultural to non-agricultural jobs, or even from rural to urban, due to seasonality of jobs, persistent displacement, and bankruptcies. Even unemployment is understated, as about 98% of employed in agriculture, based on latest 2021 data, were in informal work.[41]

Still, based on the Registry System for Basic Sectors in Agriculture (RSBSA), there are approximately 13.5 million farmers and fisherfolk. This is even a conservative figure, considering

that many farmers and fisherfolk cannot register due to lack of documents. RSBSA's scope is also limited. In any case, half of the RSBSA-listed farmers are in the Visayas, Bicol, Central Luzon, and Northern Mindanao.

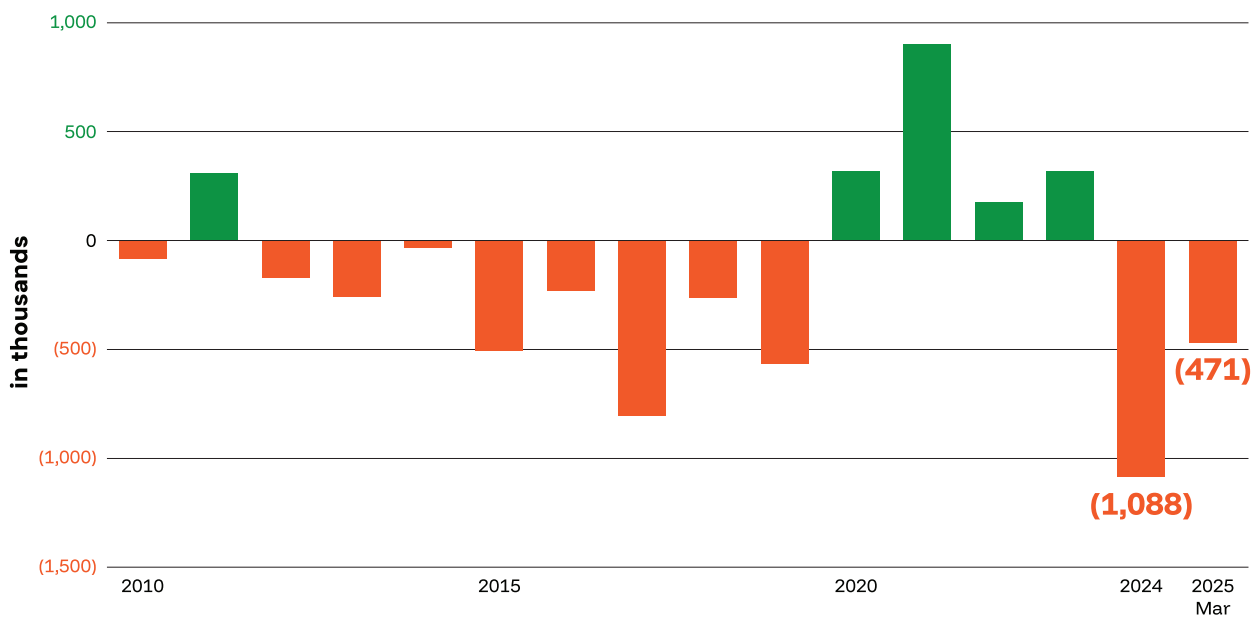
Also, the 2022 Census of Agriculture and Fisheries (CAF) recorded 19.7 million agricultural population defined as individuals aged 18 years and above who were members of households with at least one agricultural operator. Most of them are in the Visayas, Bicol and Ilocos regions. (**See Table 4**)

GRAPH 2. Employment by major sector, 1987-2024 (in millions)



SOURCE: Philippine Statistics Authority Labor Force Survey

GRAPH 3. Jobs generation in agriculture, 2010-2024 and March 2025 (in thousands)



SOURCE: Philippine Statistics Authority Labor Force Survey

TABLE 4. Agricultural population by region, 2022

Region	Population
Philippines	**19,675,420**
National Capital Region	101,727
Cordillera Administrative Region	670,316
Region I - Ilocos	1,472,687
Region II - Cagayan Valley	1,143,504
Region III - Central Luzon	958,343
Region IVA - CALABARZON	1,071,359
Region IVB - MIMAROPA	904,168
Region V - Bicol	1,653,728
Region VI - Western Visayas	2,042,054
Region VII - Central Visayas	1,963,440
Region VIII - Eastern Visayas	1,189,331
Region IX - Zamboanga Peninsula	1,082,134
Region X - Northen Mindanao	1,198,004
Region XI - Davao Region	1,170,680
Region XII - SOCCSKSARGEN	1,187,941
Region XIII - Caraga	1,063,111
Bangsamoro Autonomous Region in Muslim Mindanao	802,891

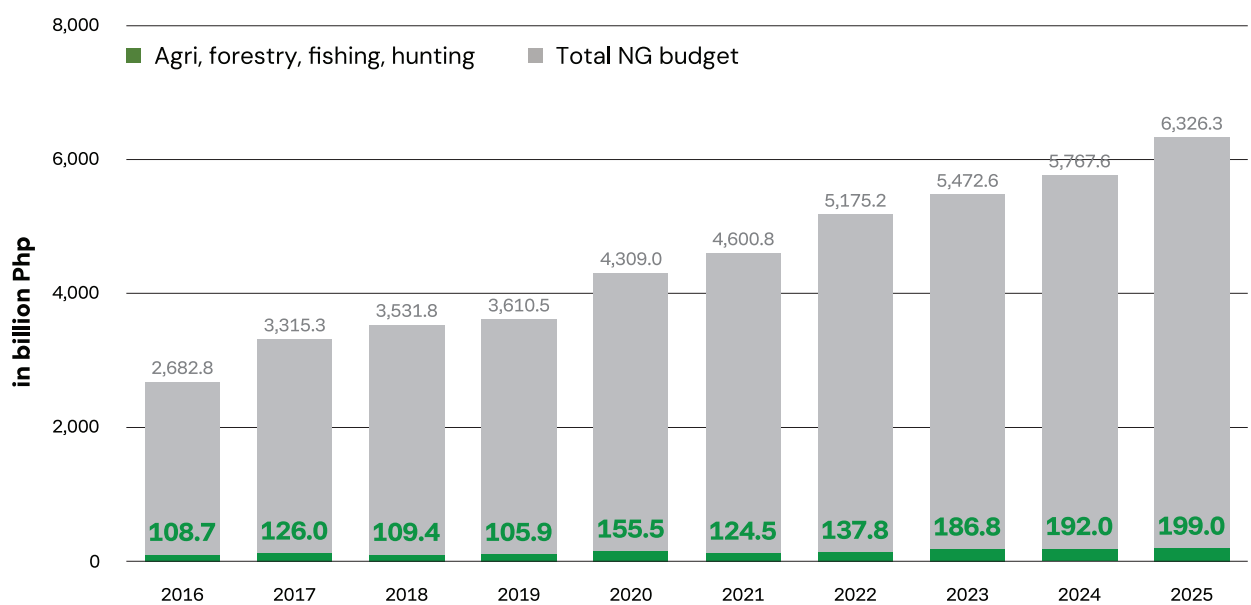
NOTE: The CAF defines agricultural population as those 18 years old and over with ownership or secure rights over agricultural land.

SOURCE: Philippine Statistics Authority Census of Agriculture and Fisheries 2022

These statistics show that agriculture's declining share of the economy and employment cannot be simply interpreted as an economy becoming less agrarian in character. They only show agriculture's diminishing economic value, but not its importance. The sector continues to account for almost one-third of employment (27%) and adult population (28.5%). What the statistics do show is how the sector has been under-valued and battered by government policies that have only prioritized commercial profits over agrarian development. In 2023, even with the official poverty line set too low, 27% of farmers still fell below it.[42]

Government neglect of the sector has manifested in the declining share of agriculture of the national budget, from an already measly 4.1% of total national budget in 2016 to 3.1% in 2025. There was a 36% increase in the allocation on the first budget year of the Marcos Jr administration in 2023, from an average annual increase of only 4.1% in 2016-2022, as the president attempted to head the agriculture department and beef up mechanization. But the succeeding years of 2024 and 2025, agriculture's budget increased by only 2.8% and 3.6% respectively.[43] (**See Graph 4**)

GRAPH 4. Agriculture and the National government budgets, 2016-2025 (in billion Php)



SOURCE: Department of Budget and Management Budget of Expenditures and Sources of Financing

Small-scale farming, massive landlessness

The extent of agricultural land varies depending on the definition and data source. The more consistent figure may be around 12.7 million hectares, or about 42-47% of the country's total land area of 30 million hectares.

A 2010 satellite imaging by the National Mapping and Resource Information Authority (NAMRIA) showed 9.6 million arable lands and permanent croplands. A 2015 Department of Environment and Natural Resources (DENR) land cover mapping indicated 6.9 million hectares of annual crop area plus 4.8 million hectares of perennial crop area, or a total of 11.7 million hectares of agricultural land. This figure was also cited in the Global Forest Resources Assessment 2020 of the FAO.[44]

Republic Act (RA) 8435, or the Agriculture and Fisheries Modernization Act (AFMA) of 1997 mandated the identification of network of protected areas for agricultural and agro-industrial development (NPAAAD) to promote efficient utilization. Within the NPAAAD, AFMA mandated the delineation of strategic agricultural and fisheries development zones (SAFDZs) to focus government resources where it can have the greater economic impact. As of 2014, at a time the government was attempting to pass a national land use act, 13.5 million hectares were identified NPAAAD, 79% as SAFDZs.[45]

The consistent figure of 12.7 million hectares of agricultural lands reflects an increase from 7.7 million hectares in 1961, following extensive land grabbing between 1971 and 1980. During this period, Marcos cronies seized lands for sugarcane haciendas, banana plantations, forestry, mining, and other extractive activities.

But despite the vast expanse of agricultural lands, the 2022 CAF recorded 6.2 million hectares of farms in the country, divided among 7.4 million farms, or an average farm size of only 0.83 hectare. Since 1960, the number of farms has consistently increased, but the total farm area has been steadily shrinking since 1991—a 38.2% reduction that mirrors the rise in land use conversions starting that decade. The average farm size has declined by 77% from 3.61 hectares in 1970 at its peak to 0.83 hectare in 2022. (**See Table 5**)

TABLE 5. Number and area of farms, 1960-2022 (area in hectares)

Indicator	1960	1971	1980	1991	2002	2012	2022
Number	2,166,216	2,354,469	3,420,323	4,610,041	4,822,739	5,563,138	7,427,563
Area	7,772,485	8,493,735	9,725,155	9,974,871	9,670,793	7,271,446	6,162,177

SOURCES: Philippine Statistics Authority Census of Agriculture 2002, and Census of Agriculture and Fisheries 2012 and 2022

Soccsksargen (Region XII) had the widest coverage of farms, followed by Bicol (Region V) and Cagayan Valley (Region II). The greatest number of farms was in the Visayas, while the largest average farm size was reported in Soccsksargen, Cagayan Valley, and BARMM. (**See Table 6**)

About 56% of the farms in 2022 had sizes of less than half a hectare, while 12.5% had 0.5-0.99 hectare and 25% had sizes of 1-2.99 hectares. More than 99% of the farms are under individual proprietorships. The numbers of farms under partnerships, government-owned and controlled corporations, and cooperatives have also declined in the past decade.[46]

TABLE 6. Number and area of farms by region, 2022 (area in hectares)

Region	Number	Area
Philippines	**7,427,563**	**6,162,177**
National Capital Region	33,783	14,542
Cordillera Administrative Region	279,665	165,821
Region I - Ilocos	555,854	282,805
Region II - Cagayan Valley	442,005	514,254
Region III - Central Luzon	345,561	363,907
Region IVA - CALABARZON	380,798	307,590
Region IVB - MIMAROPA	332,719	266,298
Region V - Bicol	605,410	518,887
Region VI - Western Visayas	779,395	453,525
Region VII - Central Visayas	722,279	304,773
Region VIII - Eastern Visayas	427,617	378,841
Region IX - Zamboanga Peninsula	395,379	387,201
Region X - Northen Mindanao	500,617	396,538
Region XI - Davao Region	484,125	496,770
Region XII - SOCCSKSARGEN	476,101	600,399
Region XIII - Caraga	390,361	405,225
Bangsamoro Autonomous Region in Muslim Mindanao	275,895	304,802

NOTE: Details may not add up to total due to rounding.

SOURCES: Philippine Statistics Authority Census of Agriculture and Fisheries 2022

But the highlight of the 2022 CAF is how non-ownership of the land has remained, if not worsened, since 2012 and after about 70 years of land reform programs. Over 7 out of 10 farm parcels are not fully owned, with the number of fully owned declining from 3.6 million farm parcels in 2012 to only 2.4 million in 2022. Around 15.2 million or 78.2% of the agricultural population still do not own the land they are tilling.

Underdeveloped

Farm mechanization in the Philippines remains low across all crops, with only modest improvements in rice in recent years. The all-crop level was 1.23 horsepower per hectare (hp/ha) in 2013, the latest available data, way below the 4 hp/ha level of other ASEAN countries around that time.[47]

According to the Philippine Center for Postharvest Development and Mechanization (PhilMech), an agency attached to the Department of Agriculture (DA), as of 2024, farm mechanization in rice farms is at 2.77 hp/ha, a slight increase from 2.68 hp/ha in 2022 and 2.31 hp/ha in 2013.[48] This figure represents the aggregate farm power available for all operations, including land preparation, crop care, harvesting, and post-harvest activities.

The agency attributed the increase to the mechanization program of the Rice Competitiveness Enhancement Fund (RCEF) under the Rice Tariffication Law (RTL) that was implemented in 2019. Mechanization currently covers only 14% of rice farms in the country, and PhilMech vows to mechanize about 44% of rice farms by the end of 2031 once the RCEF mechanization program is extended.[49]

The 2022 CAF reported that out of 42,020 barangays in the country, only 3.4% have tractors, 13.5% have seeders, 42.4% have transplanters, 46.6% have threshers, and 2.2% have harvesters. Only 29.5% of the barangays have rice mills. (See Table 7) Low mechanization level is mainly due to the country's lack of local industries and concentration of fabrication in a few areas. Parts of locally fabricated machines are imported, while most of the manufacturers are in Luzon.[50]

Updated data do not change the decade-old conclusion that over 50% of agricultural production activities are still performed using hand tools and manual labor, especially outside of land preparation and threshing/dehusking, which are the most mechanized stages.[51] Farmers and farm laborers widely use bolo, sickle, hoe, and sprayer. Agricultural workers in Negros do not even own a spade and must rent one.[52]

Farms continue to rely on rain. Only 69% of irrigable lands are irrigated, which is equivalent to only 16% of agricultural lands.[53] Ironically, regions with the highest number of farms have the lowest proportion of irrigated lands. (See Table 8) In fact, 7 of 10 farmers do not have irrigation services.[54]

Market of foreign inputs, seeds and food

Chemical-based agriculture has been the dominant practice in the country for decades, with chemical fertilizers and pesticides being used extensively. Roughly 70% of Philippine farms use chemical inputs, particularly for crop protection, and most of conventional farms allocate significant portions of their budgets to chemical inputs—with 65% of farm input cost going to fertilizers and 18.2% to pesticides.[55] Organic or chemical-free farming remains a small minority—there are only 85 certified organic farms as of December 2022—the same number reported in 2019.[56]

TABLE 7. Agricultural machineries, equipment to number of barangays in the Philippines, 2022

Agricultural machinery and equipment	Proportion to total no. of barangays
Rice mill	29.5
Mobile rice mill	8.6
Corn mill	10.9
Mobile corn mill	3.6
Feed mill for livestock and/or poultry	3.3
Feed mill for aquaculture	1.5
Tractor	3.4
Harvester	2.2
Thresher	46.6
Combined Harvester/ Thresher	24.1
Transplanter	42.4
Planter/DIrect Seeder	13.5
Mechanical Dryers	5.5
Drones for Farm Operation	5.0
Conveyor Belt	6.5
Pasteurizer	1.2
Rubber Sheeters	1.3
Others	5.8

SOURCE: Philippine Statistics Authority Census of Agriculture and Fisheries 2022

TABLE 8. Irrigation development by sevice area, as of December 2023 (in hectares)

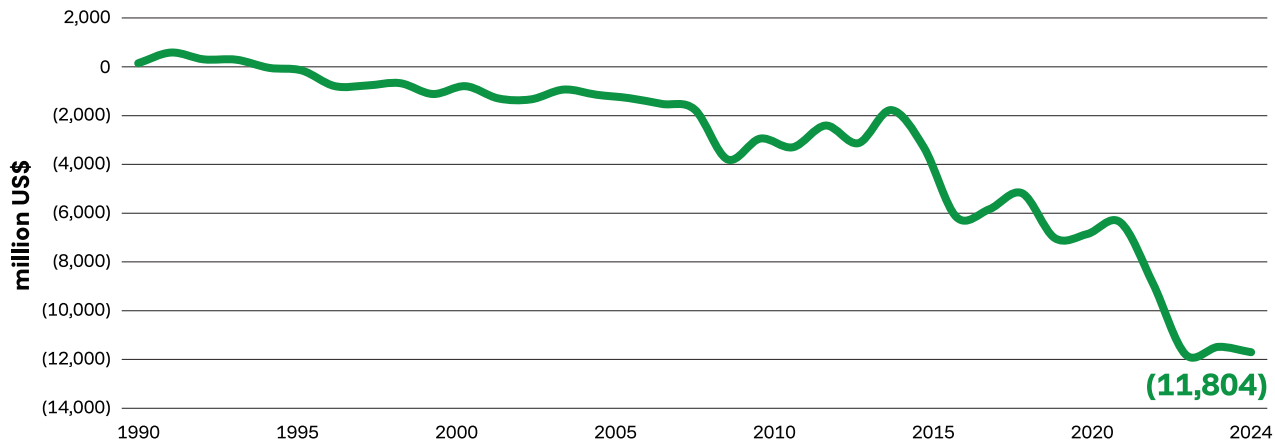
Irrigation Type	Area
Estimated total irrigable area	**3,128,631**
Total irrigated area	**2,155,026**
National irrigation system	1,023,012
Communal irrigation system	740,597
Private irrigation system	203,381
Other government agency-assisted	188,036

SOURCE: National Irrigation Administration

The country requires an average of 2.6 million tons (MT) of various fertilizer grades yearly. But it is a net importer at 98%, with China as the main source and Atlas Fertilizer Corporation as the top importer.

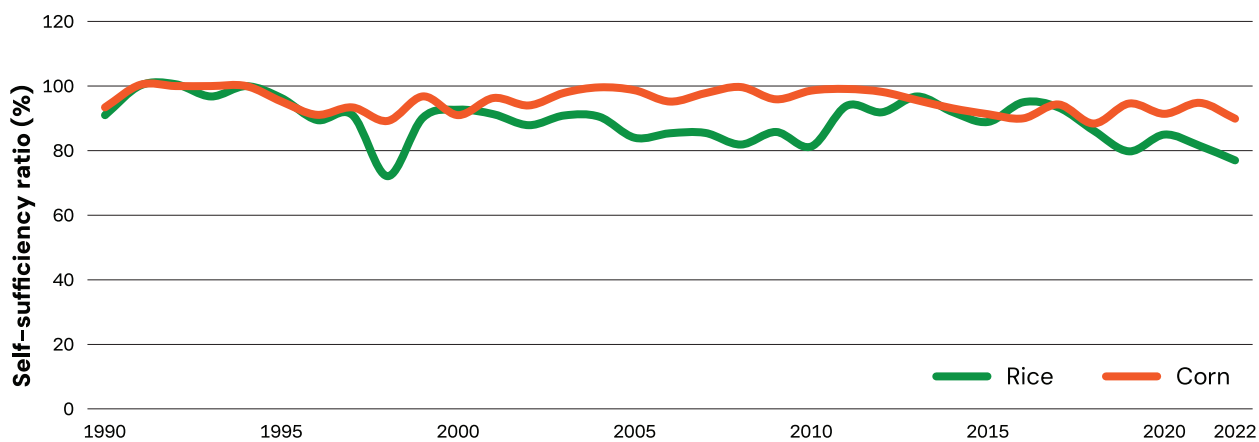
Meanwhile, the Philippine seed market is dominated by transnational corporations (TNCs) such as Bayer AG, Syngenta Group, Corteva Agriscience, Allied Botanical Corporation, and Charoen Pokphand Group. They are innovating through extensive research and development (R&D) activities to improve seed varieties with enhanced traits like disease resistance, drought tolerance, and higher yields. They are partnering with research institutions and local organizations to strengthen their market presence and distribution networks.[57]

GRAPH 5. Agricultural trade balance, 1990-2024 (in million US$)



SOURCE: Philippine Statistics Authority

GRAPH 6. Self-sufficiency ratio of rice and corn, 1990-2022 (in %)



SOURCE: Philippine Statistics Authority

The country is not only dependent on imported machinery, chemical inputs, and seeds—it has become increasingly reliant on imported food and agricultural products. Agricultural trade deficit has been perennial since the country joined the World Trade Organization (WTO) and opened to unbridled agricultural trade liberalization. (**See Graph 5**) The country's self-sufficiency ratio of rice and corn has declined over time. (**See Graph 6**) Import dependency ratios for garlic, black pepper, mongo, peanut, coffee, and beef have also increased. (**See Table 9**) By 2024, the country has remained the world's largest rice importer, ahead of Vietnam and Nigeria. The Philippines imported an unprecedented 4.8 million metric tons (MMT) in 2024, breaching 5 MMT in 2025 and projected to reach 5.5 MMT in 2026.[58]

TABLE 9. Import dependency ratio of selected agricultural commodities, 1990-2022 (in %)

Agricultural commodity	1990	1995	2000	2005	2010	2015	2020	2022
Coffee	nda	-	10.6	32.3	45.3	67.0	60.4	61.9
Black pepper	-	nda	-	3.1	37.7	74.8	86.6	88.1
Garlic	1.1	nda	27.2	78.2	71.8	87.1	92.9	94.5
Peanut	49.9	53.0	64.7	58.3	69.9	71.6	69.9	75.5
Mongo	39.4	47.6	57.2	53.6	53.6	47.8	52.5	58.1
Beef	8.5	15.1	18.8	15.1	20.5	29.2	41.4	50.0

nda - no data available

SOURCE: Philippine Statistics Authority

Green Revolution's toxic legacy

Chemical farming in the Philippines began with the aggressive promotion of the World Bank's Green Revolution program during the Marcos dictatorship. Green Revolution promoted the so-called high-yield varieties (HYVs), "IR8" or "miracle rice", developed by agricultural TNCs, which turned out to be high-input varieties as they required huge amounts of chemical fertilizers and pesticides to achieve full productivity.

The Marcos dictatorship coupled the Green Revolution program with a credit program, Masagana 99, so that farmers could buy the expensive inputs on top of paying land rent. This pushed Filipino farmers further to indebtedness and massive hunger and poverty.

Green Revolution transformed local agricultural practices from natural and organic to high chemical input dependence, in the process killing thousands of local rice varieties and exposing farmers to serious health and environmental risks. Farmers also lost ownership of the seeds they were growing. Latest available data show that 45% of the country's arable land is moderately to severely eroded with 5.2 million hectares as severely eroded. More than half of the country's lands are experiencing up to 50% decline in productivity due to soil erosion from chemical fertilizers use, soil pollution, and increased acidity. This condition has added to the country's vulnerability to climate-related hazards.

Neoliberalism in PH agriculture

The fundamental crisis of Philippine agriculture, marked by vestiges of feudalism such as land monopoly, underdevelopment, and widespread merchant exploitation, has been further intensified by neoliberal policies.

The Green Revolution in the 1970s was the precursor for the progressive implementation of neoliberalism in agriculture. The program introduced the reliance on imported chemical inputs, which facilitated an indirect TNC control in agriculture. The 1980s saw the implementation of structural adjustment programs (SAPs) of the International Monetary Fund (IMF) and the World Bank, the Green Revolution included, which packaged policies of liberalization of trade and investments, privatization of public parastatals, and government deregulation to allow

private and foreign businesses to thrive in their respective industries. In agriculture, this meant the start of tariff reductions, or lowering of taxes on agricultural imports to allow the entry of foreign products.[59]

After the ouster of the Marcos dictatorship, upon the strong clamor by farmers and agrarian advocates, the Cory Aquino government legislated the Comprehensive Agrarian Reform Program (CARP) in 1988. Ostensibly aimed at land redistribution, CARP has loopholes, however, that have allowed the reconsolidation of land to big landowners into large estates and agribusiness ventures. Worse, the law promotes schemes that have circumvented farmers' full ownership, such as the "stock distribution option", which have corporatized land ownership and reduced the farmer-landowners to being farm workers. CARP has also provided the opportunity for land use conversions, from agriculture to real estate, residential areas, commercial uses, and crop and fisheries export production. Lastly, it is CARP's basic principle for farmers to amortize the land they have been "awarded", essentially reducing agrarian reform to a mere real estate transaction.[60]

The Cory Aquino administration implemented a second round of tariff reductions under the Tariff Reduction Program II in 1991. By the time the country joined the WTO in 1995, its tariff regime was already highly liberalized. Specifically, under the WTO-Agreement on Agriculture (AoA), the country had quantitative restrictions (QRs) on agricultural imports, which had to be converted into tariffs—a process the WTO calls "tariffication"—which would eventually be reduced. The Philippine government negotiated a long-standing exemption for rice from tariffication, lasting nearly 25 years, thanks to the farmers' struggle, until it was lifted by the passage of the RTL under the Duterte administration in 2019.[61]

The WTO-AoA stipulates the removal of domestic support, which has entailed the reduction of agricultural budgets, dismantling of national marketing boards and price support mechanisms, and dismantling of subsidies and state-led extension services. The agreement also removed support for export production and quotas that earlier were enjoyed by exporting countries, like in the case of sugar quotas for Philippine exporters.

In 1997, the Ramos government passed the AFMA, which liberalized the entry of foreign investments in agriculture, promoting agribusiness modernization, contract farming, and production of export crops such as bananas, pineapples and other high-value crops. Corporate farming became a priority, especially in the identification of key areas for agriculture. AFMA paved the way for agriculture's market orientation. While the Green Revolution allowed TNCs to exert indirect control over agriculture, contract growing of export crops has given them near-total control. Agribusiness TNCs can dictate not only what crops to grow, but also the required quality and the price at which the products will be purchased.[62]

This has also started the era of weakening institutions such as the National Food Authority (NFA), which was originally mandated to have strong market intervention and influence in pricing—to buy palay from farmers at fair prices and to sell rice to consumers at reasonably cheap prices. The 'globalization' era has clipped the powers of the NFA to simply keeping buffer stock and eventually issuing licenses to agricultural importers.[63]

In the 2000s, the Arroyo government would continue the gains made from CARP, AFMA, WTO-AoA, and all other schemes in terms of 'globalizing' Philippine agriculture. Through its Super Regions infrastructure program, the government continued contract growing arrangements controlled by TNCs, particularly focusing on Mindanao, but at the same time expanded land use conversion from agriculture to commercial and residential uses in the urban areas.

The CARP, which was supposed to be accomplished after 20 years, was extended in 2009 to institutionalize more 'market-friendly' measures, such as increased cash incentives and streamlined compensation for landowners and a corporate-led agrarian reform under Agribusiness Venture Agreements (AVAs), allowing corporations to lease redistributed lands for up to 25 years and benefitting exporters of high-value crops like bananas and pineapples.

The Noynoy Aquino administration advanced this market-oriented approach to land reform, building on the framework of extending the CARP and promoting AVAs and integrating neoliberal principles championed by institutions like the World Bank. This strategy emphasized voluntary transactions, public-private partnerships (PPPs), and financial mechanisms to accelerate land reconcentration.[64]

By the late-2010s, the country phased out its rice QRs and experienced a surge in imports, not only of rice but also of other agricultural products that could have been produced domestically. The succeeding decade would be further marked with collapsing prices for local produce and declining farmers' incomes, worsening rural poverty, land reform reversals, and domination of land use by real estate and infrastructure business.

Taking up agroecology

Filipino farmers' struggle for genuine agrarian reform and rural development is inseparable from their clamor to reclaim decision-making powers not only over what they plant and for whom, but also how. The preference for ecologically sound farming practices thus is an assertion of farmers' sovereignty. Agroecology is rooted in this struggle.

What is agroecology?

Agroecology is the application of the science of ecology—the science of how nature works—to the study, design and management of sustainable agriculture and food systems. It brings together the different kinds of knowledge from farmers, food workers, and others in the agri-food systems to serve social movements that are promoting the transition to just and sovereign agri-food systems.[65] This action-oriented description is in line with the description adopted at the Nyéléni Convention, the International Forum for Agroecology, held in 2015. Clearly, agroecology has been understood as a science, a practice, and as a social movement within the food sovereignty movement.

As a science, the focus has been broadened thus to an integrated discipline that includes agronomy, ecology, sociology, economics, and political economy. These disciplines have merged in agroecology to seek transformative solutions to real-world problems, with the different actors participating in knowledge generation.

As a practice, agroecology emerged as a critique on the environmental effects of industrial agriculture. A set of agroecological practices emerged from the 1962 book, Silent Spring by Rachel Carson, which were aimed to veer away from the model of industrial agriculture dominated

by large-scale specialized farms and relying heavily on fossil fuel and chemical inputs, toward more ecologically friendly systems.[66] These were later further highlighted in response to the adverse effects of Green Revolution.

Over time, there has been no definitive set of practices prescribed as agroecological, but the approach has been summarized, to wit, "assembling crops, animals, trees, soils and other factors in spatially and temporally diversified schemes, favor natural processes and biological interactions that optimize synergies so that diversified farms are able to sponsor their own soil fertility, crop protection and productivity."[67]

Agroecological farming emphasizes "diversification, mixed cultivation, intercropping, cultivar mixtures, habitat management techniques for crop-associated biodiversity, biological pest control, improvement of soil structure and health, biological nitrogen fixation, and the recycling of nutrients, energy, and "waste" as inputs to the production process."[68] For centuries, some of these practices have already been applied in different parts of the world, while others have been more recently developed with limited adoption.

Different systems

The International Panel of Experts on Sustainable Food Systems enumerates the different agroecological systems, to wit:[69]

1. diversifying farms and farming landscapes
2. replacing chemical inputs with ecologically based materials and processes
3. reducing waste by closing material cycles
4. reducing fossil-fuel energy use by maximizing biomass accumulation and internalizing energy flows
5. optimizing biodiversity
6. stimulating interactions between different species, as part of holistic strategies to build long-term fertility, healthy agroecosystems, and secure and just livelihoods

The ecosystem—with its flows, cycles, and mutual interactions—is central to how diversified agro-ecosystems function.

As a social movement, agroecology has emerged often in response to agrarian crises and along with broader efforts of social movements to initiate meaningful changes. It has become the political framework of social movements and peasant organizations in defense of their collective rights and in their advocacy for the diverse production systems of small-scale farmers. As a social movement, agroecology has been inevitably linked to the right to food, environmental integrity, and food sovereignty.[70]

Agroecology has since evolved into a holistic discipline and global movement, growing into a network of alternatives promoted by grassroots movements defending small-scale farming against the onslaught of corporate farming and large agribusiness. Since the 2000s, agroecology

has gained broader recognition, even among international institutions such as the FAO, the UN Environment Programme (UNEP), World Health Organisation (WHO), and the UN High Level Panel of Experts (HLPE).[71]

Today, agroecology is understood in three interrelated ways: as a scientific research approach studying entire agro-ecosystems and food systems; as a set of principles and practices that enhance resilient and sustainable farming practices while preserving social integrity; and as a social movement that asserts the practical application of agroecology and seeks new ways of considering agriculture, processing, distribution and consumption of food, and its relationship with nature and society.[72]

What is food sovereignty?

The Nyéléni Declaration puts it, "Food sovereignty is the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems. It puts those who produce, distribute and consume food at the heart of food systems and policies rather than the demands of markets and corporations."[73] In basic terms, it pertains to the people's rights to food and to produce food.

The People's Coalition On Food Sovereignty (PCFS) defines food sovereignty as the power of people and communities to assert and realize their right to food, to produce food, and to fight corporates and other forces that threaten their food systems, livelihoods and survival. The ultimate goal of the struggle for food sovereignty is the realization of people's democracy in all aspects of the food and agriculture systems—from production and social relations to national policies and programs.[74]

The interconnectedness and inseparability of agroecology and food sovereignty cannot be overemphasized. As the global movements have reiterated, "There is no food sovereignty without agroecology, and certainly, agroecology will not last without a food sovereignty policy that backs it up."[75] The Nyéléni Declaration defines agroecology as a people-led movement and practice that needs to be supported, rather than led, by science and policy.[76]

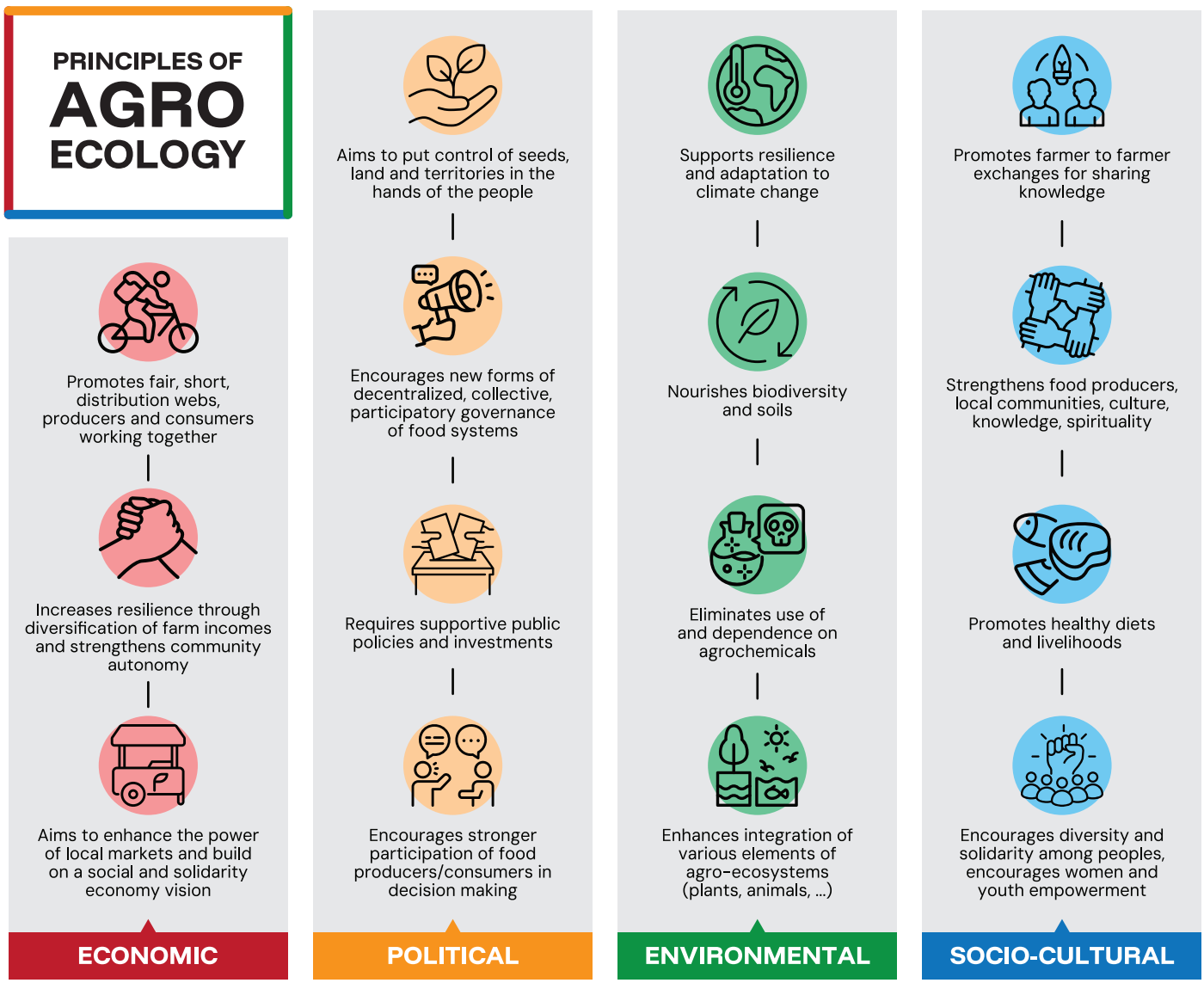
What are the principles of agroecology?

Several publications have articulated the principles of agroecology in different ways, including the more recent by the Coopération Internationale pour le Développement et la Solidarité (CIDSE). These principles are in a way broad guidelines that constitute the building blocks of agroecology, its practice and implementation. To quote CIDSE:

1. Agroecology promotes principles rather than rules or recipes of a transition process.
2. Agroecology is the result of the joint application of its principles and the values that lie behind them on the design of alternative farming and food systems. It is therefore acknowledged that the application of the principles will be done progressively.
3. The principles are valid across the diversity of territories and lead to various practices in different places and contexts.
4. All principles should be interpreted in the context of improving integration with the natural world, and justice and dignity for human and non-human actors and processes.[77]

The transformative power of agroecology depends on embracing all its four dimensions. As CIDSE emphasizes, a comprehensive understanding of agroecology and its sustainability as a form of struggle must incorporate the four dimensions – economic, political, environmental, and socio-cultural – ensuring that it remains grounded in the struggles and aspirations of the people it is meant to serve. (**See Infographic 1**)

INFOGRAPHIC 1. Principles of agroecology (CIDSE)



SOURCE: CIDSE, *The principles of Agroecology – Towards just, resilient and sustainable food systems*, 2018

Economic dimension includes the promotion of fair and short distribution webs between producers and consumers; resilience through diversification of farm incomes; and enhancing the power of local markets and building on a social and solidarity economy vision.

Political dimension includes aiming to put control of seeds, land and territories in the hands of the people. It also entails encouraging new forms of participatory governance of food systems, supportive public policies and investments, and participation of food producers and consumers in decision making.

Environmental dimension pertains to resilience and adaptation to climate change; nourishing biodiversity and soils; eliminating use of and dependence on agrochemicals; and enhancing integration of various elements of the agro-ecosystems.

Socio-cultural dimension is: promoting farmer to farmer exchanges for sharing knowledge; strengthening food producers, local communities, culture, knowledge, and spirituality; promoting healthy diets and livelihoods; and encouraging diversity and solidarity among peoples, including encouraging women and youth empowerment.[78]

Between 2015 and 2019, the FAO developed 10 elements of agroecology as guide to promote sustainable agriculture and food systems.[79] In 2019, the HLPE defined principles as a belief system that guides thinking, decisions, and actions. These can be normative (based on values, e.g. "food systems should be fair") or causative (explaining cause and effect, e.g. "more equitable food systems are likely to be more sustainable"). For these principles to be more useful, the HLPE made an effort to make them more explicit by consolidating 13 key agroecological principles.[80] (**See Infographic 2**)

INFOGRAPHIC 2. Principles of agroecology (FAO)

1 Recycling

Preferentially use local renewable resources and close, as far as possible, resource cycles of nutrients and biomass

2 Input reduction

Reduce or eliminate dependenc on external inputs

3 Soil health

Secure and enhance soil health and functioning for improved plant growth, particularly by managing organic matter and by enhancing soil biological activity

4 Animal health

Ensure animal health and welfare

5 Biodiversity

Maintain and enhance diversity of species, functional diversity and genetic resources and maintain biodiversity in the agroecosystem over time and space at field, farm, and landscape scales

6 Synergies

Enhance positive ecological interaction, synergy, integration, and complementarity among the elements of agroecosystems (plants, animals, trees, soil, water)

7 Economic diversification

Diversify on-farm incomes by ensuring small-scale farmers have greater financial independence and value addition opportunities while enabling them to respond to demand from consumers

8 Co-creation of knowledge

Enhance co-creation and horizontal sharing of knowledge, including local and scientific innovation, especially through farmer-to-farmer exchange

9 Social values and diets

Build food systems based on the culture, identity, tradition, social and gender equity of local communities that provide healthy, diversified, seasonally, and culturally appropriate diets

10 Fairness

Support dignified and robust livelihoods for all actors engaged in food systems, especially small-scale food producers, based on fair trade, fair employment, and fair treatment of intellectual property rights

11 Connectivity

Ensure proximity and confidence between producers and consumers through promotion of fair and short distribution networks and by re-embedding food systems into local economies

12 Land and natural resource governance

Recognize and support the needs and interests of family farmers, smallholders, and peasant food producers as sustainable managers and guardians of natural and genetic resources

13 Participation

Encourage social organization and greater participation in decision-making by food producers and consumers to support decentralized governance and local adaptive management of agricultural and food systems

SOURCE: Sinclair, et al. 2019. *The Contribution of Agroecological Approaches to Realizing Climate-Resilient Agriculture*

Among the 13 key agroecological principles, co-creation of knowledge is a central principle that underpins all the others. It means that agroecology can develop differently in different places because it values local knowledge and learning from experience. This respects the unique cultures and circumstances of each locality. This explains the absence of a prescriptive set of agroecological practices.[81]

Instead, agroecology uses broad principles that people can apply in different ways depending on their situation. This flexibility allows communities to create farming practices that are well-suited to their local needs and helps them cope with challenges, including those of climate change. Instead of promoting fixed practices or technologies, adapting broad principles to local conditions through shared learning leads to practical solutions that fit the needs of the community and support community-driven development agenda.

Agroecology and the small farmers

Agroecological systems are deeply rooted in the ecological rationale of traditional small- scale agriculture, representing long-standing examples of successful farming. They are marked by a rich diversity of domesticated crops and animals, sustained through ingenious practices in soil, water, and biodiversity management, all grounded in complex traditional knowledge systems. For centuries, such systems have nourished much of the world's population, and they continue to do so in many regions today.[82]

Agroecology is essential in the struggle of small farmers, as it seeks to radically transform food and agriculture systems from the current context of small farmers—corporate-controlled, exploitative and unsustainable farming—into people-centered, just, healthy and sustainable systems.

Dr. Chito Medina, environmental scientist and partner scientist of MASIPAG (Magsasaka at Siyentipiko para sa Pag-unlad ng Agrikultura – Farmers-Scientists Partnership for Development), argues that agroecology is not merely a collection of ecological or techno-productive practices. Reducing agroecology to technical fixes risks co-optation—exemplified by frameworks such as Climate Smart Agriculture and Sustainable Intensification as promoted by multilateral institutions and agribusiness TNCs. These pseudo-agroecology frameworks continue to promote genetically modified organisms (GMOs), monocropping and selective chemical use, while sidelining farmers' rights and access to markets. These reformist approaches reinforce, rather than challenge, the dominant model.[83]

True agroecology is fundamentally transformative. As a pillar of food sovereignty, it means that the control over the entire agri-food systems must return to farmers, consumers, indigenous communities, and other grassroots actors. Increasingly, diverse movements—peasants, women, consumers, environmentalists, and development advocates—are converging around agroecology as a common framework for resistance and renewal.[84]

Agroecology as a form of struggle is beneficial to the small farmers in several ways. It promotes and supports farmers' markets and other alternative marketing systems like producer-consumer

solidarity markets. This ensures that farmers are the ones who determine fair prices and that money is reinvested in the local economy.[85]

Agroecology helps farmers and consumers regain control of agri-food systems promoting local, democratic decision-making over what food is produced, how it is grown, and for whom. It empowers farmers to use their own knowledge, seeds, and sustainable practices instead of relying on corporate inputs and market dictates. At the same time, it strengthens the link between producers and consumers through direct, community-based food networks, enabling both to shape food systems that prioritize health, equity, and ecological balance over profit.[86]

Agroecology enhances socio-cultural practices by strengthening the deep connection between agricultural production and cultural identity. It values the accumulated knowledge of farmers about crops and livestock, supports farmer-led research and innovation, and recognizes farming as an expression of local culture, spirituality, and community life. Through practices like seed sharing, knowledge exchange, and collective problem-solving, agroecology fosters cooperation, solidarity, and strong social bonds—core elements of people-centered agriculture.[87]

Agroecology in PH

The agroecology movement in the Philippines started in the 1980s as a grassroots protest against the negative impacts of the Green Revolution. The study, "The Miracles that Never Was", was presented in the national farmers convention, which was followed by a protest rally against the International Rice Research Institute (IRRI). MASIPAG was established to promote sustainable, farmer-led approaches, focusing on seed conservation, participatory plant breeding, and organic methods.[88]

At international trade fairs, there was interest in organic produce from the Philippines, but without proper certification, it was hard to enter the global market. This made it necessary to bring together producers, processors, and marketers to organize and meet the requirements. The country hosted the International Federation of Organic Agriculture Movements (IFOAM) in 1999. From thereon, things moved forward—the Organic Certification Center of the Philippines was established in 2001 and the Organic Agriculture Law was enacted in 2009.

Agroecology expanded through the work of non-government organizations (NGOs) and church-based organizations, with MASIPAG as the pioneer in the country. MASIPAG is a farmer-led network of 50,000 small growers who farm ecologically for subsistence and local market sale. The network's goal is to "de-globalize and re-localize" the farmers' food system, focusing on staple crops. The core is local empowerment for the cultivation of local rice varieties and the promotion of sustainable practices and organic policies. Today, MASIPAG includes 670 sub-national organizational nodes, 20 NGOs, and scientists.[89]

Its core activities include: seed conservation and breeding, farmer-led research and training, agroecological practices, building climate change resilience, food and sovereignty advocacy,

and community empowerment.[90] [91] [92] In summary, MASIPAG'S work centers on empowering small-scale farmers for sustainable and just food system in the Philippines.

The Philippine government began showing interest in organic farming in the 2000s, but primarily for export markets. Government funding and policy support have remained limited, with conventional agriculture still receiving the lion's share of the national budget. Market access for organic farmers has remained narrow. Worse, the government has continued chemical farming, which has been the main cause of land degradation and the ecosystem's destruction, as well as the country's vulnerability to hazards posed by extreme weather events.

Can agroecology address climate issues?

Although agroecology has gained increasing support as a viable strategy for addressing climate change and its impacts, its adoption remains limited even in the face of mounting evidence and sustained advocacy. The FAO further notes that climate change discourse has yet to fully integrate agroecology, limiting its policy influence compared to its growing recognition in food security forums.[93]

Demonstrated potentials

Various researches have examined agroecology's potentials in being climate change solution as well as barriers to its wide adoption. Its potentials lie in the fact that it is grounded in ecological principles and traditional farming knowledge and sharing, thus fosters biodiversity, soil health, and sustainable food production. Its holistic nature inherently builds resilience by mimicking complex ecosystems. This systemic nature gives agroecology its climate resilience qualities.

The FAO study demonstrates that soil characteristics and biodiversity aspects are good performing patterns, particularly on the elements of soil organic carbon content, soil biodiversity, soil microbial biomass and activity, nematode and earthworm abundance, and species richness. These are said to be central aspects of climate change adaptation.[94]

Studies also show that the practice of organic agriculture has led to increased crop diversity and organic fertilizer use. The results also highlight that compared to organic agriculture, agroecology has higher yields and better yield stability because of its different diversity aspects.

Agroecological interventions have a positive impact on productivity and profitability, including income diversity. Significantly, positive responses are noted in water use, nutrient regulation, crop yield, pest management control, and pollination.[95]

Agroecological practices have improved climate change adaptation using several indicators, such as soil health, biodiversity, plant protection, productivity, employment, and health. Soil health has the most amount of markers that signal significant improvement resulting from agroecology. The FAO, however, takes note that nuances should be taken into account, particularly of different climate zones and soil types.

Meanwhile, the background paper, The Contribution of Agroecological Approaches to Realizing Climate Resilient Agriculture, to inform the flagship report of the Global Commission on Adaptation (GCA), has highlighted the adaptation and mitigation benefits from agroecological practices based on the HLPE's 13 agroecological principles across scales—from field, farm landscape, to food systems. As previously mentioned, the centrality of the principle of co-creation of knowledge gives agroecology flexibility, which enhances its ability to build climate resilience.[96]

The background paper recognizes that as different principles are applied, different levels of transition will also occur, which may be incremental or transformational change. Agroecological practices have been used to address specific climate change impacts—for example, using contour hedgerows to prevent soil erosion from heavy rains, planting shade trees to protect crops from heat, and increasing tree cover to improve nutrition and water availability. But agroecology's greatest strength in adaptation lies in how it improves the way people manage their farms and livelihoods, helping boost income and food security. Still, the study notes, there is a lack of strong evidence on how cost-effective these practices are compared to other methods, and gathering this data is urgently needed.[97]

Even with many challenges, agroecology has been successfully adopted in several large-scale efforts, and they have shown they can address specific climate hazards, enhance resilience farming systems, and support important ecosystem services. But for them to be widely adopted, the study concludes, supportive policies, better evidence, and informed consumer choices are needed. This also requires shifting from simplified farming landscapes to more diverse and complex ones, adapting practices to local contexts, and promoting coordination across different levels and sectors to create an environment where agroecology can thrive alongside other approaches.[98]

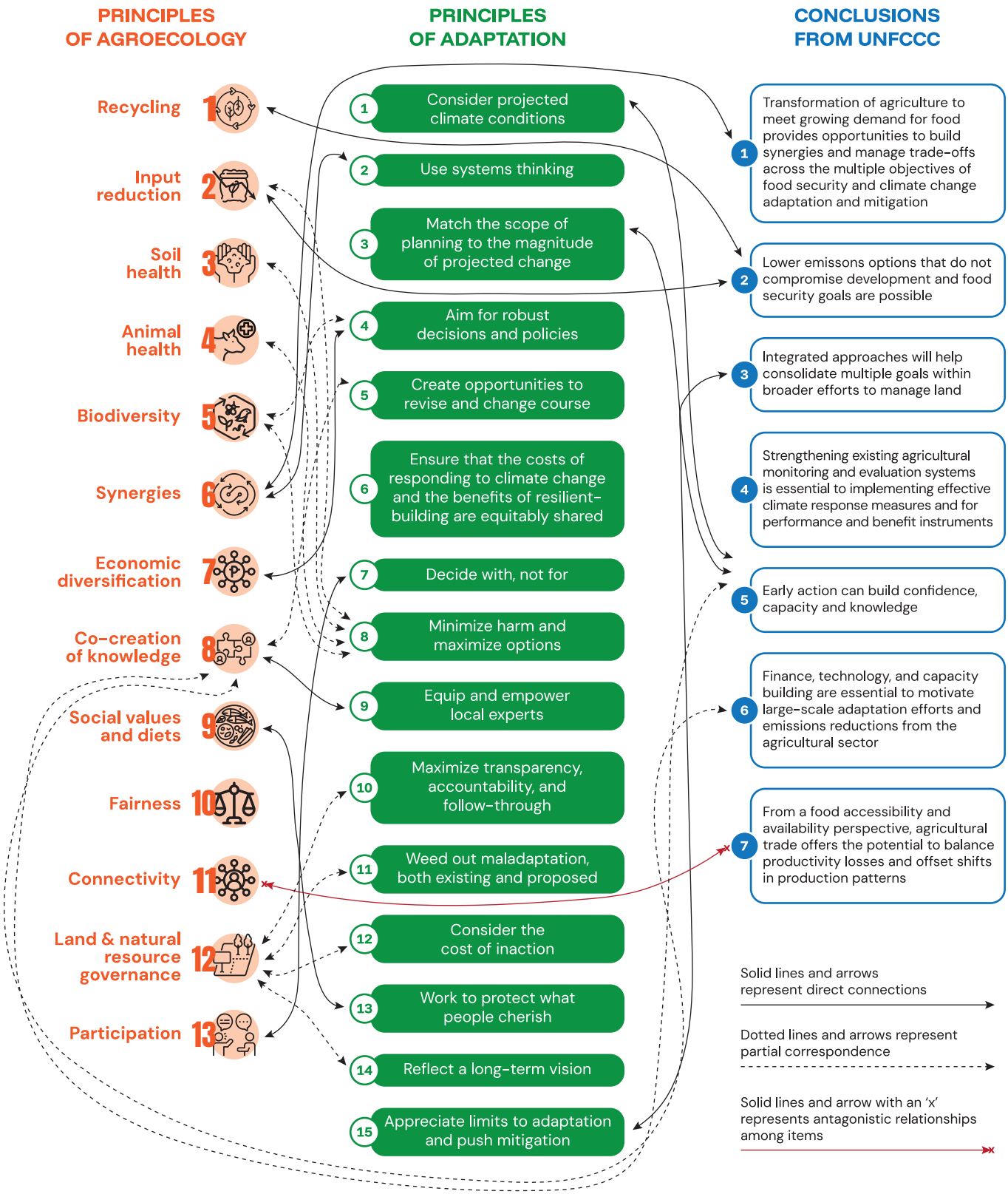
Contribution to adaptation

The IPCC defines adaptation as the process of adjusting to current or anticipated climate conditions and their impacts, with the aim of minimizing harm and maximizing potential benefits. Resilience is the capacity of social-ecological systems to cope with a hazardous event, trend or disturbance, responding or reorganizing in ways that maintain the system's essential functions, identity and structure, while also retaining the ability to adapt, learn and transform.[99]

The diagram developed for the GCA report illustrates that the HLPE's principles of agroecology entangle with the principles of adaptation, which are also related to the seven conclusions

of the policy brief to inform the UNFCCC. It shows that most of the agroecological principles contribute to adaptation and that most adaptation principles are reflected in the agroecological principles. (**See Infographic 3**)

INFOGRAPHIC 3. Correspondence between Principles of Agroecology and Climate Adaptation



SOURCE: Sinclair, et al. 2019. *The Contribution of Agroecological Approaches to Realizing Climate-Resilient Agriculture*

However, there are two key exceptions. First, agroecological principles don't directly address future climate change, even though agroecological practices often lead to unintended benefits for climate adaptation. Including more explicit climate considerations in the design of agroecological practices could improve outcomes. Second, there may be a conflict between principle 11, which promotes stronger local links between producers and consumers, and conclusion 7, a policy recommendation that supports using trade to ensure food availability.[100] This only shows that principles and practices cannot be put to work if the same overarching paradigm is at work.

Can agroecology be scaled up?

The cited studies have identified barriers that have to be addressed. FAO identifies lack of access to knowledge and understanding by everyone involved. There are still doubts regarding scientific evidence for agroecology, thus there is still a lot of reluctance to consider it on a global scale. There is also lack of supportive policies even on the national level—low budget, no funding for research, and lack of integration of agroecology in climate change discussions. But the major barrier is the predominance of neoliberalism or market fundamentalism, which has only perpetuated the interests of industrial agriculture.

The studies have put forward key actions, including addressing market failures; adapting policies; improving evidence; addressing options by context interactions; fostering co-learning and horizontal knowledge exchange; connecting social movements and science; horizontal integration across sectors; and vertical integration across scales.[101] These are essential to enable the adoption of agroecological practices at scale to build resilience of farming and food systems, but unless they are taken in the backdrop of turning around from neoliberal policies, they are bound to be ineffectual.

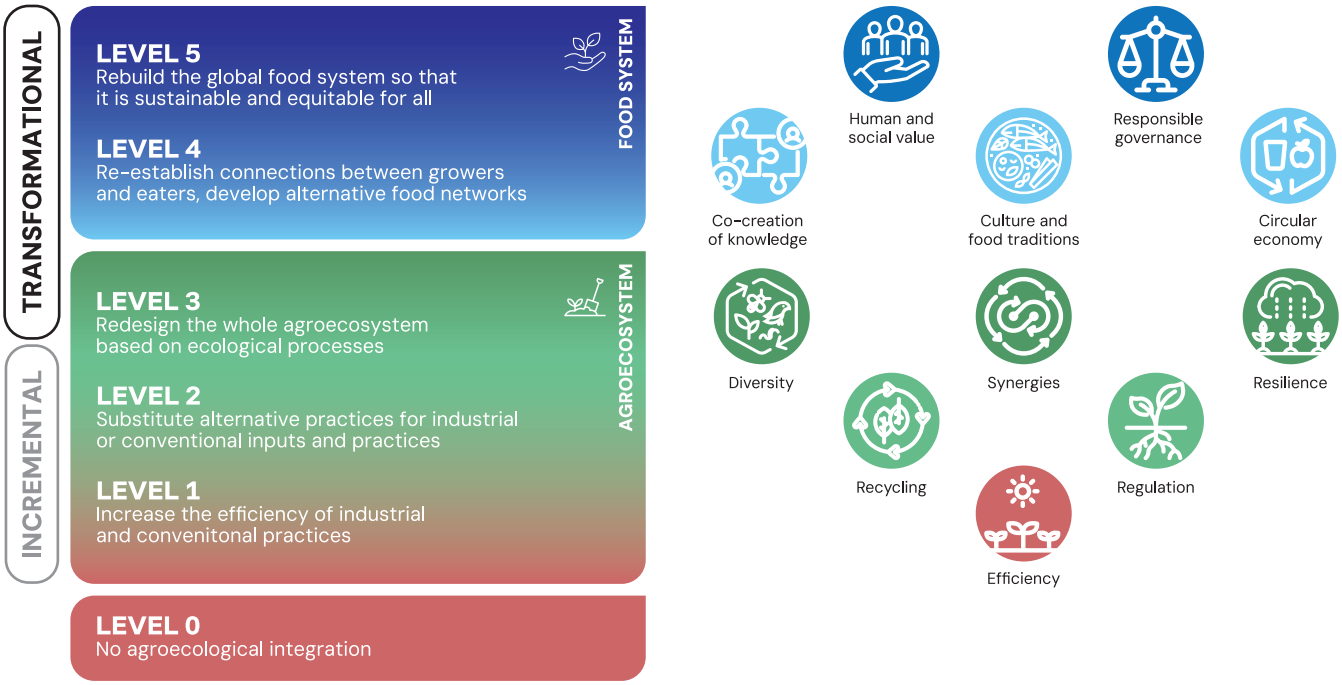
Evaluating agroecology

Several tools have already been developed to assess agroecology—not only to determine if current systems can shift to agroecology, but also to evaluate if agroecology can transform agriculture into a climate-adaptive and resilient system.

The Agroecology Criteria Tool (ACT) developed by Biovision Foundation for Ecological Development is for analyzing what programs, projects and policies can support agroecological transitions. It integrates FAO's 10 principles within five levels of food system change and contains 62 criteria. (**See Infographic 4**) However, ACT does not evaluate outcomes and its criteria selection is binary and therefore does not indicate quality or diversity of activities.[102]

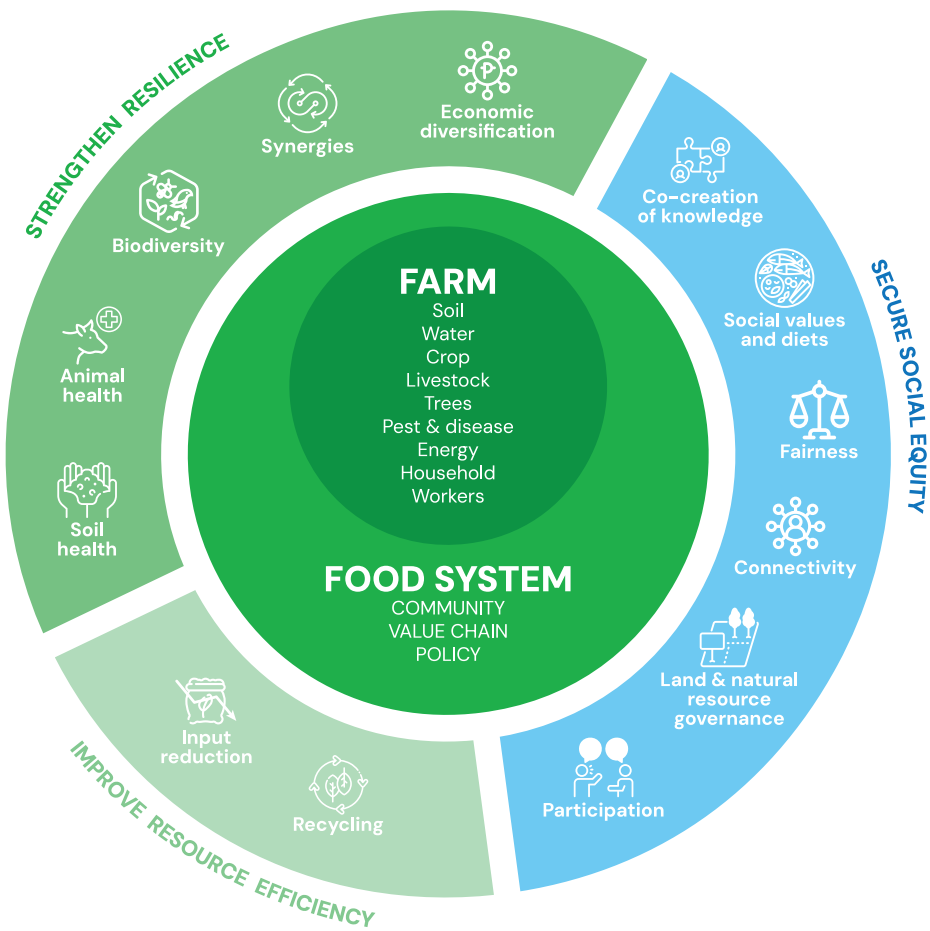
The Farmer Level ACT (F-ACT), on the other hand, is designed for participatory on-farm assessment facilitated by NGOs, external providers and the like, or farmer-led assessments. The tool has major performance criteria of strengthening resilience, securing social equity, and improving resource efficiency. (**See Infographic 5**) The farmers' narratives will be based on these criteria. However, F-ACT does not measure outcomes related to farm performance or resilience. It is also prone to self-reporting bias. While efforts have been made to create a tool that is holistic, Biovision notes, the results generated by F-ACT are a necessary simplification of reality.[103]

INFOGRAPHIC 4. The five levels of food system transformation and 10+ elements of agroecology



SOURCE: Biovision Foundation for Ecological Development & IPES-Food. 2020. *Money Flows: What is holding back investment in agroecological research for Africa? Biovision Foundation for Ecological Development & International Panel of Experts on Sustainable Food Systems*

INFOGRAPHIC 5. Farm-level agroecology criteria tool



SOURCE: Biovision Foundation for Ecological Development

The FAO, on the other hand, upon the HLPE recommendation in 2019, endeavored to create comprehensive frameworks to measure and monitor food system performance, promote national data collection, document lessons learned, and share information to support the adoption of agroecological and other innovative approaches. It came up with the Tool for Agroecology Performance Evaluation (TAPE), with core performance criteria: secure land tenure, productivity, income, added value, exposure to pesticides, dietary diversity, women's empowerment, youth employment opportunities, agricultural biodiversity, soil health, and the option to select advanced criteria.[104] (**See Infographic 6**)

INFOGRAPHIC 6. 10 core criteria of performance of agroecology and their links to SDG indicators

Main dimension	#	Core criteria of performance	Proposed method of assessment in survey	SDG	SDG indicators
Governance	**1**	Secure land tenure (or mobility for pastoralists)	Type of tenure over land; property, lease + duration, verbal, not explicit (**SDG 1.4.2, 5.a.1 and 2.4.1 sub-indicator 11**) Existence and use of pastoral agreements and mobility corridors	1 2 5	1.4.2 2.4.1 5.a.1
Economy	**2**	Productivity	Farm output value per hectare (**SDG 2.4.1 sub-indicator 1**) Farm output value per person	2	2.3.1 2.4.1
	3	Income	Outputs - inputs - operating expenses - depreciation + other income (**SDG 2.4.1 sub-indicator 2**)	1 2 10	1.1.1, 1.2.1 and 1.2.2 2.3.2 2.4.1 10.2.1
	4	Added value	Net income + rents + taxes + interests - subsidies	10	10.1.1 10.2.1
Health & nutrition	**5**	Exposure to pesticides	Quantity applied, area, toxicity and existence of risk mitigation equipment and practices	3	3.9.1 3.9.2 3.9.3
	6	Dietary diversity	Minimum Dietary Diversity for Women (**FAO and FHI 360, 2016**)	2	2.1.1 2.1.2 2.2.1 2.2.2 2.4.1
Society & culture	**7**	Women's empowerment	Abbreviated Women's Empowerment in Agriculture Index, A-WEAI (**IFPRI, 2012**)	2 5	2.4.1 5.a.1 5.a.2
	8	Youth employment opportunity	Access to jobs, training, education or migration (**SDG 8.6.1**)	8	8.6.1
Environment	**9**	Agricultural biodiversity	Relative importance of crops varieties, livestock breeds, trees and semi-natural environments on farm (**SDG 2.4.1 sub-indicator 8.1, 8.6 and 8.7**)	2 15	2.4.1 2.5.1
	10	Soil health	Adapted SOCLA rapid and farmer-friendly agroecological method to assess soil health (**Nicholls et al., 2004**)	2 15	2.4.1 15.3.1

SOURCE: FAO, 2019. *TAPE Tool for Agroecology Performance Evaluation 2019 - Process of development and guidelines for application. Test version.* Rome.

Breaking barriers

This research aims to add to the growing evidence of the viability of agroecology to build climate resilience and adaptation. The research approach has been straightforward—looking into cases in their unique contexts, evaluating their agroecological practices, and taking the cases to the wider national context in order to identify the barriers to scaling up agroecology.

This study uses the tool matrix developed by the Asian People's Exchange (APEX) for Food Sovereignty and Agroecology, spearheaded by MASIPAG and the Pesticide Action Network Asia Pacific (PANAP). It takes the broad definition of agroecology and considers the four dimensions, namely environmental, economic, sociocultural, and political. The study uses this as the Scorecard. (**See Annex 1**)

On the other hand, drawing from the review of secondary literature, the research developed a Barriers Menu, a list of possible obstacles that respondents could identify during the focus group discussions (FGDs) and key informant interviews (KII), the main primary research methods. (**See Annex 2**)

There were two sets of FGD respondents—practicing and non-practicing—both to describe their experiences in coping with extreme weather events and to identify problems that hinder them from improving their production systems. A key trait of all respondents is that they are part of farmers' groups, community organizations, or Church-led efforts, helping ensure stronger political awareness and action.

The case sites were: Albay, Catanduanes, and Camarines Sur in the Bicol Region; Tandag City in Surigao del Sur; Kabankalan City in Negros Occidental; General Nakar in Quezon Province; and Lubuagan and Tabuk City in Kalinga.

Field research partners were: MASIPAG's respective Provincial Consultative Body (PCB) for the provinces of Albay, Camarines Sur, Catanduanes, Negros Occidental, and Quezon; Tarabang para sa Bicol Inc. (TABI) for Legazpi City in Albay; Tandarora Farmers Association for Guinobatan, Albay; several people's organizations (POs) in partnership with Paghida-et sa Kauswagan Development Group (PDG) for Negros Occidental; Farmers Learning Center for CARAGA, Inc. (FLCCI) and San Miguel Parish Church for Surigao del Sur; and Center for Development Programs for the Cordillera (CDPC) for Kalinga.

Bato, Catanduanes

Catanduanes is an island province in the Bicol Region of Luzon, easternmost in the region, bordered by the Maqueda Channel (west), Lagonoy Gulf (south), and the Philippine Sea (north and east).[105]

The province encompasses Catanduanes (main island), Panay Island (not to be mistaken with the main island in Visayas), Lete Island, and Palumbanes group (Porongpong, Tignob, Calabagio). There are smaller islets, for a total area of about 1,492 sq km and 400-kilometer (km) coastline.

The terrain is mountainous and rugged, with Boctot Peak as the highest elevation at 803 meters in the province's capital, Virac, and nearby town of San Miguel. The towns of Virac, Viga, San Andres, and Bato offer limited low-lying agricultural land. Soil types include highly fertile alluvial plains suitable for rice and nipa cultivation; former tidal flats that are gently sloping and well-drained but offer low fertility; and localized valleys and narrow alluvial plains that are suitable for various crops.[106]

The geology of Catanduanes is dominated by schist and volcanic rocks, with mineralization including gold, manganese, copper, and clay veins.[107] The province is significant for fossil sites that reflect an ancient marine and volcanic history.[108]

Catanduanes does not have pronounced dry season. Rainfall is well distributed but peaks with the Northeast Monsoon (Amihan) and tropical cyclones. The province is known as the "Land of the Howling Winds", with severe impact from cyclones and monsoon rains increasing flood and landslide risks.[109]

STY Rolly made its first landfall at Bato, Catanduanes on 1 November 2020, with maximum sustained winds of 315 kph. Rolly brought catastrophic winds and extreme rainfall—80% of houses in Bato were damaged, 90% of infrastructure, and the abaca industry, a key economic contributor, sustained millions of losses. The Philippine Red Cross likened Rolly's destruction in Catanduanes to about 70% of the damage caused by STY Yolanda in 2013.[110]

Practitioners from MASIPAG

Identifying barriers

FGD participants are mostly rice farmers from Bgy. Sta. Rosa in Viga and Bgy. Libod in Bato, with a mix of long-time and new MASIPAG members. Some have recently shifted or are starting to shift to organic farming, motivated by high costs of conventional inputs, desire to save money, and interest in healthier practices. Experience ranges from decades in farming to just starting

organic methods, with some also planting vegetables as a supplemental crop. Many were introduced to organic farming through MASIPAG's organizing efforts, and recent orientations have sparked renewed interest. The average age of the participants was 56 years old.

They were asked to identify barriers to practicing agroecology, using the "power matrix" approach with farm production, community, government and politics on one hand and the factors of expansion, policymaking, adaptation and reliable allies on the other hand.

Participants identified major barriers to advancing organic farming, starting with widespread knowledge gaps at the farm and community levels, including limited skills in organic fertilizer production and the dominance of traditional practices. Weak community unity and cooperation further hinder expansion, alongside poor market access and unfavorable marketing structures.

At the government level, participants cited limited support, lack of policy clarity and technical knowledge on organic farming, and a focus on associations over individual farmers, with mechanization often provided only through leasing arrangements. Market access issues, particularly the monopoly in palay pricing and the disadvantageous terms of selling to the NFA, were also recurring concerns.

Politically, corporate influence—through control of seeds, fertilizers, irrigation, and input systems—was seen as a key obstacle, compounded by instances of farmers being politicized to block organic adoption. Irrigation issues, broken promises from officials, and the dominance of corporations like Amigo, Atlas, and Harvester were also noted as significant challenges.

Less frequently mentioned but still significant were issues with fragmented and partly privatized irrigation systems and political manipulation of farmers by business interests. Mismatched machinery provision by government was also raised.

For solutions, participants emphasized strengthening farmer associations, reviving *Bayanihan*, and producing community champions through training and leadership support. The DA, local governments, National Irrigation Administration (NIA), NGOs, barangay leaders, and in some cases even Senator Cynthia Villar were identified as agencies or people to approach for assistance, though political gatekeeping and campaign promises without follow-through were noted as obstacles.

Culture, the highest score

Using the Scorecard, participants were then asked to rank the potentials of agroecology. Participants rated agroecology highly across all dimensions, with cultural benefits scoring the highest (5.0), reflecting strong agreement that it promotes healthy diets, seed and knowledge exchange, and strengthens Bayanihan. Economic benefits averaged 4.5, with top marks for improving food security, reducing costs, and removing middlemen, though local marketing systems and actual income gains scored slightly lower. Environmental impacts averaged 4.6, driven by strong ratings for soil health and water efficiency, while pest management and biodiversity use scored modestly lower. Political benefits also averaged 4.6, with high scores for organizing farmers and enhancing participation, but somewhat lower ratings for building alliances and full control over resources. Overall, the results show broad confidence in agroecology's potential, with room to strengthen market systems, income gains, pest management, and political networking.

Albay

Albay lies within the Philippine Mobile Belt and is part of the Pacific Ring of Fire, making it highly volcanic and tectonically active. It sits on the Bicol Volcanic Arc, which includes at least 12 volcanic centers, four of which are active—Mayon, Bulusan, Iriga, and Isarog.[111]

Mayon Volcano, Albay's most iconic feature, stands at about 2,463 meters and is among the most active volcanoes worldwide. It frequently produces eruptions, ashfall, pyroclastic flows, and lahars.

Albay is a geologically complex and hazard-prone province, facing recurrent threats from typhoons, flooding, lahars, landslides, seismic events, and coastal hazards. These risks are exacerbated by its terrain and climate, making adaptation efforts crucial.

The province experiences a tropical rainforest climate, with heavy rainfall year-round, particularly during the Northeast and Southwest Monsoons. Albay is routinely hit by typhoons and tropical storms, with an average of 3 to 5 major typhoons annually, often triggering flooding, landslides, and lahars.[112]

Mayon can erupt violently, with past events (e.g. 1814 and 1968) causing mass destruction, ashfall, and fatalities. Heavy rains can mobilize volcanic debris, as seen during STY Reming (Durian) in 2006, leading to catastrophic lahars that buried entire villages.[113]

Albay's location near subduction zones and active faults also subjects it to earthquakes and potential tsunami risks. Low-lying coastal zones also face tidal flooding due to rising sea levels and storm surges. The steep volcanic slopes and heavy rains can also lead to soil destabilization and frequent landslides.[114]

Despite these natural hazards, Albay's soil types can support agriculture productivity. Albay's soils range from fertile loams (excellent for rice and root crops) in lowland plains to gravelly and clay-rich volcanic soils near Mayon Volcano, which support crops like coconuts and abacá. Libon's clay-loam and sandy-loam coastal soils help sustain its status as the province's rice granary. The province's varied terrain from plains to uplands also supports diverse agriculture like rice, vegetables, and livestock.[115] Other major crops such as pili nuts, legumes, root crops, and sugarcane also contribute to agricultural outputs. This is despite gravel and boulders from Mayon Volcano being common in some barangays.[116]

Practitioners from TABI

Identifying barriers

Some participants of the group interview have been practicing organic farming for only about a year, while others are just starting. Those with at least a year's experience noted significant cost savings, as they no longer purchase chemical inputs and instead rely on compost—their main expense being land preparation. Seedlings are often sourced from TABI, while non-members rely on seeds from the local government unit (LGU) that may not meet organic standards.Farmers emphasized that organic farming has stages: the first one to two years are dedicated to soil recovery, during which yields drop, with improvements in the third year onward. This initial dip in production makes it difficult for tenant farmers and those in precarious financial situations to sustain organic methods.

Some of them shared personal experiences of trying organic methods at home, such as using compost in rice fields. They reported better moisture retention and some harvest even under El Niño conditions, compared to fields without compost that yielded nothing. However, knowledge sharing within the community is inconsistent—some farmers prefer to work alone and keep innovations to themselves. While the graduates of TABI's training programs occasionally sell at fairs or forums, broader community adoption depends heavily on informal sharing of results and visible demonstrations of organic farming's benefits.

Using the "problem tree" technique, the participants identified the following barriers:

1. High Input Costs and Market Limitations

High price of agricultural inputs, combined with low farmgate prices, is a major obstacle to agroecology. Many farmers cannot afford the recommended levels of fertilizer or pest control, often borrowing money just to meet partial input needs. Organic products are generally more expensive, which limits local demand, while urban markets where demand is higher remain difficult to access. The absence of well-established market hubs or trading posts means farmers often rely on middlemen who buy at low prices, eroding profitability. Even for niche products like native chicken or black rice, promotion largely depends on sporadic events such as fairs, making market growth slow and uncertain.

2. Knowledge Gaps and Cultural Barriers

A recurring challenge is the lack of technical knowledge on organic farming, from seed standards to composting and pest management. Without adequate training, many farmers default to conventional methods focused on yield maximization rather than long-term soil health. There is also a cultural element—some farmers are reluctant to share information or innovations with others, preferring to work independently. This lack of collective knowledge-sharing undermines community-wide adoption of agroecological practices. Farmers also struggle to recognize and access truly organic seeds, with LGU-provided seeds often failing to meet organic standards.

3. Climate Change and Biodiversity Management

The discussion revealed frustration over the lack of systematic government programs to address climate change and biodiversity loss. While El Niño events have repeatedly damaged crops, irrigation systems remain unrepaired, especially in upland areas. Government biodiversity initiatives are tokenistic, with continued promotion and sale of synthetic inputs that harm beneficial organisms and aquatic life. Farmers recounted how chemical use in other areas has made local snails and shrimp unsafe to eat, while in their own chemical-free fields these species still thrive. There is a strong perception that government climate and biodiversity programs fail to integrate genuine environmental protection with agricultural policy.

4. Land Tenure and Power Relations

Landlessness was identified as a structural barrier to agroecology. Tenant farmers have little control over production decisions and cannot implement organic methods if the landowner disagrees. Even when land is converted to organic, landowners may reclaim it once yields improve. Tenancy arrangements, such as 50/50 or 70/30 sharing, often place the full burden of production costs on farmers while limiting their decision-making power. Land conversion to housing or other uses has also reduced agricultural land availability. Without genuine agrarian reform, participants argued, rural development—including sustainable farming—will remain out of reach.

5. Organizational Weakness and Political Priorities

Participants noted that many local organizations exist only to serve as recipients for government programs rather than to build genuine farmer advocacy. LGUs tend to focus on individuals with resources rather than the poorest farmers, weakening grassroots organizing. While there are examples of climate change committees and federations, farmers often lack the access and capacity to influence these bodies. Some join programs primarily for the cash assistance rather than long-term involvement. The group agreed that strong, independent farmer organizations are essential for promoting agroecology, lobbying for supportive policies, and ensuring farmer participation in local development councils.

6. Resource and Infrastructure Gaps

Beyond inputs, farmers face constraints in accessing basic resources such as irrigation, communal gardens, and livestock feed. Upland farms are particularly disadvantaged, often lacking any irrigation system and relying solely on rain or nearby rivers. Without storage or feed production facilities, livestock integration into organic systems remains a challenge. Infrastructure deficits—from water systems to seed supply chains—make it difficult for farmers to implement the labor-intensive practices required for soil recovery and long-term organic production.

Other identified barriers include government's policy of importation that directly competes with local production and income. The government has also over-used cash transfers, creating a culture of dependency, instead of directly supporting the farmers' production.

Scoring benefits

Agroecology in the community has shown strong benefits in environmental stewardship, social solidarity, and cost efficiency. Farmers report significant improvements in soil health,

biodiversity, and pest management, alongside good integration of crops and livestock and sound water use. Socially, agroecology fosters active seed exchanges, knowledge sharing, and cooperation, strengthening community ties and building robust alliances. Economically, it reduces production costs, generates local employment, and lessens dependence on aid, creating a more self-reliant farming system. These strengths demonstrate that agroecology is already making tangible contributions to resilience and sustainability.

The far view from the Legazpi City Agriculture Office

The organic promoter in the City Agriculture Office in Legazpi City, Mr. Renato Avenue, shared the view of the FGD respondents.[117] He articulated the problems as follows:

Upland farmers remain highly vulnerable to El Niño and rainfall variability, while typhoons like Rolly damage perennial crops such as coconut, taking years to recover. Irrigation systems are limited and concentrated in lowland areas, leaving upland farms dependent on rainfall. Support for seeds is also limited, and machinery distribution is hampered by maintenance costs and usually restricted to financially capable associations.

Organic farming adoption is constrained by high costs, lack of official prioritization, and minimal awareness or use of funds from the Organic Agriculture Act, leaving it largely practiced by wealthier farmers or on small plots for high-value markets. Support programs are often fragmented. Youth agriculture initiatives are underfunded, while biodiversity and soil health research relies on student projects rather than systematic LGU investment. Market and value-adding infrastructure is also largely absent.

Biodiversity efforts focus on multiple cropping and crop integration, with the LGU providing requested inputs when possible. But agricultural programs center on distributing farm inputs and machinery only to registered associations. In addition, fertilization combines organic compost and synthetic inputs to maintain soil productivity. Compost is produced locally from market and household waste and sold for sustainability after an initial free distribution.

According to Mr. Avenue, farmers and local stakeholders propose a set of targeted solutions. Expanding irrigation and climate-resilient water systems—such as solar-powered pumps and rainwater harvesting—would reduce dependency on unpredictable rainfall, especially in upland zones. Stable and dedicated funding for youth agriculture programs like the 4H Club would strengthen future farmer engagement. Scaling up compost production and integrating it with existing farming systems would support a gradual transition to organic practices without sacrificing productivity.

Increasing awareness and accessibility of national organic agriculture programs can widen adoption beyond wealthier farmers. Finally, investing in market infrastructure, value-adding facilities, and LGU-led research on soil and climate resilience would not only improve incomes but also make the sector more adaptive to long-term climate risks. These, however, are just Mr. Avenue's views. The level of institutionalization is far from these views.

Taking roots, raising hopes

Domeng (Pay Domeng) Lopez is a former president TABI and one of the pioneers of organic farming in Bgy. Bañadero, Daraga. Efren Ugayon, on the other hand, had just formed their organization in their rain-dependent area in Bgy. Unggo Purok 6 in Guinobatan just two months prior to the interview. Both farmers shared their farming experiences, highlighting the challenges and potentials of organic farming in their community.[118]

Pay Domeng currently manages about one hectare, producing rice for both household consumption and sale, averaging around 90–95 cavans per hectare. He recognizes that organic farming has advantages, such as reduced costs in spraying and fertilizer use, and better long-term soil health. However, he admits that it remains difficult to sustain the practice on a larger scale. Farmers are drawn to synthetic fertilizers because they are easier and faster to apply, whereas organic inputs require labor-intensive preparation, storage, and time. He recalls testing organic vegetable production through municipal programs and MASIPAG initiatives, which showed good results, but notes that adoption is limited because not all farmers have the patience or resources to shift.

Climate and natural hazards further complicate farming. Typhoons often wipe out crops regardless of whether synthetic or organic methods are used. Droughts also weaken irrigation systems, while volcanic eruptions cover crops like coconuts, tomatoes, and leafy vegetables with ash. Though rice fields at lower elevation are less affected, recovery from volcanic hazards is still difficult.

Pay Domeng points out structural barriers, such as lack of strong local government programs supporting organic farming, insufficient seedling distribution, and limited access to organic inputs. While there are organic fertilizer facilities and municipal programs in Salvacion, Daraga, Camaron, and San Ramon, farmers only receive small volumes, often through personal connections, rather than through systematic support. Programs are mostly piecemeal and inconsistent.

One major issue is land tenure and generational change. Many farmers work on borrowed or mortgaged land, limiting their ability to fully invest in organic methods. Younger generations also show little interest in farming, preferring technology or other work, raising concerns about who will continue farming once the older farmers can no longer work.

Despite these problems, Pay Domeng believes organic farming is a real solution to restoring soil health and reducing farming costs, if only there were better support from local governments such as subsidies, reliable organic input distribution, and market linkages. He emphasizes that farmers are willing to shift, but they cannot carry the burden alone.

Meanwhile, Efren Ugayon has been involved in organic farming through a newly formed group under the guidance of Pay Domeng. Their organization was only established two months ago and had just completed training when Efren was interviewed.

Efren describes the climate-related struggles his community faces. Extreme heat shrinks coconut yields, forcing many families to seek work outside farming, often migrating to Manila for construction jobs or other odd jobs like motorcycle driving (*habal-habal*). According to him, flooding from storms rarely affects rice fields directly but regularly damages houses and alters planting schedules. Farmers used to follow predictable seasons, but climate change has disrupted rainfall patterns, making them wait longer and adjust their cropping cycles.

Despite these hardships, Efren sees organic farming as a more resilient path forward. He compares experiences: farmers who use synthetic fertilizers harvest more but end up in debt due to costly inputs and herbicides, while his organic trial in the TABI farm yields less but spares him heavy expenses. He stresses that organic fertilizers (like manure and compost) enrich the soil, reduce acidity, and make crops less dependent on chemicals. Synthetic fertilizers, he observes, keep nutrients near the surface, easily washed away by rain, while organic inputs encourage roots to dig deeper for nutrients.

His biggest barrier is water. Being in an upland area without irrigation, crops suffer during drought. Pests also pose challenges, but Efren notes that organically nourished plants tend to coexist better with insects and suffer less damage than synthetically fertilized crops.

Efren criticizes government programs that continue to distribute synthetic inputs like Urea and Triple 14, which he believes worsen soil acidity and farmer dependency. While President Marcos Jr has spoken publicly about supporting organic farming, Efren sees a disconnect between rhetoric and policy—budgets still favor chemical imports and machinery rather than farmer-led agroecology. He emphasizes the need for genuine government support for training, organic input production, and localized marketing systems, so farmers can sell directly without exploitative middlemen. For example, he imagined coconut farmers processing products like soap locally, capturing more value instead of being tied to low copra prices.

Efren farms three hectares of coconut land inherited from his parents and cultivates rice and vegetables for subsistence and sale. He is also raising three children and continues to rely mainly on farm work, often paying helpers with a share of the harvest. He believes organic farming is the best solution to climate change and rural poverty, but farmers need infrastructure like water systems (deep wells, rain harvesting, solar-powered irrigation) and stronger community training to make it viable.

However, the group provided low scores on what they regarded as gaps or barriers, specifically in economic viability, institutional support, and food security. Farmers struggle to access local markets, fair distribution networks, and consistent income growth, with livelihood diversification and risk reduction largely unachieved. Organizational capacity, decision-making power, and control over resources remain limited, while food security and healthy diet promotion are only moderate. Policy and market structures to support scaling are insufficient, and government prioritization of agroecology is inconsistent. Addressing these gaps—particularly in market linkages, institutional backing, and resource access—will be crucial for maximizing agroecology's potential and making it a central climate resilience and rural development strategy.

Practitioners from MOFA

Identifying barriers

Mayon Organic Farmers Association (MOFA) is based in the campus grounds of St. Agnes School in Legazpi City. Its members were trained by MASIPAG, and their farms are located in Daraga and Santo Domingo, Albay. The participants shared that their association remains small—only 24 members with about 16 active—and attendance in meetings is inconsistent. This weak organizational capacity makes it difficult to strengthen collective efforts or engage government bodies.

They stressed the absence of government climate change programs, illegal logging, lack of water for irrigation, deforestation for charcoal and construction, and farmland conversion into subdivisions as barriers to agroecology practice.

Government's neglect of price stabilization is also a barrier, where imported rice is bought at higher cost while local palay is undervalued. Similarly, coconut and maize prices collapse when there is surplus harvest, leaving farmers exploited by traders.

Access to government support (*ayuda*) is inconsistent and often politicized. Some long-time farmers are excluded, while non-farmers manage to benefit. The participants also highlighted debt traps from microfinance and lending, with some relying on loans for inputs and livestock feed. Lack of capital, secure land tenure, and crop insurance are major barriers. Tenant farmers suffer exploitative sharing arrangements, leaving them with little yield after paying landowners and debts.

The dominance of chemical inputs is another recurring issue. The farmers noted that synthetic fertilizers are easy and instant, while organic inputs require preparation. Some farmers become impatient with composting and natural sprays. Government support continues to favor chemical distribution, while DA's organic input distribution is minimal and poor in quality. Hybrid seeds from the DA can only be planted once, forcing dependence on purchases, whereas MASIPAG seeds can be replanted indefinitely.

Lastly, they also cited low farmgate prices and high production costs. For example, labor for plowing alone can cost Php500/day plus meals, with total costs for a quarter hectare reaching Php10,000. Yet, crops such as squash sell at just Php6 per kilo, leaving farmers at a loss.

Wages in farming remain unlivable, and capital does not circulate in the community. Land acquisitions by private corporations and foreign businesses (e.g., Choc 3-in-1 Corporation) further squeeze smallholders.

Identifying solutions

Despite these barriers, the farmers reaffirm that organic farming has clear advantages. Composting with leaves, animal dung, and farm waste has yielded good results, while fermented sprays (e.g., chili, coconut water with salt) effectively manage pests and weeds. Members value intercropping and communal efforts, recalling past successes with communal gardens that produced abundant sitaw (string beans) and other crops. Organic farming reduces input costs, enriches the soil, and ensures healthier food for families.

The farmers proposed the following solutions:

1. Strengthening organizations so they can collectively lobby for programs, fair pricing, and market spaces
2. Advocating for subsidized farm inputs and price stabilization to protect farmers from exploitation
3. Expanding intercropping and diversification to reduce risks from single-crop dependency
4. Sustaining seed-saving practices to avoid reliance on hybrid and purchased seeds
5. Pushing for land reform and secure tenure to free farmers from exploitative tenancy arrangements
6. Reviving community-based marketing and processing (e.g., banana chips, peanut butter, ginger tea/*salabat*) to ensure better income circulation within the community

The farmers agreed that while organic farming is more labor-intensive, it is the only pathway toward long-term soil health, food security, and climate resilience. What they lack are government support, accessible water systems, and stronger collective action. With these, they believe agroecology can expand and truly benefit farming families in Bicol.

Scoring benefits

The participants evaluated the benefits of practicing agroecology. They gave the highest scores (5) to several key benefits: soil health, integration of crops and livestock, pest and weed management, food security, access to local markets, fair distribution networks, reduced production costs, promotion of healthy diets, farmer-to-farmer seed exchange, knowledge sharing, organizational strengthening, and stronger farmer participation in production and marketing decisions. These consistently high scores highlight the direct and tangible advantages of agroecology in improving self-sufficiency, lowering risks, and reinforcing solidarity among farmers.

Some aspects received moderate scores (3-4), pointing to persistent challenges. Water use efficiency (3), biodiversity (3), income growth from farming (3), contribution to employment (3), and farmers' control over seeds, land, resources, infrastructure, knowledge, pricing and natural resources (3) were seen as weaker areas. While agroecology helps reduce costs and risks, participants noted that profits and broader economic opportunities remain constrained by limited market access, land tenure issues, and competition with conventional farming. Employment contribution (3) also

reflects the limited scale of operations. Meanwhile, additional income sources through processing (banana chips, peanut butter, ginger tea) scored a 4, showing the potential of value-adding activities to lengthen product life and raise earnings. Reduced dependence on external aid (4), cooperation and mutual support (4), building networks and alliances (4), and lowering risks of losses (4) were also rated positively but with room for improvement.

Non-practitioners from Tandarora Farmers Association

Members recalled their early attempts at organic farming, beginning in the early 2000s with support from local government and NGOs. In the early 2000s (before Typhoon Reming in 2006), government used to provide some organic supplies.

Farmers tested organic farming after being given a sack of organic fertilizer. But the results were discouraging: more weeds grew, yields were weak, and they had to return to using chemical sprays. Their soil was described as "rusty and sandy," which may have affected the outcome.

Many reverted to synthetic inputs, discouraged by the limited supply of organic fertilizers and absence of soil testing support from the DA. Crops grown in the area included peanuts, tomatoes, cabbage, eggplant, and rice especially during rainy season. Some crops did better, but overall yields were insufficient without additional fertilizer. They felt soil testing would have helped, but the DA did not provide any.

Farmers also experienced problems with exploitative credit schemes, where promised assistance turned into heavy debts and unrealistic yield targets. Irrigation remains a major barrier, with crops often drying up before harvest.

The participants cited reasons for not continuing organic farming:

1. Organic inputs were hard to access or unavailable after local government support stopped.
2. Soil problems (sandy, iron-rich) made organic less effective.
3. Results were inconsistent and yields were low.
4. Irrigation sources dried up during summer, making crops vulnerable.

Despite these setbacks, some farmers continue experimenting with organic practices. By combining organic bio-enzymes with reduced synthetic fertilizers, they have seen improvements in soil condition and yields. This lowers costs and gradually reduces reliance on synthetic fertilizer. This approach, which the Legazpi City Agriculturist calls "balanced fertilization", offers a middle ground for transition.

The group also noted that while they are registered with the government's farm registry (RSBSA), support programs are unreliable—actual farmers are often excluded while non-farmers benefit. Overall, members recognized the value of organic farming but stressed that lack of accessible inputs, poor soil conditions, weak government support, and water shortages prevent them from fully shifting to sustainable practices.

Expressing aspirations

Using the "problem tree" method, the farmers were asked to identify their aspirations ("fruits") in agriculture. They envision a future where production is both sustainable and abundant, allowing them to provide for their families while ensuring long-term soil health and environmental balance. Central to this vision is farmer control over technology and processing facilities, such as owning their own rice mills, so that value from their produce stays within their organizations instead of being taken by traders and middlemen.

They also expressed the desire for adequate support for farm inputs, particularly affordable and accessible fertilizers, seeds, and tools, so that production would not be hindered by lack of capital. Equally important is secure access to land—whether through ownership or guaranteed tenure. Many noted that they still "borrow" or rent lands, and this insecurity undermines their confidence and investment in sustainable practices.

Another aspiration is for fair and reliable markets, where farm products are bought at just prices and farmers are not exploited by traders. Alongside this, they dream of healthy environments and safe, nutritious food for their families, knowing that the health of their communities is inseparable from the health of their farms.

Finally, the farmers emphasized the need for protection and security in times of disaster, such as insurance schemes that would help them recover from typhoons, droughts, or pests. In sum, their vision of "fruits" reflects a holistic goal: not just survival, but dignified livelihoods, healthy families, and empowered communities rooted in sustainable farming.

Identifying deeper problems

The farmers explained that their aspirations for sustainable and secure farming remain out of reach because of multiple barriers deeply rooted in their everyday struggles.

First, they highlighted the absence of crop and production insurance. While such programs exist in name, they are inaccessible to small farmers who cannot meet the many requirements or afford the associated costs. As one put it, "there may be a program, but for us, it feels so far away—maybe too late."

Equally pressing is the lack of capital. With little to no savings, farmers are forced to borrow heavily just to begin planting. Lending practices in the community are exploitative: a sack of palay that could fetch over Php1,000 in the market is often counted as only Php500 when used to repay debt. Creditors are usually neighbors, teachers, or even overseas Filipino worker (OFW) relatives, which adds a layer of social pressure.

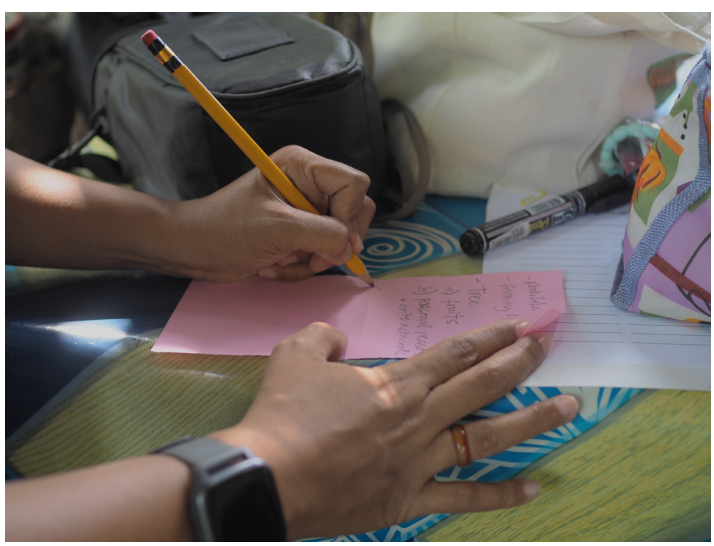
Farmers also lament their limited access to seeds. The seeds distributed by government agencies are not always suited to their soil and climate, sometimes growing well but failing to bear grain due to diseases like *tungro*. To save their crops, they are forced to spray chemicals—yet if they cannot afford the spray, the cycle of debt deepens. Seeds purchased in agri-supply

Story of a young farmer

Jake Abila, 29 years old, a farmer-technician from Farmers' Assistance for Resource Management, Education and Rehabilitation, Inc. (FARMER Inc.), shared his insights as both a practitioner and advocate of agroecology. He explained that climate change is a consequence of humanity's abuse of nature, worsened by the dominance of large companies producing synthetic farm inputs. These inputs, he said, are designed to lock farmers into dependency—such as seed varieties that cannot thrive without chemical fertilizers. The widespread and simultaneous use of chemicals across Philippine farmlands contributes to soil degradation, hardening of the land, and greenhouse gas emissions that intensify climate change.

Jake has been engaged in agroecological practices for nearly two years. He recounts his community's experience with drought, where conventional farms dependent on chemical inputs suffered massive losses. In contrast, his team conducted a "free planting" experiment on half a hectare using inbred rice varieties developed by farmers themselves. Without chemicals and with minimal intervention aside from weeding, they harvested 67 cavans, each weighing more than conventional yields. Production costs were near zero. As they gradually transitioned to using more organic fertilizers, yields rose further, reaching 80–88 cavans per hectare, showing that organic farming can match or even surpass conventional farming while cutting costs. For Jake, the principle of agroecology is that the plant itself determines what nutrients it needs—farmers must observe and respond, not force inputs.

He observed that in areas like Bgy. Cotnogan in Polangui, Albay, agroecology helps farmers survive disasters. While conventional crops fail during El Niño due to lack of water, some

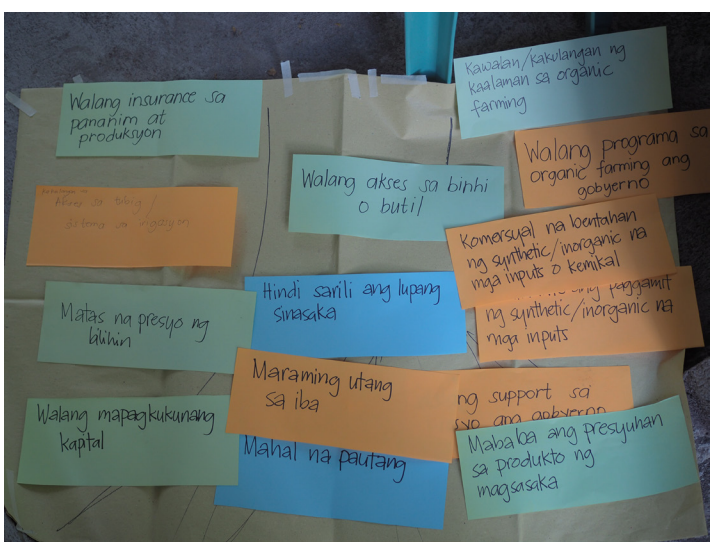


local rice varieties manage to endure droughts and pests. Farmers practicing agroecology conduct trials on multiple varieties, identifying which are most resilient to drought, floods, or volcanic hazards. Jake emphasizes that farmers are scientists and researchers in their own right, developing seeds and practices that work under real conditions. Agroecology is holistic: it includes integrating livestock, growing diverse crops, and producing feeds from plants like Madre de Agua and malunggay, reducing reliance on expensive commercial feeds.

However, Jake highlights major barriers to scaling agroecology. Government policies remain biased toward conventional farming and synthetic inputs, driven by the interests of corporations. Simple, locally available materials for organic fertilizers or pest control (like molasses) are not made accessible to farmers, forcing them to buy inputs they could otherwise produce. He criticizes the monopoly over seeds and farm inputs, which disempowers farmers and keeps them dependent.

For agroecology to expand and serve as a true climate change response, Jake proposes that government must redirect policy and resources: provide free access to organic inputs, support farmer-led seed development, and formally promote agroecology instead of discouraging farming through loans or dependency schemes. Farmers need enabling policies that strengthen their independence and control over seeds, land, and production.

Jake underscores that agroecology is not just a farming system but a path to farmer self-reliance, resilience, and climate adaptation—a practice where farmers reclaim their role as innovators, scientists, and stewards of the land.



stores are expensive, while government-provided seeds are usually hybrid varieties that cannot be reused, locking farmers into dependence.

The rising cost of farm inputs further worsens their situation. Fertilizer prices now reach Php1,800–2,000 per sack, with 7–8 sacks required per hectare. Government support has also declined: while farmers used to receive eight sacks from the DA, they now get only two or three depending on voucher allocations. With little money for inputs, some farmers try to combine synthetic and organic fertilizers, but this is not enough to bring down overall costs.

Linked to this is the dominance of synthetic and commercial farming systems. The farmers noted that chemical inputs are far easier to access than organic ones, making them the default option despite their long-term damage to the soil. Years of reliance on synthetics have left farmlands "addicted" to chemical inputs, further increasing production costs. Meanwhile, government programs for organic farming are either tokenistic or nonexistent—if real support were available, farmers said they would gladly shift more fully to organic practices.

Knowledge and training gaps also pose barriers. Many farmers admitted that they lack sufficient know-how on organic farming. Local governments do not provide training, and while the Technical Education and Skills Development Authority (TESDA) offers free 15-day courses with allowance, few can afford to take the time away from their farms. The farmers stressed, however, that before trainings, irrigation and water access must be prioritized, since without water, even the best farming practices fail. Despite government announcements of drought programs, no concrete assistance has reached them.

Another major problem is the lack of government support for farmgate prices. Farmers shoulder high production costs, yet are forced to sell palay at low prices. Selling to the NFA requires palay to be thoroughly dried, but hiring people to sun-dry erodes any potential income. Thus, they end up selling cheaply to private traders who dictate the price.

Tenancy and lack of land ownership compound these struggles. Tenant farmers must share as much as a third of their harvest with landowners, regardless of yields. For those already in debt, this arrangement means that failed harvests due to drought or pests quickly snowball into deeper indebtedness. Even those with small plots find yields too weak without production support, making ownership alone insufficient without irrigation and input assistance.

Finally, farmers emphasized the growing challenge of water scarcity and irrigation problems, worsened by quarrying and black sand mining in their area. These activities have lowered water tables, disrupted irrigation flows, and damaged dikes, leaving farmlands dry in summer and flooded during rains. The irony, they said, is that local resources are being extracted and sent to Manila and abroad, while their farms suffer from both drought and inundation.

Taken together, these interconnected barriers—lack of insurance, capital, seeds, fair pricing, secure land, and water access, alongside dependence on synthetics and weak institutional support—form the "roots" of their problem tree. These roots choke the farmers' aspirations for sustainable and prosperous farming, making it clear that without structural change, the "fruits" they desire will remain out of reach.

Camarines Sur (Camsur)

Camsur is the largest province in the Bicol Region, covering more than 5,000 sq km in southeastern Luzon. It is bordered by Camarines Norte on the north, Albay on the south, Lagonoy Gulf and the Pacific Ocean on the east, and Ragay Gulf and Burias Pass on the west.[119]

The province is a mix of plains, rolling hills, and volcanic mountains. Two volcanoes, Mt. Isarog and Mt. Iriga, are both dormant but significant in shaping land and soil fertility. Volcanic and alluvial soils support rice, corn, abaca, and coconut production. Meanwhile, the Bicol River, the longest in the region, runs through central towns, feeding rice lands but also causing recurrent flooding. Lakes Buhi and Bato are vital sources of freshwater fish, notable Sinarapan, the world's smallest fish.[120]

Camsur does not have a dry season, with heavy rainfall occurring especially from November to January. This is favorable for agriculture but also contributes to flood and landslide hazards. The province is consistently identified among the most disaster-prone provinces in the country. Located in the typhoon belt, it regularly experiences Storm Categories 4 and 5. Past typhoons such as Reming (2006) and Rolly (2020) caused widespread loss of lives, homes, and livelihoods.[121] [122]

Mountain barangays in Iriga, Caramoan and Mt. Isarog areas face slope failures, such as landslides and mudflows, during prolonged rains. In the coastal towns along Lagonoy Gulf and San Miguel Bay, storm surges and coastal erosion are the key vulnerabilities. Sea level rise is also gradually threatening fishing communities, mangroves, and coastal farmlands.

MASIPAG Camsur PCB

Identifying barriers

The participants represent four POs that are part of the MASIPAG Camsur PCB, namely Camaligan Organic Farmers Association, United Farmers Organization, Bayanihan Organic Farmers Association, and Carangcang Farmers Association.

The FGD brought together smallholder farmers to discuss and reflect on the barriers to agricultural development, drawing from their personal experiences and local situation. Facilitators consolidated earlier discussions and research, identifying major themes such as

corporate control, lack of government programs, weak organization and knowledge sharing, financial challenges, and gaps in support services. Participants were then asked to share which barriers they could most relate to, and to elaborate on how these impact their livelihoods.

1. Debt and Financial Constraints

Farmers widely emphasized the vicious cycle of debt. Crop losses due to calamities or poor yields push them to borrow heavily. With microfinance schemes, borrowers fall deeper into debt when they cannot meet repayments, leading in some cases to the eventual sale of land. Participants stressed the urgent need for sustainable capital support from government programs to break this cycle. Microfinance, while accessible, has proven insufficient and even harmful without broader structural support.

2. Inadequate Government Programs

A recurring concern is the lack of meaningful government support for agricultural development. Farmers reported insufficient subsidies, limited access to training, and programs that fail to address their realities. Government support tends to prioritize synthetic seeds and chemical farming, sidelining organic farming initiatives. Extension workers are generally unfamiliar with organic practices, leaving farmers to rely on their own networks for knowledge. While registered farmers under the RSBSA receive small subsidies (Php5,000), participants noted that these remain inadequate in covering costs and ensuring sustainability.

3. Exclusion in Crop Insurance

Farmers reported barriers in accessing crop insurance. Coverage is often limited to hybrid and patented seeds, excluding traditional and organic varieties. Local technicians sometimes refuse to insure traditional crops, although some regions cover all varieties. This uneven implementation adds to farmers' insecurity and discourages the use of diverse or organic seeds.

4. Organic Farming Challenges

Organic farming was recognized as a promising pathway but beset with multiple challenges. Farmers noted the lack of government programs, shallow initiatives, and limited markets. Misconceptions persist that organic farming is unprofitable and too labor-intensive. Despite this, farmers practicing organic methods highlighted benefits such as reduced input costs and better-tasting aromatic rice that is valued by niche buyers. However, the absence of organized markets forces farmers to rely on individual buyers or suki relationships, limiting income potential.

5. Market and Input Dominance of Synthetic Farming

Synthetic fertilizers and seeds remain dominant due to practice, subsidies, and government promotion. Farmers noted that synthetic inputs are often distributed as subsidies, making them attractive despite their higher long-term costs. Some organic farmers accept these inputs only to sell them, ensuring they remain on government lists. This entrenches synthetic dependence and undermines organic expansion.

6. Weak Farmers' Organizations

Declining membership in farmers' groups was raised as a serious concern. Without strong organizations, it is difficult to share knowledge, secure markets, or advocate for policy support.

Participants cited MASIPAG as one of the few networks with durable organizational strength, underscoring the importance of sustained collective work.

7. Land Ownership and Tenure
The lack of secure land tenure was highlighted as a fundamental barrier. Farmers argued that without ownership, investments and planning are unsustainable. Secure land rights enable farmers to decide on long-term practices, including adopting organic methods. Participants agreed that land and capital remain the twin pillars for achieving sustainable agricultural progress.

The FGD revealed how farmers confront overlapping challenges rooted in debt dependency, inadequate government programs, and systemic bias toward corporate-controlled farming. Despite these, many remain committed to pursuing alternatives such as organic farming and collective organizing.

Scoring benefits

The participants' scoring shows that agroecology is valued highly across multiple dimensions, though with some practical limitations.

Farmers' scoring indicates that agroecology is most appreciated for building farmer cooperation, reducing costs, securing food, and promoting healthy, sustainable systems. However, its potential is limited by infrastructure gaps (especially irrigation), slow soil recovery, and lack of land control. Strengthening support in these weak points could significantly enhance agroecology's benefits.

Scoring results showed that agroecology is most valued for its contributions to food security, reduced production costs, healthier diets, and farmer cooperation. Participants highlighted how seed exchange, knowledge sharing, and collective decision-making empower farmers and strengthen their organizations. These areas consistently received the highest scores.

Moderate scores were given to benefits such as soil health recovery, pest and weed management, biodiversity, market access, income gains, and employment generation. Farmers recognized these as important but noted that outcomes vary with harvests, market conditions, or require longer timeframes, such as soil restoration.

The weakest scores were on water and irrigation efficiency, reflecting the reality that many farms, especially upland, lack reliable irrigation systems. Soil health also received mixed ratings, as farmers acknowledged that while organic farming improves soil in the long term, recovery is often slow.

Overall, the scoring exercise underscored that agroecology provides strong social, economic, and ecological benefits, but its success depends on addressing structural gaps—particularly land, water, and sustained support systems.

Surigao del Sur

Surigao del Sur is a coastal province along the eastern seaboard of Mindanao, directly facing the Philippine Sea. Its capital is Tandag City, with other important centers like Bislig, Hinatuan, Lianga, Cantilan, Lanuza, Tago, Barobo, and Carrascal.[123]

The province's landscape is shaped by narrow coastal plains and bays that are separated by rocky headlands, while the interior rises steeply into the Diwata Mountain Range. A number of short but fast-flowing rivers, including the Tago River and the spring-fed Hinatuan River, drain from the uplands to the Pacific.[124] These geographic features create both opportunities for agriculture and fisheries, but also vulnerabilities to natural hazards.

The province sits within a highly active geologic zone. Offshore to the east is the Philippine Trench, a major subduction zone capable of generating powerful earthquakes and tsunamis. Inland, the Philippine Fault cuts across Eastern Mindanao, exposing communities to strong ground shaking. This was dramatically illustrated in December 2023, when an offshore magnitude 7.4 earthquake near Hinatuan triggered a tsunami that reached up to two meters in height. Such events highlight the continuing seismic risks in the province.[125]

Climatically, Surigao del Sur falls under Type II classification, which means there is no distinct dry season. Rainfall is heavy throughout the year, with peaks from November to January. The Hinatuan weather station consistently records some of the highest annual rainfall totals in the country, often exceeding 4,500 millimeters. This makes Surigao del Sur one of the wettest provinces in the Philippines. Seasonal variations linked to La Niña or El Niño further intensify risks of flooding, landslides, and drought in some areas.[126] [127]

The province's exposure to climate-related hazards is significant. River flooding is a recurrent problem in low-lying municipalities such as Tago, San Miguel, and Tandag. In the uplands, intense rainfall often triggers rain-induced landslides, threatening settlements along mountain slopes. Typhoons from the Pacific frequently bring destructive winds and heavy rains even without direct landfall, while coastal barangays remain highly exposed to storm surges and, in rare cases, tsunamis.[128]

Practitioners

Identifying barriers

The FGD participants were a diverse group of smallholder farmers—men and women aged 30s to 70s—from Davao, Bukidnon, Bohol, Cebu, Leyte, Dinagat, Tagum, and San Miguel. Most cultivate small plots of 1-2 hectares, often rice-based but sometimes combined with fishponds, coconut, or livestock. While some remain reliant on synthetic farming, many have shifted or are transitioning to organic farming inspired by trainings, campaigns, and personal experience with debt and input costs.

Farmers shared challenges with land tenure, debt cycles, irrigation, high costs of inputs, weeds, and weak markets, but also expressed commitment to agroecology for its health, environmental, and livelihood benefits. The group included both new entrants and long-time practitioners, as well as indigenous people, reflecting the breadth of experiences and perspectives shaping the push toward sustainable farming.

Overall, in San Miguel, farmers identified a consistent theme: the absence or failure of government support is the biggest barrier to expanding organic agriculture. While laws and programs exist on paper—such as the Organic Agriculture Act or climate and environmental policies—they rarely reach the grassroots. Instead, farmers experience neglect, exclusion, or even contradictions, where government simultaneously calls for environmental protection but permits logging, mining, and synthetic farming.

Participants emphasized that there are no meaningful programs for organic farming, no price support, and very limited local research and extension. Credit remains a trap, with high production costs and low farmgate prices forcing farmers into debt. Even safety nets like insurance discriminate against organic farmers, who are often denied coverage unless they misrepresent themselves as conventional growers.

Beyond the farm, structural issues of land and governance compound the problem. Farmers lack secure land tenure, while agrarian reform remains stagnant. Corruption and poor implementation mean that social protection and aid programs are diluted or captured by intermediaries, leaving the poorest empty-handed. Indigenous communities highlight how government licensing favors corporations over ancestral land rights, worsening dispossession and marginalization.

For many, the dominance of synthetic farming in surrounding communities also discourages organic expansion. Neighbors see faster yields with chemicals, reinforcing skepticism toward organic practices. Despite this, participants acknowledged the resilience of organic methods, particularly in reducing debt and reliance on external inputs.

The FGD revealed that barriers to organic farming in San Miguel are not simply technical but deeply structural and political. Farmers view the government's lack of coherent programs, weak support systems, and tolerance for destructive industries as the root causes that undermine agroecology. Without addressing these systemic issues—capital, land, fair pricing, market

access, and genuine environmental governance—organic farming will struggle to move beyond scattered individual efforts.

Scoring benefits

Most benefits were rated 5 (highest), showing very strong appreciation of agroecology across social, economic, and environmental dimensions. A few items received 4 or 3, usually linked to practical constraints, such as limited irrigation, few livestock, marketing challenges, and pest pressure.

Farmers gave top scores to almost all benefits, showing strong confidence in agroecology: soil management; water use—except some lower ratings due to weak irrigation; crop–livestock integration; pest management, if farmers are diligent; biodiversity; food security; local market sales – overall benefit, despite some struggles; increased income, lower costs, reduced risk of loss; less reliance on aid; healthy diet and livelihood; seed exchange among farmers; strengthened farmer knowledge and skills; cooperation; stronger farmer organizations; farmer participation in decisions; control of resources (seeds, land, knowledge, prices, environment); and building networks and alliances—although many depend on municipal or personal connections.

Some benefits were recognized but noted with challenges: water/irrigation – systems too small or weak in some areas; crop–livestock integration – limited by having only one type of livestock or being new to organic; pest management – weeds are harder to control; organic cannot fully eliminate viruses compared to chemicals; local market sales – organic products are harder to sell; higher prices – more work to find buyers, some buyers demand cheap but high-quality goods.

Non-practitioners

The respondents are small to medium-scale rice farmers (1-10 ha), aged 32 to 49 years old, mostly from San Roque, Patong, Barahas, and nearby barangays. Land tenure is mixed—some own titled lands, while others farm as tenants or through mortgages (sanla) and other land reform schemes. While rice is the backbone of their livelihood, secondary crops supplement food and income. Membership in irrigation associations is key for water access, but broader farmer organization is weak. Issues of land ownership, market viability, and organizational strength continue to shape their farming realities.

The participants were asked to pick a "fruit" to symbolize their aspirations for farming and community life. Each farmer explained why they chose their "fruit," linking it to their vision for the future of agriculture. The discussion revealed a range of dreams—some personal, others collective—but all grounded in the everyday struggles and hopes of small farmers.

Expressing aspirations

1. Control and Ownership

Several participants expressed the aspiration of farmers to have control over land, production, and marketing. They stressed that it should be farmers, not traders or corporations, who set the prices of their products. This reflects a strong desire for autonomy in the value chain, from

production to sale, and an end to dependence on middlemen. Land reform came out strongly as an aspiration: genuine agrarian reform where those who till the land are its rightful owners. Participants also discussed the idea that land should not remain under the monopoly of large landlords and corporations, rather accessible to those willing to cultivate it.

2. Support for Production and Marketing

Participants highlighted the need for capital, fair price support, and inputs. Many shared their experience of being trapped in debt because of the high cost of farming inputs and low farmgate prices. They aspire for government programs that provide direct financial support, as well as subsidies for fertilizers, pesticides, and other inputs, so they do not have to borrow at high interest rates. Equally important for them is support in marketing—to be able to bring products directly to the market and sell at fair prices, without losing control to traders.

3. Sustainable and Continuous Production

Another aspiration was for sustainable, continuous, and productive farming systems. Participants wanted to see their farms flourish year-round, producing both staple crops and vegetables for household nutrition. Some highlighted the dream of having guaranteed access to markets so that produce is not wasted and family income remains stable.

4. Nutrition and Family Well-Being

Nutrition was identified as a core aspiration. Participants spoke of planting vegetables and ensuring a balanced diet for their families. This shows how aspirations are not limited to economic gain but also to health, well-being, and food security at the household level.

5. Organic Farming and Health

Organic farming emerged as a major aspiration. Farmers acknowledged the health and environmental benefits of farming without chemicals and expressed the desire to fully transition. However, they also admitted the difficulties: lack of organic inputs, composting facilities, and support systems. Despite the challenges, they see organic farming as a long-term dream for healthier families and climate-resilient agriculture.

6. Insurance and Protection from Calamities

Participants also raised the aspiration of comprehensive insurance coverage. While some have crop insurance, they noted limitations such as narrow criteria and bureaucratic requirements. They dream of universal insurance for all farmers, especially during calamities, without burdensome conditions.

7. Indigenous and Historical Perspectives

Indigenous participants emphasized the importance of protecting ancestral lands from corporate encroachment and land conversion. They linked their aspirations to historical struggles against colonizers and landlords, reiterating that land to the tiller should be the guiding principle.

Overall, the exercise showed that farmers' aspirations go beyond individual survival—they envision systemic change where land, markets, and resources are placed under the control of those who till the soil. While many of these remain dreams due to lack of support, the discussion revealed a clear vision of self-reliance, justice, and sustainability at the heart of their struggles.

Conflicting signals from the national government

Ms. Rosemarie M. Ganate is a Licensed Agriculturist at the Department of Agrarian Reform (DAR)-Office of the Provincial Agriculturist (OPAG) in Surigao del Sur.[129] She recounts the multiple hazards the province faces every year—typhoons, floods, flash floods, and unpredictable rains. Earthquakes also strike, and when they do, they trigger landslides that cut off transport and isolate communities. While other provinces may worry about drought or El Niño, their experience is different—they almost always have rain. Still, Ms. Ganate surmises that they are not spared from the impacts of climate change; weather patterns are no longer predictable, and farmers cannot plan with certainty.

Agriculture suffers the most. Every year, crops, especially rice fields in San Miguel, are damaged by flooding. When strong winds arrive, farmers cannot harvest their palay. Fisherfolk are equally vulnerable, with Surigao del Sur being mostly coastal, typhoons keep boats from going out to sea, cutting off daily incomes. In almost all cases, livelihoods in farming and fishing take the biggest blow, more than housing or infrastructure.

As a government official, she laments that assistance has been problematic. There was even a case where Php10,000 aid was allocated for "drought victims", although no drought occurred in the province. Real farmers questioned why some genuine RSBSA-listed farmers were excluded while non-farmers and new registrants benefited. The reason is political, Ms. Ganate says, barangay lists are sometimes influenced by local leaders, especially with elections coming in 2025.

As a provincial office, she relates that their role is mainly technical. Quick-response relief for calamities often goes to coastal communities. For farmers, they rely on the national DA office, and the help that arrives is often delayed. This leaves many farmers feeling unsupported at the very moment they need help most.

Her office carries out regular programs: livestock, crop research, extension services, and capacity-building for rural organizations and cooperatives. For climate adaptation, they have long tried to implement organic agriculture, in line with the Organic Agriculture Act (RA 10068, amended by RA 11511).

But implementation is weak. Out of 19 municipalities and 2 cities, only five LGUs have active organic programs. Why? Ms. Ganate enumerates some of the reasons:

1. Budgets are insufficient. Under the Mandanas devolution, responsibilities were downloaded to LGUs but without clear, earmarked funds for agriculture.
2. Extension staff are too few. Some large municipalities have only three extension workers who must also cover nutrition and gender programs.
3. Leadership changes break continuity. A mayor supportive of organic farming may push programs for three terms, but once defeated, the new administration may shift priorities to infrastructure.

4. Conflicting national signals. Government gives synthetic seeds and fertilizers on one hand, while promoting organic on the other hand. Synthetic inputs are distributed from national programs, while organic remains underfunded.
5. Loss of farmer training pipelines. TESDA's organic NC II program was stopped, leaving fewer opportunities for skills-building.
6. Aid and programs are politicized. Relief distribution, and sometimes even agricultural programs, get tied to politics.

These barriers have discouraged farmers. They want to try organic, but when support for organic inputs is limited and floods wipe out their efforts, they return to synthetic inputs.

Not everything is bleak though, Ms. Ganate hopes. San Miguel has a mayor who is committed to organic farming. In 2023, the entire municipality held barangay-wide trainings on organic awareness. Farmers saw the benefits: organic rice resisted lodging during typhoons and gave higher yields over time. Learning sites accredited by Agriculture Technical Institute (ATI) also provide venues where farmers can see diversified organic systems in action.

The province also has seven operating Kadiwa stores where, according to Ms. Ganate, farmers can sell their produce. One organic trading post exists, built with DA support, to ensure genuine organic products reach consumers. Youth internship programs further bring younger generations into farming, offering stipends and start-up capital.

Despite these difficulties, the provincial agriculturist recognizes organic agriculture and diversified farming are vital for climate adaptation. Farmers themselves testify that yields improve, inputs decrease, and crops withstand storms better. NGOs like MASIPAG have helped them fill some gaps.

Harassed and red-tagged

The Farmers Learning Center for CARAGA, Inc. (FLCCI) was established in 2003 at the request of local POs. With support from religious congregations and advocates, it was created to build the capacity of farmers in sustainable and organic agriculture.[130]

Initially, FLCCI's mandate was straightforward: conduct trainings on organic methods in rice, corn, and livestock production. Over time, however, it became clear that classroom trainings alone were not enough—farmers needed to see and experience sustainable farming firsthand. By 2013, several POs transferred management of their farms to FLCCI – 8 ha in Sta. Cruz, 2 ha in Umidos, and 10 ha in San Francisco, Agusan del Sur. This allowed FLCCI to establish trial and multiplier farms, and these became demonstration sites where new varieties could be tested, and successful practices mass-produced and shared.

Alongside trainings, FLCCI also provided seedlings, fertilizers, and inputs to encourage crop diversification and help both tenants and small landowners adopt organic methods. Its partnerships extended to dioceses, parishes, schools, and even teachers, spreading sustainable agriculture to faith communities and students.

While FLCCI focused on training, the POs concentrated on broader campaigns: lowering land rents, pushing for land ownership, and asserting farmers' rights. FLCCI's farms and programs complemented these campaigns by showing viable, diversified organic systems.

At its height, FLCCI managed or co-managed around 28 hectares of farmland and maintained around 19 learning sites across the region. These served as field schools for youth from institutions like Tribal Filipino Program of Surigao del Sur (TRIFPSS) and Alternative Learning Center for Agricultural and Livelihood Development, Inc. (ALCADEV), who did two- to three-month internships before graduation. The Center also incorporated climate change programs, establishing nurseries for indigenous and fruit trees, and training farmers in food security, mitigation, and adaptation strategies.

But eventually, FLCCI's work was severely undermined by state harassment and militarization. There were instances of persecution, which worsened under the Duterte administration. POs collapsed as leaders were harassed, some even killed, and many members forced to surrender. The military and police surveilled meetings and trainings, especially those in upland

or remote areas. Soldiers demanded to be present in community gatherings, creating fear and discouraging participation.

Farm operations shrank. From 8-10 staff maintaining farms, only one or two caretakers remain. Farms that once functioned as active training sites now survive in maintenance mode. Once active across CARAGA, FLCCI now works mainly in areas with "friendly LGUs."

Farm productivity has declined. Trial and multiplier farms cannot be fully maintained anymore, reducing their role as training centers. Many former farmer members of the PO, KAMAS, and other POs abandoned organic farming after persecution. Some were reorganized by the military as "showcase rebel surrenderees."

This climate of fear disrupted partnerships. Although the Diocese of Tandag remains a supportive ally, most parish priests are hesitant to engage openly in advocacy. Even LGU collaborations are fragile, often shifting direction depending on political leadership.

Today, FLCCI retains about 16 hectares under its management, but these are underutilized. There are efforts to revive farm operations with partnerships, yet fear and instability remain major obstacles.

FLCCI maintains that sustainable agriculture is the long-term strategy for climate change mitigation and adaptation, but several barriers block its scaling up, mainly state harassment and repression.

Despite setbacks, FLCCI continues to pursue its mission. It sustains remaining farms as trial and learning sites, maintains climate programs through nurseries and training modules, and builds partnerships where possible with dioceses, select LGUs, NGOs, and schools. It recognizes, however, that rebuilding requires more than technical inputs, it demands security, political space, and consistent allies.

FLCCI's journey underscores how agroecology and climate resilience cannot thrive in an atmosphere of fear. Unless farmer organizations are protected and local leadership provides stable support, the gains of two decades risk being permanently eroded.

Agroecology as part of vocation

When the current parish priest arrived in 2021, he stepped into a landscape where "Convergence 1" – a multi-sector alliance that once drew together the parish, LGU, academe, and POs – had been dormant for five years. The previous leadership had gone quiet; POs had largely dissolved.

Rather than invent something new, Fr. Rodrigo P. Milo restarted the alliance as "Convergence 2," out of respect for the original effort and to honor the institutional memory it carried. In this second iteration, the parish, LGU, and the Northeastern Mindanao State University (NEMSU) became the active anchors, filling the vacuum left by the weakened POs and signaling that Church and local government could shoulder the work of public good together.

In his first year, Fr. Rodrigo did something simple yet radical: he listened. He did household visits, conversations, and consultations. Two urgent needs surfaced repeatedly: disaster preparedness and agriculture. On agriculture, he heard a pattern where farmers were stuck in a transactional frame (*"Magkano ang kita ko?"*), often dependent on government assistance (*ayuda*). The parish's response was to re-root farming in relationship and responsibility – an older, local ethic of caring for land, community, and health. That naturally pointed the Church toward organic agriculture – not as a niche technique, but as a moral and practical stance for climate resilience and food security.

Farmers had attended many seminars before, the priest recalls, yet field failures persisted because support ended at theory. Convergence 2 therefore shifted the method. The parish staff and lay leaders are planting with the farmers, sharing risk and pushback.

Leadership by example. The priest's physical presence—sweating in fields, organizing planting days, mobilizing volunteers—became a cultural signal. *Bayanihan* was revived. Chapel-level "edible landscaping" and group planting turned curiosity into participation as neighbors came to see organic plots performing well.

From relief-mindset to readiness. Because aid is never immediate, disaster preparedness has been woven into the agriculture program. The parish coaches families to plan for 3–5 days of self-reliance after floods or disruptions.

Systems of support. The bishop is convinced and actively courting NGO partners. The parish has also raised Php3 million over two years from small local contributions, proving that people will invest when they see communal benefit and trusted leadership.

When asked what hazards the community faces, Fr. Rodrigo identifies floods and armed conflict. Flooding is the dominant hazard, he says, but armed encounters occur intermittently in upland barangays. Recent bombing operations by the military have briefly kept indigenous farmers from their fields. The parish folds this reality into programming: organic plots are distributed, small, and low-input, so families can restart quickly after disruptions.

Why organic? The priest is frank: his personal interest in organic came from the community's need. He learned alongside farmers and tapped local practitioners from MASIPAG, because the parish's

role is to broker skills into communities, not to own expertise. Theologically and pastorally, organic aligns with care for creation, health, and fairness, while practically offering lower external input costs, soil recovery, and climate resilience. Parish formation thus links spiritual life with daily agrarian practice—a cultural repair project as much as a technical one. Fr. Rodrigo identifies the barriers that the parish is working through:

Economic pull of patronage. When government programs promise cash or inputs, many households follow short-term incentives. The parish counters by promoting diversified livelihoods to reduce dependency and ensure smooth cashflow between harvests.

Political tides. Communities tend to "lean with the leader." Parish continuity helps, but LGU shifts can stall efforts. Convergence 2 mitigates this by broadening ownership (chapel-level groups, school tie-ins) so momentum doesn't hinge on a single office.

Volunteer fatigue. With fewer material incentives, the work relies on mission-driven volunteers. The parish addresses this through recognition, small wins, and visible plots that reinforce meaning and payoff.

Stigma and skepticism. This fades when organic fields stand up to weather, weeds are managed by group labor, and harvests improve. Demonstration is the antidote.

To keep Convergence 2 from repeating past disruptions, the parish is institutionalizing three safeguards:

1. ***Farmer-held conviction.*** Move motivation from "Father's project" to "Our way of life," so farmers continue even when clergy are reassigned.
2. ***Layered leadership.*** Chapel leaders, lay ministries, and LGU partners share roles; there is no single point of failure.
3. ***Practice-first pedagogy.*** Every training has a planted plot, a calendar, and follow-through visits, until families can farm independently.

In San Miguel, the parish has become a social backbone for organic agriculture—listening first, showing up in the fields, and stitching together LGU, school, and lay energies. The work is slow and sometimes exhausting, but it is bearing cultural fruit: renewed bayanihan, confidence to plant organically in public, and a growing generation of families who see food, faith, and climate resilience as one and the same vocation.

Teaching climate resilience

When Mr. Romnick Guillermo, a faculty instructor-entomologist at the NEMSU–San Miguel Campus, reflects on climate and agriculture, the discussion starts with the place. San Miguel is hilly, and unlike many lowland schools, the campus itself rarely gets flooded.

Since 2020, it has seen frequent rains across seasons and only short dry spells. Earthquakes are the more regular shock. Yet the real environmental stressor is quieter: the steady conversion of timberland into agricultural parcels, fueled by settlement, smallholder expansion, and the spread of falcata and coconut with abacá understory.

In the instructor's entomologist eye, this conversion shows up first in the insects: species once common in forest margins decline or disappear under falcata's acidifying leaf litter; campus records of tarsier sightings foreshadow a broader displacement of native fauna. On paper, much of San Miguel campus (approximately 789 ha, spanning parts of three barangays) is timberland. In practice, jurisdictional overlaps (DENR, DAR, Executive Order 75) and land disputes weaken protection and enable piecemeal conversion.

From yield trials to ecology and a pivot to 'climate-smart agriculture'

NEMSU–San Miguel's mandate is shifting. Historically, student work skewed to applied yield research. But faculty now push a return to basics—taxonomy, biodiversity, and ecosystem function—because the campus remains a rare upland mosaic where ecological signals are still visible. The instructor's team is building an arboretum/reforestation block and tracking insect community changes over time. In parallel, agriculture programs are being reframed under a Center for Climate-Smart Agriculture.

IPM as core. Chemicals are taught as last resort, with proper pesticide handling and environmental fate emphasized (e.g., why canal dumping poisons aquatic food chains students themselves rely on).

Biocontrol trials. Student groups test entomopathogenic fungi against emerging rice pests (e.g., the "rice green bug"), aiming to pre-empt chemical dependence where commercial controls don't yet exist.

Variety-pest mapping. A province-wide survey catalogs rice varieties' susceptibility by municipality to guide locally adapted choices.

Adaptability studies. Before promoting new crops (abacá, high-value species), teams ask the basic question too often skipped: Will it grow here under San Miguel's humidity and soils?

Mitigation pilots (forestry link). Exploratory biogas work from agricultural/animal wastes complements adaptation research.

Crucially, the instructor teaches why there are no "pests" in ecology, only organisms doing what they do. "Pest" is the human label that appears when forest becomes grassland and becomes farm, and insects displaced by conversion must feed somewhere—our crops. That ecological literacy underpins the campus pivot: reduce the drivers (conversion, blanket spraying) and strengthen living controls (diversity, refuges, biological agents).

Education strategy: grow the next farmers, not just the crops

A frank assessment runs through the interview: changing current farmer behavior is hard. Many older farmers have settled practices, are drawn to immediate cash/in-kind incentives, and perceive organic methods as laborious and slow to pay back. Even well-attended municipal seminars sometimes end in low adoption once the giveaways stop.

The campus strategy therefore concentrates on the students – the future farmers-scientists. Lectures are paired with hands-on, low-cost builds (edible landscaping, container plots), precision demonstrations (e.g., drone spot-spraying as a transitional tactic to shrink chemical footprints), and visible bioindicators (fireflies disappearing where trash burning and sprays intensify). Students then carry these ideas home, often debating parents who "have always done it this way." The instructor accepts this friction as pedagogy: it signals that a next generation is more open to innovation and environmental accountability.

What's blocking the scale-up of agroecology

1. ***Fragmented land governance & creeping conversion.*** Timberland status without effective control invites gradual forest-to-farm shifts, eroding biodiversity buffers that make farming easier.
2. ***Bureaucratic drag.*** Ironically, those who follow rules (e.g., biodiversity collectors with permits) can be slowed by permitting, while non-compliant activities proceed, sapping morale and delaying ecological baselines needed for evidence-based policy.
3. ***Fast cash.*** Organic inputs feel costly upfront; practices like straw return (no burning) are labor-intensive. With thin margins, smallholders default to the quickest, cheapest option, such as blanket sprays.
4. ***Social context.*** A lone organic farmer surrounded by chemical users becomes a pest magnet. Benefits collapse without a community-wide transition.
5. ***Risk memory.*** Farmers recall failed "introductions" (e.g., abacá seedlings not adapted locally), fuelling distrust of new proposals unless local trials precede promotion.

What's working and where to push next

The most promising adoption curve runs through the youth. Today's agriculture students propose solutions that they can demonstrate cheaply. Community is the unit of change. The instructor is clear: organic must be territorial, not individual. Asked if sustainable agriculture is attainable, the instructor rates the current generation of farmers at 5/10 and the next generation at 7–8/10. The gap is not in science so much as in systems: aligning governance, economics, and social scales, i.e. moving whole communities.

On campus, fog still rolls over upland plots and fireflies still flicker—reminders that San Miguel retains its ecological capital. The task, as Teacher Romnick frames it, is to teach adaptation by rebuilding ecological checks and balances and letting the next farm be with the system and not against it.

Kabankalan, Negros Occidental

Negros Occidental is the western half of Negros Island in Western Visayas. It is bounded by the Visayan Sea in the north, Panay Gulf in the west, Tañon Strait and Negros oriental on the east and southeast, and the Sulu Sea in the southwest.[131]

The terrain consists of wide plains, gentle slopes in the north and central zones, and mountainous or hilly areas in the southwest. Negros Occidental features a predominantly volcanic landscape, with active volcanoes, Mt. Kanlaon and Mt. Mandalagan, and rich agricultural soils, making it ideal for agriculture but also exposed to major natural hazards such as typhoons, floods, droughts, earthquakes, and volcanic eruptions.[132]

The province's hazard level with typhoons and flooding is high. Typhoon Odette in December 2021 for instance caused severe flooding in Kabankalan. The Ilog-Hilabangan basin is a known flood hotspot.[133]

The province also experiences heat and rainfall extremes, with increases in dry-day counts, with implications for flood peaks, heat stress, and drought spells that affect water and agriculture. The loss of forest cover and high livestock density also increase hazard impacts, especially for water access and agricultural productivity.[134]

Practitioners

Identifying barriers

The FGD gathered nine smallholder farmers from five POs, namely Asosasyon sang mga Mangunguma kay Mamumugon sa Barangay Camigauan kay Oringao (AMMCAO), Asosasyon sang mga Mangunguma kag Mamumugon sa Lupni nga Naga-updanay (AMMLU), Buhi nga Aksyon para sa Kauswagan kag pag Amlig sa Seguridad sa Mangunguma kag Mamumugon (BAKAS), Paghiliusa sang mga Mangunguma kay Mamumugon sa Salong kag Camansi (PAMANGAS-CA), Caliling Small Agricultural Workers Association, and the Paghiliusa sa Agricultural Workers and Small Fishermen nga may Inisyatiba sa Barangay San Juan (PAWIS). Participants are in their 40s–60s, mostly long-time residents of Negros Occidental. There are two migrants – one from Bicol Region and another from Cebu. The group blends rice growers, corn farmers, and mixed-crop practitioners, reflecting the province's upland and lowland production ecologies.

Landholdings are predominantly sub-hectare, with individual plots ranging from 0.30 to 0.81 hectare. Beyond individual plots, participants maintain shared learning spaces—a 0.50-hectare trial farm and a 2.5-hectare communal plot—used for varietal testing, soil-fertility practices, and collective experimentation.

Palay is the anchor crop for most, complemented by corn, vegetables (including patola and munggo), root crops (taro and others), fruit trees, and coconut. Several participants practice diversified integrated farming systems (DIFS) with small livestock and poultry, aquaculture (shrimp, eel), and simple value-adding processing (dried fish, virgin coconut oil), which spreads risk and adds income streams.

Organic agriculture is a clear throughline. The cohort includes an early adopter who has practiced organic since 1998, a second wave beginning around 2017, and a strong cluster that transitioned in 2019-2022, with continued skills upgrading in 2023 focused on DIFS and soil fertility management.

One participant is a MASIPAG farmer-trainer with a leadership track from 2013 to 2023 across regional and national bodies, while others hold vice-chair roles in their associations, positioning the group for peer-to-peer mentoring, seed diffusion, and coordinated field trials.

Overall, the participants represent an experienced, networked, and practically oriented set of farmer-leaders. Their mix of small plots, communal/trial areas, integrated systems, and organizational roles provides a strong platform for piloting climate- and market-resilient practices.

They identified the barriers to scaling agroecology, as follows:

1. Dominance of Synthetic Farming and Contamination

The widespread use of synthetic farming is the biggest obstacle to organic practice. Even when they use organic methods, neighboring farms that use chemical inputs contaminate their land and water. Rainwater run-off and shared irrigation channels carry chemicals into their fields, making it difficult to maintain organic integrity or achieve certification. Farmers attempt to use buffers and wells, but contamination remains unavoidable.

They also emphasized the double standard in regulation: organic farmers face stricter requirements and penalties (e.g., using the word "organic" without certification can lead to imprisonment), while chemical-intensive farmers, whose practices harm health and the environment, operate freely with little oversight.

2. Lack of Secure Land Tenure

They pointed out that many farmers do not own the land they till. Because they have no security of tenure, they hesitate to invest in long-term organic conversion. Agrarian reform programs remain incomplete or are being reversed, with landowners reclaiming land or burdening farmers with amortization. Without genuine agrarian reform and state support, farmers remain insecure and under-capitalized.

3. Inadequate Infrastructure

Farmers cited the absence of farm-to-market roads, reliable irrigation, and basic support facilities. Generations have waited for proper roads, but none was built; farmers had to create makeshift paths through Bayanihan just to move their produce. Others describe how government road projects benefit developers and plantations rather than small farmers. In fact,

these projects even displace farmers. Irrigation access remains limited, forcing dependence on rain or makeshift wells.

4. Weak Knowledge Support
Limited training remains a barrier. While some farmer youths participate in MASIPAG farm schools, programs are still in their infancy, with only a few batches trained. Formal institutions like state universities offer agriculture courses but provide little genuine support for organic farming. Farmers stress the need for more consistent education, farmer-to-farmer knowledge exchange, and community-based schools.

5. Limited Market Access and Price Support
Marketing remains a major challenge. Farmers cannot easily bring their products to markets, and when they do, traders control prices. There is no government price support for organic products. As a result, even when farmers succeed in production, they still struggle with fair returns.

6. Government Neglect and Contradictory Policies
The participants agreed that government programs often hinder rather than help agroecology. There are ordinances and focal persons for organic farming, but these are often "double-faced"—appearing to support organics in meetings while siding with conventional farming and agribusiness in practice. Government prioritizes imports and chemical-based farming over genuine support for local, organic initiatives.

7. Organizational Weakness
Some participants admitted that weak organizations and limited participation reduce their bargaining power. Red-tagging and militarization further weaken farmer associations, creating fear and reducing mobilization. Farmers emphasized that only through strong and united organizations can they press for policy changes, access resources, and protect their rights.

Scoring benefits

Scoring showed that farmers see agroecology as strongly positive, particularly for soil health, reduced costs, healthier food, and stronger collective control over resources. These are the areas where confidence is highest.

However, the lower and mixed scores—especially on water management, pest control, biodiversity, food security, and marketing—point to where further support, training, and organizing are needed. Farmers noted structural barriers: contamination from surrounding chemical farms, limited irrigation and infrastructure, lack of capital for full integration, and inadequate market support systems.

In conclusion, farmers value agroecology not just for its direct benefits but also for its social and political dimensions—strengthening organizations, asserting control over resources, and building unity. Yet for agroecology to fully reach its potential, gaps in infrastructure, technical support, and market access must be addressed.

Non-practitioners

There were 10 respondents from POs such as Asosasyon sang mga Mangunguma kag Mamumugon sa Bgy. Orong (AMMBO), Kauswagan sa Bino para sa Buhi kag hilway nga Pangabuhian (Kabuhian), and Katilingban sang mga Mangunguma kag Mamumugon sa Malasbalas kag Labamba (KAMALEG). Ages range from 36 to 77, skewing toward senior farmer-leaders who hold positions in the organizations. Their land sizes range from 0.20 to 129 hectares owned by collective CARP beneficiaries. One participant also occupies public land where parts are titled but being reported under private quarrying claims by Zayo Corporation—a tenure flashpoint affecting around 200 families over roughly 300 hectares. At the other end of the scale, two participants manage 20-30 hectares of sugarcane plantations and participate in 34-hectare communal farm, indicating the presence of larger planters alongside smallholders within the same networks. Overall, the group is a mix of small plots, communal farms, and larger holdings, with the production base anchored on sugarcane and complemented by palay, corn, and vegetables.

Expressing aspirations

The participants were asked to pick a "fruit" to symbolize their aspirations for farming and community life. Each farmer explained why they chose their "fruit," linking it to their vision for the future of agriculture. The discussion revealed a range of dreams—some personal, others collective—but all grounded in the everyday struggles and hopes of small farmers.

1. Land and Control
Farmers consistently highlight the need for genuine land reform, ownership, and control of production including processing. They see land, free from landlord and corporate control, as the foundation of stable livelihood and autonomy.

2. Capital and Resources
The lack of financial support forces farmers into debt. They dream of state-backed credit and input subsidies to break free from usurious loans and middlemen.

3. Fair Prices and Marketing Support
Farmers aspire to control the pricing and sale of their products, without exploitation by traders.

4. Sustainable and Organic Farming
There is strong desire to shift toward organic farming, motivated by concerns for health, environment, and climate change. However, lack of inputs and support remains as barrier.

5. Nutrition and Family Well-being
Beyond livelihood, farmers want their families to have balanced diets and access to healthy food.

6. Insurance and Risk Protection
Participants dream of comprehensive, accessible, and fair insurance coverage to shield them from calamities.

Overcoming barriers

The participants were asked to identify the main problems they face as farmers and to propose possible solutions. The discussion was rich, emotional, and grounded in lived experiences of land struggles, state neglect, and everyday survival.

1. Land Conflicts and Defense of Farms

One participant shared that their foremost struggle is the defense of land they have tilled for decades. Despite farming for over 75 years, he faces encroachment by new claimants backed by lawyers and money. Farmers tore down fences erected by outsiders and were even confronted by police and lawyers representing the landlords. He insisted that the supposed land titles of claimants were fake, lacking DENR signatures, and that the real solution is to stand firm and continue cultivating the land.

2. Reclassification and Land Conversion

They explained the serious impact of land reclassification. Although awarded CLOAs (Certificates of Land Ownership Award) decades ago, their farms remain under threat from landowners and developers who use Republic Act 7160 to reclassify agricultural land into residential or commercial use. This has dispossessed many farmers and weakened their food security. The farmers' collective demand is for the government to "scrap reclassification" and "stop land use conversion" that undermines agrarian reform.

3. Militarization, Harassment, and Red-tagging

Participants also identified militarization and the Anti-Terror Law (ATL) as major barriers. They highlighted how the ATL and the National Task Force to End Local Communist Armed Conflict (NTF-ELCAC) brand protesting farmers as "terrorists," scaring communities from mobilizing. Farmers spoke of red-tagging, harassment, and even women being forced to guard barricades while men continued plowing. These conditions weaken organizations and stifle farmers' struggles. The solution, they said, is to demand the repeal of the ATL and defend farmers' rights to organize and protest.

4. Unity as a Solution

They shared stories of enduring landowner strategies to divide farmers, including offers of separation pay, gifts of livestock, or food meant to entice loyalty. Despite intimidation, hunger, and even red-tagging, they stress that unity is the key: "Walang iwanan" (Leave no one behind). They say that solidarity across associations strengthens their collective voice: "When we stand together and hold hands, we can push our rights forward."

5. Calls for Genuine Land Reform

The most consistent aspiration raised is genuine agrarian reform. Farmers stress that land should be distributed to farmers, not controlled by capitalists or a handful of landlords. With 70% of the population being farmers, redistribution of large estates would provide sufficient land for everyone in need. The farmers affirm their willingness to mobilize and rally to demand genuine land reform from the government.

No pedagogy for agroecology

Ms. Dyan Monteclaro and Mr. Andy Masada are senior high school teachers of agriculture technology at Florentino Galang Sr. National High School.[135] Both describe a school where climate change is acknowledged but thinly integrated, especially in agriculture course where enrollment is tiny compared to academic strands. While the school division tells all teachers to "integrate" climate change, the depth largely depends on a teacher's personal advocacy. With many new generation teachers focused on coverage of the prescribed competencies, climate themes often remain minimal.

A previous principal, Sir Jolly Gariando, proved how leadership matters. Under his tenure the school won environmental awards, enforced a no-plastic policy, and backed organic agriculture activities after class. Since he moved, overall budget cuts and a more conventional leadership style have dulled momentum; agriculture gardens that once won contests are now unmaintained.

Inside classrooms, the teachers push organic agriculture as both science and solution. They see strong potential if adoption is supported and scaled. Yet, teachers also face the classic "island effect", i.e. when one garden goes organic beside chemical farms, displaced insects concentrate there, yields suffer, and students see discouraging results. Without community-wide practice, early adopters are punished.

Beyond pedagogy, they critique the policy vacuum. National rhetoric on climate action, they say, rarely reaches schools as resourced programs. Teachers implement what "the top" prescribes, without clear mandates, budgets, and tools. Integration relies on personal conviction and personal spending.

They also link the issue to markets. Organic produce is priced for affluent buyers, while genuine organic is indistinguishable in the market, as traders often mix it with conventional goods.

Certification exists but is distant. The teachers favor participatory guarantee systems so farmers' groups can credibly label their own produce.

They also link the issue to food culture. Students' appetites are shaped by fast-food norms; the teachers try to re-seed taste and habit through exposure trips, raw-vegetables tastings, and partnerships with MASIPAG and the Kalibutan Training Center, where youth can witness farm-to-processing-to-marketing systems that actually work.

The teachers identify the following barriers to teaching agroecology: labor intensity of organic methods; higher upfront cost of natural inputs; shrinking school budgets; leadership changes that derail programs; and the lack of barangay-level machinery (e.g., shredders) to speed up composting and make organic inputs reliable.

They propose to anchor organic education in hands-on community settings and to align schoolwork with local ecosystems and markets. They also propose LGUs to designate barangay organic learning sites and marketplaces, provide machinery and technical assistance, and back price policies (or targeted subsidies) that make organic staples accessible to ordinary families. Locally led certification and strict and fairly enforced rules (from anti-plastic measures to bans on GMOs) would protect both consumers and farmers. Finally, the teachers argue for institutionalization of the organic agriculture strand, keeping it offered even with small class sizes while using social media assignments and inter-strand projects (Accountancy, Business and Management (ABM) for enterprise plans; Science, Technology, Engineering and Mathematics (STEM) for soil tests; Humanities and Social Sciences (HUMSS) for campaigns) to pull more students into the work.

When students learn by doing, farmers aren't left alone and organic agriculture becomes credible—a practical climate program rather than a mere slogan in a lesson plan.

Quezon

General Nakar is the largest municipality of Quezon Province, characterized by a mountainous and forested landscape within the Sierra Madre mountain range and is highly exposed to climate risks such as typhoons, flooding, and landslides. It is bounded on the north by Dingalan, Aurora; on the west by the towns of Doña Remedios Trinidad and Norzagaray in Bulacan and the province of Rizal; on the south by the municipalities of Infanta and Real; and on the east by the Polillo Strait and Philippine Sea.

The municipality encompasses key headwaters of the Agos River system, notably the Kaliwa and Kanan sub-basins and the Umiray River, which is tunnel-linked to Angat Dam (Umiray-Angat Transbasin). The Agos–Kaliwa–Kanan watershed drains east through Infanta to the Pacific where extreme flows have a history of bridge failures and overbank flooding. The Umiray River is the northern boundary and an inter-basin transfer source for Metro Manila water.[136]

The town is highly vulnerable to impacts of typhoons. Notable disasters include the flash flood of 2004 when four successive typhoons caused widespread flood and landslides across Real, Infanta, and General Nakar. Likewise, Typhoon Ulysses in 2020 resulted in severe flooding. During STY Karding in September 2022, General Nakar and the Polillo Islands were placed under a state of calamity.[137] Flooding and landslide occur due to deforestation, illegal logging, and quarrying activities, which have eroded natural barriers and intensified runoff during storms.[138]

MASIPAG Quezon PCB Practitioners

The participants represented three municipalities in the REINA area (Real, Infanta, Nakar). Most are long-time farmers transitioning from synthetic to organic farming, many through MASIPAG's support since the mid-2000s. Organizations were from established groups (Kidadayeg Community Farmers Association or KCFA, Anoling Organic Farmers Association or AOFA, Little Baguio Community Upland Farmers Associaion or LIBACUFA) to newer youth formations (KCFA-Youth, AOFA Youth). Most organizations are affiliated with MASIPAG and its PCB, with youth actively integrated into communal gardens, training, and trial farms.

Ages range from senior farmers (60–70 years old) with decades of experience, to youth leaders (16–21 years old) actively training as second-liners. Their main crops are rice (colored/organic), coconut, vegetables, fruits, livestock (pigs), and poultry (chickens). Some groups also ventured into processing (vinegar, *lambanog*, *suman*).

Their main motivations for organic farming were health (illness due to pesticides), resilience after disasters (Typhoon Winnie 2004, typhoons in 2013), and commitment to sustainable agriculture. Their common challenges are typhoons, land tenure insecurity, and sustaining

membership. Their main strengths are seed banking, communal work, youth involvement, and sharing of organic inputs and produce.

The participants identified the following barriers to scaling agroecology practice:

1. Land Tenure Insecurity
Most farmers do not own the land they till. Some fields are mortgaged or controlled by landlords who refuse organic conversion, leaving tenants dependent on chemical-intensive methods. Without secure ownership, farmers hesitate to invest in long-term organic practices.

2. Debt and Lack of Capital
The cycle of debt is a major obstacle. Farmers borrow money to purchase expensive chemical inputs, often through microfinance lenders with high repayment schemes. By the time of harvest, earnings are already tied to loan repayments, leaving little or no income.

3. High Input Costs and Dependence on Synthetic Agriculture
The dominance of the Green Revolution model persists. Government programs continue to provide free hybrid seeds and chemical fertilizers, but only in token amounts, forcing farmers to buy more. This creates dependency on multinational corporations (e.g., Monsanto, Bayer). Once farmers adopt these inputs, their soil becomes chemically dependent, raising production costs while degrading land health.

4. Low and Unstable Farmgate Prices
Farmers face price manipulation from traders who buy produce cheaply, especially when surplus exists. Imported rice and other products, subsidized abroad, further undercut local organic produce. Government provides almost no price support for organic goods, leaving farmers at the mercy of market fluctuations.

5. Lack of Access to Markets
In REINA area, markets are distant (e.g., Infanta is the main trading center). Transportation costs reduce profitability, and unsold surplus often rots. LGUs fail to provide spaces or subsidies for organic farmers. Farmers' initiatives, such as joining consignment systems or pasalubong centers, have not been viable due to added expenses and delayed payments.

6. Weak Government Support and Misaligned Programs
While the government promotes "climate change" and "biodiversity" programs in words, actual practice favors synthetic and GMO-based agriculture. Local experiences show DA extension services recommending glyphosate and other harmful chemicals, contradicting the supposed goals of sustainability. Farmers describe this as hypocrisy, since government both acknowledges climate change and fuels its causes.

7. Lack of Research, Extension, and Genuine R&D
Farmers note that government's research often repeats old information and fails to study actual organic practices. Officials who are sent to organic summits show little knowledge, while genuine innovations from farmers remain unsupported. Educational institutions also rarely integrate real agroecology training unless MASIPAG intervenes.

8. Knowledge Gaps and Public Awareness
Many communities remain misinformed about what "organic" means. Some equate colored rice with organic even if chemically grown. Fake organic products circulate in markets without quality control. This undermines real organic farmers who are strictly practicing sustainable methods.

9. Inadequate Infrastructure
Poor irrigation systems, farm-to-market roads and storage facilities add burdens. Without reliable infrastructure, farmers cannot efficiently bring produce to markets or preserve post-harvest quality.

10. Weak Farmers' Organizations and Exclusion from Governance
Some POs remain divided, as some members are tempted by short-term benefits of government's synthetic programs. Communities are excluded from decision-making spaces in LGUs—even focal persons for organic farming sometimes act in bad faith, supporting conventional practices when not facing farmer groups.

Scoring benefits

Most participants gave the following the highest score (5):

Soil health
However, some farmers could not rate highly because their soils remained weak, especially when floods washed away compost. Others, using animal manure and organic matter instead of synthetic fertilizers, described their soils as fertile and healthy. Middle scores came from those who were working hard but still struggling to improve soil quality.

Reduction in production costs
Farmers noted that they no longer spend on external inputs like synthetic fertilizer.

Lower risk of losses
Farmers explained that avoiding costly inputs reduced the chances of major financial loss.

Contribution to employment
Farmers shared that agroecology not only created work for themselves but also generated employment opportunities for others.

Promotion of healthy diet and livelihood
Farmers emphasized stronger bodies, better health, and fewer illnesses because of eating organically produced food.

Promotion of seed exchange among farmers
Unanimously rated 5, highlighting the importance of seed sharing as a foundation of their farming practice.

Knowledge sharing among farmers
Participants stressed constant exchange of ideas and practices as vital to community strength.

Cooperation
Participants reflected the strong culture of solidarity and mutual support among members.

Strengthening of farmers' organizations
Some emphasized the steady progress in building stronger organizations, while others noted challenges in motivating all members,

Farmers' control over seeds, land, resources, infrastructure, knowledge, prices, and natural resources
Participants identified this as showing farmers' confidence in their ability to exercise real control over the key elements of production and livelihoods.

Building networks and alliances
This reflected the progress already made in forming partnerships and alliances with other groups and organizations.

Stronger farmer participation in decision-making on production and marketing
Farmers highlighted their autonomy in managing production and setting product prices.

Meanwhile, most participants scored 4 the following benefits:

Reliable irrigation system
Farmers with access to irrigation, gave higher ratings. Some communities had already started initiatives to improve irrigation infrastructure. Others with limited or irregular water supply gave lower scores, noting that wide plots could not all be irrigated.

Pest, disease, and weed management
Higher scores indicated success in managing pests and weeds through organic practices. Middle scores noted dependence on the type of pest attacking, while lower scores reflected persistent problems with pests such as rats, or lack of time to prepare natural repellents.

Presence of biodiversity
The highest scores emphasized awareness of diversified farming systems, including crop combinations that help repel pests and enhance resilience. Some have already reached a certain level of biodiversity. Others however still rely on market-bought food due to limited diversity in their farms.

Expansion of livelihood opportunities
Scores ranged from 2 to 5. Some farmers saw only small improvements, while others reported growth from diversifying into root crops, ornamentals, and processed goods, which boosted their earnings.

Reduced dependence on aid
Some still prefer occasional aid, while others proudly shared that they no longer rely on government handouts, reflecting increased independence.

Ability to sell in local markets
Some farmers are not yet able to sell, while others successfully market their products in local markets, showing progress in linking production to trade.

Existence of fair distribution networks
Rated 3 to 5. Farmers acknowledge that fair distribution systems exist, with some already benefiting from stable networks that secure just prices for products.

Proper integration of crops and livestock
Scores varied from 3 to 5. Some said integration is not yet fully achieved, while others highlighted strong cycles where crops feed animals and manure fertilizes the soil. They emphasized that clean organic feed improves livestock health and growth, showing the benefits of integrated farming.

Most participants gave the following low to moderate scores:

Food security
Scores ranged from 2 to 5. Farmers with lower scores pointed out that they have vegetables and livestock but no rice, so they still depend on markets for the staple. Mid-level scores reflected similar struggles, such as pest attacks in upland rice farming. Those who scored 5 expressed confidence that their farms provide sufficient food for their families.

Increase in income
Scores varied widely. A youth group gave the lowest score (1), saying they are not engaged in selling. Others observed only modest increases (2–3). Those who scored 5 described significant income growth made possible by learning to process their produce (e.g., banana chips), which creates added value and broader markets.

Identifying solutions

Individually, the participants express their personal commitment to advancing agroecology not only for their families but also for their wider communities. They highlight the importance of organic farming to address climate change, protect health, and protect the environment. Many pledge to continue joining meetings, opening their homes to fellow members, and sharing their knowledge with others, especially those not yet part of MASIPAG. They see themselves as farmer-trainers, advocates, and voices of small farmers—dedicating their efforts to education, sharing knowledge, Bayanihan, and collective advocacy for sustainable agriculture.

Organizationally, participants emphasize the need for unity, active communication, and regular exchange of practices and ideas. They stress growing their membership to ensure continuity of the movement, including reaching out to youth as future second liners. They recognize the importance of consistently raising awareness, guiding members, and patiently addressing

obstacles despite slow progress. Strengthening the organization also means building ties with other POs, NGOs, and government agencies while keeping members engaged through meetings and activities. In this way, the organization would remain strong, dynamic, and capable of sustaining the push for organic farming.

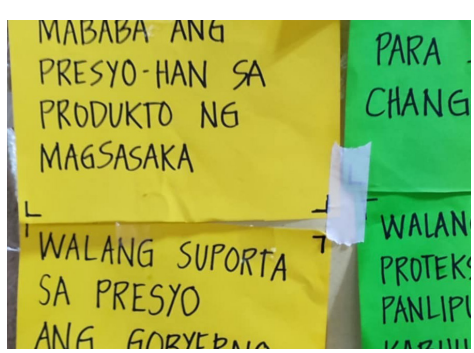
On the government level, participants delivered a clear call: genuine support for small farmers and for organic farming. The state's support remains inadequate, especially in strengthening farmers' knowledge and capacity to practice organic farming. While there are programs labeled as "organic," these often miss the mark—ill-fitted to local needs and realities.

Farmers stress that genuine and sustained backing for organic agriculture is needed, not token projects that continue to favor chemical-intensive farming. They criticize the mismatch of government programs, which often promote chemical inputs harmful to health and the environment, while farmers struggle with little assistance. They criticize the irony of government officials attending climate change events while simultaneously pushing programs that worsen the problem, such as subsidies for synthetic farm inputs that damage soil, water, and ecosystems.

They urge the state to listen to farmers' voices, promote organic products, allocate budgets for sustainable programs, and stop harmful projects like Golden Rice. They urge officials to study and promote methods that nurture rather than destroy the environment—investing in organic farming, halting the importation of harmful chemicals, and using idle lands for tree planting to help absorb toxins and restore ecological balance.

For them, government should support marketing channels, showcase farmers' produce in local festivals, and prioritize organic food in public procurement. For them, real support means standing behind people's organizations like MASIPAG that have been cultivating sustainable practices from the ground up.

Their message was unequivocal—stop expanding chemical farming, respect farmers' advocacies, and redirect agricultural resources toward organic and sustainable production that ensures both food security and public health. What farmers want is simple yet profound: an open, respectful partnership where government listens, learns, and works alongside them to advance agroecology—for healthier food, resilient livelihoods, and a thriving environment for all.



Agroecology as Community-based DRR

Joel Abrao is the area coordinator of MASIPAG Luzon for the Southern Tagalog CALABARZON area.[139] He explains that the main disasters in the area are typhoons and floods, which severely affect the Dumagat communities in Sta. Ines, Tanay (Rizal), coastal and riverside areas in General Nakar, and communities in Infanta where landslides in the Marilaque area cut them off completely.

These areas are especially vulnerable because the Sierra Madre basin and Agos River system cause waters to swell during heavy rains, cutting off transportation and isolating villages. While upland groups are less exposed, lowland and riverside organizations under PCB Q2 (REINA cluster) face recurring disaster threats.

Joel recalls that the 2004 twin disasters of Typhoons Yoyong and Winnie were the worst in memory, floodwaters rising to second floors of homes, submerging entire towns in REINA area, killing hundreds, and leaving communities isolated for days. The twin typhoons, just a day apart, led to massive landslides in Sierra Madre, uprooted trees washed into the sea, and a stampede at the Catholic cathedral in Infanta when panic spread about another possible flood. Infanta is highly vulnerable, with 33 of its 36 barangays in low-lying areas.

Relief support was delayed. It took five days before aid arrived from Lucena. Retrieval operations uncovered over 300 people buried in landslides. After 2004, NGOs like Oxfam, Christian Aid, and the Church's Social Action Center became active in relief and rehabilitation. MASIPAG entered in 2005 initially through rehabilitation programs, focusing on sustainable farming in uplands.

Subsequent disasters—Ondoy (2009), Yolanda (2013), Lando (2015), and Frank (2008)—reinforced the need for community-based disaster risk reduction (DRR) and resilience programs, which MASIPAG integrated into its organizing work. In contrast to other MASIPAG clusters (e.g., PCB Q1 focused on seeds), PCB Q2 context is fundamentally shaped by disaster experiences, linking agroecology, ecosystem preservation and DRR as survival strategies.

MASIPAG's organizational structure in Quezon is now composed of 14 POs and one NGO, many of which were engaged in disaster relief during major typhoons like Yolanda.

As a science and a movement

Joel highlights that Bayanihan culture and collective resource management are central to how MASIPAG farmers in Quezon and CALABARZON cope with disasters and climate risks. Beyond mutual aid in farming, POs organize seed banks, calamity funds, and food reserves to ensure survival and recovery when floods or typhoons strike. For instance, surplus from trial farms (up to 50 rice varieties tested) is milled and distributed to members as rice (e.g., 5 kg each) during disasters.

Agroecology itself is framed as an adaptive strategy to climate change: diversified farming systems provide food security during disasters (multiple crops, medicinal plants, and root

crops); trial farms enable continuous testing of resilient rice varieties; and farmer-scientists generate localized knowledge on pest resistance, drought or flood tolerance, and yield stability. The youth are also involved in biodiversity conservation.

Trial farms are the heart of farmer science in MASIPAG. Each season, 50 rice varieties are tested; farmers select top 10, verify them, and narrow down to top 3 for mass production. Farmers evaluate based on height, tillering, yield, pest resistance, and climate tolerance. Eating and milling qualities are also tested. Trial farms always include a mix of traditional varieties, MASIPAG rice, and farmer-bred varieties from backup farms (Nueva Ecija, Visayas, Mindanao). Each farmer treats a small plot (cordoned plants) as their "laboratory," measuring growth, tillers, flowering, maturity, and resilience.

Planting schedules are also adjusted to avoid peak typhoon months; crops are chosen for climate adaptability. *Adlai* (Job's tears) and other crops show resilience: though tall stalks fall easily in storms, they regrow from nodes. Some rice varieties are selected for flood or drought resistance.

Transitioning away from chemicals is a long but necessary process. While yields may initially drop, organic farming restores soil health, reduces pest attacks, and lowers dependence on costly inputs. Farmers' participatory research (trial farms and verification plots) ensures that adaptation is community-driven and scientifically grounded.

Joel explains that organic rice plants are sturdier, less attractive to pests, and supported by living soil microorganisms. Chemical farming, by contrast, makes plants "succulent" and pest-prone; only about 40% of chemical fertilizer is absorbed, with 60% wasted.

Transitioning to organic farming takes 2–3 years to restore soil microorganisms. Some use chicken manure for faster transition, but risks include antibiotics and residues. Compost-based systems are slower but healthier. Yields in the first years may drop (e.g., from 120 to 60 cavans per hectare), but farmers save heavily on input costs, making the system more sustainable.

Crucially, Joel stresses that agroecology is not just about techniques. It thrives when organizations are strong and cohesive, and when youth are engaged in sustaining biodiversity. MASIPAG integrates technical, organizational, and advocacy dimensions, making agroecology both a resilience practice and a social movement rooted in disaster experiences.

Agroecology demonstrably improves adaptation. It has lower input costs, higher product value, and a food-first orientation that cushions households during shocks. It is both a survival strategy and a movement.

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Existential challenges

Scaling remains uneven, however, due to structural barriers, which include insecure tenancy, predatory value chains and financing, land concentration, weak market access, and policy distortions from dole-out programs and RSBSA exclusion. These undercut continuity and replication.

Biggest landholders are the political elite. In General Nakar, the Roxas family claims large tracts of land. In Infanta, large holdings include a "Mr. M" (rumored to be Pangilinan) with approximately 3,987 ha covering much of Bgy. 1636 and Magsaysay. There are ongoing DENR disputes on declared areas against municipal surveys.

Organizational strength is decisive. POs integrate organizational and technical work, build processing and marketing committees, engage women leaders, and pass enabling local policies (e.g., Nakar's organic ordinance initiative). In PCB Q2, about 65% are women— in organization, decision-making, marketing, and linking—while the men focus more on field production. Women's persistence, led by Nanay Virgie, helped pass the Organic Law Ordinance of Nakar.

POs and NGOs organize, while MASIPAG maintains and strengthens them through organizational development. However, understanding among farmers varies. Those who grasp the full orientation stay and progress, while others who had been raised on DA's dole-out programs become fragile and backslide from upholding agroecology principles. DA dole-outs (equipment/facilities budgets) can distort organizations and create conflicts if group policies are weak. The pull of quick-fix programs may still prevail.

MASIPAG membership ebbs and flows—some POs plateau or fade, while new ones emerge. Among farmers who have internalized the full MASIPAG approach, resilience and appreciation may rise. Strengthening land tenure security, market linkages, and government ordinances could unlock wider, steadier scaling.

Kalinga

Kalinga is a landlocked province in the Cordillera Administrative Region (CAR). It is bounded by Apayao (north), Abra and Mountain Province (west), Isabela (east), and Cagayan (northeast). It is mostly rugged and mountainous, with steep slopes, river valleys, and plateaus. The province is traversed by the Cordillera Central mountain range.[140]

Its high elevation areas (e.g., Tinglayan, Balbalan, Lubuagan) contrast with its river valleys. Tabuk City sits in a relatively wider, flatter valley. Its soils are fertile alluvial plains along Chico River, which support rice and corn production. Hillsides are often used for root crops, bananas, and coffee. The Chico River is the lifeline of the province, with multiple tributaries, and irrigation systems and communal watersheds depend heavily on its flow.

Kalinga lies within the typhoon belt of Northern Luzon. Typhoons bring torrential rains that trigger flash floods in river valleys (esp. Chico River basin) and landslides in upland municipalities. Tabuk City and low-lying barangays are prone to flooding. Seasonal monsoon rains swell the Chico River and tributaries, and rice-producing lowlands are highly vulnerable. Meanwhile, siltation from upstream logging and erosion worsens flooding.[141]

Kalinga is within the seismically active Philippine Fault Zone. Fault lines traverse parts of the Cordillera, making Kalinga prone to earthquakes and landslides. Strong ground shaking has caused slope failures and damaged infrastructure in past events. Secondary hazards include landslides and river damming (which can lead to flash floods when natural dams break). During El Niño years, irrigation water from Chico River and smaller creeks becomes scarce. Farmers experience reduced rice and corn yields, and some shift to drought-resistant crops.

Non-practitioners

Expressing aspirations

Only a few of the participants consistently practice organic farming, while most continue using chemicals because they are more accessible and quicker to apply. For instance, while molasses is available in Bgy. Lacnog and considered cheaper and longer-lasting, chemicals are still easier to buy in Tabuk, making them the default option for many. Limited training—only two sessions so far—has also constrained farmers' knowledge and confidence in organic methods. Despite these challenges, organically grown vegetables remain attractive to consumers and sell faster in local markets because of their chemical-free reputation.

Land access adds another layer of difficulty, as not everyone owns farmland, forcing some to borrow or share. For livestock, farmers rely on resourceful practices, feeding animals with banana trunks, gabi, or root crops since they cannot afford commercial feeds. Seeds are usually self-produced; when shortages occur, borrowing and returning after harvest is common practice. Most production is for household consumption, with mung beans sold only when there is surplus. Harvests remain modest: about a quarter hectare yields roughly three cavans (50 kilos) of munggo, 12 cavans of rice, and 15 cavans of palay. Farmers use gasoline-powered hand tractors or carabaos, and while equipment rentals cost Php500 per plot, the lack of machinery is not seen as a major hindrance because they find ways to manage.

In the FGD, farmers noted that vegetables are more often grown organically, while rice fields still rely heavily on chemicals. Some apply SRI (System of Rice Intensification) techniques using pig manure, but only a few persist as chemicals remain the easier option.

Farmers describe organic farming as more labor-intensive but ultimately more resilient and sustainable compared to chemical farming. Women are increasingly getting active in organic

Breaking the cycle of uncertainties

Ester Basia, 68 years old, knows the weather is no longer behaving as it used to—and her paddies prove it. She sowed rice around January 20, by February the crop looked fine, but irrigation flows shrank week after week. With little rain and hotter days, the canals ran thin through March and, by her account, *"lalo pang wala"* afterward. That single disruption rippled through the whole calendar farmers rely on in Bgy. Tanglag, Lubuagan in Kalinga. After rice, they normally relay-crop munggo (*"balatong"*), then return to rice. Without water, the munggo window closes, leaving families unsure what to plant next or what they'll eat and sell by June-July, when fields are usually re-plowed. The worry is practical—no income, possible illness from heat— and communal (*"Hindi lang kami, kundi lahat sa community."*)

Asked how farmers are coping, Ester says options narrow under extreme heat. They try vegetables, but seedlings often die. Her household has leaned into agroecology. They brew a simple plant tonic—molasses mixed with chopped banana trunk (at 3:6 ratio), fermented a week, diluted and sprayed weekly from early growth through pre-flowering—plus on-farm amendments (rice bran/darat, pulled weeds, chopped leaves). In her fields, these shifts show up as sturdier plants and more resilient soil. Beside a neighbor's chemical plot, she observes *"hindi mataba ang palay"* there, while their organic stand holds up better under heat.

The soil, she says, is a telltale sign. Chemical fertilizers make beds sticky, then harden and crack under sun; organic-fed soil stays friable and moist. Costs also tilt their way. A small batch of the molasses-banana mix lasts around three months, while commercial inputs are used up 1:1. Health and trust matter too. Neighbors and market buyers prefer

work, though youth participation remains low. Organizations play a key role in solidarity, transparency, and price-setting, as produce is sold directly without middlemen. However, organic produce is subject to market fluctuations, such as demand rises when commercial prices go up but weakens when commercial goods become cheaper.

Economically, organic farming strengthens household food security and provides additional income through livestock, though costs are mixed—lower for vegetables, higher for rice due to the use of molasses. Farmers pride themselves on self-sufficiency, rarely depending on government aid.

Politically, farmers' organizations help ensure collective decision-making and promote food sovereignty, with members choosing crops based on climate realities rather than market pressures. Farmers remain cautious of global trade agreements like the WTO, which they view as harmful to small producers. They consistently call for stronger irrigation systems, regular and appropriate government support, and greater recognition of agroecological practices as central to rural resilience and climate adaptation.

produce labeled *"walang kemikal,"* and vendors actively tell customers which vegetables are unsprayed, and those move faster.

Most rice and vegetables are for household consumption, while munggo is sold when there's surplus to buy basics like sugar. Yields from their small parcel (roughly a quarter-hectare) vary with water, but a typical season brings more than a dozen cavans of palay and several sacks of munggo. For land preparations, they use a hand tractor (gasoline) when they can; a carabao saves fuel if available. Fees for hired land preparations add up, yet she insists "lack of equipment is not a hindrance" when families pool labor.

Still, uptake is limited. Convenience is the biggest barrier. Chemicals are easy to find in Tabuk and familiar to use, while molasses is available in Lacnog but requires mixing and a seven-day wait. There have been only two trainings in her area. Knowledge itself isn't the bottleneck so much as habit, supply chains, and time. Not everyone has land, so sharecropping or borrowing plots is common.

Government help has come sporadically. There are seeds and fertilizer from the DA, occasional referrals to the Lubuagan LGU, and advice to try organic inputs, but nothing regular enough to anchor planning. Her policy ask is clear and concrete: rehabilitate irrigation systems. Beyond water, she wants basic farm power and steadier support for organic fertilizers and training so farmers aren't forced back to quick-fix chemicals. The path Ester is testing can scale from one household to the whole valley.


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Building pathways

Existing literature has hypothesized and provided initial evidence that agroecology can be scaled to be a science innovation and a practical response to address climate change. In this study, the Filipino farmers' experience has demonstrated several variables that expound on agroecology's viability. Not only those who have embraced the practice but also the non-practitioners have elaborated the barriers to scaling—a necessary initial step towards knowing how to break through these barriers and build pathways towards sustainable agriculture and climate resilience.

As proven in several studies, the most significant improvement from agroecology, garnering the top score from Filipino farmers, is soil health. The respondents have elaborated that regeneration of soil nutrients has ensured the crop's strength to withstand climate extremes – from typhoons, flooding, to drought. However, other environmental variables (e.g., pest management, conservation of biodiversity, crop and livestock integration, and water use) have inconsistent scores. Farmers cited their difficulty to scale these factors as they are surrounded by conventional farms. It could not be measured therefore if their practice has increased carbon sequestration or stock, but they are certain that they have contributed to lowering the use of fossil fuels.

In the economic dimension, the benefits of lowering production costs and less chances of economic losses score the highest. However, income growth, reduced dependence on aid, and diversification of farm incomes are yet to be felt due to market limitations and the farmers' lack of control over prices and marketing channels. Still, the biggest factor in the farmers not attaining income surplus are the constraints in ownership of resources, particularly land. Agroecology's contribution to employment also earns a low score—there is limited processing or farm integration into market or distribution networks. Thus, livelihood resilience and less exposure to price fluctuations brought about by weather events could not be ascertained.

In the social and cultural dimension, farmers have consistently given high score to shifting to safe food sources, healthy diets and ensuring the family's food security. Farmers' seed exchange, knowledge sharing, *Bayanihan*, and community cooperation garner top scores as agroecology's invaluable benefits. Empowerment of women, youth, and indigenous people also emerges as one of the farmers' strengths. These ensure that the farmers have the social cohesion in responding to and managing disasters.

Since organic farming has helped produce safe, nutritious and diverse food as well as medicine sources, women farmers have become more actively engaged, training in their respective organizations and practicing diligently. However, the issue of multiple burdens on women is also underscored—they are still primarily responsible for reproductive and care work, thus the principle of collective and shared responsibilities in both household and farm should be promoted. Farmers have recognized that agroecology as a social movement clearly addresses both class-based and gender-based inequality.

Finally in the political dimension, all respondents have consistently given the top scores to organizational strength and consolidation, participation, collective action, networking and alliance building, and advocacy and mass campaigns. This dimension of agroecology's benefits emerges as the Filipino farmers' biggest and most enduring quality that can push for the weaknesses in the other dimensions. This ensures increased adaptation and resilience through democratization and food sovereignty. This ensures that agroecology as a movement has the best potential to be scaled in the Philippines.

The farmers' testimonies reveal that while the potential of agroecology is widely acknowledged, its expansion is blocked by interconnected barriers. The top barriers are: lack of government programs; land tenure and power relations; market limitations; dominance of chemical farming; and organizational vulnerabilities.

The biggest and overarching structural barrier is the government itself and its adherence to neoliberalism. Government neglect weighs heavily on small farmers. Programs that should support sustainable farming instead reinforce chemical dependence—government support for agroecology is weak, misleading, and oftentimes conflicting. The government itself lacks full knowledge of and research on agroecology and its vast potentials. Government subsidies, insurance, and price support remain absent or tokenistic. The provision of infrastructure, particularly irrigation services, is a recurring gap all throughout the case sites, even if the case sites have adequate river and water systems to sustain their agriculture. This only shows that the gap is government's deficiency rather than a natural scarcity.

The respondents have equally identified landlessness as a major barrier, which cannot be separated from government's failure. Land monopoly is one of the main enduring features of the crisis of Philippine agriculture, which government's failed agrarian reform programs have only worsened. Instead of providing full support for land distribution to make a difference, government programs have introduced amortization and market-oriented schemes to compensate the landlords. Land reform programs had not been accompanied with capital for farmers, climate insurance, facilities, and agricultural extension services. Farmers have only continued with the cycle of indebtedness and remained trapped in exploitative and oppressive power relations.

Market limitations, on the other hand, are the result of government's neoliberal policies that favor a liberalized economic system where the farmers are underpriced for their products, overpriced for their farm inputs and family consumption, and made to compete with cheaper imports. Low prices for their produce, limited market access, and competition from imports make it difficult for agroecology to survive. Privatization of infrastructure compounds these challenges,

making prices of commodities, organics included, ever more expensive for low-income majority consumers. Public misinformation further undermines consumer trust. Physical market spaces are also reserved for chemical farm products or government-accredited organic products that sell expensively to well-to-do and institutional buyers.

The dominance of chemical farming in Philippine agriculture is not only a barrier to scaling. It is also a counterculture that discourages farmers who want to transition to agroecology. This is the main reason why pest management, farm integration, biodiversity preservation, and even income growth score low for farmers. This is rooted in government's bias for corporate agriculture—peddling TNC chemical inputs and seeds, promoting foreign-invested industrial plantations, and being open to TNC food imports. Agroecology goes against all these easy profit ventures thus does not get government support.

Respondents have repeatedly cited the "weaknesses" of their own organizations as another barrier to scaling. They lament that sometimes fellow farmers are individualistic and do not share their knowledge to others. They also notice that fellow farmers are reluctant to break free from conventional farming methods and avoid being recruited to organizations and relevant advocacies. Upon closer inquiry, however, it becomes apparent that state policies and market bias have systematically disadvantaged and marginalized smallholder farmers. The farmers think thus that getting out of the unjust mainstream would further exclude them. The government has also embarked on a systematic and relentless drive of red-tagging and militarization, which is directed primarily against farmers and environmental activists. At one point, when farmers pronounce that they are practicing agroecology, they are immediately branded as communist rebels.

Despite these barriers, Filipino agroecology farmers are innovating with seed banking, composting, pest management, farm systems, farm techniques, research and development, processing, value-adding, marketing, and organizational development. They persist in asserting their rights, expanding their organizations, and sharing knowledge to the broader sections of their respective communities. These efforts underscore the transformative potential of agroecology in addressing the barriers.

More importantly, however, the research has brought out profound realizations that should be made integral in waging agroecology as a movement by Filipino farmers. First, the movement should be directed towards increasing people's understanding that corporate agriculture remains behind the dominance of conventional agriculture in the country—the government's loyalty to neoliberalism is about this profit-motivated agriculture.

Secondly, recognition of agroecology's benefits, no matter how small and fragmented, should be a commitment to agroecology. Filipino practitioners have demonstrated social cohesion, cultural transformation, and political strength—these are valuable dimensions that ensure strong commitment to agroecology, no matter the odds.

Finally, strong and steady organizational development and movement building of farmers, practitioners and advocates is a core requirement in sustaining and upscaling agroecology.

A resilient, sustainable, and people-centered agriculture must be founded on empowered local food producers—farmers, fisherfolk, and indigenous people who are upland farm and forest managers— and multi-sectoral formations who collectively work to address the economic and climate crises.

Many of the problems raised by practitioners and non-practitioners in this research are already gradually being addressed by the conscientized and organized farmers. Within their organizations, farmers are endeavoring to produce and maintain indigenous and organic seed varieties through farmer-managed community seedbanks and to breed and maintain climate-resilient varieties. Through the farmers' collective practice and advocacy for farmer-developed and adapted technologies and peasant science, they can produce natural fertilizers and pesticides, innovate small farming tools and technologies, and collectively manage big farming equipment and machines.

Through their *Bayanihan* practices, farmers can sustain labor exchange in their family and communal farms; organized farmers can provide support to each other in the difficult process of shifting from conventional to organic farming. Collective marketing better helps farmers find markets, assert just farmgate prices, and promote participatory guarantee systems. The principle of collective work and responsibility can also help democratize reproductive work in the home and help to ease the multiple burden of women.

Farmers' organizations are also partnering with schools and universities to integrate agroecology in academic curricular and extra-curricular programs. This is crucial in the development of the next generation of agroecology practitioners and advocates.

Both practitioners and non-practitioners have sustained the process of capacity building on various aspects of organic farming, organizational development and management, collective leadership, and effective advocacy for people-centered agriculture. They are building alliances, partnerships and multisectoral networks that serve as the platform for meaningful agrarian struggles, which would be the foundation of the assertion of agroecology and food sovereignty.

Essential in the strength of the organizations are the arenas of pushback against government attacks and demanding government accountability for the neglect and failure in protecting agriculture against climate change impacts. In the end, it's the farmers' struggles that should be scaled in winning the battle for genuine agrarian reform and sustainable agriculture. That should be the destination of all the pathways they have built.

Annex

ANNEX 1. APEX Tool Matrix – Scorecard

Agroecology dimensions and indicators related to climate change mitigation, adaptation and resilience	Score	Observable trends
Environmental		
Soil conservation and regeneration / reducing soil degradation		
Soil fertility regeneration / organic matter / soil biological activity		
Use of local resources, compost, biomass, and nutrients cycling		
Efficient water use and harvesting		
Use of renewable energy		
Conservation tillage		
Genetic and species diversity: intercropping / polyculture		
Crop rotation and fallow		
Cover crops and mulching		
Agroforestry / agro-silvo-pastoral		
Crop-livestock integration		
Functional biodiversity (biological management of pests/diseases/weeds)		
Conservation and encouragement of agrobiodiversity (seeds/planting materials)		
Holistic landscape management		
CC-related outcomes:		
Higher carbon sequestration		
Lower use of fossil fuels, avoiding GHG emissions		
Increased soil carbon stock		
Resilience variables (sustained production, overall agroecosystem health, disease resistance, ability to respond to distress over time, etc.; systemic resilience to extreme weather events and changing environmental conditions due to climate change)		
Adaptation variables		
Economic		
Contributing to more household food security / improve nutrition		
Local marketing (short food mileage) put in place / transparent network between producers and consumers		
Fair distribution webs		
Farmers determine market price of products / farmers respond actively to local demand		
Diversification of farm incomes and sources of production and livelihood		
Increased income opportunities and livelihood / increased financial independence		
Reduced / eliminated dependence on external inputs		
Reduced cost of production / reduced economic risk / reduced crop failures		
Contributing to making local economies and employment more robust / building social and solidarity economy		
Reduced community dependence on aid / increased community autonomy		
CC-related outcomes:		
Livelihood resilience		
Less exposure to price volatility due to extreme weather events		
Reduced packaging, storage, refrigeration and transportation costs and food wastage/ reduced carbon footprint and pollution		

ANNEX 1 (cont.)**.** APEX Tool Matrix – Scorecard

Agroecology dimensions and indicators related to climate change mitigation, adaptation and resilience	Score	Observable trends
Social and Cultural		
Promotion of healthy and culturally appropriate diets and livelihood		
Farmers doing research in their farms		
Promotion of farmer-to-farmer exchange of seeds / barter		
Farmer-to-farmer knowledge sharing		
Strengthening of culture, tradition, knowledge, innovation, identity and spirituality of local community / maintaining spiritual and material relationship with land and environment		
Cooperation (communal work), not competition		
Promotion of participatory guarantee and certification systems		
Empowerment of farmers, women, youth and indigenous people / respect for diversity and gender equality		
Promotion of solidarity among people, sectors and groups		
CC-related outcomes:		
Social cohesion and stability, especially in disaster response and management		
Restoring justice in food and agriculture as well as climate / decoupling from corporate agriculture / fostering gender justice		
Political		
Organized / strengthened (functional) farmers organization		
Stronger participation of farmers and consumers in decision-making on food and agriculture systems (what to produce; how to produce, trade and consume)		
Lobbying for public policies, public investment and public institutions in support of farmers and peasants and consumers		
Social organization for decentralized governance and local management of farming and food systems / collective participatory governance of groups at different levels		
Farmers' control of seeds, biodiversity, land and resources, commons, infrastructure, knowledge, market price		
Contributing to local/regional food sovereignty		
Opposing threats to agriculture and food sovereignty		
Networking and alliance building		
CC-related outcomes:		
Increased adaptation through democratization		
Increased resilience through food sovereignty		
Increased resilience through horizontal scaling up (food sovereignty movements)		
Increased mitigation, adaptation and resilience policies through vertical scaling up (favorable public policy environment)		

ANNEX 2. APEX Tool Matrix – Barriers Menu

Barriers Menu	Check if identified as barrier	How to overcome
Horizontal scaling up		
Level of agroecology knowledge and sharing in communities and adjoining ones, up to regional and national levels		
Dominant practice of chemical farming, monocropping and other unstainable systems		
Existing production and marketing structures and relations		
Commercial sales of chemical inputs and imported and fossil fuels-dependent machinery		
Corporate domination of research and development		
Low level of organization		
Vertical scaling up (policy on or lack of policy on the following)		
Agroecology and agricultural development in general		
Biodiversity management		
Use of renewable energy / lower use of fossil fuels		
Agrarian reform and rural development		
Food security		
Trade – Importation of food and agricultural products		
Price support		
Living wage		
Livelihood and social protection / social services		
Climate change mitigation and adaptation		
Crop and production insurance		
Access to seeds		
Research and development		
Knowledge sharing and farmer exchange		
Participatory governance		

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