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SUSTAINING FOOD AND NATURE:
BIODIVERSITY-FRIENDLY AGRICULTURAL PRACTICES

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Biodiversity-Friendly Agricultural Practices

The nexus of biodiversity and agriculture and fisheries is strongly emphasized by biodiversity for food and agriculture which ensures productivity and sustainability of food systems. Biodiversity in agricultural systems has a significant role in ecosystem functions and services essential for the productivity and sustainability of food systems. Biodiversity, paired with traditional knowledge, supports livelihoods in a sustainable manner and contributes to food security and nutrition. As response to this emerging concern, the Department of the Environment and Natural Resources (DENR) and Department of Agriculture (DA) is jointly collaborating for the mainstreaming of Biodiversity-Friendly Agricultural Practices, or BDFAPs, to promote a strong balance of biodiversity conservation and agricultural development.

Through the Biodiversity Finance Initiative (BIOFIN) Project, the Department of Agriculture (DA) and the Department of the Environment and Natural Resources (DENR) convened a series of multi stakeholder consultations from 2022-2023, to discuss how to make agriculture more biodiversity-friendly. This joint activity forms part of the commitment of the Philippines to the United Nations (UN) Convention on Biological Diversity (CBD) and more particularly, the Philippine Biodiversity Strategy and Action Plan (PBSAP).[1]

The scope of the dialogue and desk study focused on hilly land agricultural practices that are embodied in ecologically sensitive areas such as Key Biodiversity Areas (KBAs), Protected Areas, critical watersheds, and sanctuaries of agrobiodiversity. As financing the PBSAP is a continuing challenge, the dialogue and study also looked into the status of direct production support/agricultural subsidies to commodity programs, as applied in hilly agriculture conditions. These were perceived to be somehow linked to environmental footprints. Questions were asked: *What is the possibility of "repurposing" them? Can the amount for subsidies be used instead to support safeguard-oriented programs that would in turn enhance the long-term sustainability of the commodity production system in fragile hilly land setting?*

Three recurrent themes were tackled, based on the repeated interest of participants:

- **A** Rice systems as applied in areas with high agricultural heritage context (e.g., Cordillera rice terraces);
- **B** Yellow corn production in hilly lands; and
- **C** Highland vegetable production

The following are the highlights of the consultations and desk study:

Potential Environmental Footprints in Upland/Hilly Lands

Upland or hilly land agriculture production systems are an important component of Philippine agriculture (Figure 1). It is also important from the environmental standpoint. Hilly land agriculture has largely shifted from traditional practices—such as multiple cropping, small-scale agroforestry, and the use of heirloom and open-pollinated varieties (OPVs)—to high-input monoculture commodity production. These modern systems rely heavily on external inputs, including hybrid and genetically modified (GM) seeds, inorganic fertilizers, and chemical pesticides. Reports also indicate varying degrees of agricultural encroachment into ecologically sensitive areas, including habitats within Protected Areas and upper watersheds. Figure 2 provides a snapshot of agricultural systems in upland/hilly land context.

[1] It also indirectly supports the Philippine commitments to the UN Convention to Combat Desertification (UNCCD) though the National Action Plan for UNCCD and the Philippine Land Degradation Neutrality (LDN) targets and the UN Forum on Climate Change (UNFCC) though the National Action Plan for said convention.

Region 1
Photo Credit: Department of Agriculture - National Organic Agriculture Program

Figure 1: Philippine agriculture across the Philippine landscape

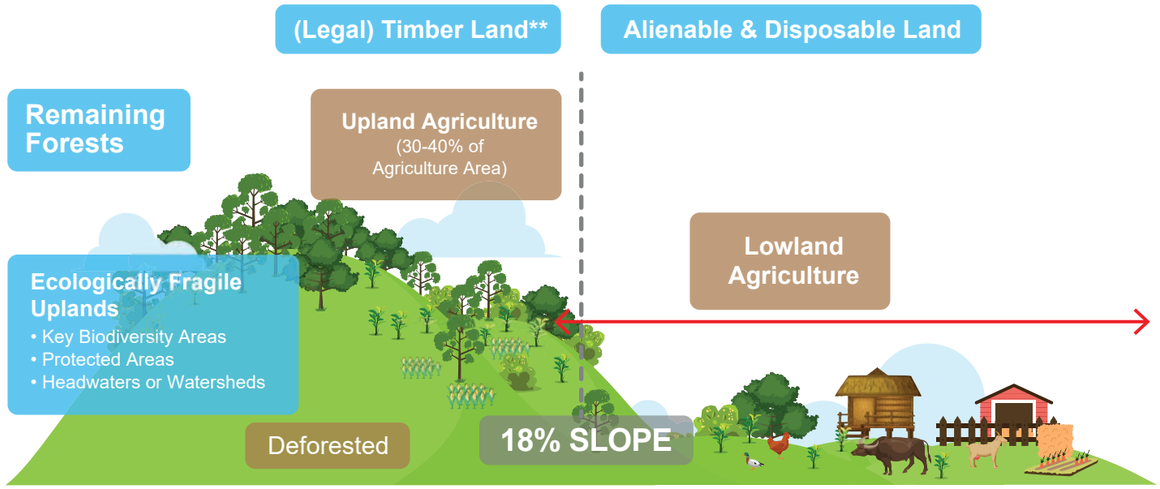
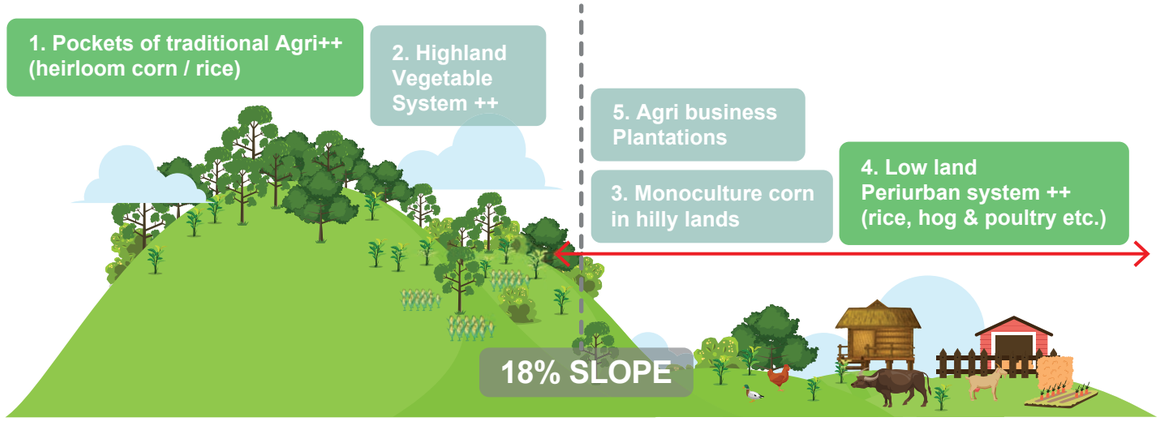


Figure 2: Agricultural production systems in the upland/hilly land agriculture context



Current Reality: Many types of production systems - several with locally perceived high environmental foot prints

High levels of soil erosion were reported in several regions a good part of which, was being attributed to more intensive land preparation, reduction of multiple cropping, and increase in monoculture commodity production (e.g., yellow corn) with the use of glyphosate that was described to indirectly affect soil stability. The pervasive and inefficient use of fertilizers and pesticides in highland vegetable production and other commercial crops has been reported, along with the rapid loss of heirloom varieties and the erosion of indigenous knowledge, skills, and practices associated with agrobiodiversity.

While anecdotal accounts of natural resource degradation and pollution are widespread, these are now being complemented by empirical evidence of alarming land use changes, made possible through advanced remote sensing technologies. Regional managers of the Fertilizer and Pesticide Authority (FPA) in the Cordillera Administrative Region (CAR), Region 2 Cagayan Valley, and Region 10 Northern Mindanao have reported increasing incidences of non-point source pollution across their jurisdictions. Notably, the Northern Mindanao Region (in 2011) and the Cagayan Valley Region (in 2019) experienced two major flooding events, which were widely perceived to be closely linked to extensive agriculture-induced water runoff and soil erosion in their watershed areas.

Drivers

The following are some of noted key drivers

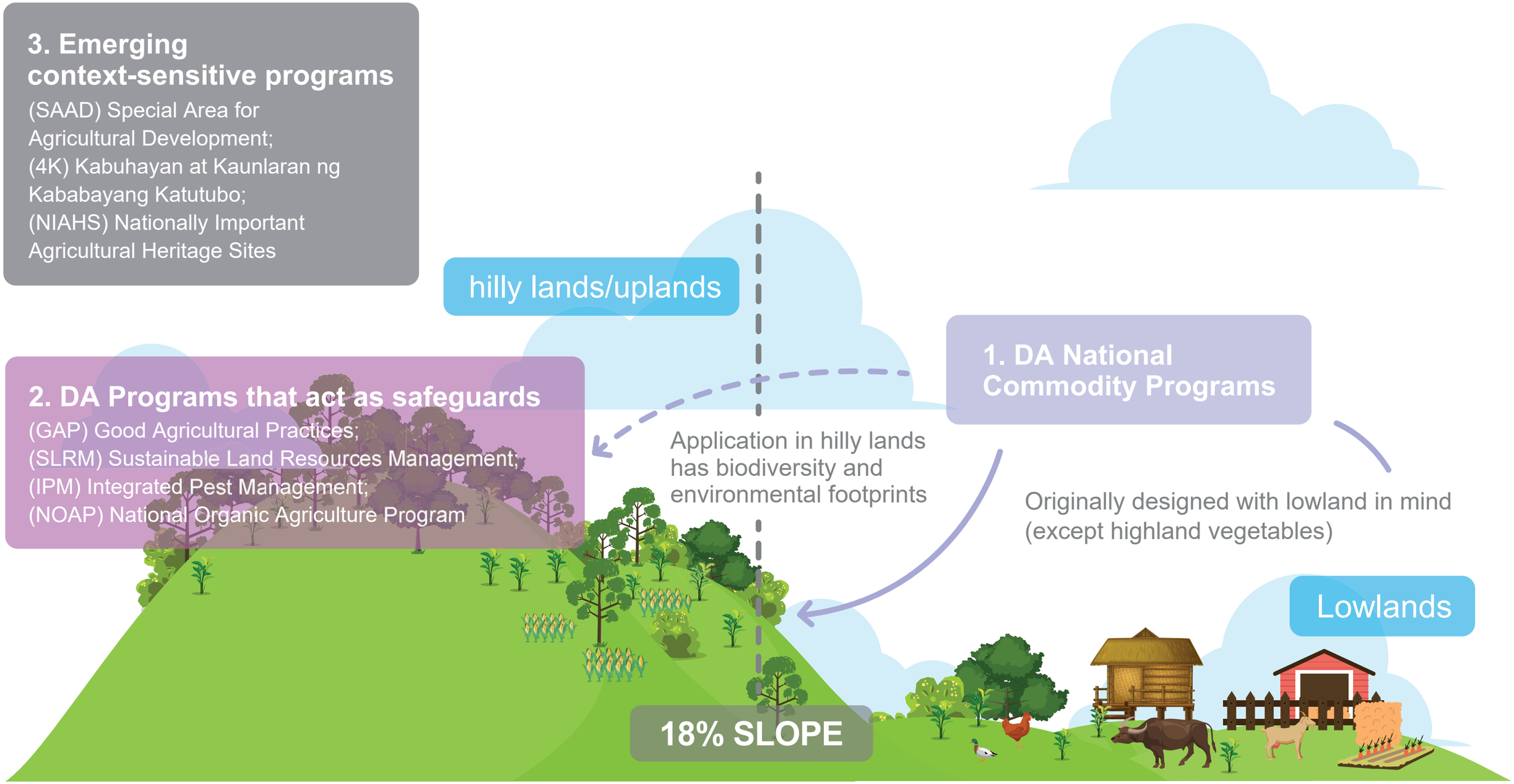
- Changing lifestyles (e.g., more meat and poultry) that translate into high demand for monoculture crop commodities such as yellow corn for animal feeds
- Underdeveloped markets for small volume, long gestating agroforestry products
- Climate change that affects seasonal patterns, farm work conditions, and labor shortage that create higher demand for non-OPVs and high use of agricultural chemicals
- Presence of direct production subsidies applied in fragile hilly land settings
- Inadequate presence of local agricultural land use plans based on suitability assessment that would guide agricultural land use decisions based on the carrying capacity of the land
- Inadequate presence of government extension services and DA safeguard programs for sustainable agriculture and agroforestry vis-à-vis the scale of environmental footprint

Transition to Sustainable Agricultural Programs

The three types of DA-led initiatives are *commodity-oriented, functional/safeguard-oriented, and context-specific programs.* Under ideal conditions they could provide a balanced presence of the agriculture sector in hilly land areas. **Commodity programs** focus on enhancing productivity and generating income. **Safeguard programs** are sustainability-driven, serving as de facto mitigation measures to reduce or prevent adverse environmental impacts of commodity programs. Meanwhile, **context-specific programs** are equity-oriented, enabling the DA to engage with marginalized farmers, such as those in hilly lands including indigenous peoples and long term forestland occupants, who often have limited resources and capacities.

PGS CARAGA
Photo Credit: Department of Agriculture - National Organic Agriculture Program

Figure 3: Typography of DA Programs present in Hilly Lands



In reality, most production technologies were developed with lowland agriculture in mind—environments characterized by uniform landscapes conducive to efficient farm operations, greater access to extension services, higher farmer education and skill levels, and better infrastructure for inputs and markets. These areas are also less prone to runoff and erosion. However, when these technologies are applied in fragile hilly land settings, they often result in significantly higher environmental footprints. Safeguards embedded in these technologies—such as pesticide use controls—are frequently overlooked by farmers.

Functional or safeguard-oriented programs, which are intended to mitigate these impacts, are currently perceived as insufficient in scale to effectively filter or offset the environmental consequences of commodity-oriented programs. The level of investment in these safeguards falls short of what is required. While context-specific programs show promise in reaching marginalized farmers in hilly lands, they are relatively new and have not yet been scaled up to serve as viable, systemic alternatives for agricultural support in these ecologically sensitive areas.

Compelling Premises and Opportunities to Build On

In developing their recommendations, DENR and DA recognized that the Philippines' mountains and hilly lands—comprising approximately 50% of the country's land area—are home to most of the remaining forests, upland watersheds, and rich biodiversity, including agrobiodiversity. Protecting and restoring these ecosystems is an urgent priority in the face of the climate emergency. *Without meaningful reforms, current agricultural practices in hilly lands will remain a major driver of the rapid degradation of these vital natural life support systems.*

The newly launched National Agriculture and Fisheries Modernization and Industrialization Plan (NAFMIP) has also undertaken a comprehensive analysis of the country's food system. It highlights key challenges such as limited crop diversification and pressing environmental concerns. NAFMIP provides strategic directions to address these issues by advocating a shift from a purely commodity-based approach to a "commodity systems" framework—one that integrates sustainability and broader ecosystem considerations.

To enable this transformation, existing agricultural policies, programs, incentive and subsidy mechanisms (Table 2) and regulatory frameworks must be reviewed and realigned, particularly in the context of hilly lands, with a long-term and systems-based perspective. The following are snapshot of preferred alternative scenarios (Table 1)

Table 1. Preferred alternative scenarios

Identifying areas with Agricultural Heritage Systems and BDFAPs

Where heritage agriculture exists and fulfills multiple values for agriculture and natural resources conservation (e.g., Cordillera terraces as part of KBAs, and upper watersheds as agrobiodiversity sanctuaries), further land use conversion needs to be arrested. This would be done by enabling public recognition of their socio-ecological role (supporting forest functions and culture) and providing integrated incentives, and support for dynamic conservation of traditional practices in modern times.

Corn and other commodities in open hilly lands

Open uplands that fall within KBAs and upland watersheds must also contribute to the restoration and maintenance of critical ecological services, such as irrigation, flood mitigation, and water regulation. Agricultural activities in these ecologically sensitive areas should be subject to stricter controls, including effective measures for water runoff management, soil conservation, and prevention of water pollution particularly from the use of herbicides and other agrochemicals.

In the long term, these areas should be gradually transformed into agroforestry-based food and livelihood systems that balance productivity with ecological integrity.

High-value crops in hilly lands

If portions of headwaters and KBAs in highland regions are also highly suitable for high-value vegetable production, such agricultural activities must not compromise the health and well-being of upland and downstream communities and ecosystem integrity.

To mitigate these risks, all smallholder high-value crop (HVC) production in highland areas should, at a minimum, comply with Good Agricultural Practices (GAP) standards. Where GAP compliance cannot be ensured, such production should be reconsidered or restricted. In parallel, there is a need to expand the coverage and implementation of the National Organic Agriculture Program (NOAP) to promote environmentally sound and health-safe production systems.

NAFMIP - from commodity-to-commodity systems in hilly land context

- Provisions for the conservation of remaining agrobiodiversity must be prioritized and actively incentivized. The promotion of OPV-based multiple cropping systems, supported by appropriate market mechanisms, should be encouraged as a key strategy for enhancing on-farm biodiversity and ensuring long-term agricultural resilience.
- High chemical input monoculture systems—if they are to be promoted at all—should be limited to the lower-lying portions of hilly lands and lowland areas, where their environmental impacts can be more effectively managed and mitigated.

Contribution of forests and trees on farm to sustainable and resilient agriculture

Promote the integration of tree components at the farm level by providing incentives and support mechanisms. Encourage the retention and maintenance of small remnant forests that are adjacent to or embedded within agricultural landscapes, and support natural regeneration as a means to restore ecological functions. These measures contribute significantly to water and nutrient cycling, improve soil health, and enhance natural pest regulation—all of which are essential for the productivity and sustainability of both upland and lowland farms. When combined, remnant forests, farm-level trees, and on-farm environmental safeguards can play a crucial role in sustaining the ecological services that mountain and hillside ecosystems are inherently designed to provide.

For the above scenarios to happen the consultations recommended attention to the incentive systems, safeguard systems, and regulatory framework and markets.

Table 2. Reviewing the incentive and subsidy systems in hilly land context

Consider repurposing subsidy from single commodity support to "commodity systems" support, as envisioned by the (NAFMIP) National Agriculture and Fisheries Modernization and Industrialization Plan

Repurpose agricultural subsidies to strengthen and scale up the implementation of key safeguard measures—such as soil conservation, multiple cropping, GAP, and NOAP. These investments should aim to enhance the natural resource base, including soil health, biodiversity, and biological pest control, thereby supporting more diverse and sustainable production systems centered around existing commodities. In doing so, these reforms will contribute to the development of more resilient and climate-adaptive upland livelihoods.

Level up safeguards in hilly land context

- Provide local agricultural land use guidance to stakeholders and consumers
- Factor non-point soil erosion, pollution in disaster risk reduction and mitigation / climate change adaptation (DRRM/CCA) and build back better plans.
- Assess existing efforts for safeguards, (soil conservation, integrated pest management (IPM) etc.) to appreciate strengths and gaps and effectively match the scope and scale of environmental footprints.
- Promote more adaptive, location specific agricultural programs (Special Area for Agricultural Development, Kabuhayan at Kaunlaran ng Kababayang Katutubo, Nationally Important Agricultural Heritage Sites, etc.) that take into account carrying capacities of the terrain.

Markets and demand side management

- Optimize market opportunities from mandated institutional markets and markets niches.
- Partner with the health and wellness sectors to enhance consumer education.

Managing the Transition: Dialogue and Gradual Phasing

The proposed paradigm shift toward more sustainable and biodiversity-friendly agriculture will be a socially and politically sensitive process. To manage this transition effectively, a phased framework should be adopted, beginning with preparatory milestones in 2025. At the outset, a national-level policy dialogue involving the DA and the DENR will be critical to build consensus and set strategic direction.

Key elements of the preparatory phase should include the integration of agricultural land use planning with regulatory enforcement, complemented by incentive mechanisms supported through repurposed subsidies. These will help guide farmers and local governments through the transition.

Equally important is the proactive inclusion of women as co-decision makers in shaping both the supply and demand sides of agrobiodiversity, ensuring that gender equity is embedded in the transformation process from the very beginning.

Urgent Questions for Agriculture and Biodiversity Requiring Resolution

Rice in heritage areas. What is the actual total value of rice-based heritage agriculture landscapes (e.g., Cordillera rice terrace systems)? What balanced cross sectoral and spatial framework need to be in place that incentivizes conservation of heritage agriculture, associated biodiversity and watershed functions while maintaining overall regional rice productivity from multiple sources (heirloom, inbred hybrids)?

Yellow corn in hilly lands. Do the socio-economic gains of the current hilly land yellow corn system outweigh the environmental and possible socio-economic losses? Given ecological imperatives, what alternative mix of lowland - upland corn production and safeguards system can be promoted that is sufficiently ecologically sound but can at the same time support attainment of corn-based commodity systems and livelihood goals?

Highland vegetable systems. What alternative, ecologically sound production and safeguard systems (with a high role from the demand side) can be promoted that can at the same time support attainment of production and livelihood support goals within the HVC program?

It is proposed that the DA articulate an institutional framework for recognizing the unique ecologically sensitive conditions of hilly land agriculture requiring a biodiversity-friendly agricultural practices (BDFAP) lens. DA also needs to:

Issue a strong policy clarification/communication of institutional protocols for the application of commodity programs in hilly lands with slopes exceeding 18% slope.

Redesign protocols for area and beneficiary targeting in hilly areas.

Level up the budgetary support for the coverage of safeguard-oriented programs to anticipate, prevent, or mitigate environmental footprints (Sustainable Corn Production in Sloping Areas [SCOPSA], GAP, NOAP, IPM etc.). Consider using part of existing direct agricultural subsidies in hilly lands for this.

Urgent Concerns in Environment and Natural Resources Policy

The DENR is encouraged to ensure a continuous flow of information that clarifies the nature, extent, and environmental impacts of hilly land agriculture. This data is essential in shaping sound land use policies and planning. It would also be valuable for the DENR to integrate BDFAP concerns into the preparation of Forest Land Use Plans (FLUPs), address ongoing issues related to Community-Based Forest Management (CBFM) tenure security, and promote inclusive forest restoration programs that are complementary to sustainable hilly land agriculture. Furthermore, the DENR's experiences and insights in agroforestry and natural resource management should be shared more widely. These contributions will be critical to the development of biodiversity-friendly agricultural land use plans and programs that balance productivity, ecosystem protection, and community resilience.

DA and DENR Collaboration Through Joint Administrative Order on Biodiversity-Friendly Agricultural Practices (JAO 2021-01)

Under the newly launched JAO 2021-01, the DA and the DENR, through their respective Regional Technical Working Groups, are well-positioned to co-facilitate subnational, gender-sensitive, and multisectoral dialogues. These dialogues will be essential for addressing on-the-ground challenges and co-developing a collaborative transition plan toward the adoption of BDFAP, as outlined above.

Strong collaboration with Local Government Units (LGUs) and the National Commission on Indigenous Peoples (NCIP) will be critical to ensure that the transition process is inclusive, culturally appropriate, and responsive to local contexts and priorities.

Parallel Sub-national and Local Dialogue

While a national policy dialogue is essential to address overarching issues, local dialogues can, and should be, conducted simultaneously to catalyze more immediate and context-specific action. These local dialogues can bring together diverse stakeholders to jointly analyze cross-sectoral challenges, explore viable, locally generated solutions, and identify common ground for collaborative action tailored to the unique conditions and nuances of each locality.

The key players and catalysts in the subnational and local dialogue would include:

- Regional Development Councils – relevant subcommittees
- Provincial Development Councils – relevant subcommittees
- Regional university-based research and development consortium
- Regional/Provincial Agriculture and Fishery Council (RAFC/PAFC)
- River Basin Councils/Watershed Councils
- Protected Area Management Boards (PAMB)
- Leagues of Agriculturists and League of ENR officers
- DA and DENR regional offices, together with regional Department of Economy, Planning, and Development (DEPDev), Department of the Interior and Local Government (DILG), Department of Health (DOH), and NCIP

It is equally important to ensure that these dialogues are gender-sensitive, particularly in addressing concerns related to agrobiodiversity, where women often play key but underrecognized roles. Participants from the earlier DA-DENR Stakeholder Dialogue conducted between 2022–2023, now equipped with deeper insights and information, can play a pivotal role in initiating and facilitating local dialogues within their respective regions and communities, helping to bridge national direction with local implementation.