



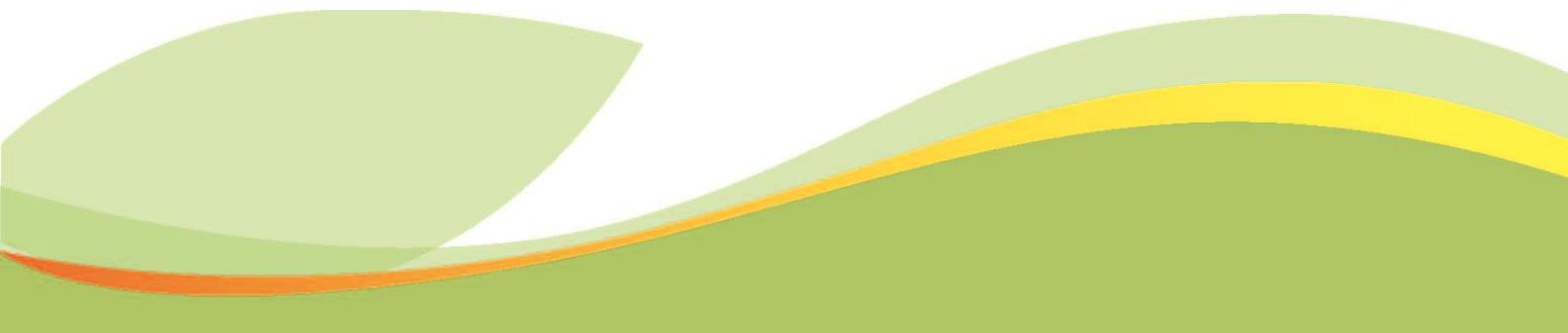
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# Project report: Integrating ecosystem services to Green Growth Action Plan: a case of Lam Dong province



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### **On behalf of the**

German Federal Ministry for Economic Cooperation and Development (BMZ)

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## EXECUTIVE SUMMARY

Lam Dong province has favorable natural resource to support its economic growth in different sectors, but recently the province's impressive economic growth has shown some negative consequences to the environment. This certainly needs to be anticipated to avoid further degradation and to keep the province's economy to grow within sustainable environment. High emission from land use changes, fragmentation of rich forests which reduces the capacity of the province to conserve biodiversity, and water pollution, are some of the concerns on the environmental degradation in the province.

The province needs to consider the safeguards of natural resources and maintenance of ecosystem and ecosystem services to ensure a long-term rather than merely short-term economic growth. Prioritizing only economic growth and not emphasizing the importance of protecting environment in development planning, can eventually result in unexpected damage and failure of the economy due to lack of supporting factors, and the cost for remedial of economic recession can be far more costly than the short-term economic benefits gained through unwise economic-oriented development plans.

Viet Nam has national strategies or action plans which strongly concern on environmental issues and protection such as national strategy on climate change, national strategy on biodiversity conservation, and national strategies on environmental protection. These strategies which focus either on "growth", "green", or "reducing emissions" are however fragmented, and meanwhile, the development plans such as national green growth strategies have relatively limited attention to the maintenance of ecosystem and different types of ecosystem services as enabling condition of sustainable economic growth. Integrating ecosystem services into development plans such as green growth provides a good opportunity to link these strategies and demonstrate the way to integrate different types of ecosystems into a development plan.

Several guidance exists providing the ways to integrate the strategies on the maintenance of ecosystem and ecosystem services into development plans. In this report, we describe the application of guidance developed by the Central Institute for Natural Resources and Environmental Studies of Ha Noi National University on how to integrate ecosystem service into a planning process and the stepwise approach developed by GIZ on how to integrate ecosystem service into a development plan, both for the case of development of 2021-2030 Green Growth Action Plan (GGAP) for Lam Dong province. The stepwise approach provides six steps with guiding questions to help setting the context and scope of the development plan, until the implementation stage.

The contents of this report are divided into five parts:

- Part I "Green Growth context in Viet Nam" describes a general context of climate policies in the country, the national Green Growth strategies, and main gaps and limitation of the national strategies in addressing concerns on ecosystem and ecosystem services as enabling condition for more sustainable economic growth. Related to the gap and limitation, the 2011-2030 Viet Nam Green Growth Strategies emphasizes three 'pillars' of green growth (namely emission mitigation, greening production, and green lifestyle and sustainable consumption), however it provides no conceptual framework and methodology. The former relates to the relationship among the three pillars, and the latter to assessment approach and tool. Furthermore, the tool should be able to deal with assessment of ecosystem services at landscape level and provides estimation of "macro-economic" indicators, which are essential for decision making and planning. As mentioned earlier, the Viet Nam Green Growth Strategies also puts little attention to the maintenance of ecosystem and different types of ecosystem service.

- Part II “Need to integrate ecosystem services” starts by emphasizing increasing concerns on environmental degradation in the global context and in the case of Lam Dong province, the need of environment sensitive GGAP in the sense that the plan considers the maintenance of ecosystem and ecosystem services as enabling condition for more sustainable economic growth, definition and different types of ecosystem services, and available guidance to integrate ecosystem service into a development plan
- Part III “Stepwise approach for the case of Lam Dong” focuses on the application of two guidelines namely the one for integrating ecosystem service into planning process developed by the Central Institute for Natural Resources and Environmental Studies of Ha Noi National University highlighting the necessity of integrating ecosystem service in the five among eight steps of planning process described in the Law on Planning, and the application of the stepwise approach developed by GIZ for integrating ecosystem services into development plans, both for the case of development of 2021-2030 Green Growth Action Plan for Lam Dong province. The complete responses to a series of guiding questions, for each of the total six steps, are provided at length in the annexes.
- Part IV “Integration into Lam Dong’s 2021-2030 GGAP” provides a complementary description to Part III, by presenting the nine green growth orientations for Lam Dong province as part of the 2021-2030 Green Growth Action Plan and shows an extensive integration of the ecosystem services into the nine strategies. Furthermore, it briefly describes the conceptual framework of the nine orientations and assessment tools for integrated assessment of ecosystem services and economy at landscape scale.
- Part V “Potential application for other planning” first emphasizes the usefulness of the two guidelines for integrating ecosystem services as part of developing Green Growth Action Plan for other provinces in the country, and eventually potential application for integrating ecosystem services into provincial Master Plan.

Related to provincial Master Plan, the Law on Planning has provided an initial version of outline, and although the outline has no explicit emphasize on three aspects of green growth (namely emission mitigation, green production and green lifestyle and sustainable consumption), the point 8 of the outline explicitly emphasizes the need of developing plans on environmental protection and safeguards of natural resources. The two guidelines will help in showing in which steps of planning process the integration of ecosystem services should be implemented, and in identifying different aspects related to prioritized ecosystem services that should be considered for an effective integration into the provincial Master Plan.

# PART I GREEN GROWTH CONTEXT IN VIET NAM

## I.1 BACKGROUND

### Transition of Viet Nam's economy and environment

Starting from the last quarter of the 20<sup>th</sup> century, economic reform in Viet Nam has helped the country to experience continuous and significant growth. Sustained economic growth over relatively long periods of time allowed the country to reduce poverty levels, develop its infrastructure, expand natural resources exploitation, and strengthen an economy with greater levels of competitiveness. The country's economic growth has also improved the quality of life of the society. The Gross Domestic Product (GDP) per capita in Viet Nam was USD 6,608.60 by 2018<sup>1</sup> (adjusted by purchasing power parity), compared to USD 939 only by 1990. Similar trend was found in the country's human development aspect. Viet Nam's Human Development Index (HDI, as defined and tracked by United Nation Development Program) was 0.694 in 2017, compared to 0.475 in 1990, which put the country in the medium human development category—positioning it at 116 out of 189 countries and territories.

The economic growth achieved over the last three decades has come with significant environmental costs. Viet Nam's forest cover had declined to 28% in 1995 before rose up again to 41.5% by 2018. However, the forest cover's gain through newly planted and regenerated forests has not been able to compensate for environmental values of the destructed forests. Although greenhouse gas (GHG) emission intensity of Viet Nam is relatively low compared to developed countries, it has increased substantially since 1990. Over the period of 2000–2010, Viet Nam had the fastest growth in CO<sub>2</sub> emissions in the region. Both Viet Nam's total emissions and per capita emissions almost tripled over the 10-year period, while the carbon intensity per GDP increased by 48 percent (World Bank 2016). The total national emissions amounted 246.8 Mt CO<sub>2</sub> eq. in 2010, and by 2020 estimated to reach 474.1 Mt CO<sub>2</sub> eq. and eventually 787.4 Mt CO<sub>2</sub> eq. by 2030 under the business-as-usual (BAU) scenario (MONRE 2015). Other serious environmental problems of the country are air pollution, soil pollution, loss of biodiversity, water scarcity, and water pollution. The environmental problems are results of multiple causes, but the main driver is likely unsustainable pattern of consumption and production that led to over exploitation and utilization of natural resources, accompanied by poor waste management and treatment. Therefore, Viet Nam is in need of economic growth without corresponding increases in environmental pressures. The country must ensure sustainable use of natural resources for future generations to have equal or better access to renewable resources and that the rate of exploitation of non-renewable resources will allow for timely investments to be made in substitutes.

### Viet Nam's climate policies

#### *International commitments*

Viet Nam ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1994 and the Kyoto Protocol in 2002 as a Non-Annex-B country, thus it is not obligated to reduce emissions under the Kyoto Protocol. In international climate debates, the country has been continuously emphasizing the UNFCCC's principle of 'common but differentiated responsibilities', but also stated that developing countries must take further actions to reach global GHGs reduction goal. For the latter, Viet Nam submitted the Intended Nationally Determined Contributions (INDC) which eventually became Nationally Determined

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<sup>1</sup> According to Trading Economics/World Bank at: <https://tradingeconomics.com/Viet Nam/gdp-per-capita-ppp>

Contribution (NDC) as the country ratified the UNFCCC Paris Agreement (in 2016). The NDC presents two mitigation scenarios: the unconditional contribution, which aims to reduce national GHG emissions by 8% from BAU, and the conditional contribution, which aims to reduce by 25%.

### *Climate policies*

Viet Nam has been involved in international climate negotiations since the 1990s. However, the first national climate change policy was only formulated in 2008 - the National Target Program to Respond to Climate Change (NTP-RCC). The NTP-RCC had clear focus on adaptation as it allocated only 2% of overall resources for mitigation actions towards a low carbon economy. Moreover, the 2008 NTP-RCC emphasizes that mitigation actions will need to be financed externally by industrialized countries or international funds.

In December 2011, National Climate Change Strategy (NCCS) was approved. Unlike the NTP-RCC, the NCCS takes a more balanced approach that requires climate change adaptation and mitigation actions to be carried out in parallel. The NCCS defines ten strategic tasks, *inter alia* outlining approaches for emission reduction, renewable energy and energy efficiency improvements, although not yet defining emission reduction targets for the energy and industry sector. However, the NCCS has confirmed and partially broadened targets from the 2007 National Energy Development Strategy to increase the share of new and renewable energy in the total commercial's primary energy to 5% in 2020 and 11% in 2050. Additionally, a National Climate Change Committee has been established. In the NCCS, Viet Nam signals its willingness to take responsibility for climate change caused by its own development pathway, thereby clearly marking the policy shift towards climate change mitigation.

Beyond this, in early 2012, the Viet Nam National Green Growth Strategy (VGGS) was developed and approved by the Prime Minister in September 2012. The VGGS – combining energy-, economic-, and climate policy aims to “achieve a low carbon economy” by restructuring the economy and reducing GHG emissions. The VGGS declared Viet Nam’s unconditional commitment to reduce its GHG intensity per unit of GDP by 8 to 10% by 2020 compared to 2010 levels and to reduce GHG emissions from energy activities by 10% (additional 10% conditional on international support) below BAU by 2020 and 20% (additional 10% with international support) in 2030. Importantly, the VGGS promised “adequate funding from the state and local budgets” to finance its implementation.

Finally, all line ministries, state agencies and regional authorities are requested to revise their strategies according to the VGGS and to develop Action Plans for its effective implementation. The Green Growth Strategy moreover announced a gradual phase out of fossil fuel subsidies, and these are often imposed indirectly, e.g. by regulating end-user prices for electricity below power producers' total generation costs. The VGGS also informed plans to move towards “trading of certified greenhouse gas emissions, carbon tax and fees and levies”.

### *Other “climate-friendly” policies*

To date, Viet Nam has enacted several “climate-friendly” policies focusing on energy use and natural resources, though not mentioning climate change mitigation explicitly as an objective. Discussed for the first time in 2004, the Environmental Protection Tax Law was passed by the end of 2010 with the tax coming into effect in January 2012. The Environmental Protection Tax (EPT) is levied on a broad range of fossil fuels including oil products and coal. Although the EPT is also imposed on some other environmentally harmful substances such as plastic bags and pesticides, it can be considered as a comprehensive energy tax.

In parallel, the Vietnamese government made efforts to reform the energy sector by enacting the Law on Economical and Efficient Use of Energy in June 2010. The Law on Economical and Efficient Use of Energy was one of the first concrete outcomes and promotes economical and efficient use of energy. In 2015, the Renewable Energy Strategy was adopted, which sets ambitious goals that go beyond all previous documents. This has also impacted the revision of the National Power Development Plan VII 2016-2030, which was approved in March 2016 and which increased the expected share of renewable energy sources.

#### *Institutional framework for climate policy*

Ministry of Natural Resources and Environment (MONRE) which is a focal point for UNFCCC and Kyoto Protocol engagement, lead on National Climate Change Strategy, and certify GHG emission reduction. Under MONRE, the Institute of Strategy and Policy on Natural Resources and Environment (ISPONRE), Institute of Meteorology, Hydrology and Environment (IMHEN), and Department of Meteorology, Hydrology and Climate Change (DMHCC) are actively doing studies on low carbon development.

Ministry of Planning and Investment (MPI) leads on the national Green Growth Strategy, lead on low carbon growth and financing. Department of Science, Education, Natural Resources and Environment (under MPI), in close collaboration with development partners, has been conducting and coordinating low carbon related activities. Central Institute for Economic Management (under MPI) is conducting several studies on impacts of low carbon development on the economy.

Ministry of Agriculture and Rural Development (MARD) is responsible for REDD-related activities and mitigation efforts related to agriculture and forestry. Ministry of Transportation (MOT) leads on the low emission in transport sector.

#### Motivations for Viet Nam to voluntarily adopt climate change mitigation measures

There are several reasons for Viet Nam to take forward steps in climate change mitigation, e.g. low carbon development pathways and green growth strategy as analysed by Zimmer et al. (2015). Some of these reasons are also linked to VGGS's limitations as will be discussed later. The reasons could be as follows:

#### *Vulnerability to climate change*

Viet Nam's Second National Communication submitted to the UNFCCC in 2010 describes scenarios of expected climate change impacts and identifies an adaptation response. Viet Nam's coastal lowlands are particularly vulnerable to sea-level rise caused by current global warming, though the extent is dependent on the rate of future global emissions. It is estimated that 7% of Viet Nam's agriculture land could be submerged due to sea-level rise. The situation is predicted to be worst in Vietnamese Mekong Delta which is considered the vital agricultural production area of the country. These could be the reason why although climate change mitigation in Viet Nam can only contribute very little to global climate change effect, policy makers have taken advantage of climate risk to raise awareness and put climate change on the political agenda (Zimmer et al. 2015).

#### *Restructuring the economy*

Viet Nam achieved remarkable economic growth rates of more than nine percent in some years between the economic reforms in 1990s and 2008. Thereafter, the economy has decelerated due to global financial crises and internal structural problems, and economic growth rates have been around 5 and 6 percent until now. Policy makers have a concern

that the country could run into a ‘middle-income trap’ marked by economic stagnation after an extensive period of rapid growth. The adoption of the Green Growth Strategy may help the country to address more structural economic issues such as an ageing economic system that is increasingly becoming less adapted to international competition. In comparison to neighbouring countries, Viet Nam’s green growth objectives are ambitious and broad. For instance, they also cover climate change adaptation and the exploitation of limited natural resources. These objectives are also aligned with Viet Nam’s intention to contribute to the global combat against climate change which it submitted at the COP21 Conference in Paris in December 2015.

### *Energy security*

Until 2011, although Viet Nam has covered its fossil energy demand primarily from domestic sources, export rates have decreased significantly. Depletion of domestic resources in combination with the projected rapid increase in energy demand is expected to quickly turn the country into a net importer of both oil and gas<sup>2</sup>. Dependence on the world energy market makes the country more prone to disruption of energy supply and put a heavier burden on state budget, as an effect of energy price subsidies. In this context, a shift of economic activity towards less intensive energy use or substitution of fossil fuels with alternative sources of energy – such as renewables – is regarded as highly desirable. For example, development of a decentralized power supply system based on renewable energy with distributed power generation on rooftops and comparatively small power plants in different places would mean more secured energy supply chain. Development of VGGS would help the country to find opportunities to restructure energy demands and consumptions towards sustainability.

### *International financial flows*

Viet Nam’s economy is to a certain degree dependent on official development assistance (ODA) from bi- and multilateral donors. In recent years, ODA accounted for about 3% of the country’s GDP (World Bank 2013). With Viet Nam having achieved low-middle income status in 2009, some donors have announced their intent phase-out of Viet Nam except some few selected areas. Viet Nam’s authorities have completely understood that climate issues are at the core of the international agenda and that many donors are willing to contribute to country efforts in this domain. As donors’ aid portfolios have increasingly shifted their focus towards sustainable development and Green Growth, this topic has become more attractive for Viet Nam as a new opportunity to preserve access to international financial support as well as technical assistance. For instance, Germany’s agency for international cooperation (“Gesellschaft für Internationale Zusammenarbeit”, GIZ) provided advice on the Environmental Protection Tax and on feed-in tariffs for renewable energy. Cooperation with donors is also regarded as a potential means to spur technology transfer and therefore to help modernizing the economy. In short, cooperation with donors on Green Growth policies is often evaluated to provide significant benefits with little or no associated costs or risks.

## I.2 VIET NAM GREEN GROWTH STRATEGY

### *Vision and Objectives of the Strategy*

The vision of VGGS declares a possibility to accelerate the process of economic restructuring in order to use natural resources efficiently, reduce GHG emissions through research and application of modern technologies, develop infrastructure to improve the

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<sup>2</sup> According to UNDP (2018) Viet Nam is already a net energy importer

entire efficiency of the economy, cope with climate change, contribute to poverty reduction, and drive economic growth in a sustainable manner. As such, the VGGGS is structured around three strategic tasks summarized as follows:

1. *Reducing the intensity of GHG emissions and promoting the use of clean and renewable energy*: Reduce the intensity of GHG emissions by 8-10 percent as compared to the 2010 level; and reduce energy consumption per unit of GDP by 1-1.5 percent per year. Reduce GHG emissions from energy activities by 10 percent (voluntary) to 20 percent (conditional) compared to BAU.
2. *Greening production*: Promote “green production” via more efficient use of resources and new technologies. This objective aims to facilitate sustainable production, greening existing business, and create new green businesses;
3. *Greening lifestyle and promoting sustainable consumption*: Implementing rapid and sustainable urbanization while maintaining the living in harmony with nature in rural areas and establishing sustainable consumption behaviours.

Because the VGGGS requires coordination across a wide variety of ministries and sectors, Viet Nam established an Inter-ministerial Coordinating Board under the National Committee on Climate Change, to support effective implementation of the VGGGS. The Deputy Prime Minister serves as the Head, and the Minister of Planning and Investment will be the standing Vice Head of the Board along with four other Vice-Heads drawn from leaders of the ministries of finance, industry and trade, agriculture and rural development, and natural resources and environment. Inter-ministerial Coordinating Board members include representatives of selected ministries and sectors, local authorities, and representatives of associations. A supporting office is in the Ministry of Planning and Investment.

#### Potential measures

During the development of VGGGS in 2012, Viet Nam undertook a Marginal Abatement Cost Curve (MACC) analysis on key sectors which showed significant win-win options in the energy and agricultural sectors and large cost-effective opportunities in the forestry sector. The study underlined that with appropriate levels of investments, Viet Nam’s GHG emission reductions targets can be achieved while maintaining level of economic growth. The National Green Growth Action Plan (VGGAP) approved in 2014 and set out order priorities and actions covered by the VGGGS. Accordingly, it categorizes activities into four main areas: (i) awareness raising; (ii) institutional improvement; (iii) economic restructuring in sectors, localities, and enterprises; and (iv) technology innovation. The GGAP further divides a total of 66 activities into 12 groups. The priority activities for 2013–2015 period include organizing the Inter-ministerial Coordinating Board for the VGGGS, completing an institutional framework to enhance the economic restructuring process in accordance with the VGGGS, and formulating a green growth financial-policy framework.

In particular, the provinces are required to elaborate their local GGAP based on their own specificities. On-going VGGGS implementation also includes the design of national green investment guidelines and the establishment of a funding entity to financially support green projects and access international climate finance. Obviously, the VNGGS objectives are formulated in terms that are directly matching the core green growth principles (reduce environmental damage combined with growth of green sectors) but also reflecting the social objectives such as cultural dimension (“traditional lifestyle”, “harmony with nature”) that is not included in most GGAP and strategies around the world.

To date, seven ministries and more than thirty provinces (accounting for more than 50% of the provinces in the country) have developed action plans in the areas of ministry, and local level based on the socio-economic situation and natural conditions, in which the initial focus

is on assessing the current situation, identifying key sectors, potentials, priority options, proposing mechanisms of mobilizing sources for investing in green growth with the participation of the private sector. According to the Climate Public Expenditure and Institutional Review (CPEIR), the government budget for climate change in Viet Nam contributing to total resources, accounts for 69%. Investments in climate change and green growth projects are worth approximately USD 1 billion per year and cover areas such as energy efficiency, afforestation and for projects of research and capacity building.

### Main gaps and limitations

The promulgation of the VGGS has become the footprint towards greening the economy and has made Viet Nam as one of few countries in the region that have a national strategy on GG, while many other countries only developed determined green sector policies. The challenge is to assure that it leads to the success of transition to a green economy in the country. In addition to this, certain limitations have been identified as follows.

#### *Lack of a conceptual and methodological framework*

Viet Nam has used the term "green growth" in the VGGS but the definition of green growth has not been explicitly mentioned in the strategy as well as other documents and policies relating to green economy. Since the country does not have a standard definition on green growth, it can be interpreted differently at different levels and by different groups of stakeholders, leading to ambiguity in planning and implementation. For policy makers, green growth can be regarded as a means to address issues such as declining rates of economic growth, restructuring the economy, addressing energy security concerns and accessing international finance at the same time (as mentioned above). Meanwhile, emission reductions do not seem to be a major goal of the policies but rather a co-benefit of policies aiming to promote other goals in the first place (Zimmer et al. 2015). More recently, new terms and policy attentions such as circular economy and eco-friendly solutions have emerged, and these would more likely lead to confusion than clarification to green growth. There are certain risks that VGGS will be diluted or even replaced by any "green" or "sustainable" terms in political agenda if sufficient interests and funding cannot be mobilized.

Not only the lack of concept but the lack of structural configuration of green growth in VGGS is a threat to the policy's sustainability. The VGGS set to focus on three main objectives, including reducing GHG emissions, greening production and consumption, but the links and interactions between these objectives (and coherently, actions under each objectives) have never been made explicit. Similarly, the interactions between socio-economic systems and the nature that should be placed at the core of any green growth strategy were not articulated. This has negative implications on the policy's governance, planning, implementation, and assessment. In lack of a rigid theoretical structure, environmental goals of VGGS can be easily overridden by economic and other societal goals in both planning and implementation. The OECD's framework of green growth assessment (Fig. 1) could be a good model for Viet Nam to frame its own green growth strategy and actions.

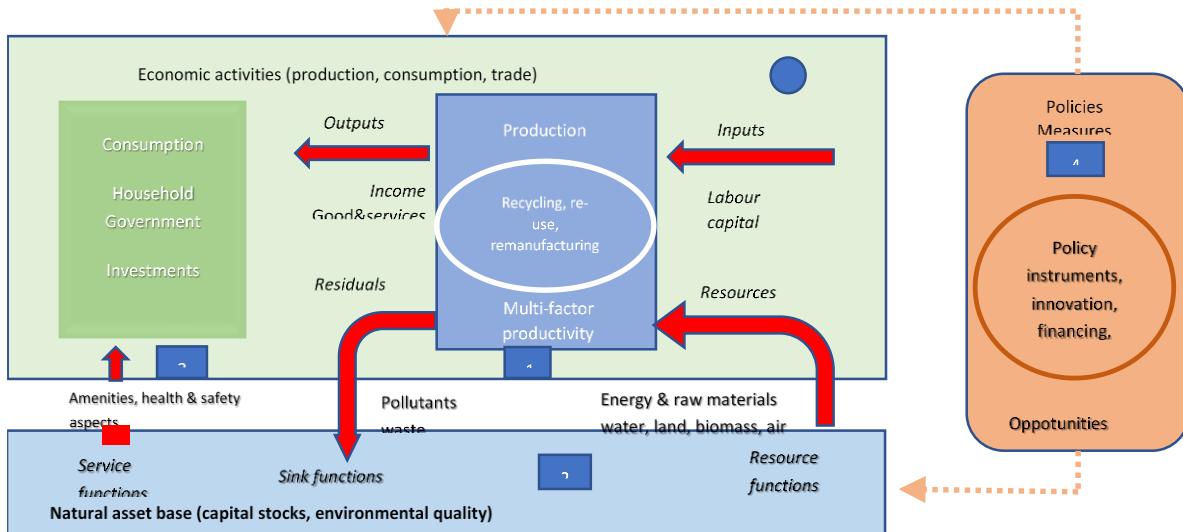


Figure 1 OECD's Green Growth Assessment Framework (OECD, 2011)

Implementation of VGGS has also faced a fundamental challenge regarding methodological framework for planning. The Marginal Abatement Cost Curve (MACC) analysis has been apparently the key “tool” to develop VGGS and other national climate policies (such as NDC). While this tool has been widely adopted by international institution (Intergovernmental Panel on Climate Change, UN agencies and the World Bank) and countries to show the relationship between the marginal costs and carbon mitigation potential of emission reduction measures, it does not consider socio-economic, health, and environmental benefits associated with mitigation options, especially in Agriculture, Forestry and Other Land Uses (AFOLU) sector. Moreover, MACC is not designed to predict impacts of implementing mitigation options on the whole economy where sectoral linkages (flows of products, services and finance) should be taken into account. Similarly, some other methods used for VGGS planning such as LEAP (Long-range Energy Alternatives Planning) are rather intra-sector than inter-sector assessment tools. As such, the GDP targets (and other macro environmental-economic indicators) set out in VGGS were rather based on political will and experience than solid and analytical sound evidence. Only very recently some studies on macro-economic benefits (i.e. GDP, employment, poverty) of increased GHG emission mitigation have been published (UNDP 2018), while the determination of green GDP indicator is in the process of studying in most developing countries including Viet Nam. The assessment tool for green growth development should be able to deal with assessment of ecosystem services at landscape level and provides estimation of “macro-economic” indicators, which are essential for decision making and planning. For example, in the development of 2021-2030 GGAP for Lam Dong province, three main tools were used namely Land Use Planning for Multiple Environmental Services (LUMENS) for impact assessment of land-based strategies related to AFOLU sector, Long-range Energy Alternatives Planning (LEAP) for impact assessment of energy sector, and Generic River (GenRiver) for hydrological assessment. The first (namely LUMENS) is a spatially-explicit tool, that can handle input maps, with assessment includes all areas over the landscape. Furthermore, the assessment of all interventions which potentially contribute to the provincial GDP was conducted with a Leontief-table which can link contribution at sector to province level. Lack of methodology for GG planning in combination with lack of awareness and political interest partially explain the fact that so far only 7 out of 22 ministries and around 30 out of 62 provinces have issued an action plan to implement the VGGS.

### *Lack of implementation measures*

Although the government has issued a series of policies relevant to green growth and climate change mitigation, how they will be implemented is still a question. It appears that Viet Nam is facing the lack of policy instruments to transform from brown to green economy. Like many other developing countries, Viet Nam has mainly based its environmental policy on command and control instruments, e.g. technological standards and performance standards. Despite its simple implementation and assurance that the environmental goal will be met, this type of instrument leaves limited room for flexibility in the regulated sector, which results in higher implementation costs. Any green growth strategy must put priority on attracting private investment so that “natural transitions” to green economy can occur. As such, economic instruments such as tradable emission permits must be in place. Viet Nam's interest in market-based instruments is underlined by Prime Minister's approval of a plan to implement an emissions trading scheme by the year 2020. However, an important prerequisite for pricing emissions is a functioning monitoring, verifying and reporting (MRV) scheme which is currently lacking. Some climate relevant policy instruments that have been implemented so far, like the Environmental Protection Tax and the feed-in tariff for wind power, can currently be expected to result in relatively small emission reductions compared to the BAU if any (Zimmer et al. 2015). The lack of a monitoring and reporting framework for green growth is common among developing countries, partly because of the lack of methodological frameworks as discussed above. Policies are usually reviewed but there are few quantitative assessments of their impact on the various dimensions of welfare. Therefore, the measurement of green economy through green economy indicators, such as the set of indicators of the OECD, or the determination of green GDP indicator should be accelerated.

### *Positioning VGGS in a wider climate policy context*

In order to address economic and environmental issues at the same time, policy makers could develop, pilot and implement a stream of policies (best if supported by donors) with a “no-regret” approach. Under this point of view, it seems like VGGS was a movement to receive climate finance as mitigation actions are more promising than adaptation in getting donors interests (Zimmer et al. 2015). Unfortunately, how VGGS are connected to and complemented by other climate and economic policies and programs such as NDC, NTP-RCC, REDD+, New Rural Development, PES, and sectoral restructuring programs are ambiguous. This has an important implication on resources mobilization for implementing the strategy. Furthermore, VGGS can be seen as one policy (among others, such as NDC) that have quantified economy-wide targets for reducing emissions of GHGs. The multiplication or these policies' targets may lead to policy inconsistency. There have been too many climate and economic targets in the country, and this could be detrimental to policy coherence and going against the principle of seeking least-cost abatement options.

The current scope of VGGS is limited to climate-change and energy policies and there is some risk that climate-related questions crowd out other important environment and development issues, such as biodiversity and water. Analysis of the effects of green growth on poverty and inequality is also underdeveloped. It is suggested that green growth objectives should be integrated into broader economic policymaking and development planning. The VGGS as part of a wider economic restructuring agenda in Viet Nam is a crucial step on the path to sustainable development.

### *Ecosystem and ecosystem services are underdeveloped content*

Ecosystem and ecosystem services underpin the whole economy and contribute to most of human well-beings. In turn, the degradation and loss of natural assets and values can undermine development and long-term economic growth Green Growth Frameworks of

OECD, UNEP, ADB highlight the importance of making natural assets/capital to deliver their full economic potential on a sustainable basis. Significant efforts are being spent to develop and improve the physical data for key stocks and flows of natural assets and develop monetary values to reflect prices and quantities for (changes in) key stocks and flows of natural assets. Such valuations, even if incomplete and imperfect are required for extended growth accounting models, more comprehensive balance sheets and for adjusted measures of real income. Unfortunately, both the VGGS and the NGGAP seem to overlook these roles and have narrow focuses on emission reduction and energy efficiency as shown in Table 1. Among 66 actions listed under NGGAP, only two actions (46-Promote the production of environment goods and services, and 47 - Restoration and development of natural capital resources) directly support the recognition of ecosystem services' values. Issues of waste minimization (Action 45) and green job creation (Action 38) were either out of focus or partly integrated into the "green lifestyle" pillar, which is a unique feature of VGGS.

*Table 1 Main elements of the green economy and focus of VGGS/NGGAP (Source: adapted from FAO 2010)*

Pillar of green economy (FAO)	Description	VGGS/NGGAP
Generation and use of renewable energy	Refers to any source of usable and renewable energy intended to replace fossil fuel sources without the undesired consequences of GHG emissions and other pollutants derived from fossil fuel combustion	●
Energy efficiency	Seeks to adopt means and a more efficient technology that uses less energy to provide the same level of energy service	●
Waste minimization and management	Considers different approaches from prevention, minimization, reduction, reuse, recycling, waste conversion and disposal in order to ensure that the use of materials and waste generation remains within the regenerative and absorptive capacities of the Planet	◎
Preservation and sustainable use of existing natural resources	Recognizes the importance and economic value of natural resources, such as freshwaters, forests, soils, coral reefs and ecosystem services provided by functional and healthy ecosystems	◎
Green job creation	Promotes decent jobs that offer adequate wages, safe working conditions, job security, reasonable career prospects and workers' rights	◎

Note: ● Focused; ◎ Not focused but mentioned;

While VGGS and other climate policies in Viet Nam propose quantitative goals for the different mitigation measures in the AFOLU sector, they often do not pay adequate attention to co-benefits of such mitigation options. Failing to consider the importance of ecosystem services such as biodiversity or water supply and regulation that the AFOLU sector provides can have detrimental effects (Carbonari et al. 2019). Economic sectors directly reliant on

natural resources and have a fundamental interest in safeguarding the natural asset base. The fact that agriculture and forestry's exports are key to Viet Nam's income and environmental sustainability but overlooked in VGGS poses a question to both "green" and "growth" aspects of VGGS. Opportunities to harmonize with other policies and conceptual frameworks, like PFES and climate smart agriculture (CSA), can also be missed.

## PART II NEED TO INTEGRATE ECOSYSTEM SERVICE

### Increasing concerns on environmental degradation

Despite a remarkable advance in global economy, the Millennium Ecosystem Assessment (MEA) was conducted in 2001 along with an increasing concern on environmental degradation. The effort involved 95 countries. In 2005, the MEA published four main messages which highly emphasize the need of a more sustainable economic development, namely development that can reconcile with environmental conservation (UNEP 2005):

- Over the past 50 years, humans have changed ecosystems more rapidly and extensively than in any comparable period in the human history, largely to meet rapidly growing demands for food, fresh water, timber, fiber and fuel. This has resulted in a substantial and largely irreversible loss in the diversity of life on earth.
- The changes to ecosystems have contributed to substantial net gains in human well-being and economic development, but these gains have been achieved at growing costs in the form of the degradation of many ecosystem services, increased risks of nonlinear changes, and the exacerbation of poverty for some groups of people. These problems, unless addressed, will substantially diminish the benefits that future generations obtain from ecosystems.
- The degradation of ecosystem services could grow significantly worse during the first half of this century and is a barrier to achieving the Millennium Development Goals<sup>3</sup>.
- The challenge of reversing the degradation of ecosystem while meeting increasing demands for services can be partially met under some scenarios considered by the MEA, but will involve significant changes in policies, institutions and practices that are not currently under way. Many options exist to conserve or enhance specific ecosystem services in ways that reduce negative trade-offs or that provide positive synergies with other ecosystem services.

For the case of Lam Dong, the ecosystem and current states of ecosystem services in the province are described in length in the GGAP technical report, and while the province has favourable natural resource to support its economic growth in different sectors, recently the province's impressive economic growth have shown some negative consequences to the environment. This certainly needs to be anticipated to avoid further degradation and to keep the province's economy to grow within sustainable environment. Some concerns on the environmental degradation in the province include:

- *Emission from landuse change*

A report by USAID (2013) on the landuse and forest cover changes and historical GHG emission in Lam Dong province for the period of 1990-2010 concluded that the area of forested lands declined by about 134,950 ha during the period of 1990-2010, with an average annual loss of 6,747 ha. In more detailed, a sharp decline was observed during the period of 1990-1995, and more gradually during 1995-2005. The forest loss was however more dramatic again in the following five year (2005-2010) related to a sharp decline in broadleaf evergreen forests, namely by a total of 91,744 ha. This forest loss was mainly associated with the expansion of crop cultivation, that in the same period increased by 50,100 ha.

The report also highlighted that the main driver of deforestation during the two decades (1990-2010) was the expansion of industrial crops such as coffee and food crops. The most intensive deforestation for coffee plantations took place between 1993 and 2000. Concurrently, some forest areas were restored following forest protection and regeneration programs. However, the associated increase in forest area was not

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<sup>3</sup> Now becomes Sustainable Development Goals (SDG) with 17 main programmes

comparable to the total annual loss of forest cover in the province. The total net emission in the province over the two decades was 60.5 million-ton CO<sub>2</sub> eq. with an average of 3.02 million-ton CO<sub>2</sub> eq. per year. In line with the trend in forest cover loss, the net emission was high during 1900-1995, lower in the subsequent decade, and rose again during 2005-2010.

The report identified areas with high deforestation rate include the districts of Dam Rong, Cat Tien, Da Teh, Da Hoai, Lam Ha, Lac Duong and Bao Lam. The areas with serious forest degradation include the districts of Bao Lam, Da Teh, Da Hoai and Lam Ha. The carbon sequestration took place in the areas of special-use forests such as Cat Tien and Lac Duong districts, particularly associated with the national parks in these two districts. A sustainable forest management was suggested to introduce in some communes of Dam Rong, Lac Duong, Don Duong, Duc Trong, Lam Ha, Di Linh, Bao Lam and Cat Tien districts that had areas of production forests. A forest enrichment was suggested to implement in the areas of protection forests in Dam Rong, Lac Duong, Da Lat, Don Duong, Duc Trong, Di Linh and Da Huoai districts.

From 2010 onwards, the analysis of 2010-2015 landcover change conducted during the development of the 2021-2030 GGAP for Lam Dong, and the projection of landcover area based on this historical change until 2030, shows an expansion of perennial crops between 2010 and 2015, and if this trend continues without intervention, the area of perennial crops will reach about 320,000 ha by 2030. Other landcover type which shows a steady increase from 2010 to 2030, without any intervention, is settlement due to population growth. On the other hands, the area of some forest types to include coniferous and deciduous forest decreased in 2010-2015 and if without intervention, this trend will continue until 2030.

The total emission for 2010-2030 based on historical trend reaches 92.1 million-ton CO<sub>2</sub> eq. with an average of 4.6 million-ton CO<sub>2</sub> eq. per year. Although in the same time there is a sequestration from afforestation and reforestation programs accounting for 95.1 million-ton CO<sub>2</sub> eq. over the two decades, with an average of 4.75 million-ton CO<sub>2</sub> eq. per year, the high emission should be reduced to lead the province towards economic growth with zero or at least minimized deforestation. Moreover, the loss of forest area has a direct consequence on different types of ecosystem services to include biodiversity and hydrological service, not merely CO<sub>2</sub> emission.

- *Fragmentation of rich forest and biodiversity*

The loss and fragmentation of forests will generate pressure on biodiversity. Therefore, there is a need to ensure long-term maintenance of forest resources and connectivity between patches of intact forests. As informed by Enright (2014), although in the recent years the total area of forested lands in Lam Dong province has increased, the decline in quality of forests has in the same time been observed and mostly driven by the expansion of plantation forest and expansion of agriculture and infrastructure.

The author claimed that the deforestation and forest degradation in Lam Dong were driven by a complex interaction within key socio-economic developments. Among these, the province's population growth has driven illegal deforestation for new settlements and agricultural lands. Commercial plantations and promising economic return contributed to the conversion of forested lands to monoculture plantations such as for coffee, tea, and rubber. For example, between 1995 and 2000, a large expansion of perennial crops related to the rise of coffee price towards VND 45,000 (around USD 2.25) per kg in 2000 (FREC 2013). The area of coffee plantations rose by 200% over the decade (1990-2000).

The deforestation in the province was also related to illegal forest clearing for example by smallholder residing or with agricultural plots in the forest margin, infrastructure

developments such as for road establishment and hydro-electric plants, and insufficient forest patrolling efforts (FREC 2013). The decline in area also took place in natural bamboo forests due to conversion to other landuses, following low market value of raw bamboo material and difficult access to processing centres. Other important drivers of deforestation and forest degradation include illegal logging especially in remote mountainous areas beyond an effective control of forest rangers, non-timber forest product (NTFP) harvesting, and forest fires.

Dewi et al (2013, 2015) developed an index called Total Edge Contrast Index (TECI) to measure the contrast between rich forests and their surrounding landuses, and based on this contrast, another called Degree of Integration of Focal Area (DIFA) to measure the capacity of a landscape to conserve biodiversity. In a landscape with low contrast between rich forests and their surrounding landuses, and where the rich forests are less fragmented, the DIFA index will have high value indicating a good capacity of the landscape to conserve biodiversity.

The TECI and DIFA indexes were estimated during the development of 2021-2030 GGAP for Lam Dong province, with rich broadleaves forest, rich coniferous forest, and deciduous forest as forest types considered as source of high biodiversity, and the fragmentation of these types of forest will reflect the capacity of the province in conserving biodiversity. As described in length in the GGAP technical report, the degradation of rich coniferous forests in the northeast of the province during the period of 2010-2015 has led to high TECI index indicating that this type of forest was more fragmented in 2015 than 2010. On the other hand, improvement in quality of broadleaves forests in the northwest part of the province mainly related to conservation in the national park, resulted in low TECI index. In the central and southern part of the province, higher contrasts were generally observed due to fragmentation of deciduous forests. Consequently, while the DIFA value of rich broadleaves forest increased gradually which indicates a maintained connectivity of this type of forest from 2010 to 2015, and without intervention this trend will continue until 2030, the DIFA value of rich coniferous and deciduous forests decreased sharply indicating a strong fragmentation of these two forest types from 2010 to 2030. In the analysis, all quality levels (rich, medium, and poor and restored) of deciduous forests were lumped into one category due to their limited area in the province.

- *Water pollution and water shortage*

There has been increasing incidence of serious water pollution observed in the main rivers of the province including to underground water due to various activities in agricultural, industrial and service sector<sup>4</sup>. Different pollutants such as TSS, coliform, COD, N-NH4+, and Fe have contaminated main rivers due to agricultural and mining activities.<sup>5</sup> In agricultural sector, solid waste from chemical inputs which are mostly toxic, packaged in glass or plastic bottles, or plastic bags, are difficult to decompose and to process. Due to lack of awareness of local people, many of these solid wastes directly released into the environment, become residues in the soil, affecting the environment and the productivity of the soil. Furthermore, residues that are washed away by rainfall or irrigation cause a serious water pollution. If not well treated, this water pollution can further affect health of people. In addition to this, the province is currently devoid of appropriate treatment of hospital's wastewater, which is also an important source of water pollution.

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4 <https://tintaynguyen.com/lam-dong-thuc-trang-tai-nguyen-nuoc/302668/>; Resolution No.

104/2018/NQ-HDND

5 <https://tintaynguyen.com/lam-dong-thuc-trang-tai-nguyen-nuoc/302668/>

According to JICA (2018), the water demand in Lam Dong province from different sectors such as agriculture for irrigation, domestic use, livestock, fishery, and industry reaches about 1,138 million m<sup>3</sup> per year. The highest demand comes from agriculture namely 87% of total demand followed by 8% from aquaculture. Due to the high demand, the province has experienced a serious water shortage. For example, in 2015-2016, the shortage reached about 130 million m<sup>3</sup>. The southern part of Da Lat City, Lam Ha and Duc Trong districts were areas with serious surface water shortages. The water shortage also relates to climate change and more contrasting rainfall gradient between wet and dry season. For example, the long drought due to El Niño has affected many provinces in Central Highlands region and in the country, including Lam Dong. The climate change's projection until 2050 by MONRE (2016) informed a high possibility of stronger gradient in rainfall between wet and dry season in Lam Dong province.

- *Potential impacts from infrastructure development*

The Construction Planning (Decision No. 1848/QĐ-TTg) describes impacts from infrastructure developments to environment in general, not limited to emission, biodiversity and hydrology condition. These also constitute potential impacts from future development of urban-rural infrastructure, transport and tourist development, and other infrastructures.

#### Need of environment-sensitive Green Growth Action Plan

It has been increasingly recognized that sustainable development will not be achieved merely through the intersection among three spheres of sustainability namely environment, society or community, and economy (Fig. 2). Instead, sustainability can be achieved through a framework of nested circles namely through recognizing that community and economic development should take place within sustainable environment, ecosystem or ecological boundary (Fig. 2). Economic development cannot be sustainable without sustainable community, and the latter cannot be achieved without sustainable environment. This emphasizes the need of prioritizing conservation of ecosystem and ecosystem services to support economic development.

A remarkable economic development without environmental, ecosystem, and natural resource protection, will only lead to short-term rather than long-term benefits to human welfare. In that case, the consequence from environmental degradation will gradually become apparent and will in turn lead to unbearable economic loss. The degradation will directly result in a diminishing capacity of the ecosystem to provide valuable goods and services, with a negative consequence to economic and society. Among different socio-economic groups in the society, rural community and poor households who largely depend on natural resources and lands for livelihoods are those who will be severely affected. A further impact will affect the provincial economy.

Ecosystem services play a vital role to any economy. For example, it was estimated that ecosystem and ecosystem values contribute to 40% of Viet Nam's economy (WWF 2013). The utilization and management of ecosystems for human needs will create a feedback loop that potentially modifies the ecosystem's organization and functions, and its potential to provide ecosystem services in the future. Therefore, there is a need to manage ecosystem services utilization that will not cause a structural change of ecosystem services' provision capacity within the targeted natural and jurisdictional territory. Unfortunately, ecosystem services and their contribution to the whole society and economy are often overlooked in development plans or policies, especially at sub-national such as provincial level. This poses a serious threat in achieving sustainable development.

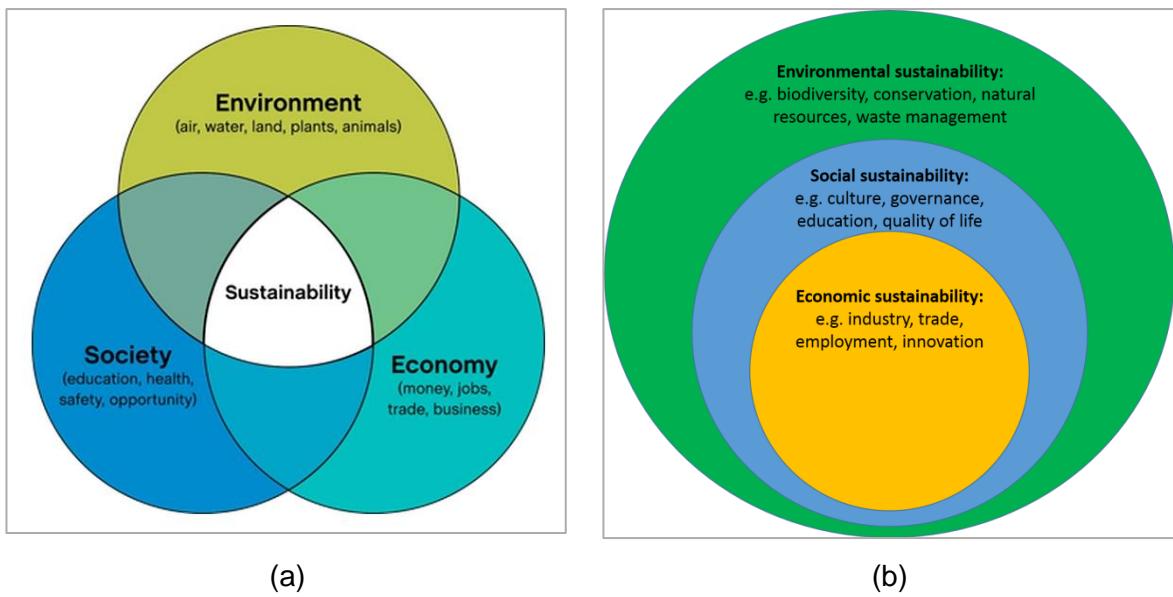


Figure 2 (a) Sustainability as *intersection of three spheres namely environment, society, and economy* (b) *sustainability with economic and social development within the limit of environmental boundary.*

Therefore, there is a need of more environment-sensitive GGAP which takes into the account the safeguard of natural resource, conservation of ecosystem and ecosystem services including biodiversity, as a pillar of sustainable development. The social aspects can also be incorporated although in a more limited way compared to the scope of Sustainable Development Goals. In the development of 2021-2030 GGAP for Lam Dong, the social aspects were considered by ensuring that the GG orientations are devoid of major social issues such as land tenure and land right, and the orientations are as far as possible gender-balance, pro-poor and pro-ethnic minority. These aspects were explored through several consultation workshops and meetings with relevant stakeholders in the province, with a feedback loop process, namely concerns from the stakeholders in the workshops/meetings on these issues were followed up by improving the associated GG orientations and re-discussed in the subsequent workshops/meetings.

Viet Nam has strategies or action plans which strongly concern on environmental issues and protection such as the 2011-2020 National Strategy on Climate Change, Environmental Protection Strategy to 2020 and vision to 2030, and 2011-2020 National Biodiversity Strategies. In a more inclusive way, the Action Plan of 2030 Sustainable Development Agenda (No:622/QĐ-TTg) also exists as the national implementation and targets related to the 17 SDGs. These strategies/action plans are however fragmented, while the 2011-2020 National Green Growth Strategies as one of the main development plans has relatively limited concerns to ecosystem and different types of ecosystem services. The Action Plan of 2030 Sustainable Development Agenda covers concerns and targets related to economic, social and environmental sustainability, but the action plan provides no detailed strategy on how to integrate the three aspects, and mainly elaborates targets and general solutions. In the development of 2021-2030 GGAP for Lam Dong, these strategies/actions plans were set as legal basis and used as references to develop the initial version of GG orientations and solutions to communicate and improve together with relevant stakeholders in the province, and to adapt to local context.

## Types of ecosystem services

According to MEA, ecosystem services are the benefits people obtain from the ecosystems. These include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services such as nutrient cycling, which maintain the conditions for life on earth. By this definition, ecosystem services are “products” of the interaction between ecosystem (biophysical) and human (social) systems (Fig. 3), and thus are context-dependent. The underlying principle is that functioning ecosystems provide a range of services that have a lot of potential uses with different values attached (Small et al. 2017).

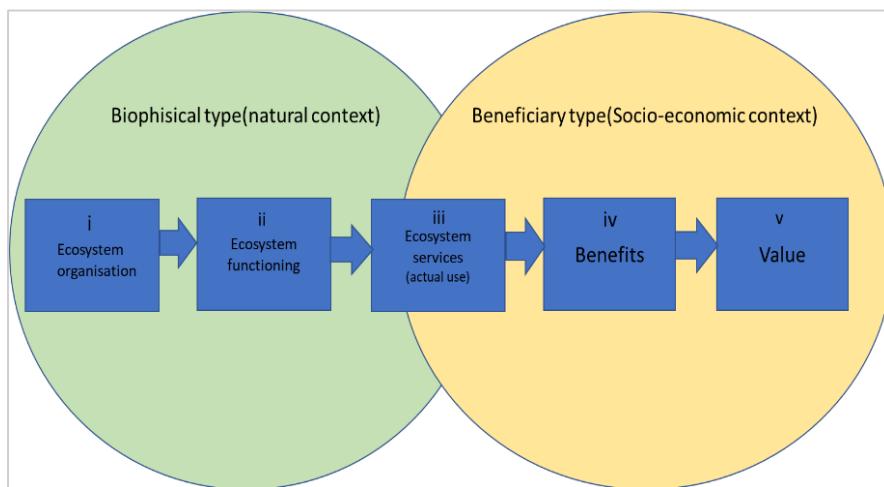


Figure 3 The sequence of processes that connects the biophysical type to human wellbeing wherein ecosystem services are at the interface (Source: Small et al. 2017)

According to MEA (2003), there are about twenty ecosystem services, broadly classified into four types. However, this whole set of ecosystem services is not always relevant, and some are very difficult to be quantified as long as the “actual use” of ecosystem functions is defined as ecosystem services. For example, “pollination” often has no direct use, while some services are non-consumptive (e.g. recreation). In the development of 2021-2030 GGAP for Lam Dong province, in which ecosystem services were quantitatively assessed, three types of ecosystem services were considered and assessed namely:

- *Provisioning services*: include production of food crops such as paddy and vegetables, commercial crops such as coffee and tea, and timber from production forest lands.
- *Regulating services*: carbon emission and sequestration related to landcover/use change, agricultural and livestock practices, including emission from expansion of agricultural greenhouses. In this category, hydrological assessment to examine the landscape capacity in reducing the surface run-off for reduced rate of soil erosion and sedimentation to the river basin, and provision of clean water from sub-soil water flow, was also conducted.
- *Supporting services*: this is represented by biodiversity. By scientific definition, biodiversity is generally not considered an ecosystem service, but biodiversity and ecosystems are closely related concepts. There is significant evidence on the linkages between changes in biodiversity and the way ecosystems function (DEFRA 2017). Biodiversity is also considered to possess insurance value by providing resilience in the face of current or future shocks to ecosystems and the services they provide. Therefore, biodiversity is here considered as an ecosystem service both in the broad sense that it underpins all other services and in specific case where it is seen as a service. As mentioned earlier, in the development of 2021-2030 GGAP for Lam Dong province, the

assessment focused on the capacity of the provincial landscape in conserving biodiversity, which depends on the contrast between rich forests and their surrounding landcover/uses, and the fragmentation of the forest types over the landscape.

Cultural services were not quantitatively assessed, however the provincial 2021-2030 GG orientations supports the maintenance of this service through e.g. forest and biodiversity conservation, as well as reducing the expansion rate of agricultural greenhouses for mitigating emission and landscape beauty.

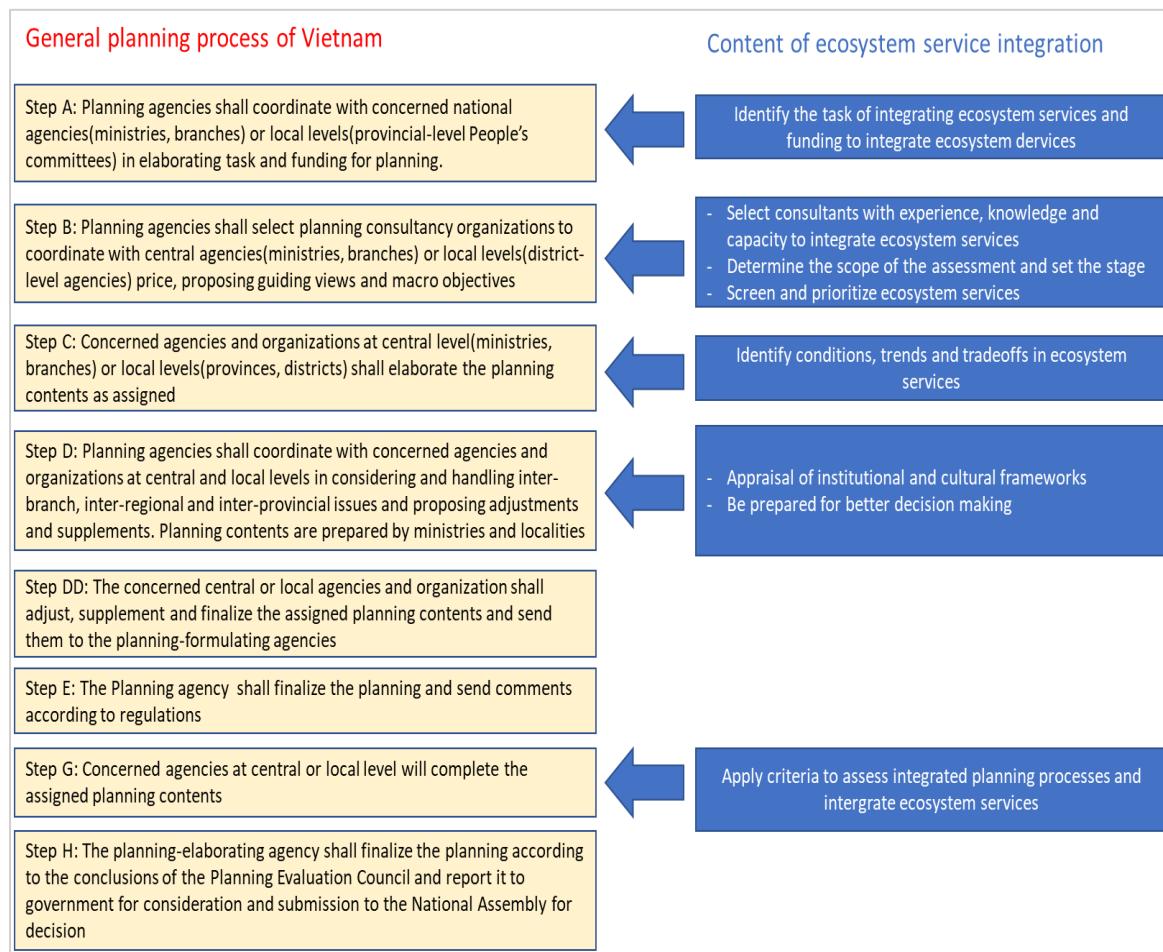
#### Available guidance to integrate ecosystem services

According to the Planning Law (Article 16), the planning process in Viet Nam either at national or sub-national such as province level needs to follow eight steps (Fig. 4) namely:

- Step A: The planning agency shall coordinate with the concerned agencies at the national level (ministries, branches) or at the local level (the district-level People's Committees) in formulating tasks and funding for planning.
- Step B: Planning agencies shall select planning consultants to coordinate with central agencies (ministries, branches) or local levels (district-level agencies), proposing guiding views and macro objectives.
- Step C: Concerned agencies and consultants at the central level (ministries, branches) or local levels (provinces, districts) shall elaborate the planning contents as assigned.
- Step D: Planning agencies shall coordinate with concerned agencies and consultants at central and local levels in considering and handling inter-branch, inter-regional and inter-provincial issues and proposing adjustments and supplements. Planning contents are prepared by ministries and localities.
- Step DD: The concerned central or local agencies and consultants shall adjust, supplement and finalize the assigned planning contents and send them to the planning-formulating agencies.
- Step E: The planning agency shall finalize the planning and send comments according to regulations.
- Step G: Concerned agencies at central or local level will complete the assigned planning contents.
- Step H: The planning-elaborating agency shall finalize the planning according to the conclusions of the Planning Evaluation Council and report it to the Government for consideration and submission to the National Assembly for decision.

The manual for integrating ecosystem services in the planning process in Viet Nam developed by the Central Institute for Natural Resources and Environmental Studies of Ha Noi National University highlighted that among the eight steps, the integration of ecosystem services can be incorporated especially in the step A, B, C, D and G. In the step A, when the planning and concern agencies collaborate to formulate task and funding for planning, the task and funding related to the integration of ecosystem services to the planning should be also discussed and added. In step B, a qualified consultant that can conduct an assessment and integration of ecosystem services can be recruited and together with the planning and concern agencies can determine the scope of the work and ecosystem services that need to prioritize. In step C, when the planning and concern agencies as well as the consultant elaborate the planning contents, the ways to identify the conditions, trends, and to perform trade-off analysis related to the ecosystem services can be elaborated. In step D, inter provincial or inter regional issue of ecosystem services can be identified and considered to result in better decision making. Finally, in step G, there is a need to apply criteria to assess the ecosystem services in the integrated planning process and eventually, integrate the ecosystem services into development planning. In the GIZ's stepwise approach to integrate ecosystem services into development planning (Kosmus et

al. 2012), steps and guiding questions to clearly determine the context and scope of concerns and integration of ecosystem service into development plans, until implementation stage, are provided at length. The steps are further described below for the case of GGAP development in Lam Dong province.



*Figure 4 Steps of planning process according to the Planning Law (left) and steps for integrating ecosystem services (right)*

Related to the step A, B, C, D and G as part of the eight steps above, in which the integration of ecosystem services should be discussed and determined with relevant stakeholders, below is the context within the development of 2021-2030 GGAP for Lam Dong province:

- Step A: the funding for the GGAP development is provided by a consortium of three donors namely IDH, GIZ and UN-REDD. The context of the funding is to develop a more environment-sensitive GGAP which considers maintenance of ecosystem and ecosystem services in Lam Dong province to support provincial economic growth. In addition, a quantitative assessment to the impact of GG interventions to ecosystem services is also necessary. This impact assessment and integration of ecosystem services constitute novel aspects in the development of provincial GGAP in the country.
- Step B: the consortium assigned World Agroforestry (ICRAF) as a technical development partner or consultant based on ICRAF's recent experience in developing GGAP for South Sumatra province in Indonesia, in which an assessment tool called LUMENS was used as the main tool for assessing the impact of GG interventions. For the case of Lam

Dong, with more sectors are under concern beside agriculture and forestry, and emission mitigation from energy sector through promotion of renewable energy and energy efficiency is one of the main focuses, an independent and qualified consultant for energy sector is also recruited as part of the project team members. The GGAP development covers six main sectors of the province namely agriculture, forestry, tourism, transport, water resource and management, and energy. The prioritized ecosystem services to assess are as described above classified into three types namely provision, regulating, and supporting service. The project officially started in November 2018 with the inception workshop organized in the province to inform the context and scope, as well as the project plan and targeted activities until the final stage namely the appraisal and approval process of the draft of provincial Decision and supporting technical report.

- Step C: the assessment of ecosystem services includes analysis of baseline condition characterizing the historical trend and current condition of the ecosystems and ecosystem services in the province, including projection until 2030 if the trend continues without intervention. This projection based on historical trend is compared to those based on 2016-2020 provincial planning related to the six sectors and based on GG orientations. The potential trade-off among scenarios was identified and communicated with relevant stakeholders in the province through consultation meetings/workshops.
- Step D: As mentioned earlier, the initial draft of 2021-2030 GG orientations and interventions was developed with different national strategies and action plans, as well as those of regional and provincial level. An example of regional plan is the Construction Planning (Decision No. 1848/QĐ-TTg), while provincial plans are the 2016-2020 planning from the six sectors as well as technical reports related to those planning. The initial draft was refined and adapted to local context through a scenario building workshop, and several consultation meetings/workshops. The outline of the provincial Decision of 2021-2030 GGAP was developed based on those of 2011-2020 National Green Growth Strategies, and innovative outline proposed in the GGAP development of South Sumatra.
- Step G: the quantitative assessment of ecosystem services resulted in a list of estimated GG indicators comparing the performance under GG and baseline condition. Based on this list, indicators for monitoring and evaluation (M&E) were also proposed, which incorporate all the assessed indicators as well as additional indicators considered as important to be part of the M&E although no available data is currently available in the province for their assessment. Further efforts from the province to provide the input data for those indicators is necessary. The list of these M&E indicators is provided in the GGAP technical report.

## PART III STEPWISE APPROACH FOR THE CASE OF LAM DONG

In this part, the stepwise approach for integrating the ecosystem services into the GGAP for Lam Dong province is described and can become an example to implement similar approach in other provinces for developing GGAP or other development plans. As mentioned earlier, the 2021-2030 GGAP covers six main sectors of the province. However, to avoid complexity in presentation, the stepwise approach described here focuses on **agriculture** and **forestry** sector. The responses to guiding questions within each of the six steps are classified into those for provisioning, regulating, and supporting services. The provisioning services focuses on provision of agricultural and forestry products, regulating service on emission mitigation and hydrological function, and supporting service on the capacity of the province to conserve biodiversity.

Among the six steps of the stepwise approach, the first two namely 'defining the scope of assessment and setting the stage' and 'screening and prioritizing ecosystem services' are important to understand the way the development plan depends and impacts on ecosystem services; steps 3-5 namely 'identifying ecosystem service conditions, trends and trade-off', 'screening and prioritizing ecosystem services', and 'preparing decision making' are to understand risks and opportunities that the ecosystem services pose to the development plan; and step 6 'implementing change' is to identify policy measures which can help to avoid the costs and capture the benefits. Below is the summary of each step, while complete responses are provided in the annexes.

### Step 1: Defining the scope of assessment and setting the stage

As informed by Kosmus et al. (2012), the first step covers all need to define in the preparation stage including to identify main development, environmental and management issues. In this regard, agriculture, to include forestry, livestock, and aquaculture, is the sector with the largest share to the provincial GDP, namely about 46.33% in 2016 compared to service sector (36.99%) and industry and construction (16.68%). The income from the sector underwent an increase by 7.92% (according to 2010 comparative prices) during the 2010-2016 period. By 2020, the economic structure in the province is targeted as 46-46.5% from agriculture sector, 19.5 - 20% from industry, and 33.5 - 34% from service. Therefore, agriculture is projected to remain as the sector with the largest share to provincial GDP by 2020 followed by service and industry. From the consultation workshop as part of the 2021-2030 GGAP development for Lam Dong province, the order of sectors based on the share to GRDP is projected likely to remain as agriculture - service – industry, while the order of service - industry – agriculture in which agriculture becomes the sector with the lowest share to GRDP can be targeted after 2030 along with further preparation and completion of infrastructure development.

The important share to the provincial GDP has been accompanied by a remarkable expansion of commercial crops such as coffee, especially during the last three decades which resulted in deforestation and forest degradation. If without intervention, the total area of perennial crops in the province will reach about 320 thousand ha by 2030<sup>6</sup>, from about 180 thousand ha in 2015. In addition to this, the expansion of agricultural greenhouses especially in Da Lat city and Lac Duong district, not only produced substantial emission from related management practice, but also influences the landscape beauty which is important element for supporting the tourist sector. In the forestry sector, the conversion of different forest types to cultivation lands, illegal logging, and forest encroachment, reflects the need of strengthened law enforcement and sanctions, and a review of small- and large-scale projects and activities which involve forest conversion. Related to forest encroachment, the

<sup>6</sup> Based on projection with 2010-2015 historical trend in the GGAP development for Lam Dong

data from the province reveals the existence of about 52,000 ha of ‘illegal’ crops on forest lands, either managed by local communities or migrants.

To be more competitive both in the national and international agricultural market, whilst maintaining the level of other services such as the regulating and supporting services, the main orientation of agricultural sector in the province should not be directed towards higher production from land expansion, but to exert more efforts to enhance product quality based on certification standard, better marketing such as through branding, and strengthen processing and downstream industries. Furthermore, along with increasing market uncertainty under influence of global market competition and uncertainty in level of production due to climate change, the province should not prioritize monoculture type of agricultural cultivation and need to put more attention to climate-smart and more sustainable system such as agroforestry, which promote product diversification and multifunctional purposes such as improved micro-climate, higher water and nutrient efficiency and higher mitigation potential. In the forestry sector, forest protection and biodiversity conservation efforts should be accompanied by sustainable funding source, indicating the need of improving and amending the scheme of payment for forest ecosystem services (PFES) to different forest ecosystem services, or to explore economic instruments such as biodiversity-fee. The GGAP technical report provides at length the options and experiences from different countries in implementing biodiversity-fee. Annex I provides complete responses to guiding questions of step 1.

### Step 2: Screening and prioritizing ecosystem services

This step is to prioritize ecosystem services which are the most relevant to the development plan and key beneficiaries/target groups. The relevancy relates to the risk or opportunity that the ecosystem services can bring to the plan, and those which may affect or be affected by the plan. Annex II describes complete responses to guiding questions related to this step for identifying the relationship between development plan and ecosystem services, main stakeholders affected by the ecosystem services, the share of benefits and costs among different groups, potential conflict-competition-synergy, and prioritized ecosystem services in the GGAP.

Related to prioritized ecosystem services for Lam Dong, the economic contribution from provisioning service to the provincial GDP related to the production of main agricultural commodities needs to be maintained and enhanced, whilst strengthening the processing and downstream industry as part of production and market value chain, certification and marketing strategy. These efforts should be in synergy with the provincial commitment in developing low-emission and more sustainable development pathway, and conserving biodiversity.

The orientations and solutions in the development plan, especially those related to land-based, will have direct impacts to the level of three types of ecosystem service. On the other hands, the plan also depends on the services, if the orientation is towards long-term and more sustainable development, and increased resilience to economic and environmental shock. For example, such orientation will need product diversification, supporting environment, and conservation of species richness for different uses. These key factors will strengthen other sectors as well<sup>7</sup>, not only agriculture and forestry sector.

### Step 3: Identifying ecosystem service conditions, trends and trade-offs

In this step, the guiding questions will lead to the identification of current status and main trends in the supply and demand for the selected ecosystem services, the main drivers of

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<sup>7</sup> For example, species richness and biodiversity conservation areas can support the development of eco-tourism

change, and potential trade-off which might arise between development goals, ecosystem services and stakeholder groups. Furthermore, the available information and existing gaps can also be identified, which determine the scope and quality of assessment of ecosystem services for developing the plan. Annex III provides complete responses to guiding questions related to this step.

Related to the supply and market demand of main agricultural commodities in the province, the 2018-2023 provincial scheme on market value chain (Resolution No. 104/2018/NQ-HDND) provides a good and comprehensive summary. On the demand side, the main commodities such as vegetable, flower, coffee, and tea have both domestic and export market. For example, the export market of vegetables accounts for 247,800 tons of raw materials or about 10.4% of total production in the province to distribute to East Asia (80%), Europe (10%), and the rest to Southeast Asia and Australia. For coffee, direct export market through enterprises in the province accounts for about 112,000 tons or about 22% of total production in the province mainly to Europe (60%), South Asia (12%), and East Asia (11%). Mulberry production is important input for textile industry namely for silk production.

According to the Construction Planning (Decision No. 1848/QĐ-TTg), Lam Dong province has more than 30 silkworm factories and plants, and the province's silk industry accounts for 75% of the country's silk reeling capacity and 70% of the country's silk weaving capacity.

On the supply side, the provincial statistic book provides data on the area and total production of main agricultural commodities across years. The 2018-2023 provincial scheme on market value chain describes detailed information on the stakeholders along the production and market value chain. As example for coffee, most coffee plantations are reported to be small scale and in total there are 114,000 households growing coffee. The province has 235 coffee nurseries, in which 61 meet seedling quality standards. It also has 33 coffee processing enterprises, over 250 small processing industries, with a total processing capacity of about 300,000 - 320,000 tons of green coffee (accounting for about 80-90% of total coffee production), of which 13 industries participate in export.

The future demand of the main commodities is however uncertain under intensifying impact of global market competition. For example, recently the coffee price has dropped to a 10-year low<sup>8</sup>, and black pepper to a 12-year low<sup>9</sup>. Under this high uncertainty in market price, there is an urgent need that the province prioritizes product diversification and strengthen the processing and downstream industries. For the regulating and supporting services, the GGAP technical report describes at length the current states, observed historical trends, and projections until 2030.

#### Step 4: Appraising the institutional and cultural framework

The guiding questions in this step help to provide an overview of the institutional and cultural framework, through analysis of the policies, regulations and informal rules which will directly or indirectly affect the key ecosystem services, as well as the key institutions and traditional authorities which will influence the management of the ecosystem services. Annex IV describes complete responses to guiding questions related to this step.

The 2016-2020 provincial agricultural planning and rural development program focus on enhancing production of raw materials, product quality, and the volume of processed products through new processing industries. For example, Decision 482/QĐ-UBND on the development of tea sector aims to expand the area of safe tea to 23,000 ha by 2020. The expected productivity reaches 10 tons/ha, with a total output of 230,000 tons of fresh tea buds per year. The production is expected to meet VietGAP standard and Hazard Analysis

<sup>8</sup> <https://english.vietnamnet.vn/fms/business/216889/coffee-prices-fluctuate--price-drops-to-10-year-low.html>

<sup>9</sup> <https://asia.nikkei.com/Business/Markets/Commodities/Black-pepper-prices-hit-12-year-low-as-Southeast-Asian-output-grows>

and Critical Control Point (HACCP) system. In addition, more than 50% of tea processing and preserving facilities are expected to meet HACCP and ISO. Meanwhile, the Resolution No. 104/2018/NQ-HDND on market value chain highlights a massive conversion of tea to fruit tree plantation by smallholder farmers due to higher economic return. This shift has generated concern on supply to tea processing industry. The 2021-2030 GGAP proposes a development of tea-fruit tree agroforestry system, in which fruit tree provides economic as well as ecological function, namely to provide shade for tea.

In forestry sector, some policies which relate to forest protection and plantation exist (e.g. Decision 18/QD-UBND, Decision 2771/QD-UBND), and improvement in access and implementation of REDD+ activities (e.g. Decision 247/QD-UBND). The province has also developed REDD+ action plan. As emphasized earlier, these policies should be accompanied by law enforcement and sanctions, whilst exploring options for more sustainable funding source for forest protection.

Related to biodiversity conservation, the province has enacted Decision 169/QD-UBND on planning for biodiversity conservation until 2020, vision to 2030. It includes the plan of establishing four new conservation areas and an ecological corridor connecting natural forests in two national parks of the province. As for regulating service, the effort should be accompanied by sustainable funding source. The 2021-2030 GGAP highlights option of biodiversity fee, and potential collaboration with tourism sector to develop eco-tourism program.

#### Step 5: Preparing better decision-making

This step summarizes the main ecosystem service-related risks and opportunities to the development plan, and based on the summary, identify different policy options, instruments and entry points in order to maintain or enhance the flow of the selected ecosystem services. Complete responses to guiding questions related to this step are provided in Annex V.

Related to the provisioning service, the promotion of climate-smart and more sustainable system such as agroforestry, has a potential to increase and stabilize smallholder farmer's and provincial income from agricultural sector through product diversification<sup>10</sup>. A higher income can potentially be drawn if the products are processed, certified and branded. For a successful implementation, this solution needs to be accompanied by appropriate training especially for smallholder farmers, improved access to credit and market of different product from the system. Entry points for this provisioning service include climate-smart and sustainable agriculture, product diversification, short- and long-term economic benefit, improved micro-climate to reduce risk of pest and disease outbreak, and resilience to economic and environmental shock.

For the regulating service, forest protection leads to higher mitigation potential and higher capacity of the landscape to regulate water for conservation<sup>11</sup>. However, lack of funding source or economic incentive provides risks for the continuity of the forest protection programs. There is an urgent need to amend the PFES policy to cover carbon service, and to provide a guidance on developing voluntary payment scheme, through which the service providers will have more bargaining power in the transaction process with the service beneficiaries.

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<sup>10</sup> Based on the analysis with LUMENS tool during the 2021-2030 GGAP development, as described in the GGAP technical report

<sup>11</sup> Based on the analysis with LUMENS tool during the 2021-2030 GGAP development, as described in the GGAP technical report

The forest protection effort for biodiversity conservation, to include the ecological corridor, can maintain the capacity of the province to conserve biodiversity<sup>12</sup>. However, the plan of ecological corridor covering a massive area including production forests needs an adequate mainstreaming and approach to related stakeholders including local communities who might depend on the forest area for livelihood. This process is necessary to avoid unexpected social, as well management issues. Similar to regulating service, lack of funding source or economic incentive provides risks for the continuity of the conservation efforts.

#### Step 6: Implementing change

In this step, the guiding questions help to identify implementation strategy and a concrete working plan including policies and instruments, stakeholder involvement, responsibilities and actions, as well as financial resources. Identification of how to monitor and evaluate impacts of policy measures is also required. Annex VI provides complete responses to guiding questions related to this final step.

In the 2021-2030 GGAP development, a total of 50 monitoring and evaluation indicators are proposed to the province and classified into five categories to capture the main features of green growth: (1) *Environmental and natural resources productivity*, to capture the need for cleaner production, efficient use of non-renewable energy and natural resources, and promote the use of renewable ones; (2) *Economic and Environmental assets* since a declining asset base presents risks to growth and because sustained growth requires the asset base to be maintained; (3) *Green lifestyle and sustainable consumption* capturing the direct impacts of human activities on environment and the ways that the society respond to environmental pressures through trading and consumption behaviors; (4) *Economic opportunities and policy responses*, which can be used to help discern the effectiveness of policy in delivering green growth and human development in green growth context; and (5) *Social sustainability* encompassing social dimension of green growth such as labor, labor market, education, and inclusion.

Most of the indicators were estimated during the GGAP development, while some due to lack of input data or beyond the scope of the assessment, are still listed to stimulate the province to do further data collection. For each indicator, a proposition of leading agency responsible for monitoring is also provided. For example, related to provisioning service, proportion of agricultural area under productive and sustainable agriculture is under monitor of DARD in coordination with DONRE; number of agricultural greenhouse facilities and total area of greenhouse is under DARD. For regulating service, gross GHG emissions and GHG emission intensity namely per GDP or per capita are under DONRE in coordination with DOIT, DARD and provincial statistic office; Forest area and forest cover, and area of new concentrated forest plantation is under DARD. For supporting service, proportion of land area where biodiversity is protected and maintained, and number of threatened species, is under DONRE in coordination with DARD.

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<sup>12</sup> Based on the analysis with LUMENS tool during the 2021-2030 GGAP development, as described in the GGAP technical report

## PART IV INTEGRATION INTO LAM DONG 2021-2030 GGAP

Part II has described the integration of ecosystem services into the five (A, B, C, D and G) among the eight steps, within the context of 2021-2030 GGAP development for Lam Dong province. Below is a complementary and brief description<sup>13</sup> on the nine green growth orientation for the province, which cover the six main sectors of the province, how they strongly consider the safeguards of natural resources and the maintenance of ecosystem and ecosystem services, and how they are included in the outline of provincial Decision on 2021-2030 GGAP, vision to 2050. The nine orientations are:

### **(1) Promoting and enhancing the use of renewable energy and energy efficiency**

Promotion of renewable energy such as solar and wind power as well as biogas supported by advanced technology and enhance its use to support livelihood, production and economy in the province. A wide use of these endless and clean source of energy can potentially contribute to the mitigation of GHG emission and reduce the depletion rate of non-renewable energies. Furthermore, the use of renewable energy is suitable in rural and upland areas, due to a challenge in providing infrastructure in remote areas. The sources of biogas as a type of renewable energy are also plenty in rural areas, from the remnants of crops or livestock.

### **(2) Control GHGs emission from all sectors**

The control of emission from three main sectors (agriculture, industry, and service) such as from construction and operating industries, commercials/buildings, transport, power generation etc., including from agriculture and forestry lands such as from the expansion of agricultural greenhouse and related management practices such as fertiliser and pesticide application, livestock, and from conversion of forest lands. This orientation aims to lead the province towards a deforestation-free or at least minimized-deforestation landscape.

### **(3) Control waste production and reuse for greener production**

The various activities in the three sectors (agriculture, industry, and service) generate waste, both solid waste and wastewater, which if not controlled and treated well, will lead to soil and environmental pollution, and furthermore to human's health. In agricultural sector, the unwise use of chemical inputs such as fertilizer and pesticide, generates solid waste such as plastic and glass bottles which are not recyclable, and difficult to process. The livestock raising can also lead to water pollution from improper use of input materials and manure, including to directly discharge the manure into environment. This strategy aims to control the production and treatment of different types of waste including waste incineration from different sectors.

### **(4) Promoting climate-smart and more sustainable landuse system**

According to several climate change projections, the province will likely experience a change in rainfall pattern with longer and more intense drought during dry season and heavier rain during wet season, and a steady increase of air temperature. This climate change needs to respond by developing more resilient and sustainable farming practice, to ensure production, and furthermore to enhance smallholder's resilience to economic and environmental shock. Agroforestry has been recognized as a more sustainable farming system due to its efficient resource-use<sup>14</sup> and ability to improve micro-climate,

<sup>13</sup> Full description is provided in the GGAP technical report, including the solutions and activities related to each orientation, targeted location, supporting policies, estimated investment cost for each intervention and potential funding source, and leading and supporting agencies

<sup>14</sup> For example, for coffee in Central Highlands, estimation from Nestle company shows that coffee agroforest can reduce up to 40% demand on water, and up 20% demand on nitrogen, compared to

and when access to market of various products from the system is available, can potentially provide higher and more stable income. This kind of system is suitable to face the challenge from future climate change in the province.

#### **(5) Conserving water, natural resources and biodiversity**

This orientation aims at further protecting the existing forests through halting forest conversion for any purpose especially cultivation areas and residential, to reduce emission and to safeguard natural resources. Furthermore, the forest protection is also crucial for conserving biodiversity and landscape beauty, which can support the development of eco-tourism as one of the main attractions of the province. This orientation relates to the two biodiversity conservation programs developed by the province namely the biodiversity corridor connecting the Bidoup Nuba and Cat Tien national parks, and the four new biodiversity conservation areas.

#### **(6) Enhancing product quality and market access of main commodities**

The green economic growth in the province needs to support by higher product quality both for domestic and export market. According to the 2018-2023 provincial scheme on market value chain, value added of many agricultural products from the province is not high which lead to low competitiveness in the market. The agro-processing industries, although develop rapidly in the province, are mostly preliminary and to process raw materials without attributing added-value. To increase the product quality, this orientation also emphasizes the need of participating in certification scheme and strengthen the processing and downstream industry. The market access and opportunity can be enhanced through branding.

#### **(7) Develop green and sustainable tourism**

The province has a beautiful landscape, favourable weather and cultural heritage. The challenges in advancing the tourism sector in the province includes further development of green and eco-tourism which are attractive for tourists, and in the same time developing a 'code of conduct' for tourists and stakeholders involved in the tourism business to respect environment and local culture, namely a program of 'responsible' tourism. Furthermore, involvement of local and poor communities including ethnic minorities in the tourism activities with fair profit sharing is deemed as very necessary to develop a sustainable tourist sector.

#### **(8) Promote green lifestyle and sustainable urban consumption**

The green growth in the province needs to support by green lifestyle and sustainable consumption by all stakeholders namely local communities and private sectors either large, medium or small enterprises, in all sectors. This is mainly achieved through improving the management and adequate use of natural resource, awareness raising on the importance of controlling waste and applying sustainable consumption models, and develop green technology including to explore post-harvest technology to reduce food loss.

#### **(9) Create enabling conditions for transitioning towards a green economy**

The transition to a green economy will not happen without the presence of enabling conditions. A range of barriers needs to be removed and investments in green economic sectors and green economy initiatives must become attractive to various stakeholders, including public and private actors. If the right mix of fiscal measures, regulations, norms, know-how and infrastructure is in place, then the green economy should emerge as a result of general economic activity. Some of these measures can only be done at

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full-sun coffee. This relates to low evapotranspiration from the soil due to shading and soil cover management and better micro-climate, and due to better water and nutrient cycling inside the system when different plant components grow together and generate facilitation mechanism.

national level, but many of them can be addressed at provincial level. The province should, therefore, take forward policy initiatives designed based on the following criteria: cost-effectiveness, adoption and compliance incentives, and ability to cope with uncertainty and provide a clear and credible signal to investors.

The nine orientations are not replacing but complement to existing environmental and economic policy priorities of Lam Dong province. They cover the whole nature-economy cycle as shown before in Fig. 1. Therein economic activities are divided into two subsets: production (supported by orientation 1 and 4) and consumption (supported by orientation 7 and 8) that are linked by trading (supported by orientation 6). Impacts on nature system of the economy system such as pollution and waste can be minimized by implementation of orientation 3, while maintaining sustainable supply of raw materials, energy and other resources to the economy as supported by orientation 2. The service functions of natural system to the economy system (i.e. the different types of ecosystem services) is supported through many orientations, related to agricultural production as provisioning service (orientation 4, 6); enhancing mitigation potential from agriculture and forestry lands and water conservation as regulating service (orientation 2, 4, 5), and biodiversity conservation as supporting service (orientation 5). Orientation 9 is to enable green growth process in general and it plays a very important role in harmonizing economic and natural systems through policies that stimulate innovation, technologies, capacity, and economic opportunities in general.

Compared to the content of the 2011-2020 National Green Growth Strategies, which largely focuses on three aspects namely emission mitigation, green production, and green lifestyle and sustainable urban consumption, the proposed content of provincial Decision of 2021-2030 GGAP for Lam Dong<sup>15</sup> has several innovative elements, particularly the additional two sections on integrated approach and assessment and on green growth orientations:

- The section of inclusive and integrated approach highlights the need to develop strong economy within sustainable environment with the maintenance of ecosystem and ecosystem services, and the need of quantitative assessment with reliable tools for assessing the impacts of green growth interventions to three different types of ecosystem services (namely provision, regulating, and supporting service), compared with the baseline or historical trend. This section also describes the scope and steps of assessment with three main tools namely Land Use Planning for Multiple Environmental Services (LUMENS), Long-range Energy Alternatives Planning (LEAP) for energy sector, and Generic River (GenRiver) hydrology model. As mentioned earlier, LUMENS is a spatially-explicit tool used for impact assessment of land-based strategies related to AFOLU sector; LEAP was used for impact assessment of energy sector; and GenRiver used for hydrological assessment. The first (namely LUMENS) can handle input maps, with assessment includes all areas over the landscape. Furthermore, the assessment of all interventions which potentially contribute to the provincial GDP was conducted with a Leontief-table which can link contribution at sector to province level.
- The section of green growth orientations describes the nine orientations, rationale, detailed activities and proposed leading and supporting agencies, provided in the annexes. Therefore, this section clearly describes the consideration of ecosystem and ecosystem services in the GGAP, and how all orientations, those concern on economic and ecological purposes, are integrated to achieve green economy and growth, under supporting enabling conditions.

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<sup>15</sup> Under review and approval process by the authorities of Lam Dong province

## PART V POTENTIAL APPLICATION FOR OTHER PLANNING

The guidance such as the one provided by the Central Institute for Natural Resources and Environmental Studies of Ha Noi National University and the stepwise approach developed by GIZ, are very useful to assist in integrating ecosystem services into development plans. In this report, the application of the two for the case of development of 2021-2030 GGAP for Lam Dong is described at length and can provide as a good example for the development of GGAP in other provinces.

The eight steps of planning development described in Part II, in which ecosystem services are suggested to integrate in the five steps (A, B, C, D and G), are associated with development plan in general, and the steps are presented according to the Planning Law (Article 16), for national or sub-national level. This indicates that the guidance and the case presented in this report can also be useful for developing provincial Master Plan (MP).

The Law on Planning describes the provincial MP as “a plan concretizing the national comprehensive plan and regional plan at provincial level in aspects of space for socio-economic, national defense, security activities, urban systems and residential distribution in rural areas, infrastructures, land allocation, natural resource use, as well as environmental protection on the basis of connecting national level planning, regional planning, urban and rural planning.” The definition emphasizes the consideration on natural resource use and environmental protection. The GGAP inception report describes the eight fundamental principles and different aspects need to be covered by the provincial MP.

Related to the outline, Article 24 in the Decree “Detailing regulations for the implementation of a number of articles of the planning laws” provides a version without explicit emphasize related to the three aspects of GG (namely emission mitigation, green production, and green lifestyle and sustainable consumption). However, point 8 explicitly emphasizes the need of the plan on environmental protection, exploitation, use, protection of natural resources and biodiversity, prevention and combat against natural disasters and response to climate change. In a more specific, point 8 describes the following need:

- a. To formulate the principles and mechanisms for coordinating the application of environmental management and protection measures in the provinces
- b. To arrange space for distribution of solid waste treatment stations and inter-district wastewater treatment stations
- c. To formulate the principle of coordinated exploitation of water resources and control of water pollution in river basins; combating natural calamity and responding to climate change in the province
- d. To develop forest management, protection and development plans in the province
- e. To develop zoning for exploitation, use and protection of natural resources in the province; high-biodiversity areas, biodiversity corridors; to arrange space for the systems of nature conservation zones and biodiversity conservation facilities in their respective localities; proposed mechanisms and management measures.

These objectives related to environmental issues as part of outline of provincial MP indicate the two guidance of integrating ecosystem service into development plans will be useful for the development of provincial MP, to help in showing the steps in which the integration should be implemented, and in identifying all important aspects related to the integration of ecosystem services through a stepwise approach and a series of guiding questions.

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## ANNEX I RESPONSES TO STEP 1 OF THE SIX STEPWISE APPROACHES

Guiding questions	Responses		
	Provisioning services	Regulating services	Supporting services
What are the main development/management issues that need to be addressed, and to what ends?	<p>Issues:</p> <ul style="list-style-type: none"> <li>Main agricultural commodities such as tea and coffee are mostly cultivated in monoculture types, which are more vulnerable to economic and environmental shocks</li> <li>Weak processing and downstream industry related to the commodities</li> <li>Lack of certification and branding for better access to market</li> </ul> <p>To what ends?</p> <ul style="list-style-type: none"> <li>Most if not all monoculture systems are converted into more climate-smart and sustainable systems<sup>16</sup></li> <li>Strengthened processing and downstream industry</li> <li>Most if not all stakeholders in the production and market value chain participate in certification scheme</li> <li>Common or specific branding for main agricultural commodities of the province</li> </ul>	<p>Issues:</p> <ul style="list-style-type: none"> <li>The expansion of monoculture systems especially from forest conversion, expansion of greenhouses, and forest degradation due to illegal logging and encroachment induces high emission from landuse changes and plot management practice, and higher risk of erosion/sedimentation especially during wet season due less tree cover</li> <li>In terms of management, lack of strong forest control, law enforcement, and sanctions for companies/projects with activities lead to deforestation/forest degradation</li> </ul> <p>To what ends?</p> <ul style="list-style-type: none"> <li>No more forest conversion for agricultural expansion, highly strict permission to any development project proposing forest conversion especially those not for public benefits, reduced illegal logging and</li> </ul>	<p>Issues:</p> <ul style="list-style-type: none"> <li>The expansion of monoculture systems, deforestation, forest degradation and fragmentation reduce the level of biodiversity, both plant and animal diversity</li> <li>Lack of funding for biodiversity conservation</li> </ul> <p>To what ends?</p> <ul style="list-style-type: none"> <li>Similar to the first bullet point for regulating service (no more forest conversion etc.)</li> <li>More high conservation value (HCV) areas, and/or ecological corridor</li> <li>Reliable funding mechanism for biodiversity conservation</li> </ul>

<sup>16</sup> For example, agroforestry integrating different plant components both annual and perennial crops such as trees, with/out livestock, spatially arranged as e.g. alley cropping with annual crops or understory among rows of tree. In steep sloping lands, can be combined with contour planting

Responses			
Guiding questions	Provisioning services	Regulating services	Supporting services
		<p>forest encroachment, through strengthened regulation, law enforcement, improved management, and sanctions</p> <ul style="list-style-type: none"> <li>Reduced expansion rate of greenhouse by 50% compared to the baseline, through different instruments such as fee of landscape beauty</li> </ul>	
Who are the relevant stakeholders, and how should they participate in the process?	<p>Relevant stakeholders:</p> <ul style="list-style-type: none"> <li>Smallholder farmers, private sectors (processing industries, traders), provincial government especially Department of Agricultural and Rural Development (DARD), extension service at province and district level</li> </ul> <p>Way to participate:</p> <ul style="list-style-type: none"> <li>Involved in the development and implementation of GG plan which incorporates the solutions to maintain/improve provisioning service</li> <li>Provide input data for assessment of impact of interventions</li> </ul>	<p>Relevant stakeholders:</p> <ul style="list-style-type: none"> <li>Similar to those for provisioning services with addition of Department of Natural Resource and Environment (DONRE)</li> </ul> <p>Way to participate:</p> <ul style="list-style-type: none"> <li>Similar way of participation like in provisioning services</li> </ul>	<p>Relevant stakeholders:</p> <ul style="list-style-type: none"> <li>Similar to those for provisioning services with addition of DONRE</li> </ul> <p>Way to participate:</p> <ul style="list-style-type: none"> <li>Similar way of participation like in provisioning services</li> </ul>
What are the process milestones and expected outcomes?	<p>Process milestones:</p> <ul style="list-style-type: none"> <li>Stakeholder mapping, identification of solutions and scenario building through stakeholders' consultation, assessment of impact of scenario compared to baseline, development of roadmap including potential funding source and implementing agencies</li> </ul>	<p>Process milestones:</p> <ul style="list-style-type: none"> <li>Similar to those for provisioning service with quantitative assessment relates to regulating services</li> </ul> <p>Expected outcomes:</p> <ul style="list-style-type: none"> <li>Similar to those for provisioning services, and stakeholders are</li> </ul>	<p>Process milestones:</p> <ul style="list-style-type: none"> <li>Similar to those for provisioning service with quantitative assessment relates to supporting services</li> </ul> <p>Expected outcomes:</p>

Guiding questions	Responses		
	Provisioning services	Regulating services	Supporting services
	<p>Expected outcomes:</p> <ul style="list-style-type: none"> <li>• All relevant stakeholders and authorities are more aware on the issues related to provisioning services</li> <li>• Well informed on the potential solutions</li> <li>• Consent and implement the solutions with clear allocation of responsibility to relevant departments/agencies</li> </ul>	more aware on issues related to regulating services	<ul style="list-style-type: none"> <li>• Similar to those for provisioning services, and stakeholders are more aware on issues related to supporting services</li> </ul>
What are the requirements for staff, funds and other inputs?	<ul style="list-style-type: none"> <li>• Staffs: to ensure a smooth collaboration with the province in the GGAP development, the consultant (for the case of Lam Dong is World Agroforestry (ICRAF)) received support from provincial task force led by DPI, to assist in issuing permits, organizing events, and coordinating local stakeholders to participate in the GGAP development process</li> <li>• Funds: the GGAP development for Lam Dong is funded by a consortium of donors namely IDH, GIZ and UN-REDD. For the implementation of GGAP itself, as described in the GGAP technical report, the estimated costs and potential funding sources were identified together with relevant departments in the province, especially DPI, DARD and DOF through consultation meetings/workshops</li> <li>• Other inputs: the inputs to develop the GG orientations and solutions were</li> </ul>	<ul style="list-style-type: none"> <li>• For staffs, fund and inputs are similar to provisioning services, with involvement of DONRE</li> </ul>	<ul style="list-style-type: none"> <li>• For staffs, fund and inputs are similar to provisioning services, with involvement of DONRE</li> </ul>

<b>Guiding questions</b>	<b>Responses</b>		
	<b>Provisioning services</b>	<b>Regulating services</b>	<b>Supporting services</b>
	gathered through consultation meetings/ workshops; for the quantitative assessments, inputs for assessment tools were obtained from the relevant departments and literature review		
How are you going to communicate key messages to target groups?	<ul style="list-style-type: none"> <li>• Formal communication on the key messages along the process of GGAP development was delivered through consultation meetings and workshops in the province. In the latter, diverse relevant stakeholders were invited to include local (provincial and district) authorities, private companies, representative local communities, farmer's and women's unions, and department of ethnic minorities.</li> <li>• DPI will further communicate the GGAP to local authorities and communities in all levels of administration</li> </ul>	<ul style="list-style-type: none"> <li>• Similar ways of communicating the messages were conducted for regulating services</li> </ul>	<ul style="list-style-type: none"> <li>• Similar ways of communicating the messages were conducted for supporting services</li> </ul>

## ANNEX II RESPONSES TO STEP 2 OF THE SIX STEPWISE APPROACHES

<b>Guiding questions</b>	<b>Responses</b>		
	<b>Provisioning services</b>	<b>Regulating services</b>	<b>Supporting services</b>
How does the development plan depend and impact on ecosystem services?	<p>How it depends:</p> <ul style="list-style-type: none"> <li>The level of provisioning service directly determines the provincial income and economic growth</li> </ul> <p>How it impacts:</p> <ul style="list-style-type: none"> <li>The orientations and solutions related to agriculture and forestry sector such as land allocation and prioritized commodities directly determine the level of provision service</li> </ul>	<p>How it depends:</p> <ul style="list-style-type: none"> <li>The economic development in the province can be classified as green growth, particularly if it is of low emission, and can safeguard natural resources such as water</li> <li>Forest protection and conservation provides natural resources and conducive environment for the economic development</li> </ul> <p>How it impacts:</p> <ul style="list-style-type: none"> <li>The orientations and solutions related to agriculture and forestry sector directly determine the level of emission and hydrological condition, under the influence of climate change</li> </ul>	<p>How it depends:</p> <ul style="list-style-type: none"> <li>Rich forests are the genetic sources of plant and animal diversity, which the province can explore and utilize to enhance the resilience to economic shock thanks to higher level of product diversification</li> <li>Biodiversity conservation supports development of eco-tourism.</li> <li>All organisms are related through food, production and dispersion chain, the extinction of an organism can lead to degradation in quality or extinction of others.</li> </ul> <p>How it impacts:</p> <ul style="list-style-type: none"> <li>As in the other two services, the orientations and solutions related to agriculture and forestry sector directly influences the level of biodiversity and the capacity of the province in conserving biodiversity</li> </ul>

Responses				
Guiding questions	Provisioning services	Regulating services	Supporting services	
Which are the main stakeholders that are affected by ecosystem services?	Smallholder farmers and related actors along the production and market value chain including private sectors <sup>17</sup>	<ul style="list-style-type: none"> <li>Related to hydrological service, the whole population are affected, and specifically to support agricultural activities, smallholder farmers and related actors along the production and market value chain</li> <li>Related to mitigation potential, the whole population will enjoy the benefits through improved environment</li> <li>The provincial authorities are affected related to their commitment in developing low-emission and sustainable development pathway</li> </ul>	<ul style="list-style-type: none"> <li>The whole population can enjoy landscape beauty and species richness</li> <li>The community surrounding biodiversity area can participate and draw economic benefit through profit sharing (e.g. through eco-tourism)</li> <li>The provincial authorities are affected related to their commitment in conserving biodiversity</li> </ul>	
How are the benefits and costs distributed between different groups?	<p>Investment cost:</p> <ul style="list-style-type: none"> <li>The GGAP technical report provides cost estimation for each intervention related to the promotion of climate-smart and more sustainable farming systems</li> <li>Private sectors and ODA can be potential funding sources, while farmers provide in-kind contribution (i.e. land, labor)</li> </ul> <p>Benefits:</p>	<p>Investment cost:</p> <ul style="list-style-type: none"> <li>Mixed system as part of the climate-smart and sustainable system, can enhance mitigation potential. The investment cost is as described for provisioning service</li> <li>The cost for forest protection can come from the scheme such as PFES, or if linked to biodiversity conservation, biodiversity fee</li> </ul> <p>Benefits:</p>	<p>Investment cost:</p> <ul style="list-style-type: none"> <li>The initial investment for biodiversity conservation can come from e.g. ODA, to formulate scheme of biodiversity fee<sup>19</sup> and prepare supporting policy.</li> <li>The cost at later stage can be expectedly covered from the biodiversity fee itself</li> </ul> <p>Benefits:</p>	

<sup>17</sup> The provincial scheme of market value chain (Resolution No. 104/2018/NQ-HDND) describes at length the number of farmers and processing industries are involved in the production of each of main commodities in the province

<sup>19</sup> The GGAP technical report describes at length examples of schemes of biodiversity fee in different countries

<b>Guiding questions</b>	<b>Responses</b>		
	<b>Provisioning services</b>	<b>Regulating services</b>	<b>Supporting services</b>
	<ul style="list-style-type: none"> <li>Distributed to smallholder farmers and different actors along the production and market value chain, including nurseries, processing and downstream industries<sup>18</sup></li> </ul>	<ul style="list-style-type: none"> <li>Distributed to forest owners or community through e.g. PFES, thanks to e.g. forest water service or forest patrolling service</li> </ul>	<ul style="list-style-type: none"> <li>The province, stakeholders involved in tourism sector if the biodiversity conservation is part of e.g. eco-tourism, communities nearby the conservation area potentially involved in the scheme</li> </ul>
Do potential areas of conflict, competition or synergy emerge?	<p>The promotion of climate-smart and sustainable farming system will lead to synergy rather than conflict/competition:</p> <ul style="list-style-type: none"> <li>Higher mitigation potential thanks to tree component in the system</li> <li>In a large scale, contribute to water saving<sup>20</sup>, and reduced risk of erosion and sedimentation</li> <li>Diverse plant components in the system increase biodiversity, including animal diversity above and belowground</li> <li>Reduced risk of pest and disease outbreak thanks to improved micro-climate</li> <li>In general, higher resilience to economic and environmental</li> </ul>	<p>Synergy:</p> <ul style="list-style-type: none"> <li>The climate-smart and more sustainable system can provide timber and fuelwood, reducing the risk of forest encroachment</li> <li>The system provides higher mitigation potential and at large scale can contribute to water saving</li> <li>Forest protection conserves water and provide conducive environment for farming system</li> <li>Forest protection relates to biodiversity conservation</li> </ul>	<p>Synergy:</p> <ul style="list-style-type: none"> <li>At large scale, the climate-smart and sustainable system contribute to increasing biodiversity, above and belowground</li> <li>Forest protection relates to biodiversity conservation</li> <li>Biodiversity conservation can create job and income opportunity for tourism sector and local communities</li> </ul>

<sup>18</sup> The provincial scheme of market value chain (Resolution No. 104/2018/NQ-HDND) describes at length the number of farmers and processing industries are involved in the production of each of main commodities in the province

<sup>20</sup> For example, according to Nestle, coffee agroforestry can reduce water demand by 20-40% thanks to appropriate shading and soil cover (e.g. through mulching) management

<b>Guiding questions</b>	<b>Responses</b>		
	<b>Provisioning services</b>	<b>Regulating services</b>	<b>Supporting services</b>
	shocks thanks to product diversification that can provide both short- and long-term economic benefit, and ecological benefits mentioned above		
Which are the priority ecosystem services for the development plan, and why?	<p>Priority:</p> <ul style="list-style-type: none"> <li>• Provision service in terms of promotion of climate-smart and more sustainable farming system</li> </ul> <p>Why:</p> <ul style="list-style-type: none"> <li>• It enhances resilience to economic and environmental shock, as described above</li> </ul>	<p>Priority:</p> <ul style="list-style-type: none"> <li>• Regulating service in terms of enhancing mitigation potential both in forest and agricultural lands</li> <li>• In terms of water conservation, and reducing the risk of soil erosion and sedimentation to the river basin</li> </ul> <p>Why:</p> <ul style="list-style-type: none"> <li>• Low-emission is one of main criteria of green growth and part of sustainable development pathway</li> <li>• In line with the country and provincial commitment for mitigation climate change</li> <li>• Forest protection provides conducive environment for economic growth</li> <li>• Water conservation and supply are prerequisite for agricultural development, and for the whole society</li> </ul>	<p>Priority:</p> <ul style="list-style-type: none"> <li>• Supporting service in terms of biodiversity conservation</li> </ul> <p>Why:</p> <ul style="list-style-type: none"> <li>• It maintains genetic resources both plant and animal species, for different purposes</li> <li>• It can provide economic contribution to local communities and other sector such as tourism for eco-tourism development</li> <li>• In line with the country and provincial commitment for biodiversity conservation</li> </ul>

### ANNEX III RESPONSES TO STEP 3 OF THE SIX STEPWISE APPROACHES

<b>Responses</b>			
<b>Guiding questions</b>	<b>Provisioning services</b>	<b>Regulating services</b>	<b>Supporting services</b>
What kind of information and evidence related to the condition and trends of ecosystem services exists and what are information gaps?	<p>Condition and trend:</p> <ul style="list-style-type: none"> <li>Data on total area and productivity of main agricultural commodities such as coffee and tea, are available from the 2017 provincial statistic book</li> <li>The main commodities are marketed for domestic and export</li> <li>Uncertainty in future income exists due to national and global market competition<sup>21</sup> and climate change</li> </ul> <p>Information gap:</p> <ul style="list-style-type: none"> <li>To estimate contribution to provincial income and GDP, data on production cost and product price are necessary, and in the GGAP development, these data were obtained from provincial documents and literature</li> <li>Lack of data to estimate investment cost for related</li> </ul>	<p>Condition and trend:</p> <ul style="list-style-type: none"> <li>The analysis of GHG emission from landcover change in Lam Dong province, for the period of 1990-2010, conducted by USAID (2013) informed high emission particularly due to expansion of perennial crops, illegal logging, and population growth</li> <li>The trend is likely to continue, if without any intervention</li> <li>As informed by JICA (2018), agriculture is the most demanding sector for water, and the province has recently experienced some water shortage, due to the high demand and under influence of climate change</li> </ul> <p>Information gap:</p> <ul style="list-style-type: none"> <li>The USAID report provides C stock data of forest types. In the GGAP development, the data of C stock for other landuses were obtained from the literature</li> </ul>	<p>Condition and trend:</p> <ul style="list-style-type: none"> <li>The province is home of some unique and endangered species, threatened by forest conversion and degradation</li> </ul> <p>Information gap:</p> <ul style="list-style-type: none"> <li>No indicator of biodiversity such as species richness index of different types of landcover is available</li> <li>In the GGAP development, the biodiversity analysis focused on estimating the capacity of the province in conserving biodiversity. The analysis mainly used landcover distribution over the landscape and relative capacity of the landcovers in conserving biodiversity, to calculate the two indexes<sup>22</sup>. For the historical trend, it used the available 2010 and 2015 landcover maps from the province</li> </ul>

<sup>21</sup> For example, the recent drop of coffee and black pepper price: <https://english.vietnamnet.vn/fms/business/216889/coffee-prices-fluctuate--price-drops-to-10-year-low.html>, <https://asia.nikkei.com/Business/Markets/Commodities/Black-pepper-prices-hit-12-year-low-as-Southeast-Asian-output-grows>

<sup>22</sup> The TECI and DIFA indexes as described earlier

Responses			
Guiding questions	Provisioning services	Regulating services	Supporting services
	<p>interventions. In the GGAP development, the input data were obtained from literature</p>	<ul style="list-style-type: none"> <li>Similar situation to provisioning service, related to lack of data to estimate investment cost</li> </ul>	<ul style="list-style-type: none"> <li>Similar situation to other services, related to lack of data to estimate investment cost</li> </ul>
What are the current conditions and likely future trends in the supply of and demand for the identified ecosystem services?	<p>Current condition is described above</p> <p>Future trend:</p> <ul style="list-style-type: none"> <li>If without any intervention, the area of perennial crops will expand to about 320,000 hectares by 2030</li> <li>Demand is however uncertain, due to stronger market competition both at national and international level, and increasing intensity of climate change and extreme weather events</li> <li>Further expansion of agricultural greenhouses which reduced landscape beauty</li> <li>Higher vulnerability of smallholder farmers and the province to economic shock, due to the focus and expansion of monoculture rather than climate-smart and more sustainable system</li> </ul>	<p>Current condition is described above</p> <p>Future trend:</p> <ul style="list-style-type: none"> <li>Emission is still high due to expansion of agricultural systems especially monoculture systems including agricultural greenhouses, forest encroachment due to population growth and illegal logging due to weak law enforcement</li> <li>Under a higher intensity of climate change and extreme weather event such as drought, the province will have more frequent incidence of water shortage</li> <li>Due to a stronger gradient in rainfall between wet and dry season, there is a higher risk of erosion and sedimentation</li> </ul>	<p>Current condition is described above</p> <p>Future trend:</p> <ul style="list-style-type: none"> <li>Landcover changes from forest types to other landuses such as perennial crops, and forest fragmentation, will further reduce the capacity of the province to conserve biodiversity</li> <li>The plan for new four conservation areas and ecological corridor connecting the national parks in the north and south of the province will substantially contribute to biodiversity conservation.</li> </ul>
What and who are the main drivers of change?	<p>Demand, access to market and price of commodities, contract agreement between smallholder farmers and other stakeholders</p>	<ul style="list-style-type: none"> <li>Deforestation and forest degradation were driven by expansion of perennial crops, population growth which led to</li> </ul>	Similar to regulating service

<b>Guiding questions</b>	<b>Responses</b>		
	<b>Provisioning services</b>	<b>Regulating services</b>	<b>Supporting services</b>
	along the production and market value chain	<p>forest encroachment<sup>23</sup>, illegal logging, forest fire</p> <ul style="list-style-type: none"> <li>• As informed by USAID (2013), reforestation and increase in forest quality were driven by provincial reforestation and afforestation programs</li> <li>• The water shortage was due to the high demand mainly from agriculture sector, under the influence of climate change</li> </ul>	
What trade-offs might arise between development goals and the ecosystem services, or between stakeholder groups?	<ul style="list-style-type: none"> <li>• The development goals which prioritize economic growth can lead to higher provisioning service but for short-term, and this will also economically benefit smallholder farmers and related actors within the production and market value chain for short-term, but along with the depletion of natural resource and supporting environment, the economic growth cannot be maintained</li> <li>• The cost of failure and damage due to neglecting the safeguard of natural resource and ecosystem service can be far more costly than the short-term economic achievement</li> </ul>	<ul style="list-style-type: none"> <li>• The development goals which prioritize economic growth can also lead to higher emission due to landcover/use change and from agricultural practices, infrastructure development, etc.</li> <li>• In agricultural sector, expansion of monoculture systems will increase the level of surface runoff, which induce high risk of erosion and sedimentation</li> </ul>	<ul style="list-style-type: none"> <li>• The development goals which prioritize economic growth can also lead to higher fragmentation of rich forests which are the sources of biodiversity both above and belowground</li> <li>• The plan for ecological corridor connecting the national parks in the north and south of the province covers areas of production forests. Need appropriate mainstreaming of the plan, and intense and thorough discussion with related stakeholders</li> </ul>

<sup>23</sup> According to the projection of forest encroachment area by the province, the total area of 'illegal crops' on forest lands reach about 52,000 hectares

#### ANNEX IV RESPONSES TO STEP 4 OF THE SIX STEPWISE APPROACHES

Responses			
Guiding questions	Provisioning services	Regulating services	Supporting services
Which institutions govern ecosystems and their services? Who participates in these, and in the decisions they make?	Provisioning service in terms of production of main agricultural commodities from agricultural lands and timbers from forestry lands are managed under DARD	The emission mitigation from agricultural and forestry lands, and hydrological service in terms of water conservation and the capacity of the provincial landscape in reducing surface run-off and provision of clean water from sub-soil water flow are under management of DONRE	Biodiversity in general, both related to agricultural and forestry lands, is under management of DONRE
Which policies, regulations and other positive or negative incentives influence people's use and management of ecosystems and their services? Who or what do they target, and how are they enforced?	<ul style="list-style-type: none"> <li>• The provincial agricultural planning and rural development program which focus on enhancing production as well as quality of processed products through hi-tech processing industry etc.<sup>24</sup></li> <li>• Market incentive affecting landuse change<sup>25</sup></li> <li>• Need support from private sectors in providing market access for the products from</li> </ul>	<ul style="list-style-type: none"> <li>• The policies which relate to forest protection (e.g. Decision 18/QD-UBND), forest plantation (e.g. Decision 2771/QD-UBND), improvement in access to and implementation of REDD+ activities (PRAP, Decision 247/QD-UBND).</li> <li>• For hydrology service (Decision 475/QD-UBND) on reviewing existing plans on hydrology</li> </ul>	<ul style="list-style-type: none"> <li>• Mainly Decision 169/QD-UBND on planning for biodiversity conservation vision to 2030</li> <li>• As for regulating service, unfortunately, the current PFES scheme as formulated in the Decree 99/147 has no payment scheme for biodiversity service</li> <li>• The tourism sector considers eco-tourism as one of potential tourist products, that can link to biodiversity conservation</li> </ul>

<sup>24</sup> For example, Decision 774/QD-UBND on the improvement of product processing technology, Decision 2261/QD-UBND on development of coffee sector, Decision 780/QD-UBND on the development of wine and fruit juice processing industry etc. Each plan has their own targets, both relate to production and farmer' groups, and some plans provide subsidy for investment by smallholder farmers

<sup>25</sup> For example, as the 2018-2023 provincial scheme on market value chain informs, due to higher economic return, many farmers in the province have converted tea into fruit plantation

<b>Guiding questions</b>	<b>Responses</b>		
	<b>Provisioning services</b>	<b>Regulating services</b>	<b>Supporting services</b>
	the climate-smart and more sustainable farming system, and/or a market incentive for example a higher price	<ul style="list-style-type: none"> <li>Unfortunately, the current PFES scheme as formulated in the Decree 99/147 has no payment scheme for carbon service. For water service, standard payment rate is low, and the amount of payment is entirely decided by related private sectors such as water drinking companies or hydroelectric plants. Farmers who own forest lands, have no bargaining power in appreciating the service from their own forest lands</li> <li>Need a development of regulation and guidance for establishing voluntary or direct PFES</li> </ul>	
Are there conflicts or inconsistencies between institutional, policy, legal and cultural frameworks, and the incentives they give rise to?	<ul style="list-style-type: none"> <li>The plans for main commodities developed by the province sometimes have overlapped cultivation zones</li> <li>The boundary of agricultural lands issued by DARD often has inconsistencies with the forest boundary issue by DONRE</li> </ul>	Some inconsistencies between the forest boundary on the planning map and actual boundary, or unclear boundary between forestry and agricultural lands in the field due to lack of boundary marks	Potential confusion might arise related to task and budget allocation and responsibility because forest protection and conservation are managed by DARD, while the related forest biodiversity is under management of DONRE
Which other kind of needs, interests and rights drive management	<ul style="list-style-type: none"> <li>The annual growth of provincial GDP is expected not less than 8% until 2030<sup>26</sup>. Agriculture</li> </ul>	Similar to provisioning service, and the orientation and target can impact the regulating services in	Similar to provisioning service, and the orientation and target can impact the biodiversity conservation

<sup>26</sup> Informed by the provincial authorities in the consultation workshop during the GGAP development. This target determines prioritization in resource allocation among the three main sectors (agriculture, service, industry) and influence ecosystem services in the province.

<b>Responses</b>			
<b>Guiding questions</b>	<b>Provisioning services</b>	<b>Regulating services</b>	<b>Supporting services</b>
choices regarding ecosystems?	<p>sector provides the largest share to provincial GDP</p> <ul style="list-style-type: none"> <li>• The need to advance in infrastructure development to support industrialization and starting from 2030 the service and industry sector are expected to contribute larger share to provincial GDP than agriculture<sup>27</sup>.</li> <li>• The population growth and immigration create a challenge for the province to reconcile development and conservation purposes</li> </ul>	terms of emission mitigation and hydrological service	

#### ANNEX V RESPONSES TO STEP 5 OF THE SIX STEPWISE APPROACHES

<b>Responses</b>			
<b>Guiding questions</b>	<b>Provisioning services</b>	<b>Regulating services</b>	<b>Supporting services</b>
What ecosystem service-related risks and	<ul style="list-style-type: none"> <li>• The promotion of climate-smart and more sustainable system such</li> </ul>	<ul style="list-style-type: none"> <li>• Forest protection leads to higher mitigation potential; however</li> </ul>	<ul style="list-style-type: none"> <li>• The forest protection effort for biodiversity</li> </ul>

<sup>27</sup> Informed by the provincial authorities in the consultation workshop during the GGAP development. This orientation determines prioritization in resource allocation among the three main sectors (agriculture, service, industry) and influence ecosystem services in the province.

Responses			
Guiding questions	Provisioning services	Regulating services	Supporting services
opportunities to the development plan emerge as a result of the foregoing assessment?	<p>as agroforestry, has a potential to increase and stabilize provincial income from agricultural sector through product diversification</p> <ul style="list-style-type: none"> <li>The income contribution will potentially be higher if the products are processed, certified and branded</li> <li>The promotion needs to be accompanied by appropriate training, improved access to credit and market</li> </ul>	<p>lack of economic incentive provides risks for the continuity of the forestry programs (i.e. as mentioned earlier, no payment for carbon service, and low payment for water service in the current PFES scheme)</p> <ul style="list-style-type: none"> <li>The climate smart and more sustainable system has potential to contribute a higher mitigation potential and in large scale contributes to water saving. As mentioned earlier, the promotion of this system needs to be accompanied by appropriate training, improved access to credit and market</li> </ul>	<p>conservation, to include the ecological corridor, can maintain the capacity of the province to conserve biodiversity.</p> <ul style="list-style-type: none"> <li>The ecological corridor covering a massive area including production forests needs adequate mainstreaming, approach and governance among related stakeholders including smallholder farmers to avoid unexpected social and management issues</li> <li>Similar to regulating service, lack of economic incentive provides risks for the continuity of the conservation efforts</li> </ul>
Could economic valuation be useful, and if so what should it cover?	<p>Yes, to cover:</p> <ul style="list-style-type: none"> <li>Potential cost and benefits, income estimation from cultivating the climate smart and more sustainable system, compared to the baseline</li> <li>Potential income from the development of processing industries of different agricultural products such as for tea, coffee, vegetable and flower, milk,</li> </ul>	<p>In the GGAP development, the economic evaluation related to mitigation potential and hydrological service is the estimation of investment cost for related interventions, not on the potential economic benefits from the two services. The latter will be useful, however the current PFES policy in Viet Nam has not formulated payment standard and mechanism for carbon service. The</p>	<p>Similar to regulating service, in the GGAP development, the economic evaluation related to biodiversity conservation is the estimation of investment cost for related interventions and potential income from the application of biodiversity-fee mechanism. The current PFES scheme in Viet Nam has not formulated payment standard</p>

Responses			
Guiding questions	Provisioning services	Regulating services	Supporting services
	<p>macadamia, cold water fish, wine and fruit juice, and forest timber<sup>28</sup></p> <ul style="list-style-type: none"> <li>Potential income from participating in certification scheme and product branding</li> </ul>	<p>policy has standard payment scheme for water service, however the hydrological assessment in the GGAP development was conducted at landscape level, as the result of contribution from different landcover/uses, not only from forests managed by smallholder farmers</p>	<p>and mechanism for biodiversity service</p>
Which are the most feasible policy options and entry points to use to capture ecosystem service opportunities, and reduce or avoid risks?	<p>Policy options:</p> <ul style="list-style-type: none"> <li>Mainstreaming the risk of cultivating monoculture system</li> <li>Mainstreaming the potential benefits of cultivating climate-smart and more sustainable system</li> <li>Developing supporting processing and downstream industries</li> <li>Provide capacity building and financial support for farmers and relevant stakeholders' participation in certification scheme</li> <li>Promoting the product branding</li> <li>Develop policy or economic instrument to reduce expansion of agricultural greenhouses</li> </ul> <p>Entry points:</p> <ul style="list-style-type: none"> <li>Climate-smart and sustainable agriculture</li> </ul>	<p>Policy options:</p> <ul style="list-style-type: none"> <li>Mainstreaming the need to develop low-emission and sustainable development pathway</li> <li>Mainstreaming the benefits of forestry protection to safeguard natural resources especially water conservation</li> <li>Develop PFES mechanism and standard for forest carbon service</li> <li>Develop mechanism and guidance for voluntary PFES scheme</li> </ul> <p>Entry points:</p> <ul style="list-style-type: none"> <li>Low-emission and sustainable development</li> <li>Water conservation</li> <li>Reduced risk of soil erosion and sedimentation</li> </ul>	<p>Policy options:</p> <ul style="list-style-type: none"> <li>Mainstreaming the need of conserving biodiversity</li> <li>Develop a scheme of biodiversity-fee for sustainable and long-term funding source</li> <li>Linking biodiversity conservation with eco-tourism program</li> <li>Conducting a thorough feasibility study for the implementation of ecological corridor</li> <li>Develop PFES mechanism and standard for forest carbon service</li> <li>Develop mechanism and guidance for voluntary PFES scheme</li> </ul> <p>Entry points:</p>

<sup>28</sup> Related target for each commodity is described in the GGAP technical report

Responses			
Guiding questions	Provisioning services	Regulating services	Supporting services
	<ul style="list-style-type: none"> <li>• Product diversification</li> <li>• Short- and long-term economic benefits</li> <li>• Improved micro-climate to reduced risk of pest and disease outbreak</li> <li>• Resilience to economic and environmental shock</li> <li>• Expansion of agricultural greenhouses</li> </ul>	<ul style="list-style-type: none"> <li>• Carbon service and payment</li> <li>• Voluntary PFES scheme</li> </ul>	<ul style="list-style-type: none"> <li>• Biodiversity conservation</li> <li>• Biodiversity fee</li> <li>• Eco-tourism</li> <li>• Biodiversity service and payment scheme</li> <li>• Voluntary PFES scheme</li> </ul>
What kind of experiences (positive and negative) related to the implementation of particular instruments and mechanisms already exist in the region, and can be built on?	The climate-smart and more sustainable system such as coffee agroforestry has been widely practiced in some provinces of Central Highlands region such as Dak Lak, but still limited in Lam Dong province. The key enabling factor for the expansion is the access to market for different products <sup>29</sup> of the system as part of production and market value chain with private sector. This enabling factor is still lacking in Lam Dong province	<ul style="list-style-type: none"> <li>• The province has plans for forest protection and REDD+ action plan, but the main challenge is in the implementation which needs law enforcement and strict sanctions</li> <li>• The country has been trying to develop mechanism and payment standard for forest carbon service for years, but until now only water service is successfully formulated</li> </ul>	<ul style="list-style-type: none"> <li>• The biodiversity-fee scheme is a new approach for the province and likely for the country. The GGAP technical report provides examples of application in other countries</li> <li>• The tourism sector in the province prioritizes eco-tourism as one of main tourism products to include the biodiversity conservation areas</li> <li>• The technical report reviewing tourism planning (Decision No. 1369/QD-UBND) highlights the need of professional and environment-sensitive</li> </ul>

<sup>29</sup> For example, based on an informal interview with coffee farmers, representatives of authorities and private companies in the capital of Dak Lak province, the market of different products from the coffee-based system integrated with fruit trees (e.g. durian and avocado) and black pepper, are facilitated by local coffee companies. They considered this is the main enabling factor missing in other provinces in the region where the coffee agroforestry was not expanded.

<b>Guiding questions</b>	<b>Responses</b>		
	<b>Provisioning services</b>	<b>Regulating services</b>	<b>Supporting services</b>
			tourism staffs and guides, to reduce risk of environmental, forest and biodiversity degradation as the result of increasing tourism activities to forest/biodiversity conservation areas as part of eco-tourism program

## ANNEX VI RESPONSES TO STEP 6 OF THE SIX STEPWISE APPROACHES

<b>Guiding questions</b>	<b>Responses</b>		
	<b>Provisioning services</b>	<b>Regulating services</b>	<b>Supporting services</b>
Are the prioritized policy options realistic, feasible, acceptable and coherent with the development plan?	Yes, in the GGAP development, they have been discussed with relevant stakeholders in the province through consultation meetings and workshops	Yes, similar situation with those of provisioning service	Yes, similar situation with the other two services
Are there the necessary financial, technical, human resource and institutional capacities to deliver on the selected policy options?	<ul style="list-style-type: none"> <li>• Financial: for mainstreaming, establishment, training etc as described in detailed in the GGAP technical report as activities of the solutions</li> <li>• Technical: need to provide guidance on how to establish the system, and need to be commodity specific for example to establish coffee agroforestry system</li> <li>• Human resource: need capacity building for the relevant authorities and extension service, including farmers, related to the climate-smart and sustainable farming system and plot management options, and study tour to sites with successful examples of the system</li> <li>• Institutional capacities: there has been concern that many staffs of agricultural extension in the country in general, lack of</li> </ul>	<ul style="list-style-type: none"> <li>• Financial: need sustainable funding source and economic incentive for forest protection</li> <li>• Technical: not the main issue</li> <li>• Human resource: lack of integrated staff to do forest patrolling, and to some extent related to lack of funding</li> <li>• Institutional capacities: need a capacity to strengthen law enforcement and apply more strict sanctions to parties violating the policies/regulations</li> </ul>	<ul style="list-style-type: none"> <li>• Financial: need sustainable funding source and economic incentive for biodiversity conservation</li> <li>• Technical: need to provide guidance on the conservation approach and technique, including list of unique and endangered species</li> <li>• Human resource: need of trained staffs on the conservation's guidance, especially related to the unique and endangered species</li> <li>• Institutional capacities: need a capacity to strengthen law enforcement and apply more strict sanctions to parties violating the policies/regulations related to biodiversity conservation; need of developing close collaboration with other</li> </ul>

<b>Guiding questions</b>	<b>Responses</b>		
	<b>Provisioning services</b>	<b>Regulating services</b>	<b>Supporting services</b>
	agricultural background. Therefore, capacity building including increasing communication skill to effectively deliver key messages to farmers, including those belong to ethnic minority with low literacy and language barrier, is necessary		sectors such as tourism sector
Who is going to be involved in implementing the policy measures, and in what role?	<ul style="list-style-type: none"> <li>• Mainly DARD and extension service at province and district level, for mainstreaming through training etc. co-organizing relevant events in the province, building connection/collaboration among potential stakeholders, monitoring and evaluation, upscaling in the province</li> <li>• Farmers and different stakeholders along the production and market value chain for establishing demonstration trials, building strong production and market value chain with fair and effective profit-sharing mechanism</li> <li>• Research institutions and universities: provide guidance, sharing relevant research materials, conducting further research for more productive and environmentally-sound</li> </ul>	<ul style="list-style-type: none"> <li>• Mainly DARD and DONRE at province and district level, for mainstreaming the need of low-emission development, improve the regulation as necessary, strengthening the implementation of the regulation and sanction, explore ways for sustainable funding source for forest protection</li> <li>• Rural households and communities, to be well-informed on forest protection efforts, forest boundary, what are legal vs. illegal activities on forest lands, and participate in the forest protection</li> <li>• Research institutions and universities, for exploring effective and feasible ways to develop payment scheme related to carbon service, voluntary scheme, and scheme of biodiversity fee</li> </ul>	<ul style="list-style-type: none"> <li>• Mainly DARD and DONRE at province and district level, for mainstreaming the need of biodiversity conservation, improve the regulation as necessary, explore ways for sustainable funding source for biodiversity conservation, explore collaboration with stakeholders of tourism sector</li> <li>• Rural households and communities, to be well-informed and participate in biodiversity conservation efforts</li> <li>• Research institutions and universities, for exploring effective and feasible ways to develop payment scheme related to forest biodiversity service, voluntary scheme, and scheme of biodiversity fee</li> </ul>

<b>Guiding questions</b>	<b>Responses</b>		
	<b>Provisioning services</b>	<b>Regulating services</b>	<b>Supporting services</b>
	systems, co-facilitate the building of production and market value chain, participate in the M&E	inputs to the formulation of regulation and payment standard for the carbon service	
How will the impacts of the policy measures be monitored?	The GGAP technical report provides M&E indicators for this provisioning service including the proposition of responsible agency for examples, proportion of agricultural area under productive and sustainable agriculture by DARD in coordination with DONRE, number of agricultural greenhouse facilities and total area of greenhouse by DARD etc. <sup>30</sup>	For examples, gross GHG emissions and GHG emission intensity namely per GDP or per capita by DONRE in coordination with DOIT, DARD and provincial statistic office; Forest area and forest cover, and area of new concentrated forest plantation by DARD	For examples, proportion of land area where biodiversity is protected and maintained, and number of threatened species, by DONRE in coordination with DARD
How will learning be generated, shared and communicated?	At authority's level: <ul style="list-style-type: none"> <li>As one of enabling conditions for GG implementation and as highlighted by provincial statistic office in the consultation workshop of GGAP development, all departments responsible for M&amp;E need to annually inform the statistic office on related figures of the</li> </ul>	Similar with provisioning service for the case at authority's level.  At farmers and local stakeholder's level: <ul style="list-style-type: none"> <li>Farmers and local communities can report relevant issues to forest rangers, and forest rangers to authorities such as DARD</li> </ul>	Similar with the other two services for the case at authority's level.  Similar case with the regulating service for the case at farmers and local stakeholder's level.

<sup>30</sup> The M&E indicators (in total 50 indicators) are classified into five areas to capture the main features of green growth: (1) Environmental and natural resources productivity, to capture the need for cleaner production, efficient use of non-renewable energy and natural resources, and promote the use of renewable ones; (2) Economic and Environmental assets to reflect the fact that a declining asset base presents risks to growth and because sustained growth requires the asset base to be maintained; (3) Green lifestyle and sustainable consumption capturing the direct impacts human activities on environment and the ways that the society respond to environmental pressures through trading and consumption behaviours; (4) Economic opportunities and policy responses, which can be used to help discern the effectiveness of policy in delivering green growth and human development in green growth context; and (5) Social sustainability encompassing social dimension of green growth such as labour, labour market, education, and inclusion

Responses			
Guiding questions	Provisioning services	Regulating services	Supporting services
	<p>indicators. All inputs will be compiled and shared to all departments</p> <ul style="list-style-type: none"> <li>As other provinces in the country, the authorities of Lam Dong province will conduct a 5-year policy and target revision (2021-2025 and 2026-2030), through which opportunities and risks related to GGAP implementation and the ecosystem services can be evaluated</li> </ul> <p>At farmers and local stakeholder's level:</p> <ul style="list-style-type: none"> <li>The extension staffs especially at district and commune level will be the agent to deliver key messages from grass-root level</li> <li>Researchers, NGOs and universities can also report issues on provisioning service based on formal/informal interview with farmers, or data collection</li> </ul>	<ul style="list-style-type: none"> <li>Researchers, NGOs and universities can also report issues on regulating service based on formal/informal interview with farmers, or data collection</li> </ul>	

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