Annex 2: Best practice in international biomass governance

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Introduction

This annex accompanies our main report - *Biomass in a Low-Carbon Economy*. As highlighted in the report, the role of biomass in future decarbonisation efforts crucially depends on the quality and strength of international governance:

- Biomass can play a key role in delivering a low-carbon economy and in meeting ambitious greenhouse gas (GHG) reduction targets in the longer term.
- Governance is crucial to ensure that risks related to sustainability of biomass feedstocks are properly managed, particularly in relation to imports. This will become more critical if supply scales up as a result of climate change policies.
- Ultimately, the long-term role of biomass should depend on the success of immediate and longer-term efforts to improve sustainability governance.

The purpose of this annex is to provide an overview of the current governance framework highlighting some key gaps, and to set out principles to improve governance over time, with a particular focus on imports.

The starting point is a brief overview on the UK sustainability governance framework for domestic and imported bioenergy feedstocks and timber products:

- This consists largely of UK transposition of EU bioenergy law, centered around the Renewable Energy Directive (RED), EU rules for sustainable timber imports under the EU Forest Law Enforcement, Governance and Trade plan (FLEGT) and GHG accounting rules for land use, land use change and forestry (LULUCF).
- The sustainability rules for bioenergy feedstocks are linked to subsidy schemes for renewable energy and cover the power sector, heat, and transport.
- Whilst timber regulations apply to all imports, agricultural imports appear to be relatively unregulated in comparison.

This is followed by an overview of international governance initiatives covering crops used as fuel, as well as broader biomass and wider sustainability goals. The focus is on:

- Voluntary best-practice standards and certification schemes.
- Initiatives focussed on putting in place an overarching framework and goals (e.g. Sustainable Development Goals - SDGs), or developing knowledge and sharing best practice.

Finally, the annex presents examples and case studies from international experience to identify elements of best practice, and uses these to draw insights for policy.

This annex only provides a high-level assessment of this extensive topic. It is based on a review of existing literature[1], our call for evidence[2], broad stakeholder consultation and findings from an expert workshop held in July 2018 and including representatives from NGOs, academia, industry and the public sector. It is not a systematic review of the literature, nor an in-depth comparative analysis of governance systems.

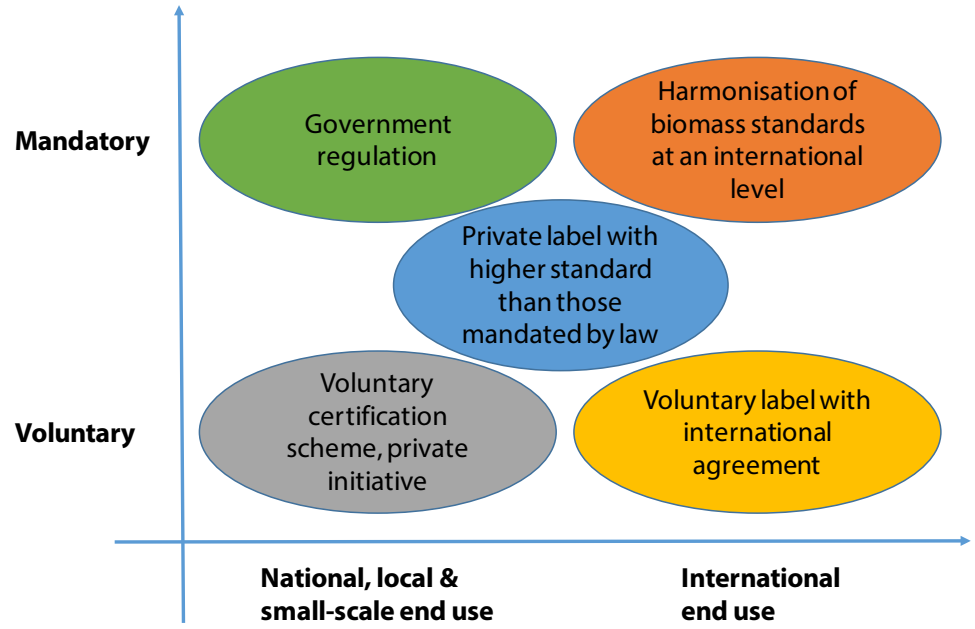
[1] A long list of references is provided at the end of this annex.

[2] CCC (2018) *Bioenergy Review 2018 - Call for Evidence:* https://www.theccc.org.uk/bioenergy-review-2018-call-evidence/; main report, Box 1.3; Ricardo (2018) *Summary of evidence submitted, final report*.

Box 1. Key terminology and concepts used throughout the annex

- **Governance** is intended here as the set of all institutional arrangements and instruments put in place to regulate biomass use, covering forestry, agriculture, land-use management and broader sustainability goals. These include both direct regulation and market-based tools (e.g. financial incentives, voluntary standards and industry initiatives); they can be mandatory or voluntary; and can apply at local, regional, national or international level (Figure B1.1).
- **Sustainability** refers to a broad concept including lifecycle GHG emissions, biodiversity, ecosystem services (e.g. soil and water quality), and social issues such as land tenure and food security. At a broad level, it covers the three dimensions of economic, social and environmental sustainability. Whilst there is general consensus around the broader concept, there is no universally recognised definition of sustainability: its meaning varies with time, place, and conditions.
- **Standards** are sets of requirements against which a certain product or process is evaluated. These are typically formulated as a set of criteria with related indicators.
- **Certification** is a verification tool, typically used to demonstrate compliance with standards and carried out by a third party auditor. The certified product or process is evaluated against the criteria set in the standard.
- A system is defined as **multi-stakeholder** when all relevant and interested stakeholders in the supply chain are equally engaged in the governance process. Stakeholders may include industry representatives, producers, civil society, governments, research bodies and non-governmental organizations (NGOs).

Figure B1.1. Possible approaches for implementation of biomass certification



Source: Adapted from Van Dam et al. (2006) *Overview of recent developments in sustainable biomass certification.*

Source: JRC (2011) *Recent developments of biofuels / bioenergy sustainability certification: A global overview;* IEA (2013) *Strategic Inter-Task Study: Monitoring Sustainability Certification of Bioenergy. Task 4: Recommendations for improvement of sustainability certified markets;* WWF (2013) *Searching for sustainability. Comparative Analysis of Certification Schemes for Biomass used for the Production of Biofuels.*

The annex is structured in three main sections:

- Current governance framework
  - UK and EU
  - Voluntary certification schemes and broader international initiatives
- 'What works' evidence based on international case studies
- Principles for governance and practical insights.

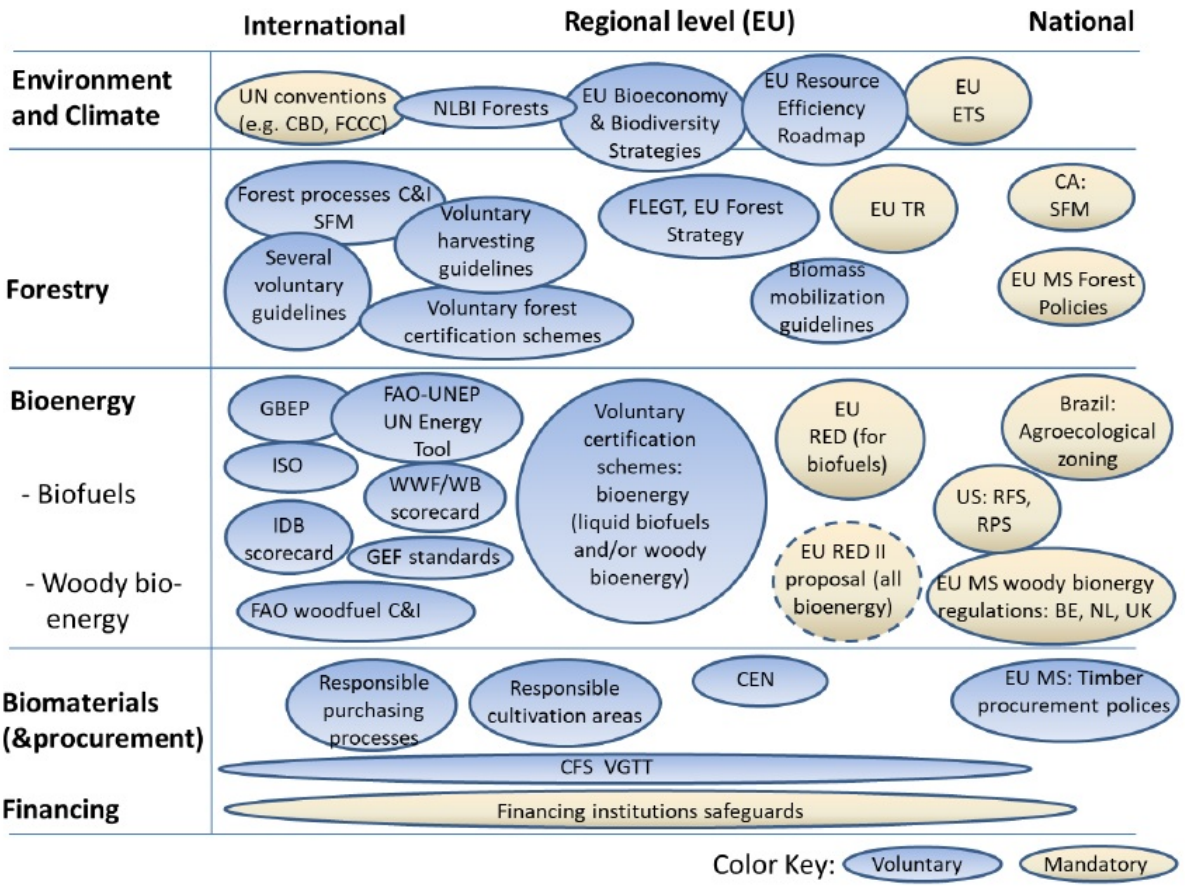
Overview of the current governance framework

This section provides a high-level overview of the current governance framework regulating biomass feedstocks relevant to bioenergy use, focusing on UK and EU governance and touching on international initiatives, standards and certification schemes. A more detailed overview of the framework is given in Chapter 3 of the main report.

As illustrated by Figure 1, a wide range of instruments have been developed and implemented to date to address biomass sustainability. These include directives and regulations, action plans and strategies, action by international organisations, financing, voluntary standards and schemes. Instruments can differ in their geographic coverage (from local or regional to national and international), scope (e.g. a single crop as raw material, a type of feedstock or end product, or a process), and on whether they are voluntary or mandatory.

Overall, forestry governance appears to be more developed than for agricultural commodities. An in-depth discussion on forestry governance can be found in Annex 1: Sustainable Forestry Management.

Figure 1. Overview of governance instruments for biomass supply chains



Source: Uwe R. Fritsche (IINASA) - IEA bioenergy workshop. *Sustainable Bioeconomy: Key issues and perspectives for bioenergy.*
Notes: Slides available at https://www.iea.org/workshops/sustainability-governance---bioenergy.html

Bioenergy governance in the UK and EU

The UK framework for biomass builds on EU legislation that either directly regulates bioenergy production and use, or does so indirectly by addressing related areas such as land use and forestry. In some areas, the UK framework goes beyond the mandatory EU rules.

The main mechanism for biomass governance consists in the sustainability criteria overseen by Ofgem. These apply to biofuels, bioliquids, solid biomass and biogas, with separate land criteria for woody and non-woody biomass:

- **Land criteria for non-woody biomass** restrict the type of land that feedstock can be sourced from. This rules out sourcing from land that was in January 2008 (or since) primary forest, land designated for nature protection, highly biodiverse grassland, peatland, or which was a former continuously forested area, lightly forested area or wetlands.
- **Land criteria for woody biomass** require woody biomass to be grown according to sustainable forest management principles, which must be regularly assessed. Feedstocks must meet the '70/30 threshold' meaning that, 100% of the woodfuel sourced must be legally harvested and 70% needs to comply with sustainability requirements.
- The **GHG criteria** set limits on the lifecycle GHG emissions for bioliquids, biomass and biogases. GHG emissions thresholds vary according to fuel use and type. They are set to tighten over time. For solid biomass or biogas these are expressed as carbon intensity, currently set at 79.2 gCO_2e/MJ (equal to 285 gCO_2e/kWh) of electricity; for bioliquids and biofuels these are expressed as percentage savings compared to fossil fuels, currently set as 50%.
- The framework also includes non-mandatory **environmental (e.g. soil, water) and socio-economic (e.g. land and workers' rights) criteria**. Whilst several certification schemes include these as a requirement, stakeholders suggest these issues are only partly addressed, with evidence of negative impacts on local habitats and societies.

Access to subsidies is conditional on compliance with the criteria. There are different ways in which operators can demonstrate compliance:

- Compliance with sustainability criteria can be demonstrated through the use of approved voluntary certification schemes, such as the Forest Stewardship Council (FSC) and the Sustainable Biomass Programme (SBP). This is what constitutes 'Category A' evidence for woody biomass under Ofgem's subsidy framework.
- Alternatively, operators need to collect bespoke evidence about the supplier and this needs to be verified by an independent auditor, corresponding to 'Category B' evidence for woody biomass under Ofgem's subsidy framework.
- For woody biomass, compliance can be met at a regional level rather than forest level, providing that all wood is traceable and that there is sufficient evidence that a region is low-risk ('regional risk-based approach') (Box 2).

Whilst in principle the system does not prevent the sourcing of feedstocks from high-risk areas, it makes it harder to achieve this in practice, which creates barriers to entry for producers in high-risk areas.

Box 2. Regional risk-based approaches

A risk-based approach is a compliance tool that applies to a specific spatial scale or region as opposed to applying to an individual level (e.g. a single producer). Such an approach can be a viable and efficient alternative to certification as it does not rely on third party auditing nor does it require verification of the whole supply chain. Such an approach requires credible evidence of **low-risk** of non-compliance with the sustainability criteria **on a regional level** based on monitoring and validation. It also requires an ongoing overall risk assessment to avoid negative impacts, such as suppliers from 'safe' countries not adhering to regional or national standards.

Such an approach presents several **advantages**, as regional risk assessments can be more cost-efficient (compared to certification), and can help the inclusion of smaller actors who struggle to sustain high certification costs. It provides a more flexible means of compliance and is increasingly used to address issues which are difficult to deal with at the individual actor's level (e.g. forest carbon). This approach can support a shift to monitoring and validation as the main compliance mechanism. There are however some **issues**, the main of which is the risk of generally excluding producers from high-risk regions. This means that the implementation of risk-based approaches requires some caution.

Source: IEA (2018) Inter-Tasks Sustainability Project 2016-2018. Webinar (September 2018) *Approaches to creating trust in sustainability of bioenergy through effective governance;* BEIS (2017) *Risk based regional assessment: a checklist approach*.
Notes: The current UK framework includes the option of using a risk-based approach to demonstrate compliance with the sustainability criteria for woody biomass (i.e. 'Category B' evidence in Ofgem's subsidy framework).

Broader international initiatives and private certification schemes

The use of biomass as a fuel feedstock has been encouraged as part of international efforts to reduce GHG emissions, including under the 2015 Paris Agreement. However, at the global level there is no coordinated action to address the sustainability of biomass, which is mostly governed through decentralised initiatives:

- The Paris Agreement makes no specific provisions relating to the governance of biomass feedstocks, though it includes broader sustainability principles for mitigation efforts, which are relevant to biomass governance:
  - These principles relate to the protection of rights of indigenous peoples and local communities, food security, sustainable consumption and the protection of biodiversity and ecosystem integrity during the implementation of Nationally Determined Contributions (NDCs).
- Around three quarters of the parties to the Agreement include targets for land use, land use change and forestry (LULUCF) within their mitigation commitments. However, the inclusion of LULUCF targets in NDCs is not mandatory, and often only limited detail is available on the underlying accounting methodology.

There have been however a number of decentralised initiatives at the international level.

Voluntary best practice standards are the main ones (Box 3). These have emerged as a market-based response to concerns about the sustainability of biomass production. They are classified according to the feedstock they govern, and they typically make use of third-party certification as a tool to demonstrate compliance.

Other initiatives include coordinated initiatives aimed at establishing an **overarching framework and goals.** The UN-led programme coordinating efforts to 'reduce deforestation

and forest degradation in developing countries' (REDD+) and the Sustainable Development Goals (SDGs) are examples of such initiatives.

There are also various **platforms** to exchange local and regional experiences and best practice, either within international bodies such as the IEA with its Bioenergy Agreement, or within dedicated fora, such as the Global Bioenergy Partnership (GBEP). The GBEP, whose Secretariat is based at the UN Food and Agriculture Organisation (FAO) aims to provide a framework for coordinating ongoing activities related to bioenergy.

The main issues with the current framework include a number of gaps (e.g. in the accounting of carbon stocks), a general weakness in monitoring and reporting, and issues of trust and legitimacy of sustainability schemes (Box 4). A more detailed overview is given in Chapter 3 of the main report.

Box 3. Standards and certification as a tool to achieve biomass sustainability

Voluntary sustainability standards for crops are market-based tools which emerged as a response to raising sustainability issues, particularly in the context of international trade, as is the case for palm oil and soy standards to address deforestation. Each voluntary scheme is classified according to the feedstock it governs (e.g. forestry, agriculture, biofuel/bioliquids, solid biomass). Some examples are provided below:

- International voluntary standards such as the Forest Stewardship Council (FSC), the Roundtable on Sustainable Biomaterials (RSB), the Roundtable on Sustainable Palm Oil (RSPO), the Roundtable on Responsible Soy (RSS), and the International Sustainability and Carbon Certification (ISCC), include ambitious sustainaility requirements to address environmental and social risks related to biomass production.
- In an attempt to harmonise standards, the 'sustainability criteria for bioenergy' (ISO 13065) were developed in 2015 by the International Organization for Standardization as a 'meta-standard' that required taking into account environmental criteria (greenhouse gas emissions, water, soil, air, biodiversity, energy efficiency, and waste), and social criteria (focusing on human rights, labour rights, land-use rights and land-use change, and water rights).

Standards make use of third party certification as a monitoring tool allowing participants to demonstrate compliance with sustainability criteria. Compliance along the supply chain can be demonstrated using different methods (chain of custody, mass balance or segregation).

To date, certification proved to be an effective tool to demonstrate compliance with best practice standards in international supply chains, supplementing local or national regulation in regions where policies and governance structures are weak. The large increase in the number of standards in recent years has stimulated competition amongst them, and supported trade in certified goods.

However, there is evidence that **relying on certification** can lead to **negative impacts**. The proliferation of schemes can lead to 'greenwashing', resulting in the choice of the least ambitious standard, and certification entails administrative costs which can lead to the exclusion of small producers. Several stakeholders suggest that there are issues around the lack of transparency inherent to the use of certification as opposed to publicly available data to show that biomass is sustainable. Overall, evidence suggests that compliance with standards does not necessarely ensure that sustainability is achieved, for instance:

- A number of comparative studies have been carried out to benchmark standards and assess whether compliance ensures sustainability. A 2013 study by WWF compared 13 certification schemes recognised under the EU RED and assessed how each scheme performed against the ISEAL Code of Good Practice for Setting Social and Environmental Standards. Whilst all of the

Box 3. Standards and certification as a tool to achieve biomass sustainability

analysed schemes met minimum RED requirements, many of them performed poorly against additional sustainability criteria (water, soil, air and social issues).

- Stakeholders also raised concerns around the ability of standards to take into account local conditions and social issues. For example, Tomei (2015) reports that in Guatemala the ISCC requires sugar bioethanol producers to demonstrate legal history of land tenure. However, many communities in Guatemala did not have legal ownership, hence the system ended up marginalising rural communities.

Overall, it appears that voluntary standards and certification are a helpful tool but insufficient alone to guarantee sustainability of biomass crops at the global level. They should rather be regarded as part of a wider 'pyramid of governance' (Figure 2) including other instruments and mechanisms such as regulation, financial incentives, and community-based initiatives.

Source: NL Agency (2012) *Sustainability certification for biomass;* Mai-Moulin, T. et al. (2017) *Shaping the biomass market. Toward a harmonization of national sustainability requirements and criteria for solid biomass;* Tomei, J. (2015) *The sustainability of sugarcane-ethanol systems in Guatemala: Land, labour and law;* Hennenberg, K. J., Böttcher, H. and Bradshaw, C. J. A. (2018) *Revised European Union renewable-energy policies erode nature protection*; WWF (2013) *Searching for sustainability. Comparative Analysis of Certification Schemes for Biomass used for the Production of Biofuels;* IEA (2013) *Strategic Inter-Task Study: Monitoring Sustainability Certification of Bioenergy. Task 4: Recommendations for improvement of sustainability certified markets.*

Box 4. Issues under the current framework

The review of current sustainability governance systems has highlighted some key issues, which we summarise in Chapter 3 of the main report. The main strategic issues from the perspective of UK climate policy are around gaps in the coverage of sustainability criteria (i.e. the accounting of forest carbon stocks in existing plantations), a focus on minimum standards at the expense of best practice, along with an inherent weakness in relying on criteria attached to public subsidy schemes to manage bioenergy sustainability risks as opposed to a more comprehensive framework. There is also an argument that setting tighter sustainability rules in the EU has resulted in a two-tier system globally, leading to cherry-picking of more sustainable stocks rather than driving up standards more widely.

Certain issues become more dominant when seen through the lens of emerging markets and practical conditions in developing countries. These include socio-economic issues, limited data availability and weaknesses in monitoring, a fragmented approach across sectors, and, more broadly, a lack of transparency and trust:

- **Social sustainability is only partially addressed**, with potential negative impacts on the environment and local societies. This often results from the failure to fully consider local conditions such as land access, participation in trade unions and compliance with local or national law. The fact that social sustainability is not fully addressed means there is a risk that higher demand for bioenergy crops in the future can exacerbate those conditions.
- **Insufficient monitoring and reporting makes it difficult to track progress.** This makes it hard to quantify the impact of sustainability requirements on trade flows and limits the ability to validate outcomes, suggesting the need for a systematic and transparent registration at the global level. Currently, many countries do not have sufficiently developed monitoring or modelling systems to track how the management of land may be changing over time. Data often appears to be incomplete, difficult to access or not in a usable form and data on how much trade is certified is not publicly available.

Box 4. Issues under the current framework

- **A sector-based approach** introducing boundaries between related sectors can generate conflicting incentives, and prevent synergies from being realised. For example, issues often arise when agricultural and forestry policies are not sufficiently integrated. Financial incentives directed at renewable energy are often excluded from broader land-use governance which may result in misalignment of incentives.
- Stakeholders suggest there is a broader issue around **trust and legitimacy** of the organisations in charge of governance, which may result in enforcement issues. The independence of these is a crucial factor. For example, the fact that the Indonesian Sustainable Palm Oil standard's auditing unit sits within government makes it challenging for it to gain the trust of international buyers. Some stakeholders have expressed concerns about the independence of the Sustainable Biomass Programme (SBP) given it is industry-led.

Source: Forest Research (2018) *Carbon impacts of biomass consumed in the EU. Supplementary analysis and interpretation for the European Climate Foundation;* IEA (2018) *Inter-Tasks Sustainability Project 2016-2018. Webinar (September 2018) Approaches to creating trust in sustainability of bioenergy through effective governance;* NRDC & Dogwood Alliance (2017) *The sustainable biomass programme: smokescreen for forest destruction and corporate non-accountability.*

'What works': examples from international experience

Our analysis looks broadly at international experience rather than focusing on details for an individual country. We focus on trade-offs between approaches, and on practical examples and case studies of governance that has been successful in improving the sustainability of bioenergy. For each of these, we identify key strengths of the approach and their impacts.

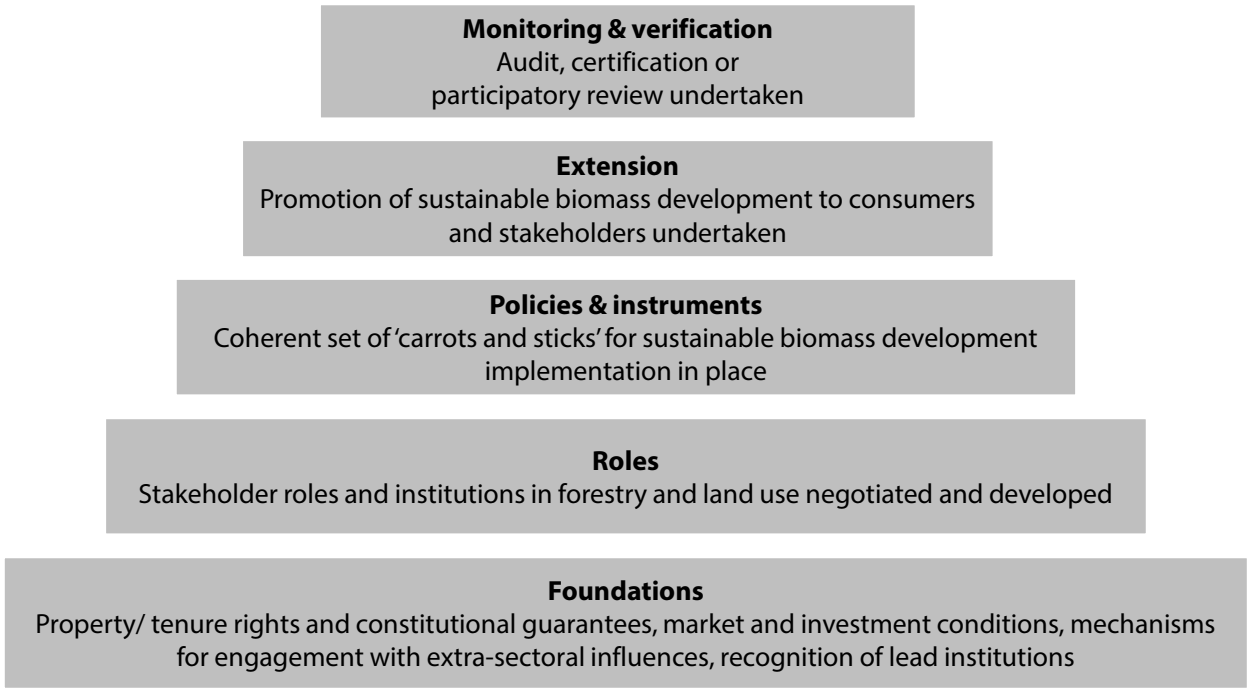
This is not a systematic review – rather, it is a high-level evidence assessment which draws heavily on stakeholder input from the workshop as well as the Call for Evidence submissions and the Advisory Group input.[3]

Overall, it is clear that no instrument is sufficient on its own and the success of each crucially depends on the ability to adapt to local circumstances. For instance, certification has proven an effective monitoring and verification tool, however relying on voluntary standards has led to negative outcomes. These include the risk of a 'race to the bottom' (i.e. an incentive to opt for the least demanding standard) and of relying exclusively on a few select producers from low-risk areas.

Each instrument should be considered as part of a wider governance structure, requiring coordination between its parts (Figure 2).

[3] A long reference list is included at the end. The Call for Evidence responses and summary report are published alongside the main report.

Figure 2. Pyramid of governance



Source: Adapted from Mayers, J., Bass, S. & Macqueen, D. (2005). Power Tools Series. London, IIED. *The Pyramid: a diagnostic and planning tool for good forest governance.*
Notes: The pyramid was developed by the authors as a diagnostic and planning tool for forest governance, with the aim to stimulate participatory governance at country level and to fill the gap between international policy and level-field progression in sustainable forest management.

This section explores some of the trade-offs between approaches, providing examples of successful implementation in each case.

Monitoring, reporting and verification (MRV)

Robust monitoring, based on accurate measurements at the appropriate spatial scale, is crucial to track progress on sustainability, verify and validate results, support learning from experience, and increase trust through greater transparency:

- In order for the reporting of mitigation action in the land use sector to be fully transparent, it is important that gross emissions and removals are reported and accounted for separately.[4] This would clearly mark up any continued deforestation offset by afforestation or ecosystem restoration elsewhere.
- MRV critically relies on the availability of high-quality data and measurements. Modern technologies such as satellite imaging, track and trace[5], and improved soil carbon measurements can play a critical role in improving existing data and be used to build geographically-specific datasets. Some examples are described below:

[4] CLARA (2018) *Missing Pathways to 1.5°C: the role of the land sector in ambitious climate action*. Available at: https://www.climatelandambitionrightsalliance.org/report
[5] Enviva: http://www.envivabiomass.com/sustainability/track-and-trace-2/, and Drax: http://forestscope.info/

- The IEA (2018) has identified several existing data sources for forestry along with a few for agriculture. Alongside national forest inventories and biodiversity data, data from the NepCon sourcing hub[6] and SBP Data Transfer System can be used to show compliance with EU Timber Regulation and other standards.
- The US Forest Service uses remote sensing to track carbon stocks. Dale et al. (2017) have used a dataset of timber land variables to assess forest conditions in two South Eastern United States' fuelsheds. Their analysis enabled them to show that harvesting feedstocks for fuel did not lead to a decrease in carbon stock over the timeframe considered.
- The Swedish Forestry Board has national monitoring in place based on weekly Sentinel 2 data from Copernicus, to monitor the clearcut areas. This allows monitoring of each harvest permit granted, and weekly updates of regenerated areas.[7]
- Kastens et al. (2017) have used satellite data to estimate the impacts of the Brazil soy moratorium on deforestation rates, showing that the programme's benefit had originally been underestimated.

Land use management

The use of biomass crops for energy raises issues relating to the allocation of land to competing uses, particularly for growing food crops. The associated issues include indirect land use change and food security, and they are covered in Chapter 2 of the main report.

A landscape-based approach could allow to address these issues and exploit existing synergies, managing bioenergy as part of a sustainable bio-economy including food systems and supply of bio-materials (e.g. wood in construction).

- **Financial instruments designed with a cross-sectoral view** can support the **alignment of incentives across land-use areas**, creating a level-playing field for market participants and limiting distortions in incentives and price signals across sectors (e.g. between forestry and agriculture).[8]
- Techniques such as **integrated food and energy systems (IFES), multicropping and integrating agriculture with forest and livestock** can improve the efficiency of land use and help solve tensions amongst competing uses of land (e.g. growing food or energy crops).
  - **IFES** are based on the integration of food and energy production. They have been endorsed by organisations such as UN FAO as a good approach to sustainable development objectives. They contribute to diversifying revenues for local communities, reducing waste and environmental impact.
  - The example of **Jatropha** is summarised in Box 5; additional examples of IFES and multicropping being successfully implemented are provided in Box 4.2 of the main report.

[6] Available at https://www.nepcon.org/sourcinghub/timber

[7] EARSC (2016) *Copernicus Sentinels' Products Economic Value: A Case Study of Forest Management in Sweden.*

[8] An example of these distortions is given by US agricultural subsidies in the 1980s. These created incentives to clear privately-owned forests for crops as forest products, which faced higher transport costs due to the typically isolated location of forests, had to compete with subsidised agriculture products.

Box 5. Integrated food and energy production: the example of Jatropha

Jatropha is a non-edible crop grown across Asia, Africa and Latin America, which has a number of traditional uses including for protective hedges, erosion control, soap making, traditional medicine and lighting. It is a low-growing tree with seeds typically containing 35% of oil with properties highly suited to produce biofuel. Due to its rooting nature, Jatropha can extract water as well as other nutrients from deep in the soil, enabling it to grow with little nutrients and little care.

Evidence suggests that Jatropha farming has the potential to benefit poor producers in arid and semi-arid contries, where farmers have limited alternative in terms of farming strategies and livelihood. The utilisation of the oil for energy production combined with other traditional uses (e.g. soap making and protective hedges) can deliver economic benefit for local communities as well as environmental improvements (on water and soil conditions). Studies have shown that Jatropha can also contribute to CO_2 sequestration from the atmosphere, increasing its potential to contribute to emissions reductions.

Sources: Becker, K., et al. (2013) *Carbon farming in hot, dry coastal areas: an option for climate change mitigation;* FAO (2010) *Jatropha: A Smallholder Bioenergy Crop The Potential for Pro-Poor Development.*

Biomass governance can be effectively coupled with broader development objecties. However this critically requires robust governance to be in place and technologies, knowledge, and business models to be adapted to local circumstances:

- Bioenergy feedstocks can positively address key causes of food insecurity and development issues (e.g. poverty, absence of functional agricultural markets)[9], and have the potential to contribute to broader environmental improvement. One example is the case of perennial grass buffer strips, which can contribute to improve water quality.[10]
- Bioenergy feedstocks can support the production of sustainable food and energy. This can be achieved by investing in technology and innovations, building capacity and infrastructure, promoting stable prices for local production and adopting flexible crops (Lynd et al., 2015).
- Strategies for integrated production of food crops, livestock and bioenergy can offer an alternative to an agricultural model based on specialized land use, contributing to empowering local communities through diversified revenues.
- Community-based schemes can allow communities to receive socio-economic benefits deriving from resources, and provide an incentive to manage these sustainably, and to maintain biodiversity[11]:
  - Forest concessions are an example of such schemes. These work by assigning land tenure to local communities coupled with clear rules for sustainable management. Forest concessions such as the one implemented in Guatemala (Box 6) and Indonesia provide an example of the positive outcomes that can be achieved when local communities are given the responsibility to manage land in line with sustainability goals. This can be achieved with the support of international initiatives.

[9] SCOPE - 72 (2015) *Bioenergy & Sustainability: bridging the gaps.*
[10] Brandes, E., et al. (2017) *Targeted subfield switchgrass integration could improve the farm economy, water quality, and bioenergy feedstock production.*
[11] This finding was supported by various stakeholders and studies, for instance: FAO (2016) *Forty years of community-based forestry. A review of its extent and effectiveness.*

Participatory governance

As the concept of sustainability is very context-specific and dependent on local conditions, the ability to take these into account can determine the effectiveness of sustainability initiatives. This can be addressed by having all relevant stakeholders participate in the governance process.

Several studies have shown that **multi-stakeholder** structure leads to more efficient governance outcomes including on social sustainability.[12] **'Roundtables'** such as the Roundtable for Sustainable Palm Oil (RSPO) and Roundtable for Sustainable Soy (RSS) have usually been set up by non-governmental bodies in partnership with industry. These provide an example of a multi-stakeholder structure, where all relevant stakeholders along the supply chain are involved in the various stages of the governance process (i.e. from standard setting to enforcement). Other ways to include local communities include forest concessions and community-based certification schemes.

Forest concessions provide a successful example of participatory governance. Guatemala's forest concessions provide a well-documented case of such system. Local communities were given the responsibility to manage around 660,800 hectares of forest. The forest concessions reached a near-zero deforestation rate. The programme included capacity building, technical tools and the option to trade carbon credits (Box 6). Similarly, current policies in Indonesia aim to transfer 10% of public Forest Estate (i.e. 12.7 million hectares) to local communities upon proof of historic presence in an area. Measures set up include specific programmes to resolve tensions amongst large companies and small communities.[13]

[12] See for example: IEA (2013) *Strategic Inter-Task Study: Monitoring Sustainability Certification of Bioenergy. Task 4: Recommendations for improvement of sustainability certified markets* and WWF (2013) *Searching for sustainability. Comparative Analysis of Certification Schemes for Biomass used for the Production of Biofuels*.

[13] Fisher, M.R., et al. (2018) *Assessing the new social forestry project in Indonesia: recognition, livelihood and conservation?*

Box 6. Guatemala's forest concessions

These were set up, following civil war peace accords in 1996, within the Maya Biosphere Reserve (MBR) as part the national forest management plan. The concession agreements gave usufruct rights to 12 communities and two private companies for both timber and non-timber resources, upon the payment of a small fee.

In order to apply for a concession, community organisations were required to demonstrate historical use or the capacity to manage forests sustainably. Communities had to be accompanied by an NGO who would provide support on technical skills and financial capabilities.

Through such schemes, local communities were given the responsibility to manage around 660,800 hectares of forest and were supported with capacity-building and technical tools. Forest concessions have been coupled with the possibility of selling carbon credits on international markets through the Guate Carbon programme.

The Rainforest Alliance reports that:

- The system contributed to support 26,000 new jobs in sustainable forestry and to improve gender equality by increasing the involvement of women in production activities.
- The forest concessions reached a near-zero deforestation rate, and kept the rate of forest fires remarkably low compared to nearby areas. These outcomes are much stronger than those achieved in national parks.

Source: Rainforest Alliance (2018) *Guatemala's Forest Concessions: A Global Conservation Model*; Radachowsky, J. et, al. (2011) *Forest concessions in the Maya Biosphere Reserve, Guatemala: A decade later.*
Notes: Some authors have identified weaknesses in the forest Concessions set up in Guatemala. For example, Radachowsky et al. (2011) report failure of some of the concessions due to poor law enforcement and insufficient sanctions. Some concessions also faced issues related to institutional resilience (e.g. financial management capacity and high turnover in management positions).

Regulatory framework

A **hybrid framework** can combine the advantages of mandatory regulation with the flexibility of 'soft' tools.

An example of such a system is given by the EU Renewable Energy Directive (RED, 2009) which combines the advantages of enforceable mandatory rules with the flexibility that characterises decentralised tools (main report Chapter 3).

In Canada, a robust regulatory system manages sustainability risks, while voluntary certification is used to support trade through international marketing:

- Canada has established a rigorous governance system, with provinces required to develop and get the approval for ten-year forest management plans. These need to address the full spectrum of forest products as well as a broader set of social and political values. Stumpage rates are set by government and monitoring is in place to check that actual harvests do not exceed agreed quantities.[14]

As highlighted by IEA (2018), successful governance requires continuously **adapting to changing circumstances** and lessons learned, driving the gradual **improvement of standards over time**. The EU FLEGT (Forest Law Enforcement, Governance and Trade) and biogas programme in Germany provide examples of adaptive systems achieving positive outcomes on

[14] Further information can be found at: https://www.nrcan.gc.ca/forests/canada/planning/17493

biomass sustainability through continuous adaptation and improvement. The Indonesian Sustainable Palm Oil standard (ISPO) is being developed building on similar principles with the aim of extending the current coverage of sustainability standards.

- This has been the case for the EU framework which regulates the sales and imports of forestry products, known as **EU FLEGT** (Forest Law Enforcement, Governance and Trade) Action Plan and EUTR (Timber Regulation) (main report Chapter 3). FLEGT has set up standards to gradually improve over time. Coverage was also gradually extended through a process for negotiating bilateral trade agreements, using a multi-stakeholder process to define outcomes under the licencing system. In this way FLEGT has achieved broad market coverage and relatively high standards, while minimising administrative and transaction costs.
- **Biogas in Germany**. The system was continuously shaped through monitoring and strengthening of incentives over time, taking into account market developments. Energy crops were eventually replaced by manure as this eventually proved to be the best option. Biogas governance under the Renewable Sources Act was more successful in addressing arising issues compared to agricultural laws, which did not have a monitoring mechanism in place (IEA, 2018).
- The **Indonesian Sustainable Palm Oil (ISPO) standard** has been developed by the Indonesian government with foreign capacity-building support (including from the UK). It follows a similar principle of aiming to develop a properly-enforced minimum standard covering domestic forest products, and subsequently to tighten this further, allowing it to increase the share over time of sustainable exports. If successful, it will allow market entry to producers currently excluded from international standards such as RSPO, while at the same time balancing this with issues of national sovereignty.

Private sector initiatives can play a key role in shifting demand towards more sustainable uses. Targeted regulation can provide the enabling conditions for these initiatives to be developed, including through the use of public private initiatives (PPIs) and public procurement, as illustrated by **Brazil's Soy Moratorium** example:

- In 2006 major soy traders, following pressure from retailers and NGOs, committed not to buy any soy from Amazon land deforested after 2006.
- A study by Gibbs et al. (2015) reports that, while in the two years preceding the agreement nearly 30% of soy came from newly cleared forest areas, soy-driven deforestation dropped down to 1% by 2014 in the Amazon biome.
- Critics point at the fact that enough land had already been cleared at the time to still enable soy expansion without further deforestation, and that the Moratorium focused on two Amazon biomes only, leaving other high-value biomes unprotected.
- Nevertheless, the Soy Moratorium is regarded globally as a large success which inspired similar agreements to be set up.

Conclusions

The analysis contained in this annex has informed the conclusions and recommendations on sustainability governance which are set out in our main report - *The Role of Biomass in a Low-Carbon Economy*.

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