Integrating climate change into forestry

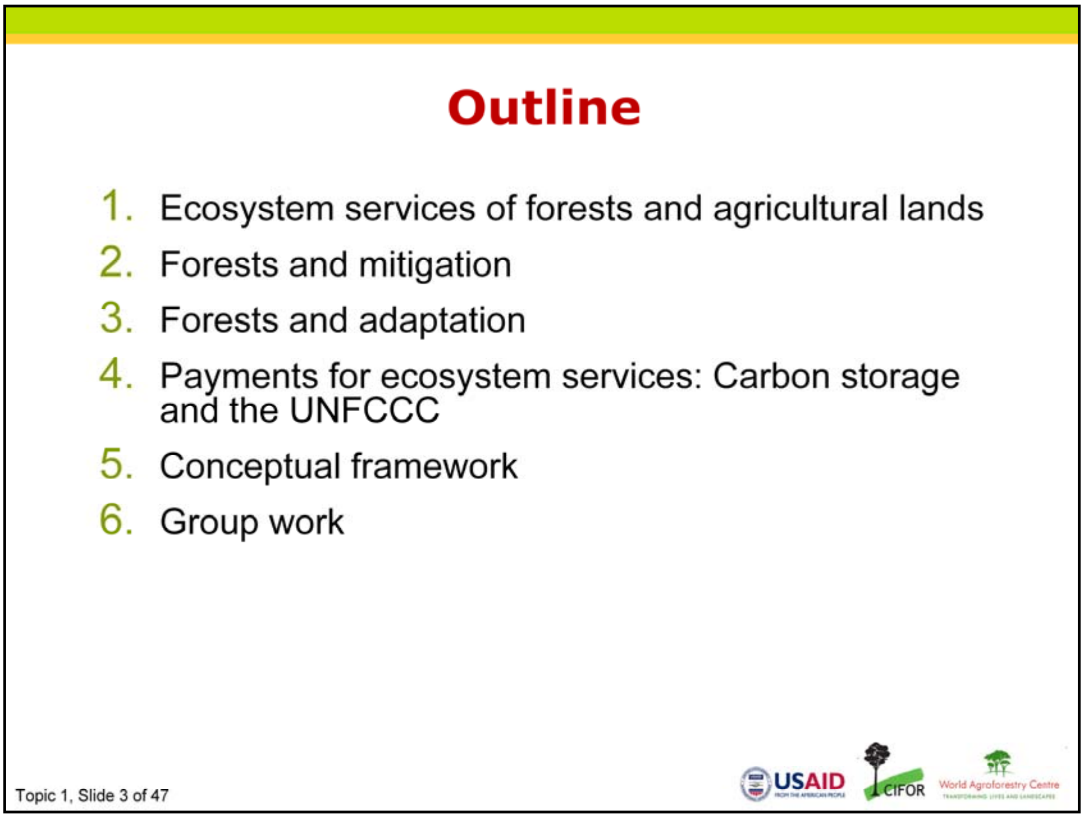
Objectives

- To present the links between climate change, forests and agriculture
- To identify ways to address climate change issues in the case of existing forestry and agriculture programs
- To develop a conceptual framework about the linkages between land use programs and climate change

Topic 1, Slide 2 of 47

USAID CIFOR World Agroforestry Centre

Narration: *This presentation is an overview of the issue of climate change for forestry programs. The objectives are to present the links between climate change and forests and to identify ways to address climate change issues within existing forestry programs. We also develop a conceptual framework about the linkages between forestry and climate change. This conceptual framework will help to analyse the possible ways to integrate climate change related activities into forestry programs.*



Narration: *The presentation consists of six parts.*

Presentation of the outline.
1 Brief introduction to the difference between adaptation to and mitigation of climate change
2 and 3. Links between forestry and mitigation / adaptation
4. Policies
5. Conceptual framework
6. Group work

1. Ecosystem services and climate change

- **Landscapes provide ecosystem services**
  - Carbon storage → mitigation
  - Water regulation and quality → adaptation
  - Microclimate regulation → adaptation
  - Economic opportunities → adaptation
  - Biodiversity, cultural values → adaptation
- **Landscapes and their ecosystem services are vulnerable to climate variability and change**
  - Practices to reduce landscape vulnerabilities → adaptation

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USAID CIFOR World Agroforestry Centre

Narration: *Both forested and agricultural landscapes provide a variety of ecosystem services which can either be enhanced and protected by management or can be degraded. Ecosystems can store carbon in trees and other biomass as well as in the soil. In climate change terms, this is called mitigation because better management results in lower emissions or in increased removal of carbon from the atmosphere, thus lowering the CO2 in the atmosphere. At the same time, these same landscapes can provide benefits that increase resiliency to climate change. Such adaptation benefits include improved storage and release of water, maintained local and regional rainfall patterns and diversified economic opportunities through agricultural products, timber, nontimber products and tourism. These same landscapes can also provide services such as biodiversity maintenance and places where local people uphold cultural or religious values.*
The services and landscapes are themselves vulnerable to climate variability and change, such as increased risk of forest fires. Thus forest or agricultural management itself needs to be adapted to become more resilient.

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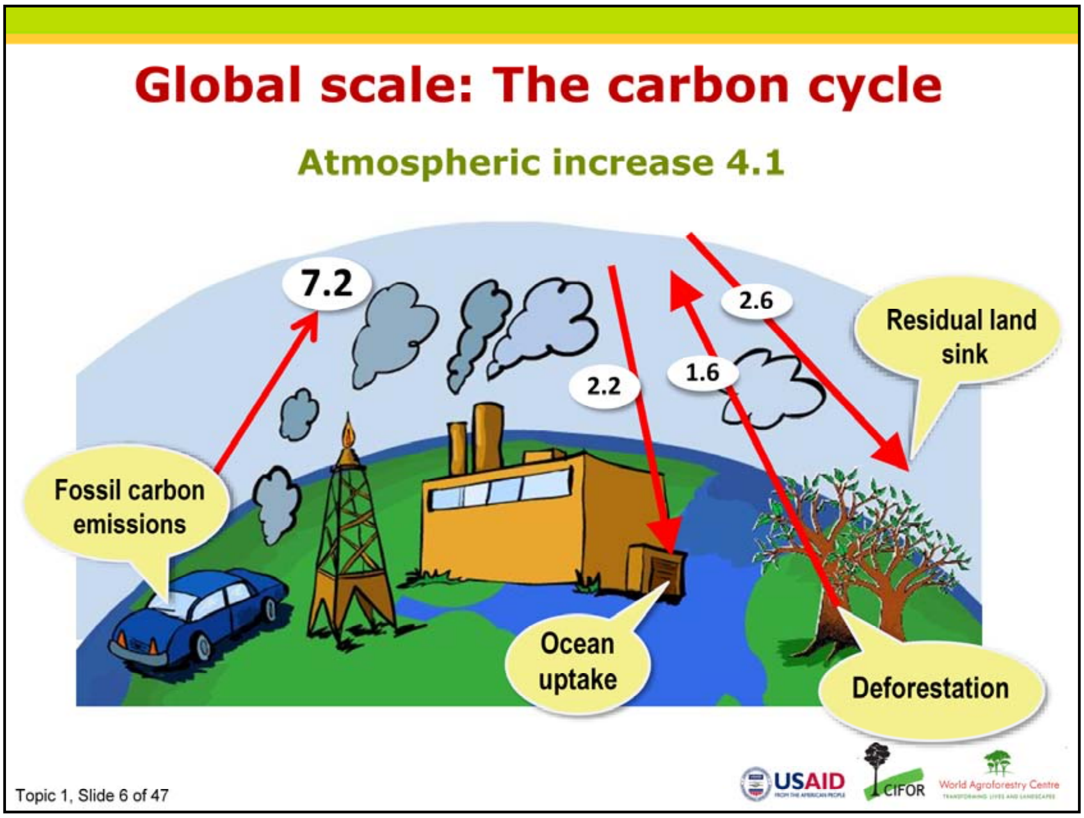
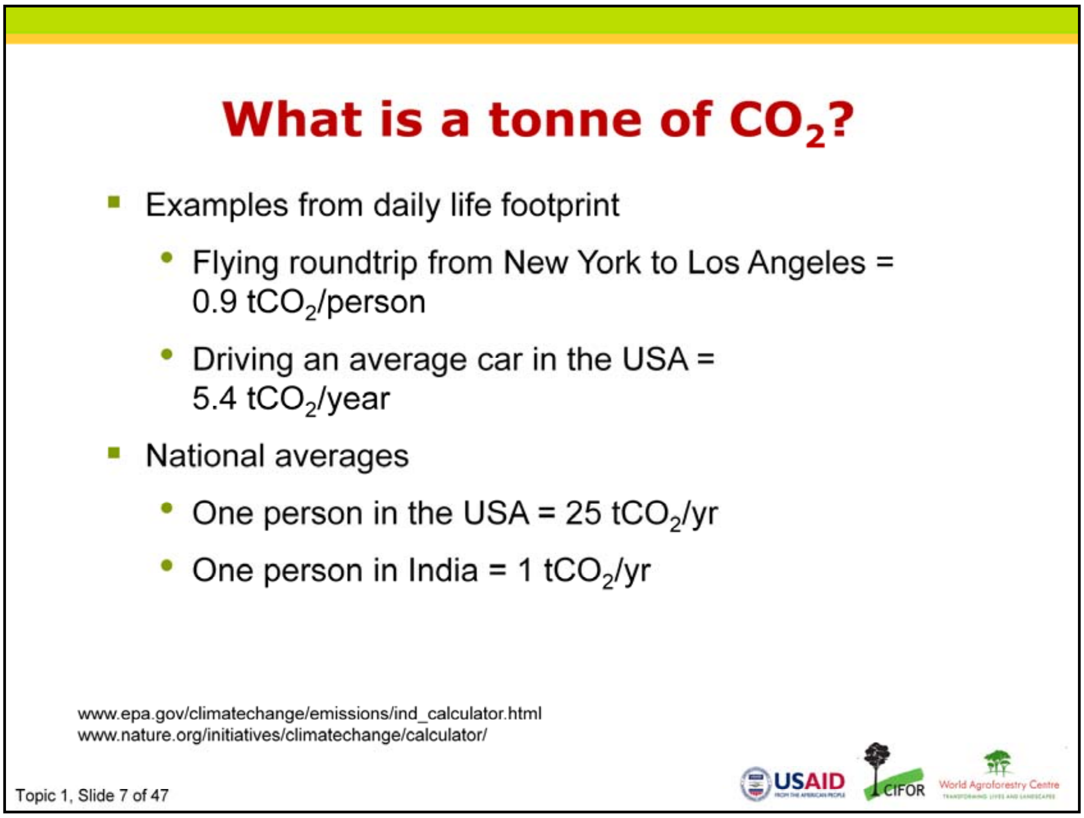
The services and landscapes are themselves vulnerable to climate variability and change, such as increased risk of forest fires. Thus forest or agricultural management itself needs to be adapted to become more resilient.
In the rest of this presentation, we will review mitigation and adaptation as it relates to landscapes, with a focus on the forest sector. While we treat these issues separately in some of the presentation, our main message is that on the ground, the same management action, like setting up local community fire patrols, will both provide mitigation benefits through reduced emissions from deforestation, and will bring adaptation benefits through greater climate resiliency to local communities from continued regulation of local water supplies.

2. Forests and mitigation: Storing carbon on land

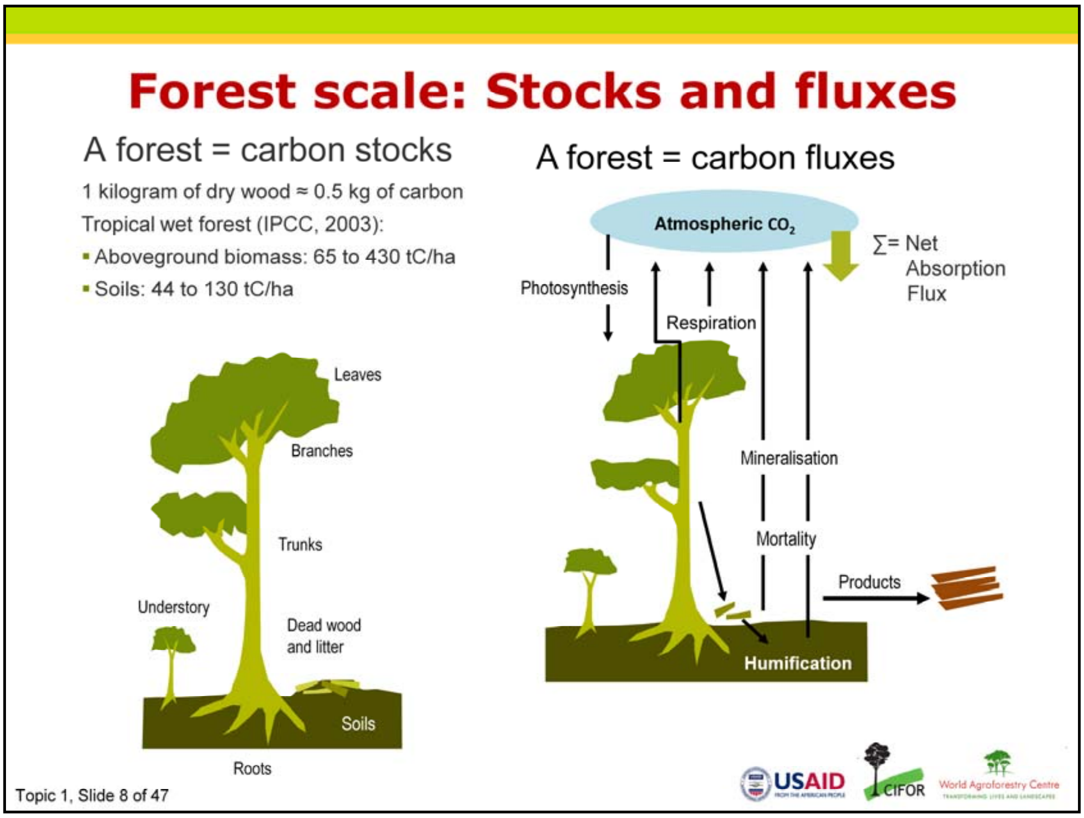


Narration: *First, you will learn about the carbon cycle at the global scale before downscaling to the forest scale. Today, the use of fossil fuels is responsible for an emission of 7.2 billion tonnes of carbon per year; 4.1 billion tonnes accumulate in the atmosphere. The unaccumulated carbon—2.2 billion tonnes per year—is absorbed by the oceans. However, a terrestrial sink of 1 billion tonnes is still missing. Deforestation, mainly tropical, emits 1.6 billion tonnes. This means that 2.6 billion tonnes of carbon are absorbed by the biosphere every year.*

This absorption is the result of expanding forests in developed countries, the enhancement of ecosystem productivity by higher atmospheric CO_2 concentrations, and a longer growing season in northern latitudes.

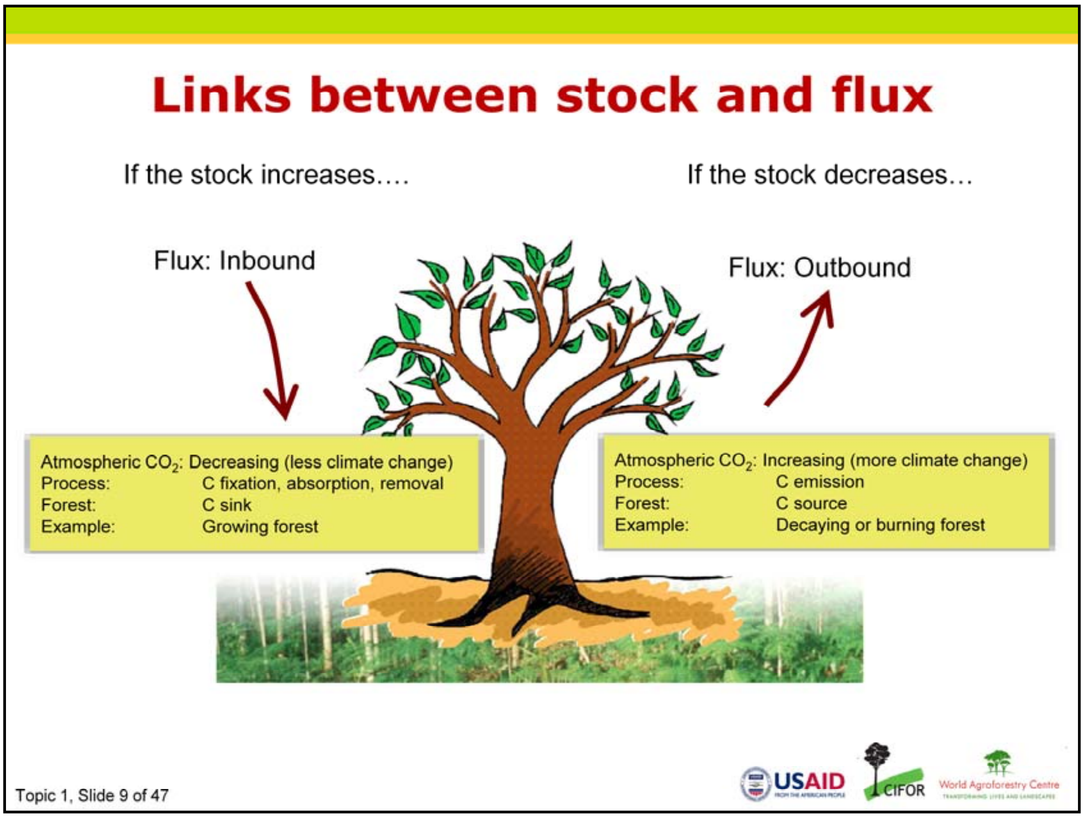


Narration: *To give a clearer idea of what a ton of CO2 is, here are some examples of emissions from daily life.*



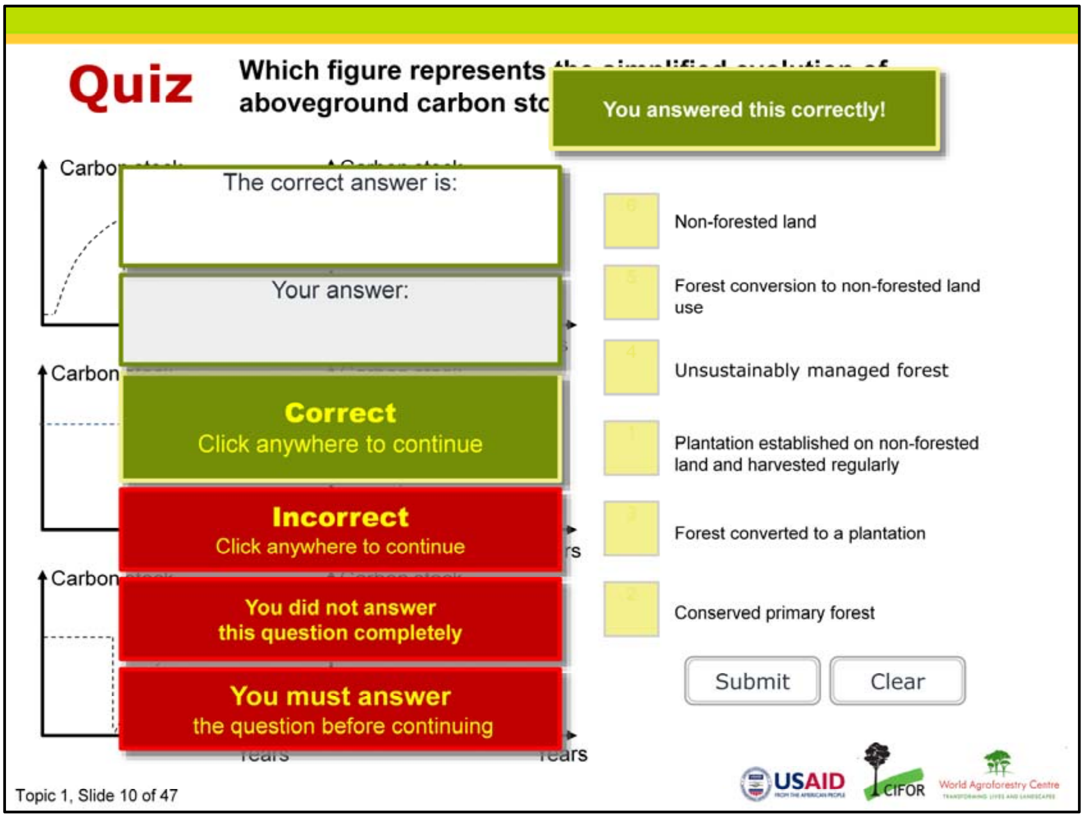
Narration: *At the forest scale, forests affect the carbon cycle in two ways. First, a forest, like any ecosystem, is a set of carbon stocks. Carbon is everywhere, from the leaves to the soil. A good way to visualize a stock of carbon is to think of the biomass stored in the ecosystem. Almost 50% of the dry biomass is carbon. If the dry biomass of a tree is 2 tonnes, then it contains around 1 tonne of carbon. A tropical wet forest can store up to 430 tonnes of carbon per hectare in the aboveground biomass.*

Second, a forest is a set of carbon fluxes. Using sunlight as a source of energy, the leaves absorb carbon dioxide from the atmosphere and transform it through the process of photosynthesis. The products of photosynthesis will be distributed to the plant and will move to the litter and soil when branches or leaves fall down and decompose. Other fluxes are returning CO2 to the atmosphere through respiration and soil mineralisation. Products exported from the ecosystem also affect carbon fluxes. Among these fluxes, those that interest us most are the ones between the atmosphere and the biosphere. The difference between inbound, photosynthesis, and outbound fluxes, respiration and mineralisation, is the net absorption flux.



Narration: *When an ecosystem absorbs carbon dioxide, the carbon stock increases and climate change is reduced. When carbon dioxide is released into the atmosphere the carbon stock decreases and climate change increases.*

Stock and flux are two important variables, but how are they linked? If the stock increases, it means that the ecosystem absorbs carbon. This fact comes from the mass conservation law. As an example, if your bank account is growing, it means there is more money entering than going out. In the case of a growing ecosystem, the net balance of flux is an inbound flux. It means that CO_2 is removed from the atmosphere, the atmospheric concentration of greenhouse gas emissions is decreased and climate change is reduced. In that case, the process is called carbon fixation, absorption or removal and the ecosystem is called a carbon sink. Conversely, if the stock decreases (for instance in a decaying or burning forest), an outbound flux will increase atmospheric greenhouse gas emissions concentrations and increase climate change. The process is called carbon emission and the ecosystem is called a carbon source.



Narration: *After these basic definitions of stocks and fluxes, you can imagine the evolution of carbon stock under different management. Charts 1 to 6 represent the evolution of aboveground carbon stocks in different ecosystems. Match each carbon stock graph with its description to the right. Then share your answers.*

Quiz answers:

First, the most simple ones. Non-forested land has constant levels of low carbon content: 6.

Conserved primary forest has constant levels of high carbon content: 2.

When forest is converted to non-forested land use the carbon content abruptly changes, from high carbon content before the conversion to low carbon content after: 5.

When a forest is converted to a plantation, the high carbon content before the conversion abruptly drops then builds up again: 3. (Note that the carbon content at the end could be higher or lower than the level before conversion)

Plantation established on non-forested land and harvested regularly has low carbon content at the beginning then cycles: 1.

Unsustainably managed forest begins with high carbon content that gradually decreases: 4.

Quiz

Your Score	{score}
Max Score	{max-score}
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Question Feedback/Review Information Will Appear Here

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Review Quiz

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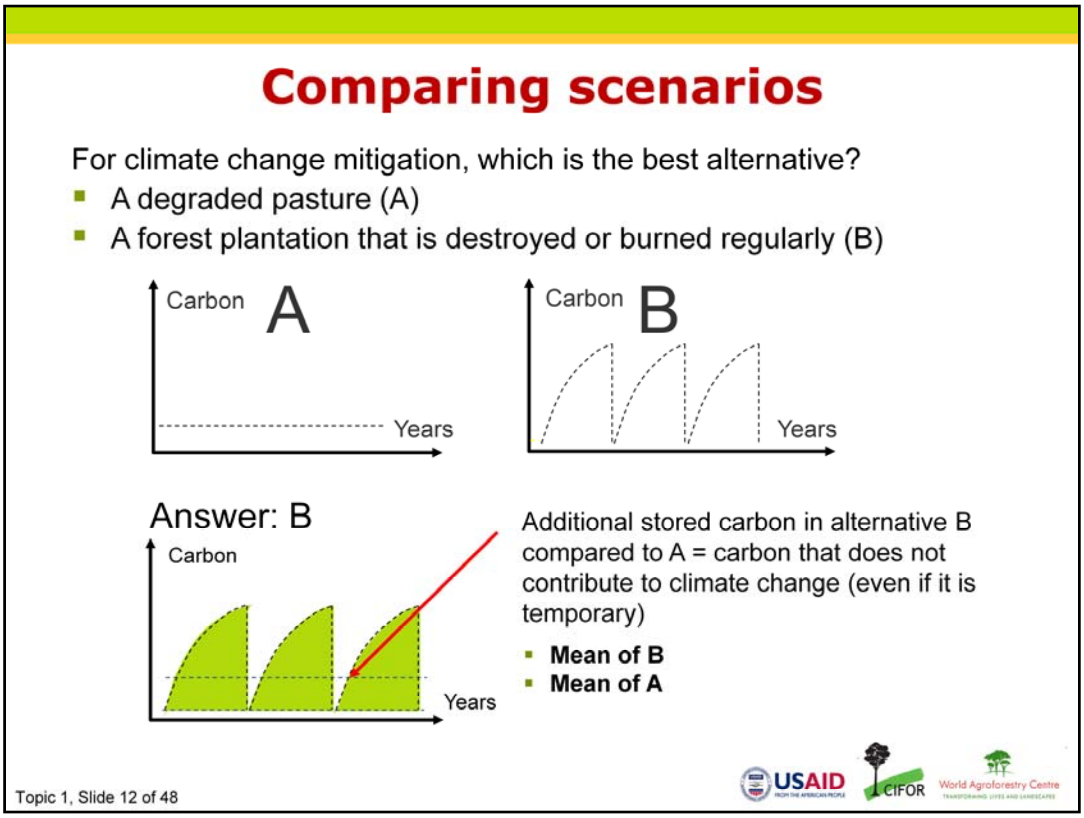
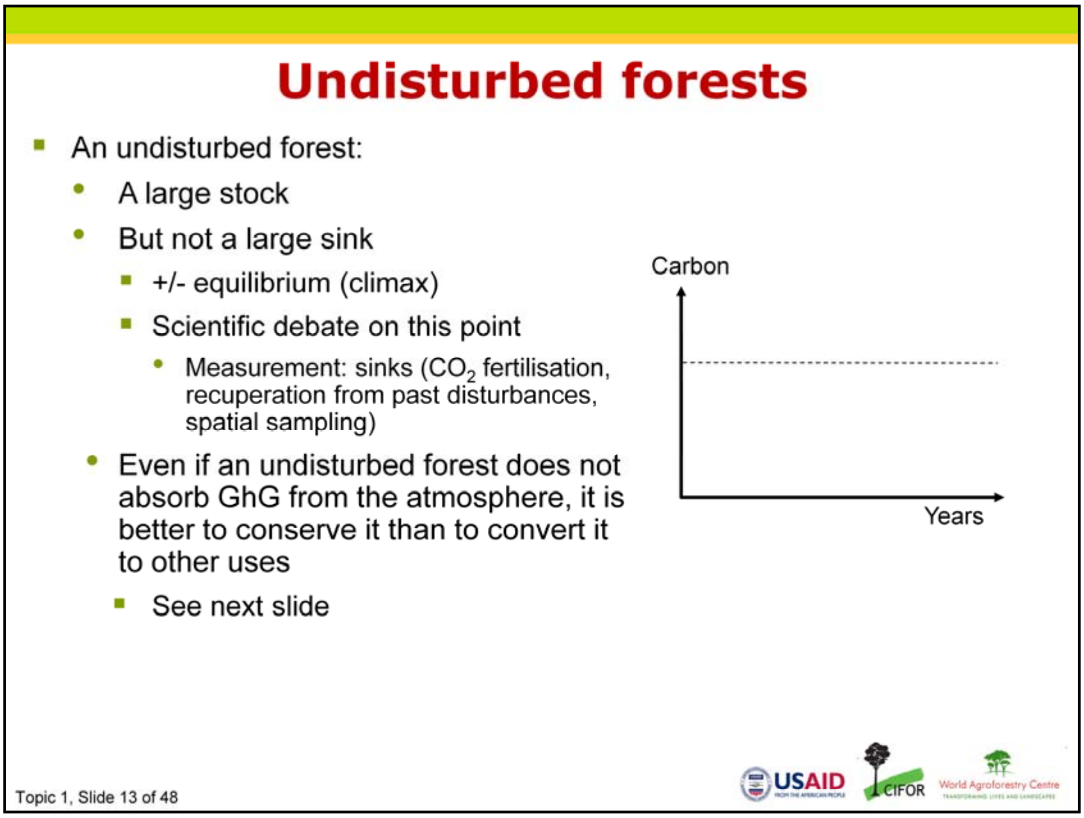


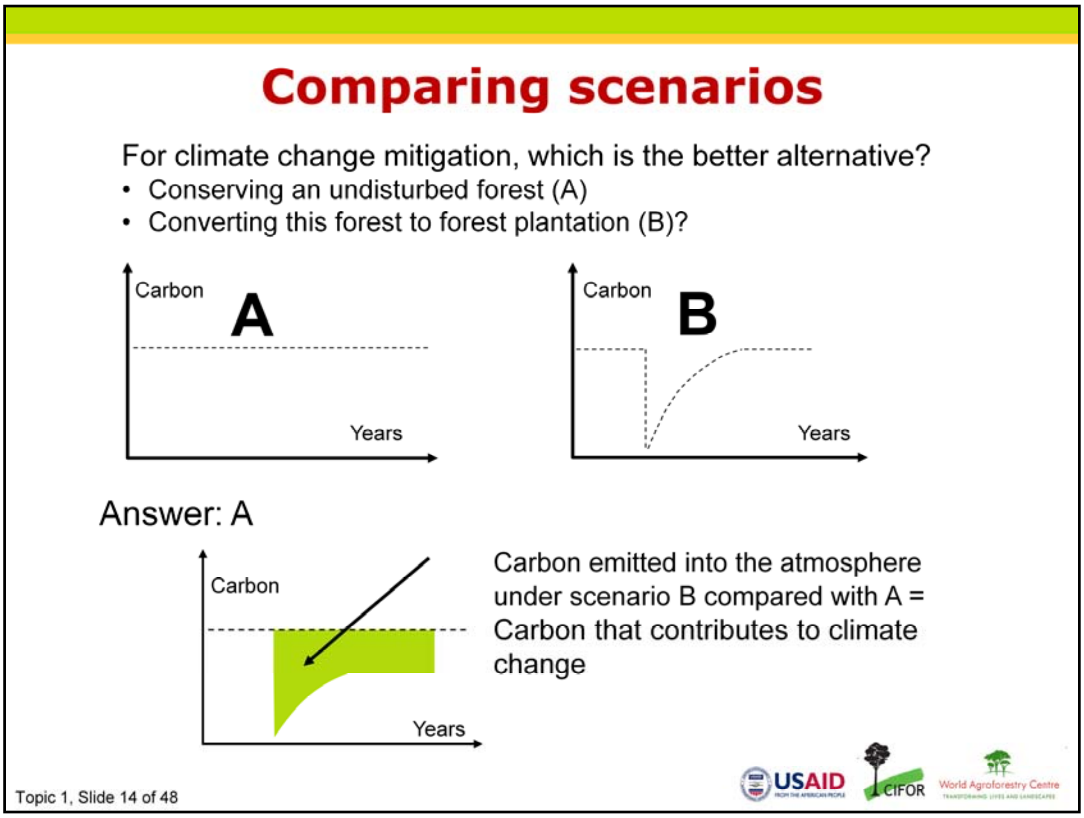
Narration: *In this example, Graph A represents a degraded pasture with low and constant carbon stock. Graph B represents a forest plantation, which is destroyed or burnt regularly. Comparing the carbon stocks under the two scenarios shows that there is more carbon in B. The difference with A is the amount of carbon that does not contribute to climate change if we choose to create a plantation in a degraded pasture.*

To understand how land use contributes to climate change mitigation, you can compare these scenarios. In this example, Graph A is a degraded pasture with a low and constant carbon stock. Graph B is a forest plantation that is destroyed or burnt regularly. The comparison of carbon stocks under the two scenarios shows that there is more carbon in B. The difference with (A) is the amount of carbon that does not contribute to climate change if we choose to create a plantation in a degraded pasture. The fact that the storage in the plantation is not permanent does not mean that there is no contribution to climate change mitigation. Temporary storage can reduce the concentrations of greenhouse gases during a fixed period of time.



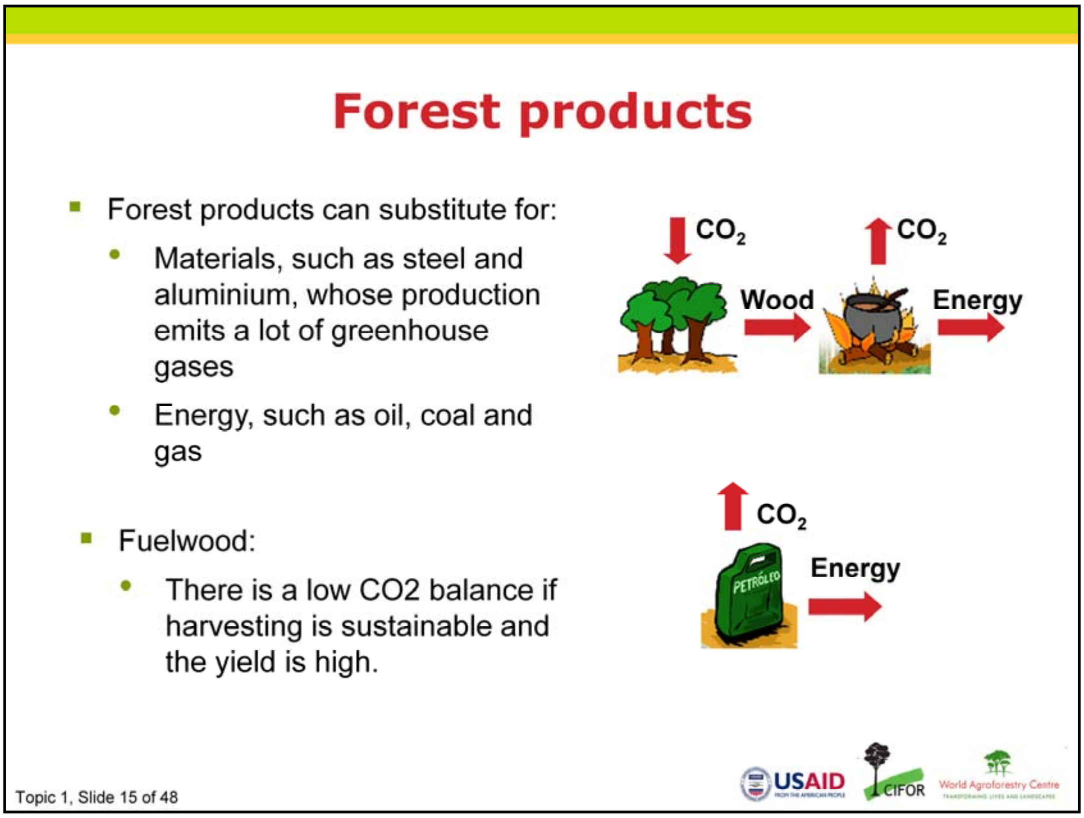
Narration: *Although scientists debate whether or not undisturbed forests are carbon sinks, they agree that these forests should be conserved rather than converted to other uses.*

We have seen that a growing ecosystem is a carbon sink. Undisturbed forests are more or less in equilibrium, as their biomass cannot grow indefinitely. If the carbon stock is fairly constant, the ecosystem is not a sink any more. This is a simplified view, and many scientific debates revolve around this point. In fact, current flux measurements show that undisturbed forests are sinks, mainly because of CO_2 fertilisation, recuperation from past disturbances, or problems of spatial sampling. The future of these sinks is also highly debated: With climate change impacts, will undisturbed forests become a source? In any case, even if an undisturbed forest does not absorb greenhouse gases from the atmosphere, it is better to conserve it than to convert it to other uses (see next slide).



Narration: *A primary forest stores large quantities of carbon and should be conserved rather than converted to a forest plantation.*

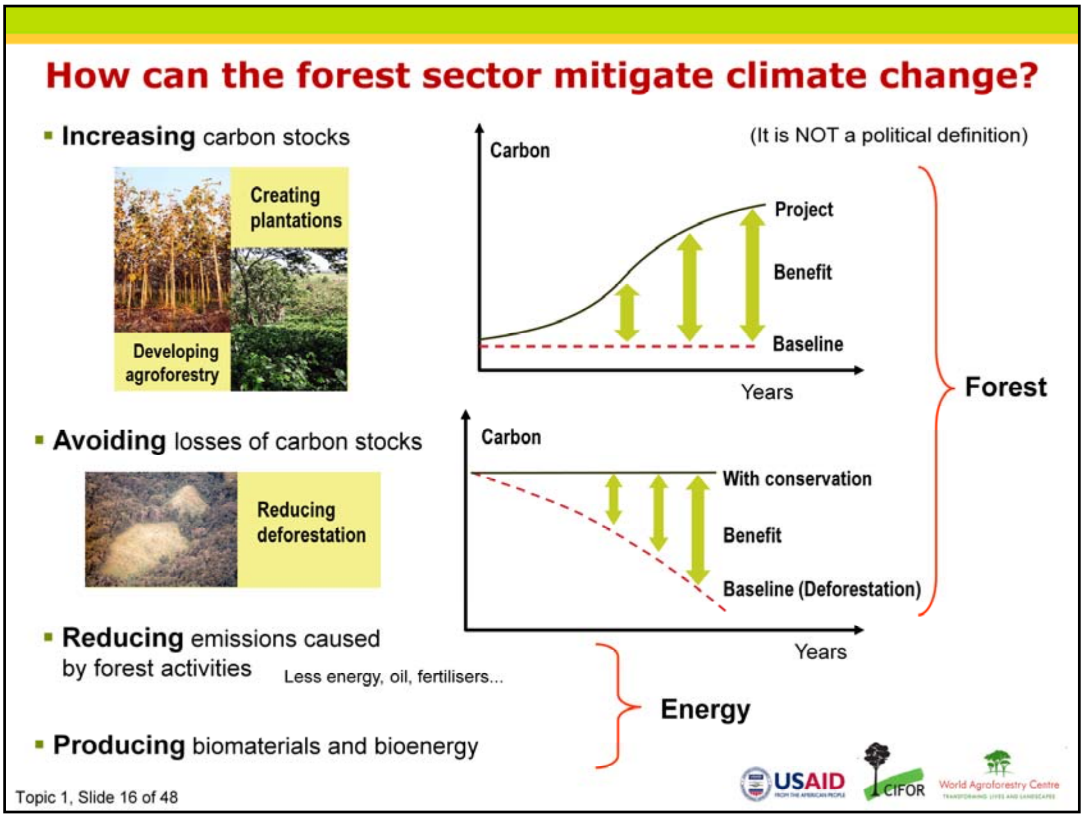
We have seen that a primary forest usually has a larger carbon stock than a plantation, although it may not absorb as much carbon from the atmosphere as the plantation does . Primary forest has a large carbon pool and a low sequestration rate. A plantation has a smaller carbon pool and a high sequestration rate. Does this mean that a primary forest is useless for climate change mitigation, and a better option would be to replace it by a growing plantation that absorbs carbon? The answer is, no. The important fact is that primary forests store a great quantity of carbon, so destroying them for other uses will release a lot of carbon dioxide into the atmosphere. Comparing alternatives A (primary forest) and B (conversion of a primary forest to a plantation) shows that B would release more carbon into the atmosphere, making a greater contribution to climate change.



Narration: *Forest products store carbon over a long period of time. But their main contribution to climate change mitigation is through substitution. Forest products can substitute for other materials such as steel or aluminium, whose production emits a large quantities of greenhouse gases. Forest products can also substitute for other energy sources such as oil, coal or gas. Fuelwood emits fewer greenhouse gases than fossil fuels do, as long as the fuelwood is sustainably managed and the technology for transforming it into energy is efficient.*

We mentioned previously that forest products store carbon. In fact, forest products can store carbon over a long period of time—for example, in a building made from wood—but their main contribution is through substitution. Forest products can substitute for other material such as steel or aluminum, whose production emits a large quantities of greenhouse gases, or uses other energy sources such as oil, coal or gas.

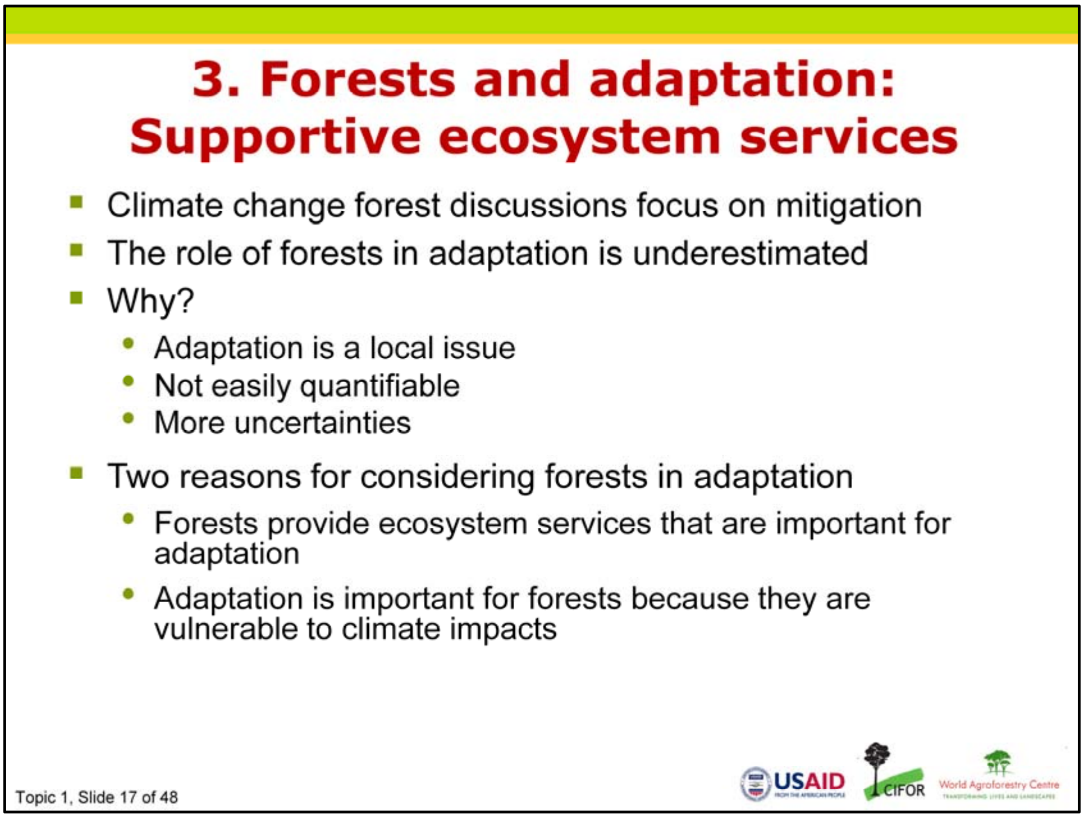
The figure shows that the greenhouse gas balance of fuelwood is better than fossil fuel because carbon dioxide absorption occurs when the wood is produced. However, some conditions must be fulfilled for fuelwood to aid in mitigating climate change. First, the forest resource must be sustainably managed: if the forest disappears, absorption can no longer take place. Second, the technology for transforming wood into energy must be efficient.



Narration: *Many forest activities contribute to climate change mitigation. Carbon stocks can be increased through plantations or agroforestry. Existing stocks can be conserved through reducing deforestation. These two activities relate to carbon sequestration in the ecosystem. Emissions caused by forest activities can be reduced, for example, by using less energy or fertiliser in forest operations. Biomaterials and bioenergy can be produced to substitute materials or energy that generate greenhouse gases. The last two activities refer to energy-related emissions.*

The benefit of these activities is the difference between the growing stock and the baseline, as show on the graph.

In this case, the benefit of conserving is estimated with reference to the degradation or deforestation scenario. 3. Emissions caused by forest activities can be reduced, for example, by using less energy or fertilisers in forest operations. 4. Biomaterials and bioenergy can be produced to substitute materials or energy that generate greenhouse gases.
The first two activities refer to carbon sequestration in the ecosystem, while the last two refer to energy-related emissions.



Narration: *So far the international discussions about climate change and forest have dealt mostly with mitigation. The links between adaptation and forests are underestimated. Why?*

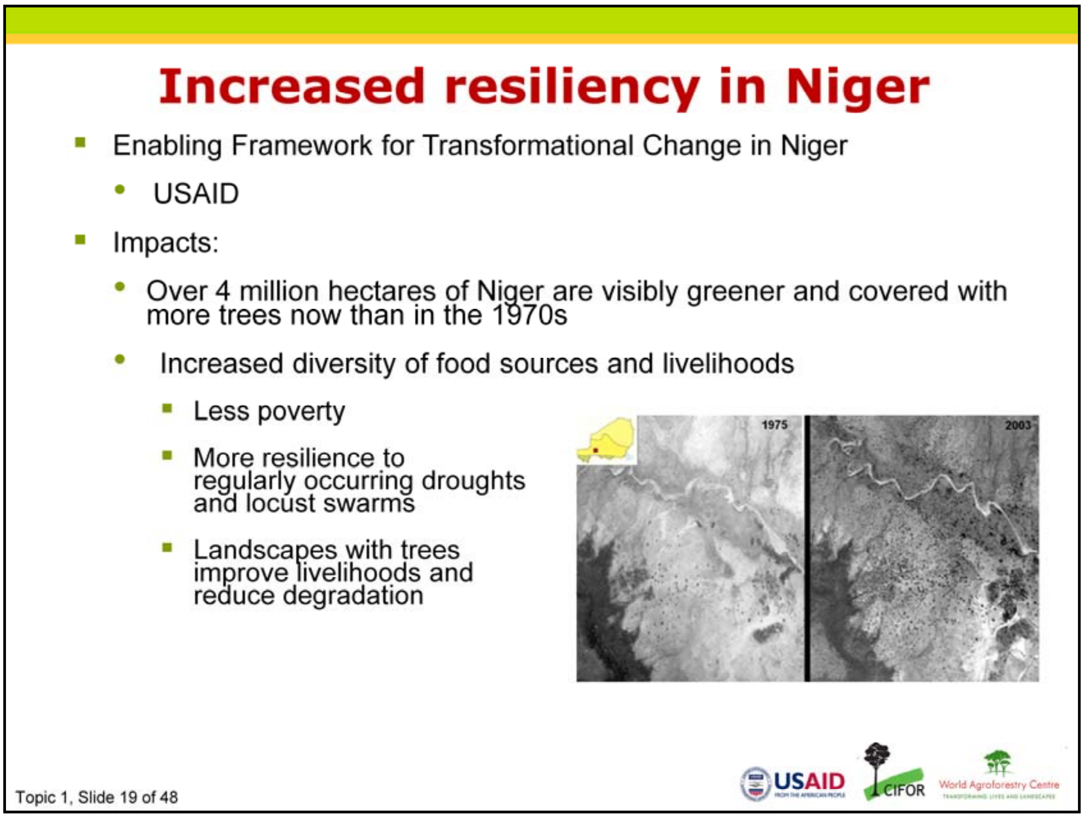
First, adaptation has received less attention than mitigation because it is more a local or national issue while mitigation is a global one. If a forest project reduces deforestation, it will be beneficial to the whole world. If a forest project increases income for vulnerable communities or protects water quality, it will produce local benefits. For this reason, mitigation has been addressed extensively at the international level, and financial mechanisms that promote mitigation are being created.

Other reasons why adaptation is neglected relative to mitigation are related to the difficulty of measuring the impacts of an adaptation project. There is a way to measure mitigation: by comparing the tonnes of carbon dioxide in the atmosphere. With adaptation efforts there are also uncertainties about underlying vulnerability and impacts.

However, there are two reasons which justify considering forests in adaptation: 1. Forests provide ecosystem services that help human communities and biodiversity adapt to climate change, and 2. Adaptation is important for forests because they are vulnerable to climate impacts themselves. You will learn more about these two reasons.

Narration: *Forests are important for adaptation: they provide goods and ecosystem services that are crucial for local and global populations, especially in the context of climate change.*

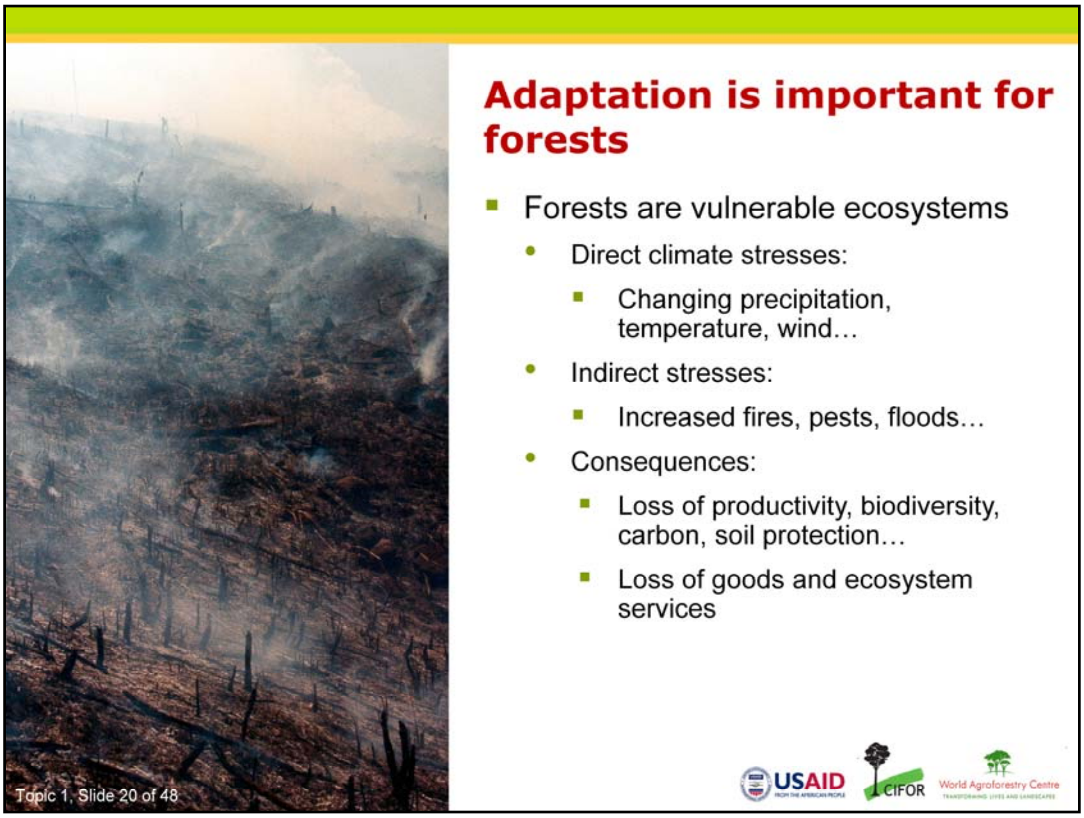
The first reason for including forests into adaptation is that forests are important for adaptation. Forests produce goods and ecosystem services that are crucial for local and global populations, especially in the context of climate change.



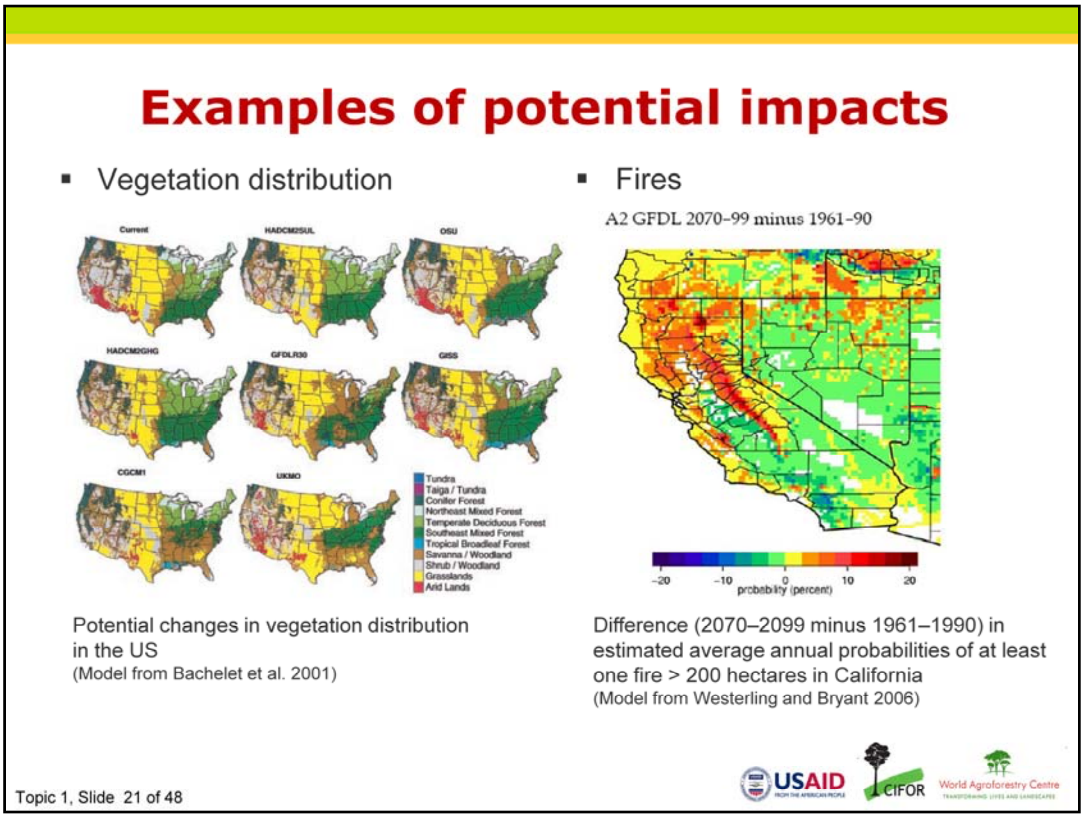
Narration: *A USAID programme implemented in the harsh environment of Niger resulted in greener landscapes that have boosted the diversity of food sources and livelihoods, reduced poverty and increased resilience.*

A 15 year commitment by USAID in Niger supported a process of reform in land management that resulted in over 4 million hectares of Niger being visibly greener and covered with more trees now than in the 1970s. By enabling increased diversity of food sources and livelihoods, these trees helped farmers move out of poverty as well as survive regularly occurring droughts and locust swarms, such as the one that devastated Niger in 2005. The trees provide an alternate source of livelihood during such difficult times through the sale of firewood, building materials, rope, dye, and medicines. Trees also provide food directly such as pods and fruits as well as fodder. The trees also may help protect crops from high temperatures and high winds during droughts.

This farmer-led, self-sustaining, landscape-level investment in tree cover was accomplished by reforming the legal framework to give farmers rights and access over trees, combined with promotion of low-cost, effective technologies. Over time, the Government of Niger’s forester to farmer relationship was changed from one of enforcement to one of expertise and service delivery. The approach was based on natural regeneration which is cheaper, more sustainable, and more useful to farmers than large replanting programs.



Narration: *In addition to the importance of forests for adaptation, another point is about of the importance of adaptation for forests. Indeed, forests are vulnerable to the impacts of climate change. They are vulnerable to direct and indirect stresses, with consequences on productivity, biodiversity, carbon, soil protection (i.e. loss of goods and ecosystem services).*

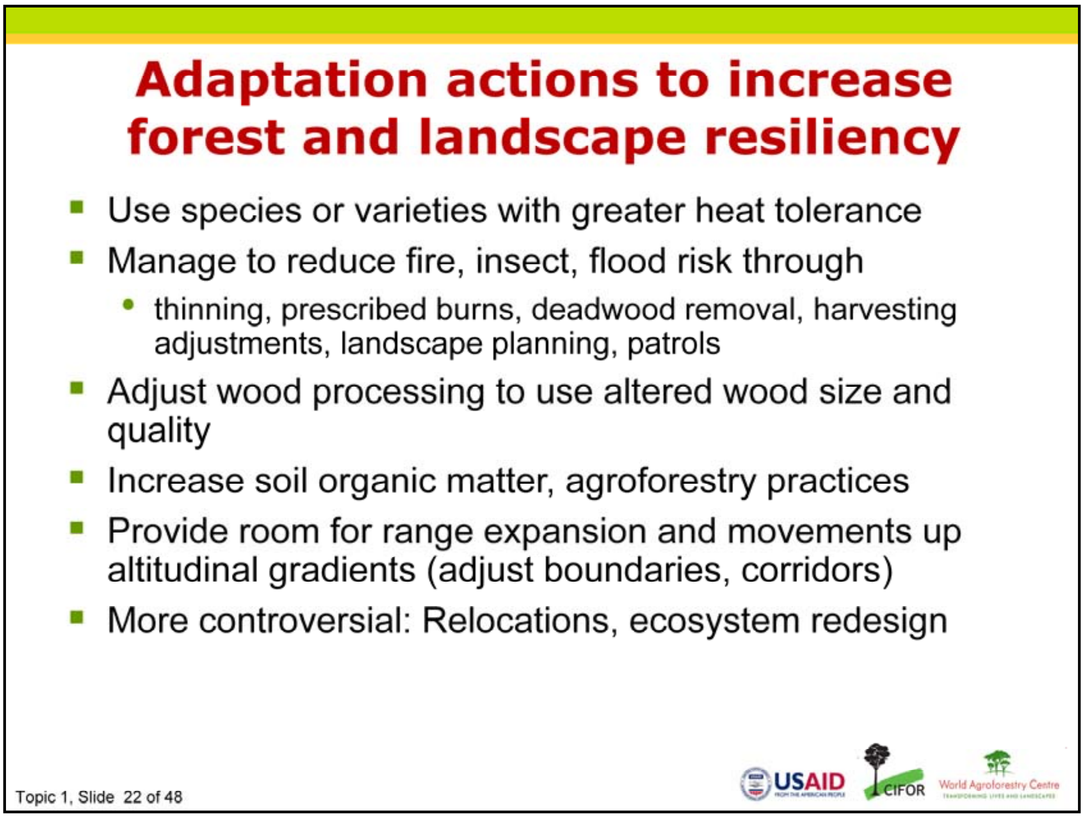


Narration: *These two models show that climate change could affect vegetation distribution and increase the risk of fires in some regions of the United States.*

Example of some potential impacts of climate change on ecosystems in the US.

Left: prediction of changes in vegetation distribution under different climate change scenarios. For the UKMO global circulation model, there is a strong reduction in the area covered by southeast mixed forests and temperate deciduous forests and an increase of grassland area.

Right: increase in fire probability in California.



Narration: *Forests and landscapes can be made more resilient through a variety of changes in management practices. At the lowest scale and in managed systems, we can choose species or varieties that are better able to deal with increased temperatures, or periods of flooding or periods of drought. At the stand level, we can implement practices that reduce risks of fire, insect outbreaks or windfalls —threats that are increasing due to climate change. Actions at this level could include thinning, prescribed burns, adjusting harvesting schedules and increased patrolling. These changes may require adaptations to the associated processing if the species or the size of wood products have changed. At the landscape level and particularly for natural ecosystems with high biodiversity, we may need to change the borders of our parks or management areas to allow for species to change their ranges and to move seasonally. Corridors between natural areas can also allow this flexibility. In particular, in locations where there are areas of higher altitude we need to create ways for species to move up in altitude to avoid temperature changes. Finally, ecologists are exploring the possibilities of relocating natural species or creating "new" ecosystems. The effectiveness of these measures, particularly considering the risk and expense, makes them controversial.*

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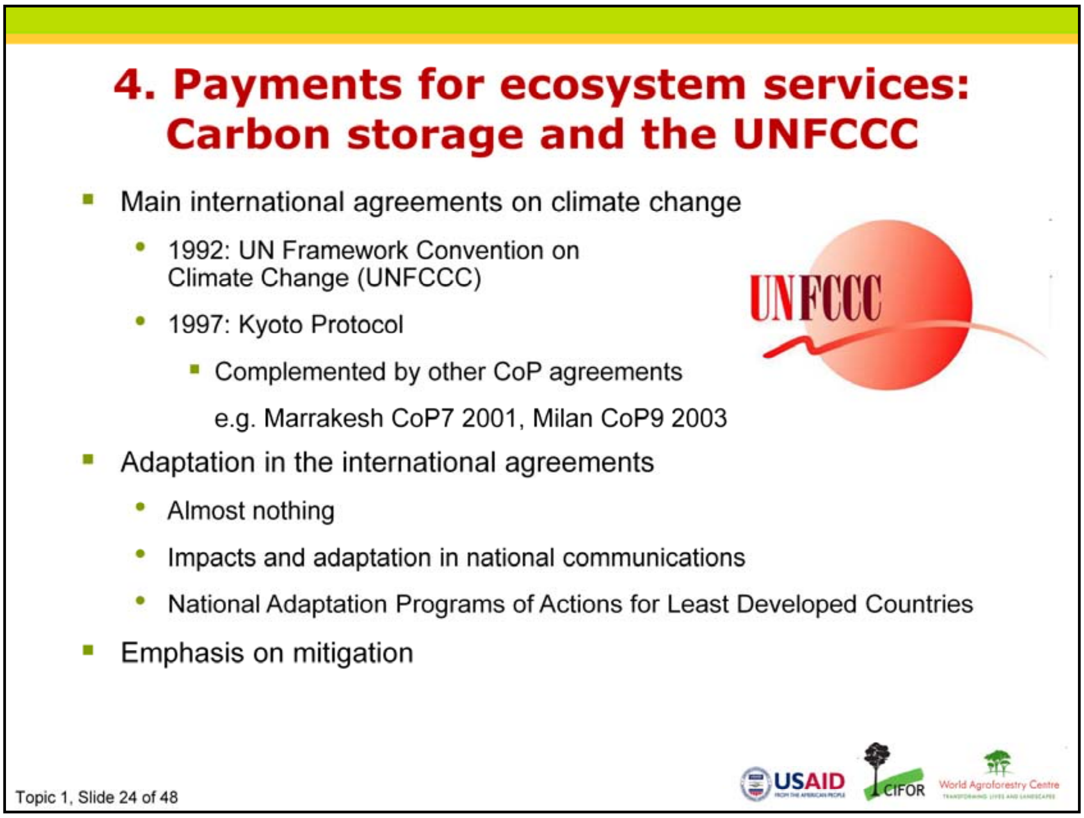
Obtaining multiple ecosystem services: An integrated landscape approach for adaptation and mitigation

- Forests are part of the landscape matrix
- Agriculture in adjacent areas is often the main driver of deforestation
- Often, to address deforestation it is necessary to address land tenure issues and improve agricultural productivity as part of an integrated approach
- Increasing soil carbon and adding trees to the agricultural system can raise agricultural productivity, while providing mitigation and adaptation benefits

Narration: *As you consider actions to reduce climate vulnerabilities, you need to consider how they integrate with actions to increase or maintain carbon storage. An integrated landscape management approach recognises the linkages between agriculture and forests and between mitigation and adaptation.*

Improving agricultural productivity can reduce pressures for deforestation, thus lowering carbon dioxide emissions. In addition one of the key ways to increase agricultural productivity is through soil conservation and incorporation of trees through agroforestry practices. One reason these practices increase productivity is that they increase water infiltration and holding ability of soils which is itself an adaptation to future climate impacts.

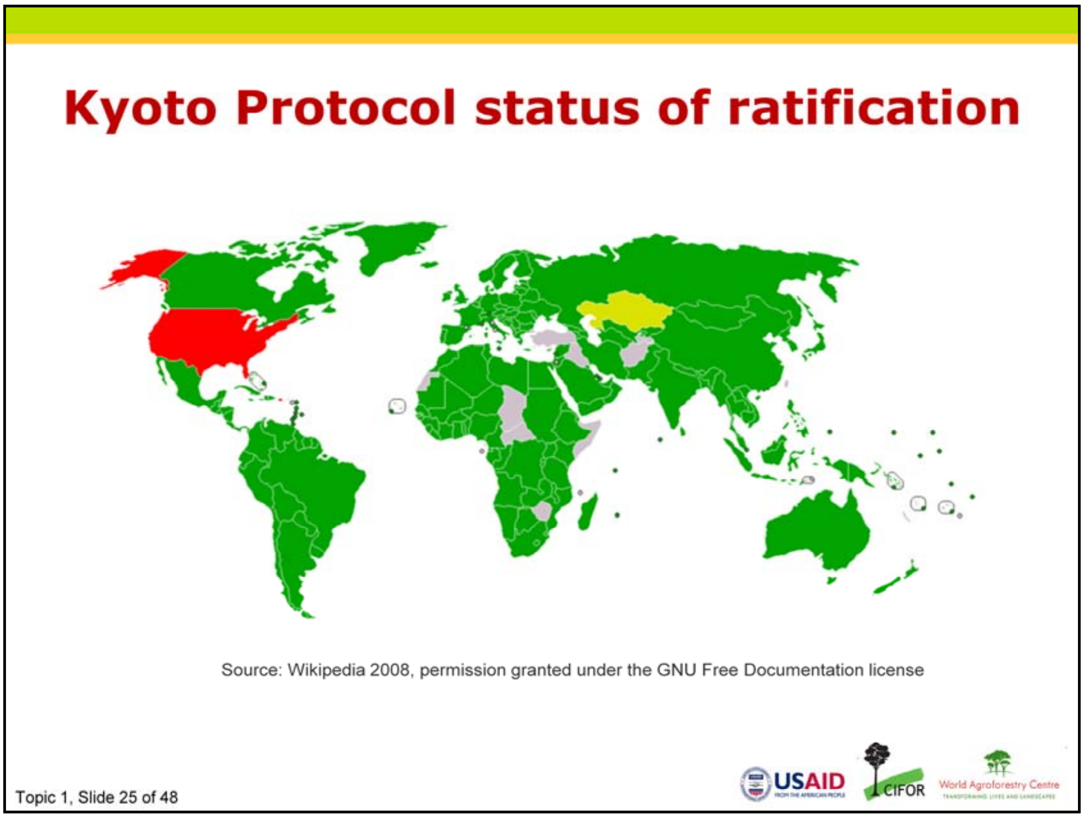
And how do we pay for all this? Many people are excited about the potential of carbon markets, the subject of the next part of this presentation.



Narration: *International agreements emphasise mitigation rather than adaptation. Let's examine the ways in which forests are considered under these agreements.*

In this section we look at how forests, especially tropical forests, have been included in climate change policies. The main international agreements on climate change are the UNFCCC, adopted in 1992, and the Kyoto Protocol, elaborated in 1997. The Protocol was complemented by other decisions taken by the Conference of the Parties (CoP), e.g. the CoP7 in Marrakesh in 2001.

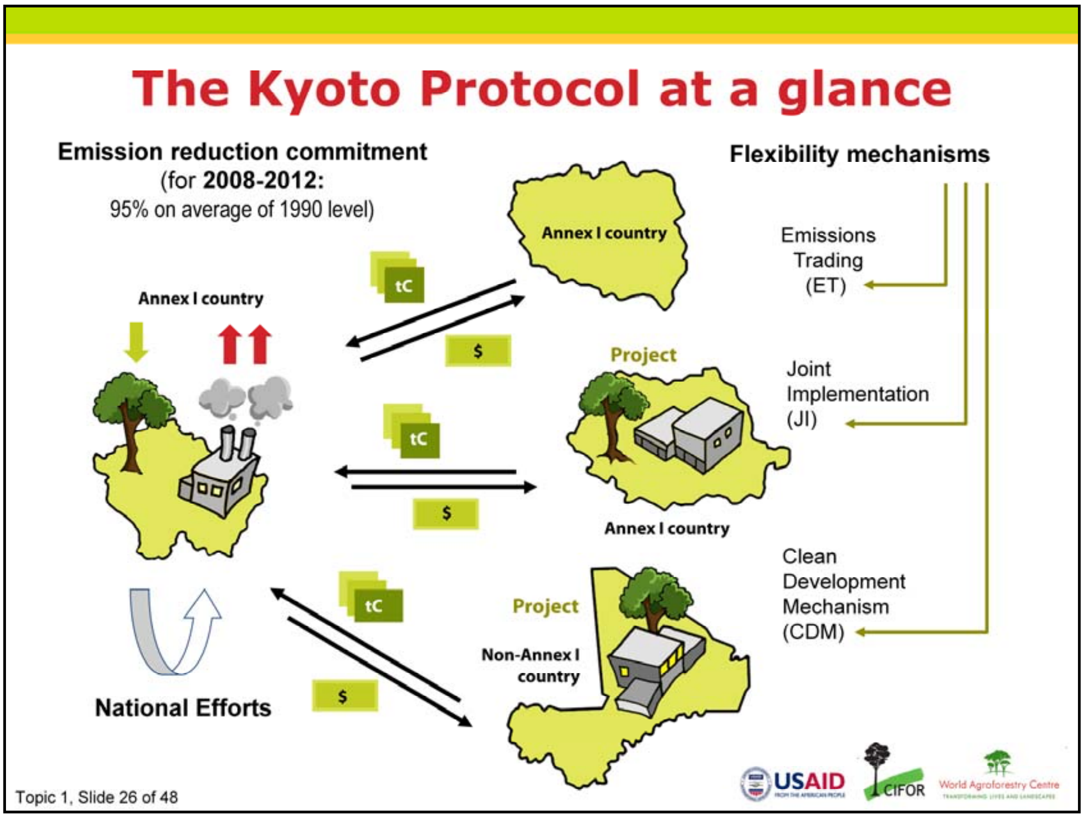
Compared to mitigation, adaptation is not well addressed in international agreements. Adaptation is mentioned in the Framework Convention, specifically regarding the national communications which must include sections on impacts and adaptation. Least Developed Countries must also develop National Adaptation Programmes of Actions (NAPAs) to assess their vulnerability and propose adaptation project ideas.



Narration: *All developed countries except the United States have ratified the Kyoto Protocol. The US government is pursuing a post-2012 agreement that will include meaningful participation from all countries, including major emerging economies.*

Before presenting how forests are considered under international agreements, let's examine the ratification status of the Kyoto Protocol. The Protocol entered into force in February 2005 after Russia ratified it. Now all developed countries have ratified except the United States.

The US government did not ratify the Kyoto Protocol primarily because of significant opposition by the US Congress. Congress and the Bush Administration felt that they could not participate in such an agreement unless China, India and other major emerging economies also made commitments to reduce emissions. Given that China has now surpassed the US in total emissions, this concern remains valid to the Obama Administration and the current US Congress. It is very unlikely the US will join the Kyoto Protocol. Instead, the US government is pursuing a post-2012 agreement that will include meaningful participation from all countries, including major emerging economies.

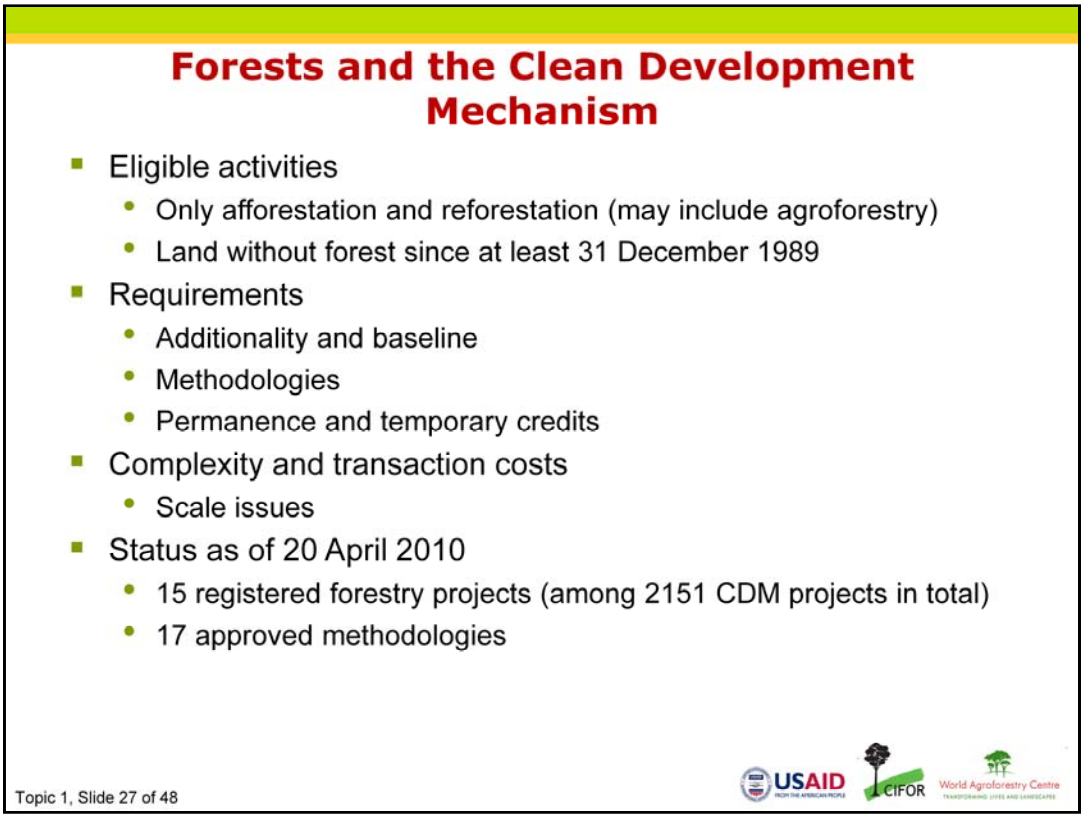


Narration: *Under the Kyoto Protocol, industrialised countries committed to reduce their greenhouse gas emissions to an average 95% of their 1990 emissions, between 2008 and 2012. Under the treaty, countries must meet their targets primarily through national measures. However, the Kyoto Protocol offers them additional means of meeting their targets by way of three market-based flexible mechanisms: Emissions Trading, Joint Implementation and the Clean Development Mechanism.*

The basic principles of the Kyoto Protocol are summarised in this slide.

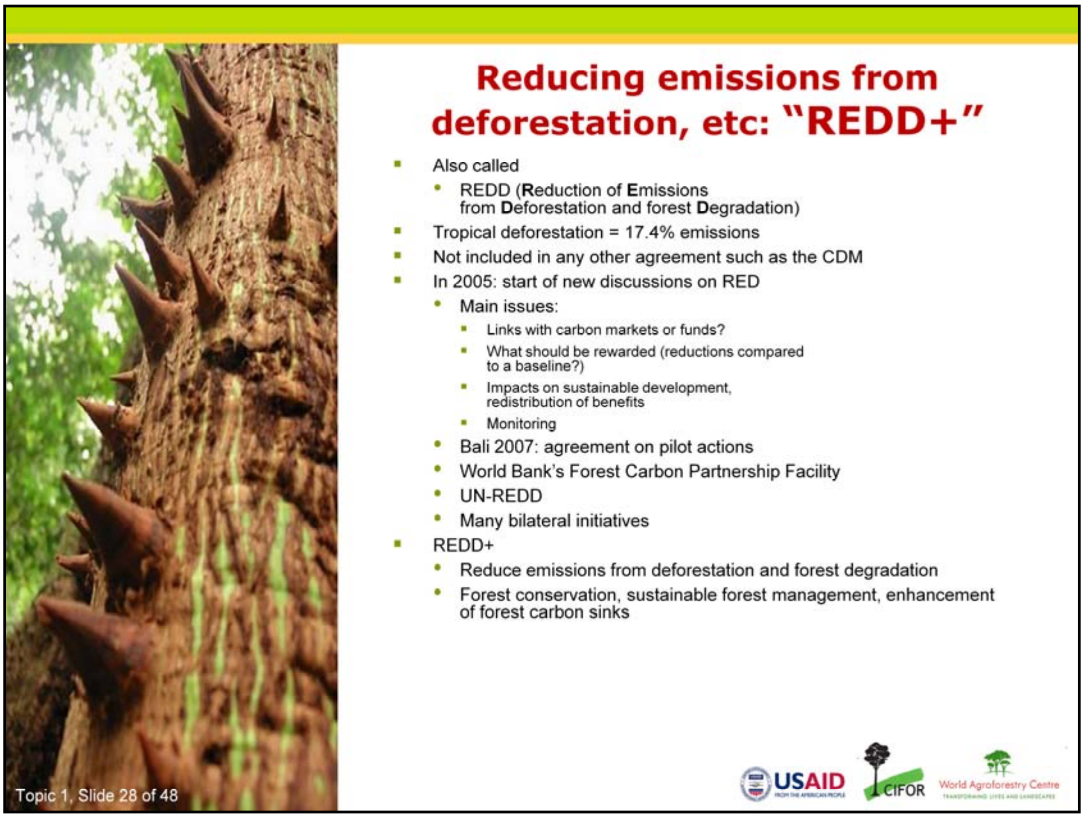
First, developed countries that have ratified the Kyoto Protocol (or Annex I countries) are committed to reduce their greenhouse gas emissions in 2008-2012 to 95% of their 1990 emissions. Commitments are not all the same (e.g. 8% reduction for the European Union).

Second, three flexibility mechanisms were defined: Emission Trading (trade of excess allowances between Annex I countries), Joint Implementation (JI, trade of carbon credits between an Annex I country and a project located in another Annex I country), Clean Development Mechanism (CDM, trade of carbon credits between an Annex I country and a project located in a non-Annex I country, in other words, a developing country). Forests are included in the national efforts of Annex I countries. Project-based mechanisms (JI and CDM) involve energy and forestry projects.



Narration: *Under the Clean Development Mechanism, the only eligible forestry projects are afforestation and reforestation projects. Due to the CDM's complex rules, only one forestry project has been accepted.*

Under the Clean Development Mechanism (CDM), the only eligible forestry projects are afforestation and reforestation projects. These projects must implement a forest on land that has not been forested since December 31, 1989 for reforestation or for 50 years for afforestation. A set of well-defined yet complex rules must be followed by the projects. Among other issues, the rules concern:
-Additionally: only projects that would not have been implemented without the CDM are eligible.
-Baseline: only the difference of carbon between the project and the baseline or "business as usual" is credited.
-Methodologies: a project must follow an approved methodology for assessing its baseline, calculating its carbon storage, etc.
-Permanence and temporary credits: as the carbon stored in a project may be released back to the atmosphere in case of land use change or fire, a safeguard had been defined: CDM forest projects can only trade temporary credits. Credits can expire, and carbon storage can disappear.
The CDM is quite complex, especially for forestry projects which face more barriers than energy projects. Due to transaction costs, small projects will probably not benefit from the CDM, even with specific simplified approaches have been defined for small-scale activities. So far, fifteen forestry projects (in 12 different countries) have been registered under the CDM. In total, there are more than registered 2000 projects for emissions reduction (energy, industry, transportation, waste) under the CDM. At the moment, 17 methodologies for forestry projects have been approved. They have been submitted by projects under design. More projects are currently under preparation, so new projects should be accepted soon.

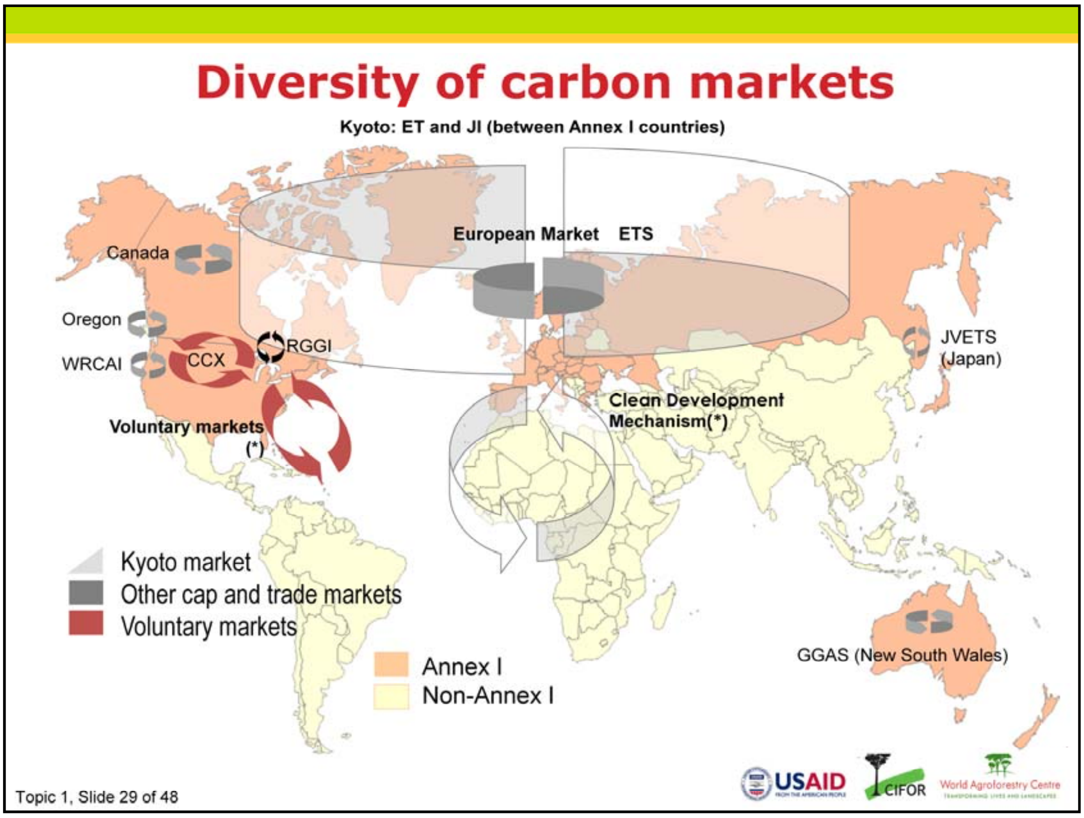


Narration: *REDD mechanisms use market or financial incentives to reduce the emission of greenhouse gases from deforestation and forest degradation. REDD activities are undertaken by national or local governments, NGOs, the private sector, or any combination of these.*

The conservation of tropical forests is not currently considered in international agreements on climate change, even though tropical deforestation represents between 15 and 20% of global emissions. In 2005, some countries asked to start negotiations on how to include avoided deforestation in the global climate regime. Under the UNFCCC negotiations, this issue is formally called 'reducing emissions from deforestation and orest degradation' , or REDD for short.

Main issues under discussion are the links with cap-and-trade agreements and carbon markets, what to reward (efforts, reductions compared to a baseline…), impacts on sustainable development, redistribution of benefits and technical aspects of monitoring. In 2007 in Bali, an agreement was reached on the implementation of pilot actions. The World Bank has created a fund for funding REDD pilot activities (FCPF). Many bilateral initiatives have been developed and are under design.

Recently in the negotiations, REDD has been broadened to REDD+ which considers not just the reduction of emissions from deforestation and forest degradation, but rather adopts a holistic approach where both sources of emissions from forests and sequestration of carbon in trees and soils should be taken into account. REDD+ includes forest conservation, sustainable forest management, enhancement of forest carbon sinks, afforestation and reforestation, deforestation and forest degradation.

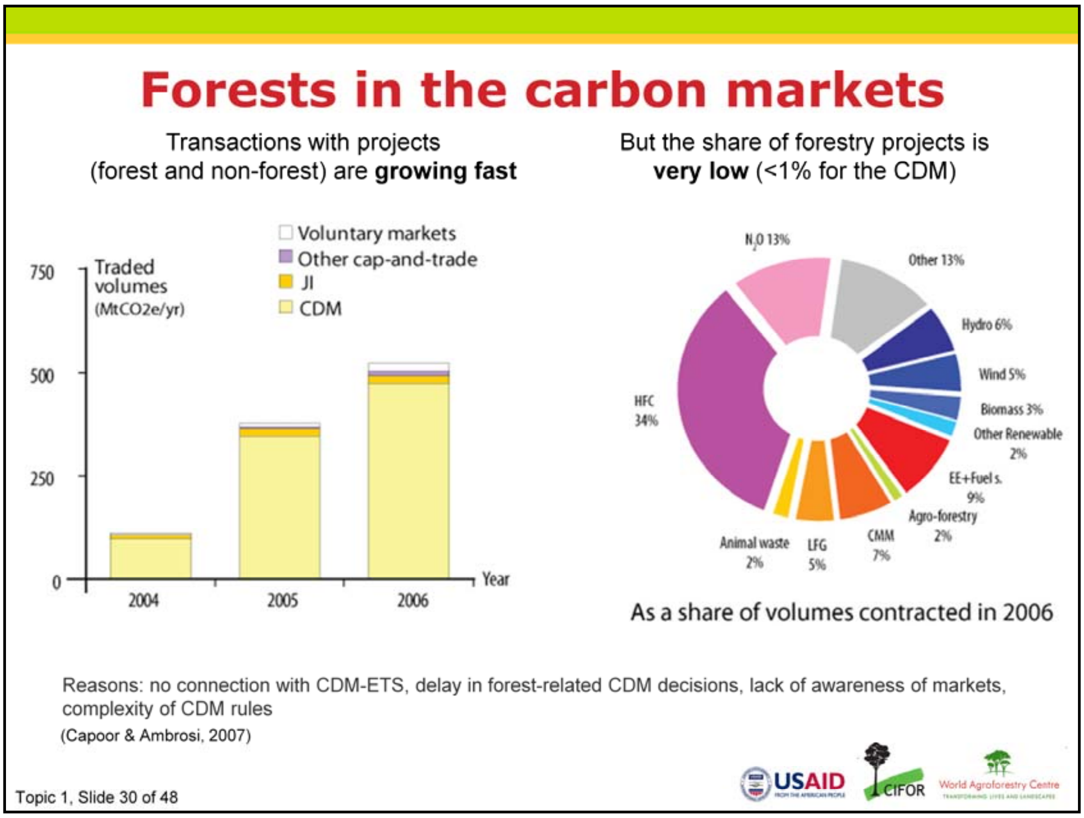


Narration: *There are two basic types of carbon markets: compliance and voluntary. Compliance markets are established by governments and require companies to reduce their emissions by a particular amount. One way they can do this is to buy offset credits that represent emissions reductions achieved by somebody else. Voluntary markets also provide a way to buy offsets, but the credits cannot be used by companies to meet their requirements under government emissions regulations.*
Some of these carbon markets work for forestry projects in developing countries, such as the Clean Development Mechanism or voluntary markets.

There are two basic types of carbon markets: compliance and voluntary. Compliance markets are established by governments and require companies to reduce their emissions by a particular amount. One way they can do this is to buy offset credits that represent emissions reductions achieved by somebody else. Voluntary markets also provide a way to buy offsets, but the credits can not be used by companies to meet their requirements under government emissions regulations.

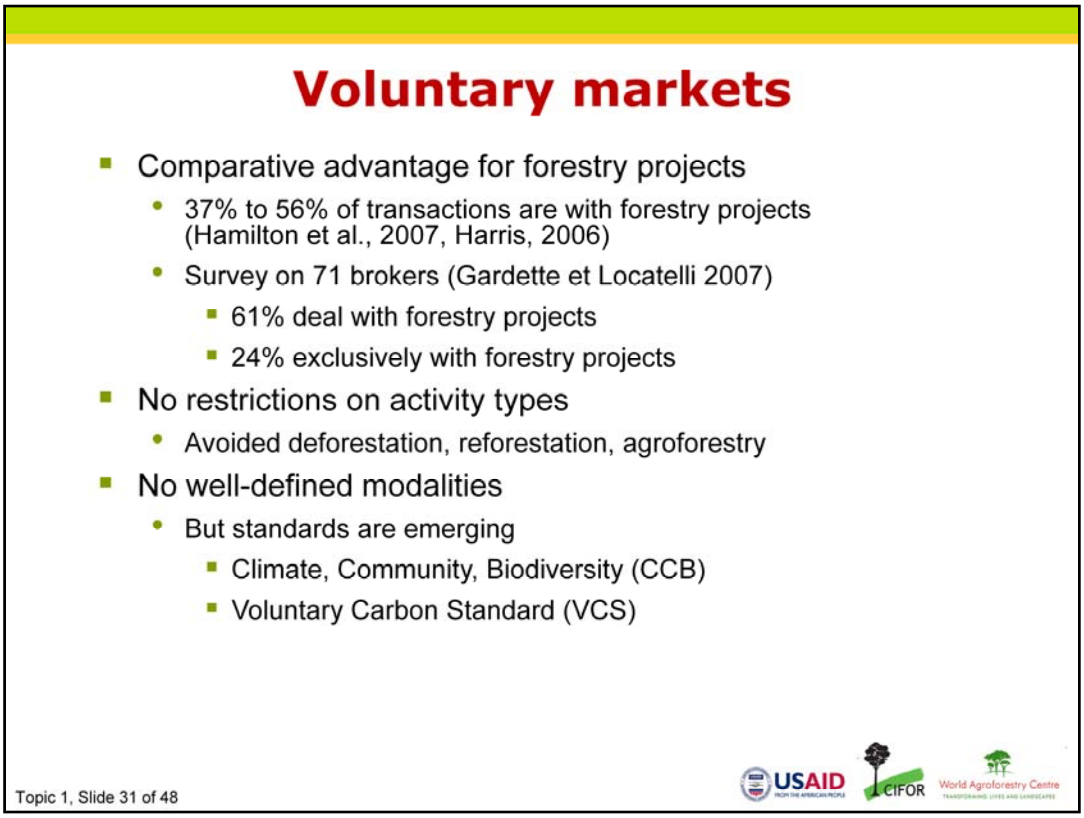
The Kyoto Protocol defined three flexibility mechanisms that involve market transactions under mandatory government regulations. These are Emissions Trading, Joint Implementation and Clean Development Mechanism. To meet their commitments under the Kyoto Protocol, the European Union created an internal carbon market, the EU ETS (Emission Trading System) that allows EU countries to trade their emissions, and it allows a limited amount of offsets to be purchased from developing countries through the CDM. Other cap-and-trade initiatives (RGGI the Regional Greenhouse Gas Initiative in the Northeastern United States, WRCAI the Western Regional Climate Action Initiative, the Oregon Power Plant Offset Program,…) have developed carbon markets as well.

Despite the fact that the CDM does allow forestry projects, the European ETS has not allowed forestry CDM credits to be used as offsets, greatly reducing demand for forestry credits in the compliance markets and shifting most forest and agriculture projects over to voluntary markets.



Narration: *The share of forestry projects within the carbon market is very low.*

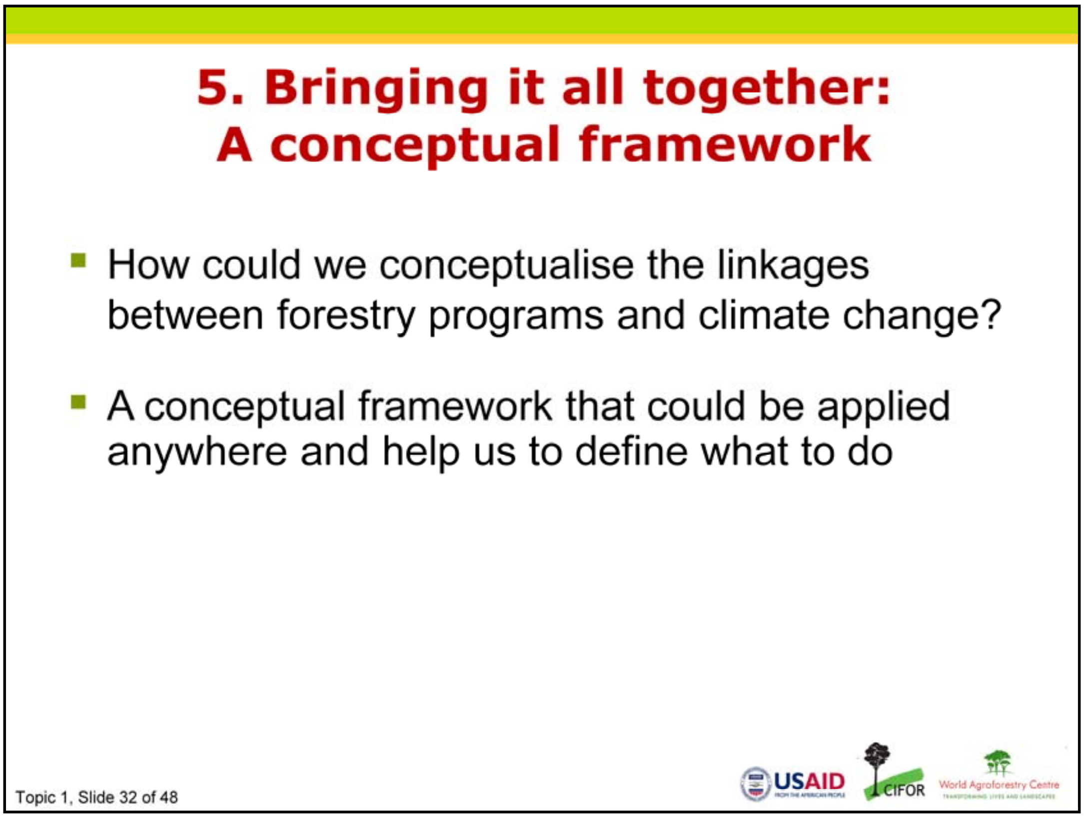
In carbon markets, transactions with projects are growing fast. The CDM is the most important mechanism in term of traded volumes. However, the share of forestry projects overall is very low: less than 1% of the total in the case of the CDM. The share is higher for voluntary markets (around 50%), but voluntary markets represent a small volume compared to the CDM.
There are many reasons for having a low transaction volume with forestry projects in carbon markets: the absence of connection between the CDM and the European Union Emission Trading System; the delay in forest-related CDM decisions, which was taken two years after those for energy projects; the lack of awareness of markets for forestry projects; and the complexity of forestry projects for carbon estimation, monitoring, and impacts on sustainable development.



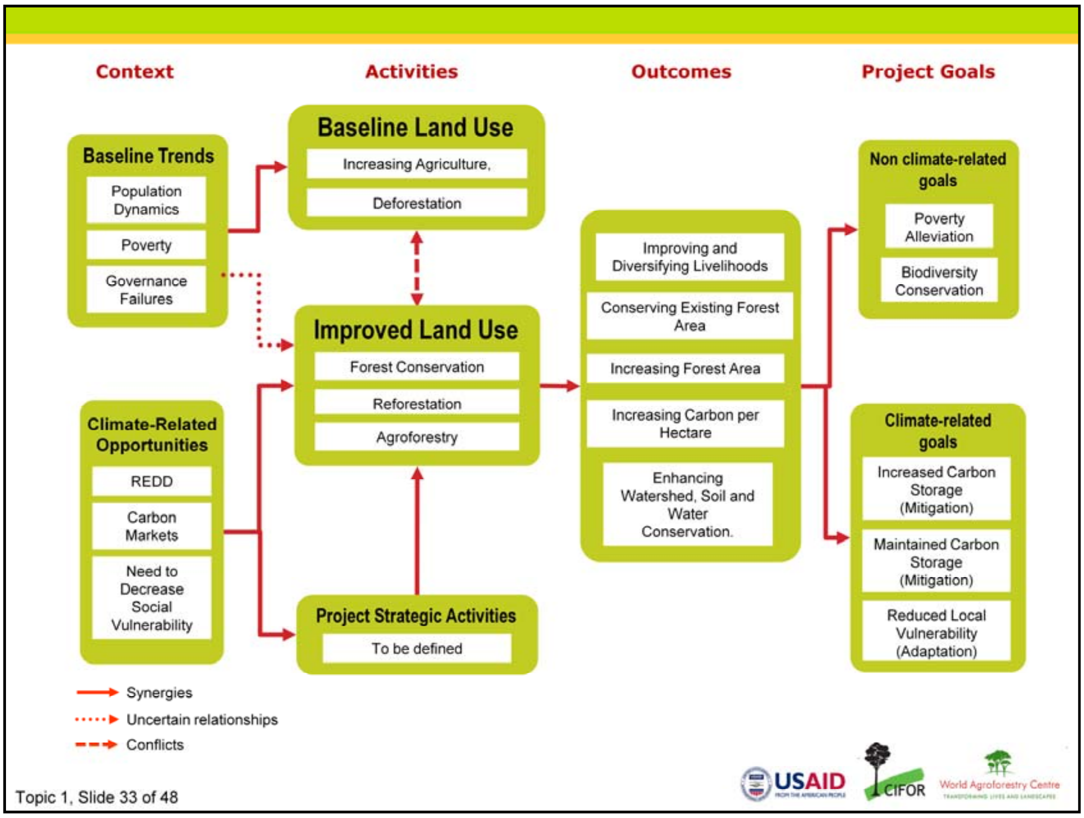
Narration: *Voluntary markets could offer good opportunities for forestry projects, especially if those markets use standards to assess and demonstrate the quality of their projects.*

Although voluntary markets represent a lower transaction volume than the CDM, they could offer good opportunities for forestry projects, which seem more attractive to buyers in these markets.

Another advantage of voluntary markets is that activities are not restricted to afforestation and reforestation as in the CDM. The modalities are not well-defined and may be simpler than in the CDM. However, some voluntary markets have been criticised for lack of stringency and for selling 'air' to buyers. That's why many organisations are using standards to assess and demonstrate the quality of their projects. Examples of standards are the Climate, Community, Biodiversity Standard (CCB) and the Voluntary Carbon Standard (VCS).

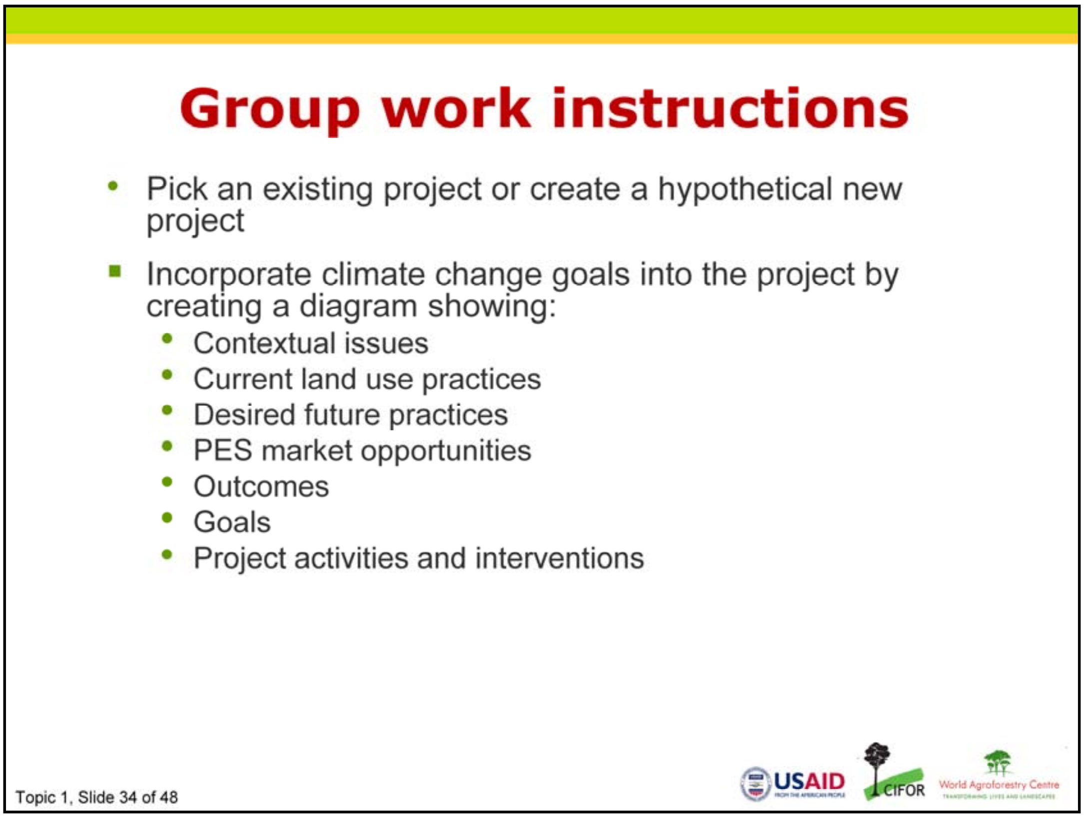


Narration: *So how do you bring this all together and design programs to address climate change and landscapes? In the next slide we propose a simple framework that lays out many of the factors involved in achieving change.*



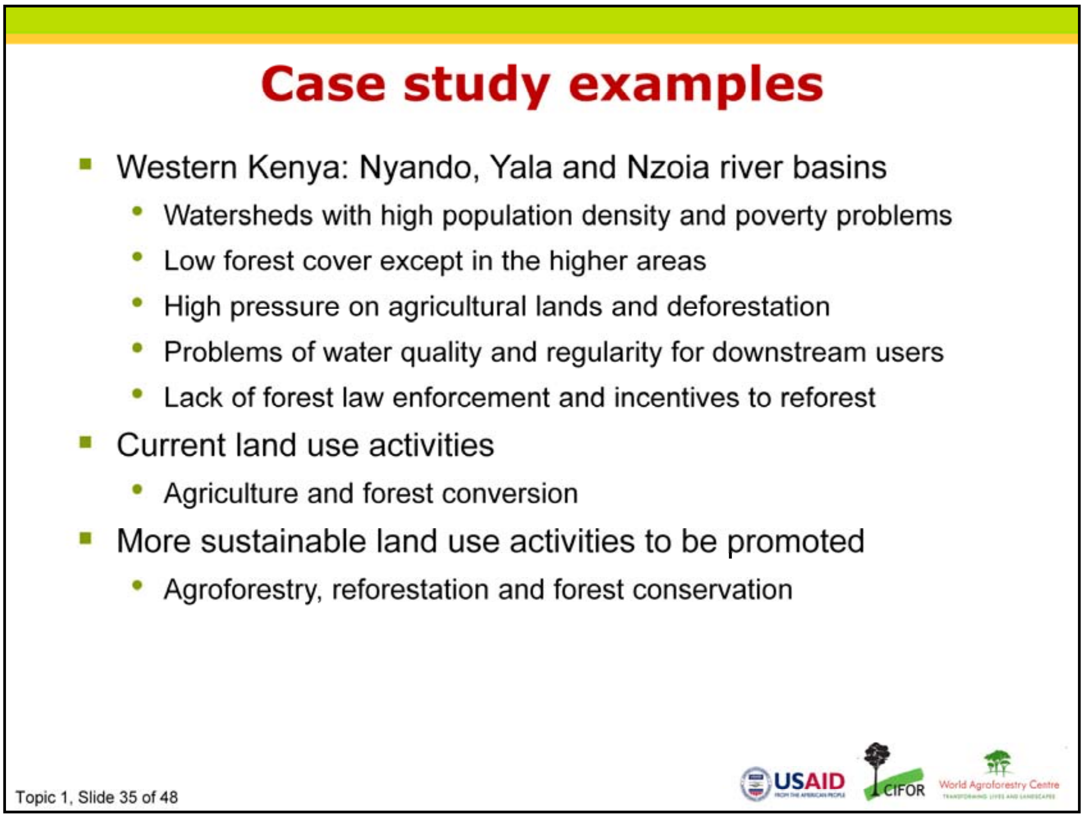
Narration: *Here is a simple framework.*

(Walk them through the framework)



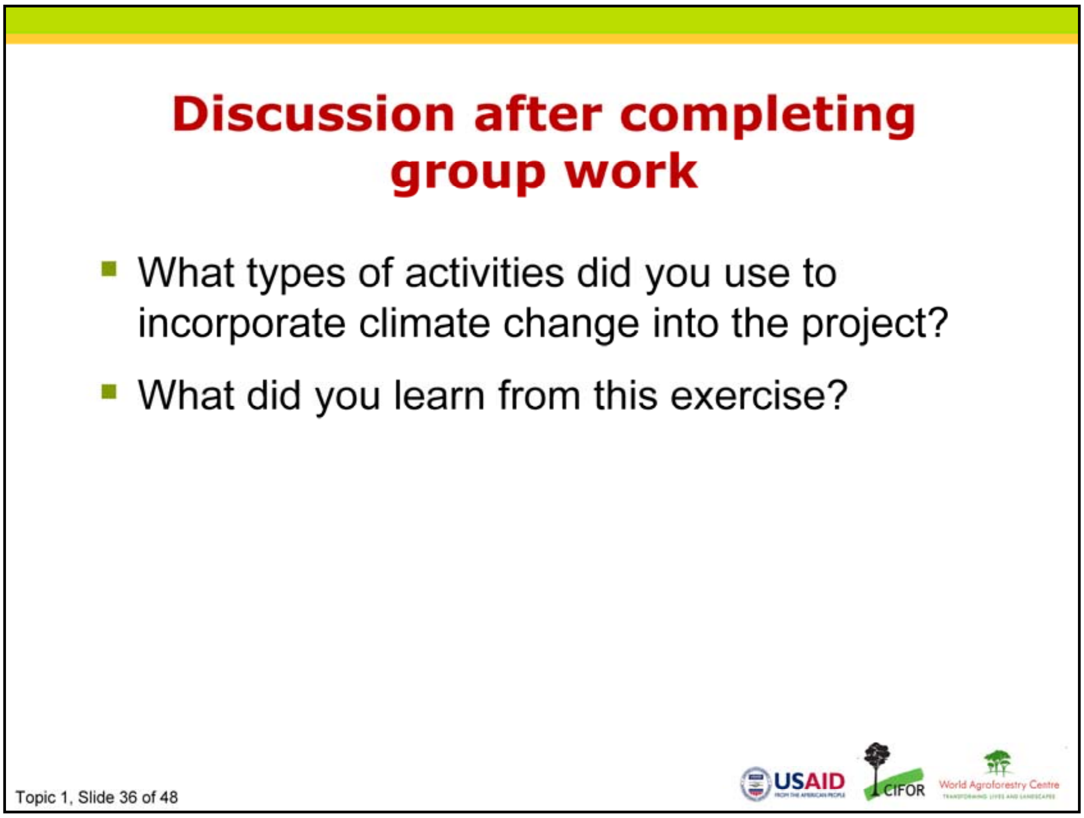
Objectives and specific questions to be addressed.

Groups will choose a real project that preferably all group members know. If possible, a group member will present the project to the others.



Narration: *Here is an example.*

Case example to be shown if the groups have difficulty starting the exercise



Group share the result of discussion. If time is available, prepare a short presentation of the findings.

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Thank you for your attention