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Incentives for the implementation of agriculture and forestry activities under the Kyoto Protocol

A diploma thesis
for the degree of
Magistra der Naturwissenschaften (Mag.rer.nat)

submitted to the
School of Natural Sciences at the
University of Graz

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2005



Declaration

I hereby declare that this diploma thesis is my own work which I wrote without anybody's help-except people mentioned in the acknowledgement section.

In addition to my own work, I only used literature listed in chapter 6, References.

Preface and Acknowledgements

I have chosen to study Environmental Sciences and Geography because of my deep interest in those subjects. In my studies I focused on the subject of climatology as a part of physical geography and on the subject of social skills at the Center for Social Competence. At the end of my studies I undertook this thesis at Joanneum Research, Institute of Energy Research, based on a topic proposed for a thesis by BERNHARD SCHLAMADINGER. PETER CEDE agreed to be my advisor at the Institute of Geography and Regional Science at the University Graz.

In this spirit I would like to thank

- **DIPL. ING. DR. BERNHARD SCHLAMADINGER** for giving me the chance to write my diploma thesis about a very interesting, contemporary topic at Joanneum Research. He introduced me to the subject and supported me with literature, contact persons, thoughts and suggestions. He was very interested in the progress I was making on the thesis and had time for my requests even when he was very busy.
- My supervisor **UNIV. PROF. DR. PETER CEDE**, Institute of Geography and Regional Science, University Graz, first reader of the diploma thesis, for his suggestions and feedback. He always had time for answering my questions.
- **Many individuals** from all over the world for supporting me with data and for filling in the e-mail questionnaire that I sent out as part of this thesis work.
- **MR. KACZMAREK** from the European Forest Institute who sent me a major part of the data necessary for writing this thesis.
- My dear friends **MAG. ANDREA BAIER**, **MAG. BRANDY GRÜNER** and **MAG. ANGELA TANGL** who proofread this thesis.

Abstract

On February 16th 2005 the Kyoto Protocol came into force when the Russian Federation ratified this international treaty. Participating countries are now looking for ways to meet their individual greenhouse gas emission-reduction targets which are now binding under international law.

The existing work is a survey of incentives for greenhouse gas (GHG) mitigation activities in agriculture and forestry in industrialized countries in response to the Kyoto Protocol requirements, and was undertaken as part of the EU-funded research project CarboInvent

(<http://www.joanneum.at/CarboInvent/carboinvent/carboinvent.html>).

The intention of the study was to investigate past, present and future incentive programmes for GHG mitigation in agriculture and forestry, and their success or failure.

Questions of special importance were:

- Which kinds of incentives were, are or will be provided?
- How do incentive programmes operate?
- How successful or unsuccessful are these programmes?
- What are reasons for success/failure?
- What are implementation barriers if any?

The full set of data, investigated from August 2004 to August 2005, is provided in a database. Incentive programmes for which a high level of information was available are also summarized in an Excel file. Both the database and the Excel file are attached to this document on a CD-ROM.

There is a total of 81 incentive programmes covered in the database. The number of incentives provided with the main intention to meet Kyoto targets is small (9 %).

53 % of the incentives are provided for afforestation/reforestation activities, and 35 % for other forestry related activities.

This explains the main focus on forestry in this work.

The study includes an overview of examples from Europe, North-America and Oceania. Nine incentive programmes from, Central, Southern and Western Europe, North America and Oceania are presented in detail.

The results of the survey are of use for decision makers in government and industry. It is hoped that they will encourage and/or inform the establishment of a new range of successful incentives to assist countries in meeting their Kyoto obligations, and reducing net GHG emissions.

Zusammenfassung

Das Kyoto Protokoll ist am 16. Februar 2005 in Kraft getreten, als die Russische Föderation diesen internationalen Vertrag unterschrieb. Länder suchen nun verstärkt nach Wegen, ihre individuellen Treibhausgas - Reduktionsziele, die durch die Ratifizierung des Protokolls völkerrechtlich bindend wurden, zu erreichen.

In der vorliegenden Diplomarbeit wird das Thema: Anreize zur Umsetzung von land- und forstwirtschaftlichen Aktivitäten unter den Bedingungen des Kyoto Protokolls untersucht. Die Studie bezieht sich auf die im Annex B des Kyoto Protokolls aufgelisteten Industrieländer und ist Teil des EU-Forschungsprojekts CarboInvent (<http://www.joanneum.at/CarboInvent/carboinvent/carboinvent.html>).

Ziel der Arbeit ist es, vergangene, aktuelle und zukünftige Anreize bezogen auf ihren Erfolg oder Misserfolg hin zu untersuchen.

Ein Schwerpunkt wurde auf folgende Fragen gesetzt:

- Welche Anreize werden angeboten?
- Wie funktionieren die dazugehörigen Anreiz Programme?
- Wie erfolgreich oder nicht erfolgreich sind die Programme, die Anreize anbieten?
- Welche Gründe gibt es für Erfolg bzw. Misserfolg?
- Gibt es Barrieren die der erfolgreichen Umsetzung eines Programms im Weg stehen?

Die Datenerhebung erfolgte von August 2004 bis August 2005. Am Ende der Datenerhebungsperiode standen mir Informationen über 81 Anreiz Programme zur Verfügung. Die überwiegende Mehrheit der Programme (91 %) wurde aus anderen Gründen als dem der Erreichung von Kyoto Zielen geschaffen.

53 % der Programme beziehen sich auf Aufforstungsaktivitäten, 35 % auf andere Aktivitäten im Bereich Forstwirtschaft. Diese hohen Prozentsätze erklären den Fokus der Arbeit auf den Bereich Forstwirtschaft.

Die Studie beinhaltet einen Überblick über Anreiz Programme aus Europa, Nordamerika und Ozeanien. 9 dieser Programme aus Mittel, Süd- und Westeuropa, Nordamerika sowie Ozeanien werden im Detail präsentiert.

Die gesamten Daten wurden in einer Datenbank erfasst. Anreiz Programme über die ein hoher Gehalt an aussagekräftigen Informationen zur Verfügung steht, wurden in einer Excel Tabelle zusammengefasst. Eine CD-ROM mit der Datenbank und der Excel Tabelle ist der Diplomarbeit beigelegt.

Die Resultate dieser Arbeit können für Entscheidungsträger in Regierung und Industrie von Nutzen sein. Sie regen hoffentlich dazu an, aus Fehlern zu lernen und neue, Erfolg versprechende Wege zu gehen um rechtzeitig die Zielvorgaben des Kyoto Protokolls zu erreichen und Treibhausgas – Emissionen zu reduzieren.

Table of Contents

Preface and Acknowledgements	3
Abstract	4
Zusammenfassung	6
Table of Contents	8
Index of Figures	10
Index of Tables	10
Abbreviations and Acronyms	12
Key Terms	13
1. Introduction	16
1.1. Background	17
1.1.1. Greenhouse effect, climate change an its impacts	17
1.1.2. The Climate Convention and the Kyoto Protocol	24
1.1.3. Article 3.3 and 3.4. of the Kyoto Protocol: Land use, land use change and forestry - LULUCF and sequestration	28
2. Objectives	29
3. Methods	30
3.1. Data collection	30
3.1.1. Internet investigation, library inquiry, phone interviews and e-mail enquiries	30
3.1.2. Questionnaire	31
3.2. Data analysis	32
3.3. Problems	33
4. Results	35
4.1. Overview	35
4.2. Subsidies	39
4.2.1. Europe	39
4.2.1.1. Ireland	43

4.2.1.2.	Portugal.....	47
4.2.1.3.	Austria.....	49
4.2.2.	United States of America.....	52
4.3.	Special concessions.....	58
4.4.	CO ₂ credits.....	60
4.4.1.	Overview.....	60
4.4.2.	Australia.....	60
4.4.3.	New Zealand.....	64
4.5.	Other incentives.....	67
4.5.1.	United States of America.....	67
4.5.2.	Canada.....	68
5.	Conclusions drawn from the results.....	72
5.1.	Success or failure?.....	72
5.2.	Continental peculiarities.....	77
5.3.	New incentives for a new generation of farmers.....	80
5.4.	Future prospects.....	81
6.	References.....	82

Index of Figures

Figure 1: Sources of Greenhouse Gas emissions in Austria 2003.....	19
Figure 2: Global Environmental Change in Alpine Regions	22
Figure 3: Number of programmes addressing forestry, agricultural or both sectors ..	35
Figure 4: Breakdown in categories of the whole data collection.....	36
Figure 5: Dispersion of incentives.....	37

Index of Tables

Table 1: Evaluation of incentive programmes through experts.....	38
Table 2: Financial forecast of forestry measures in the framework of the rural development programmes 2000 – 2006: EU contribution under EAGGF.....	42
Table 3: Reasons for success – selected examples.....	73
Table 4: Reasons for failure – selected examples	75
Table 5: Implementation barriers – selected examples.....	76

Abbreviations and Acronyms

A	Afforestation of non-forest land
CEIT	Countries with Economies in Transition
CH ₄	Methane
CM	Cropland management
CO ₂	Carbon dioxide
COP	Conference of the Parties (to the United Nations Framework on Climate Change)
EQIP	Environmental Quality Incentive Program
EAGGF	European Agricultural Guidance and Guarantee Fund
FM	Forest management
GHG	Greenhouse gas
GM	Grassland management
IEA	International Energy Agency
LULUCF	Land use, land use change and forestry
NGO	Non-governmental organisations
N ₂ O	Nitrous oxide
NRCS	Natural Resources Conservation Service
OECD	Organization for Economic Co-Operation and Development
R	Reforestation of non-forest land
RD	Reduction of deforestation
RV	Revegetation
NFCCC	United Nations Framework Convention on Climate Change
U.S.	United States
USDA	United States Department of Agriculture

Key Terms

In the following chapter some key terms will be described to assist the reader with essential information:

Afforestation:

“The direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources is defined as ‘afforestation’.”(web site of the UNFCCC (United Nations Convention on Climate Change)[58])

Annex B countries under the Kyoto Protocol:

“These are industrialised countries with greenhouse gas emissions limitations or a reduction commitment. The annex also identifies those countries currently making a transition to a market economy.” (web site of Climate Change Projects Office [22])

List of Annex B countries:

“Australia, Austria, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, France, Finland, Germany, Greece, Hungary, Italy, Iceland, Ireland, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, United Kingdom, United States of America.

Belarus and Turkey are not included in the Protocol’s Annex B as they were not Parties to the Convention when the Protocol was adopted.” (web site of the UNFCCC [58])

Carbon dioxide sinks:

“Carbon sinks are the ecosystems, principally forests and oceans, which remove carbon dioxide from the atmosphere by absorbing and storing it, thereby offsetting carbon dioxide emissions.” (web site of California Climate Action Registry [23])

“The term sink is used to describe any process, activity or mechanism that removes a greenhouse gas from the atmosphere.” (UNFCCC 1992, in: website of the Joanneum Research: IEA-Bioenergy¹, Task 38 [33])

Carbon sequestration:

“The process of increasing the carbon content of a carbon reservoir other than the atmosphere is called ‘sequestration’. Biological approaches to sequestration include direct removal of CO₂ from the atmosphere through land-use changes and changes in forest management.” (web site of the New Zealand Climate Change Office [19])

Cropland management:

“The system of practices on land on which agricultural crops are grown and on land that is set aside or temporarily not being used for crop production is called ‘cropland management’.

Deforestation:

The direct human-induced conversion of forested land to non-forested land is called ‘deforestation’.” (web site of the UNFCCC [58])

Extension service:

Institutions which offer information, education and advice to farmers are referred to as extension services. Information about currently available incentives is often distributed through this service. In Austria the ‚Bauernkammer‘ and the ‚landwirtschaftliche Bundesanstalten‘ act as extension services.

Forest:

“‘Forest’ is a minimum area of land of 0.05-1.0 hectares with tree crown cover (or equivalent stocking level) of more than 10-30 % with trees with the potential to reach a minimum height of 2-5 metres at maturity *in situ*. A forest may consist either of closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground or open forest. Young natural stands and all plantations which have yet to reach a crown density of 10-30 % or tree height of 2-5 metres are included under forest, as are areas normally forming part of the forest area which are

¹ IEA =International Energy Agency

temporarily unstocked as a result of human intervention such as harvesting or natural causes but which are expected to revert to forest.” (web site of the UNFCCC [58])

Forest management:

“A system of practices for stewardship and use of forest land aimed at fulfilling relevant ecological (including biological diversity), economic and social functions of the forest in a sustainable manner is called ‘forest management’.” (web site of the UNFCCC [58])

Grazing land management:

“The system of practices on land used for livestock production which are aimed at manipulating the amount and type of vegetation and livestock produced is called ‘grazing land management’.” (web site of the UNFCCC [58])

Incentives:

“In economics, an incentive is any factor (financial or non-financial) that provides a motive for a particular course of action, or counts as a reason for preferring one choice over the alternatives.” (web site of the online encyclopaedia Wikipedia[9])

Reforestation:

“The direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land is called “reforestation”. For the first commitment period (2008 – 2012) under the ‘Kyoto Protocol’, reforestation activities will be limited to reforestation occurring on those lands that did not contain forest on 31 December 1989.

Revegetation:

A direct human-induced activity to increase carbon stocks on sites through the establishment of vegetation that covers a minimum area of 0.05 hectares and does not meet the definitions of afforestation and reforestation contained here is defined as ‘revegetation’.” (web site of the UNFCCC [58])

1. Introduction

“In 1997 industrial countries committed themselves at the third ‘Conference of the Parties’ in Kyoto, Japan, to reduce the concentration of six greenhouse gases (GHG) in the atmosphere (see chapter 1.1.2).

Participating countries should reduce their overall GHG emissions by at least 5% below existing 1990 levels in the period 2008 to 2012.” (Web site of the UNFCCC [54])

Countries have a wide range of possibilities to meet their individual targets. The reduction of GHG emissions from sources within the country plays a leading part. Countries can also implement the mechanisms “Emission Trading”, “Clean Development” and “Joint Implementation” under the Kyoto Protocol (see chapter 1.1.2.).

“In addition countries may offset their GHG emissions by increasing so-called “carbon sinks” (see “Key terms”) in the land-use, land-use change and forestry (LULUCF) sector.

Eligible activities in this sector are:

- “Afforestation of non-forest land (A)
 - Reforestation of non-forest land (R)
 - Reduction of deforestation (RD)
- } Article 3.3 (see chapter 1.1.3)
-
- Forest management (FM)
 - Cropland management (CM)
 - Grassland management (GM)
 - Revegetation (RV)”
- } Article 3.4. (see chapter 1.1.3)

(web site of the UNFCCC [56])

If a country, for example, deems afforestation of non-agricultural land a promising way to meet the commitments, it may consider offering financial and other incentives for plantation establishment and maintenance to encourage landowners to change their current land use.

Incentives in this context are defined as “public subsidies given in various forms to the private sector to encourage socially desirable actions by private entities.” (GREGERSEN 1984 in WILLIAMS, J., 2000: 1)

Generally there are two categories of incentives that can be offered:

“Direct incentives include cost sharing, subsidized credit, fiscal incentives, reduction of uncertainty through loan guarantees, insurance, forest protection agreements, and provision of land tenure.” (GREGERSEN and HOUGHTALING 1978 in WILLIAMS, J., 2000: 1)

“Indirect incentives include provision of market information, extension and education, and research.” (KEIPI 1997 in WILLIAMS, J., 2000: 1)

As a first step, governments have to figure out if incentives are necessary at all. Subsequently, they have to figure out which kind of incentive suits best. ([33])

In this survey incentives for GHG mitigation activities in agriculture and forestry (A/R, RD, FM, CM, GM, and RV) have been studied in Annex B countries under the Kyoto Protocol.

The intention of the author was to provide an overview of currently offered incentives and to explore innovative, noteworthy examples. The main focus has been on success and failure of those incentives and on implementation barriers. The most important question has been: What are reasons for success and failure of these incentives?

The results of the survey are of use for decision makers in government and industry.

1.1. Background

1.1.1. Greenhouse effect, climate change and its impacts

The discovery of climatic change

"For more than one hundred years science has known about changes in the atmosphere. Already in 1896 the Swedish scientist Svante Arrhenius described the natural greenhouse effect that makes life possible on our planet. He found out that

incoming sunbeams are reflected back into the atmosphere by the surface of the earth and that the chemical structure of greenhouse gases traps a part of those reflected sunbeams in the atmosphere. This process increases the global average temperature by 33°C to an average level of about +15°C.

With the industrial revolution, another process started: the so-called enhanced greenhouse effect. Mainly caused by the burning of fossil fuels, the amount of greenhouse gases in the atmosphere increased and the natural greenhouse effect was sped up.” (OBERTHÜR, S. and OTT, H., 2000: 27)

Over the years people got more and more aware of the threatened environment, the changing climate and its impacts on life on earth. Discussions occurred about whether there would be (man-made) global warming or not. Possible impacts of a changing climate have been researched.

The Intergovernmental Panel on Climate Change (IPCC)

“In 1988 the IPCC was set up by the United Nations Environmental Programme (UNEP) and the World Meteorological Organisation (WMO). Its intention is to survey the state of the scientific findings concerning climate change. IPCC reports are compiled and checked by hundreds of experts from all over the world and are presented to governmental decision makers. The first report of the panel was published in 1990.” (OBERTHÜR, S. and OTT, H., 2000: 28)

Controversial positions:

The thesis of global warming was disputed from the very beginning (see section below: “Possible effects on life on earth”). Some scientists argued that a changing climate would be natural and that there would be no reason to be worried. Another group of scientists predicted a rapid increase in human-induced greenhouse gas levels in the atmosphere and forecasted an unnaturally high rise of the global average temperature. Within this group of scientists, an argument has been going on about different methods of measuring the exact increase of the global average temperature.

“For 15 years scientists have been discussing the dimension of the global warming.” (Presstext Austria, 12.8.2005 [48]). ”Three articles in the latest issue of the magazine ‘Science’ state problems with measuring the exact increase of temperature as solved and an increase of 0.2 °C per decade has been assessed.” (Der Standard,

13/14. 8.2005: 39) These findings may finally stop the discussion about whether there is global warming or not.

Reasons for global warming

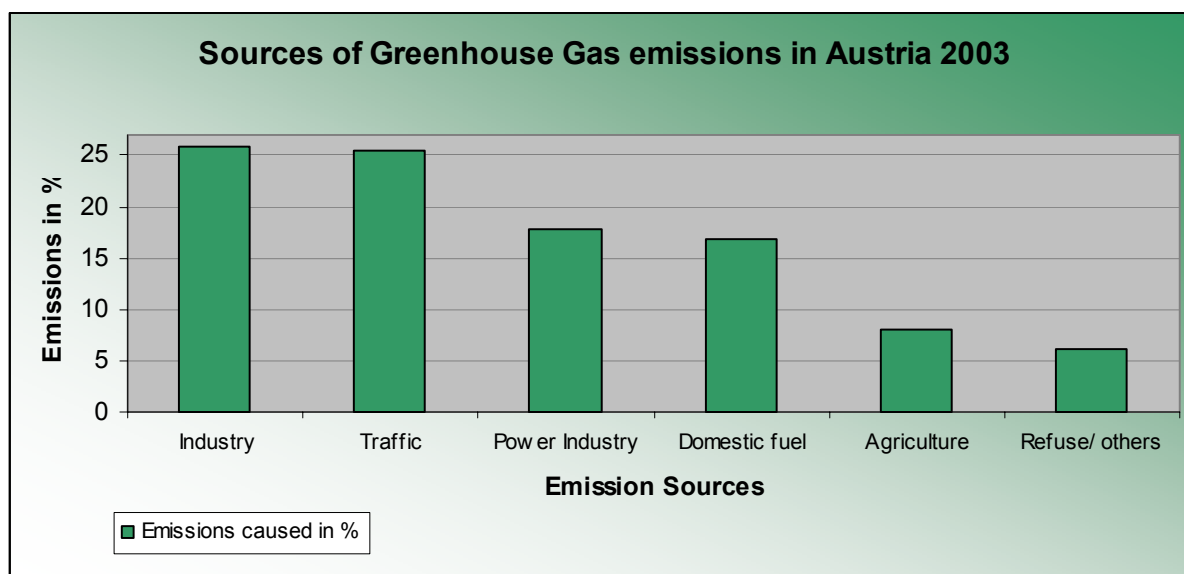
“The two main causes of increasing levels of greenhouse gases in the atmosphere have been identified as:

- Burning of fossil fuels and
- Land-use change, particularly deforestation.”(website of Joanneum Research, IEA-Bioenergy, Task 38 [33])

Main polluters are:

- Industry
- Traffic
- Power Industry
- Domestic fuel
- Agriculture and
- Refuse

Figure 1: Sources of Greenhouse Gas emissions in Austria 2003



Source: Der Standard, 1. 3. 2005: 16, modified

As demonstrated in figure 1, the main sources of emissions in Austria (to give an example) are industry and traffic, followed by the power industry and domestic fuel.

AGRICULTURE:

The agricultural sector accounts for 10 % of global GHG emissions (IPCC 2000 in PEREZ, I. and HOLM-MÜLLER, K., 2002 [17]).

Greenhouse gases of relevance within the agricultural sector are:

- Methane (CH₄)
- Nitrous Oxide (N₂O)
- Carbon Dioxide (CO₂)

Nitrous oxide (N₂O):

“Nitrous oxide has 270 times the effect of carbon dioxide for producing global warming. It is naturally emitted from soils and oceans. Human activity contributes to the release of the gas through the **cultivation of soil** and the use of **nitrogen fertilizers**, the production of nylon, and the burning of fossil fuels and other organic matter.” (website of the online encyclopedia Wikipedia [11])

“Nitrous oxide can, for example, be reduced by the abandonment or a reduction of nitrogenous fertilizers” (Österreichische Energieagentur and Umweltbundesamt GmbH, 2005: 174; see chapter 4.2.1.3)

Methane (CH₄):

“Methane has 22 times the warming ability of carbon dioxide.

Principal methane sources are

- decomposition of organic wastes,
- natural sources (marshes),
- mineral fuel extraction,
- the processes of digestion in animals (cattle),
- bacteria in rice plantations and
- anaerobic digestion” (web site of the online encyclopedia Wikipedia [10])

“One possibility to reduce the greenhouse gas CH₄ can be the reduction of livestock per ha” (Österreichische Energieagentur and Umweltbundesamt GmbH, 2005: 174; see chapter 4.2.1.3)

Carbon dioxide (CO₂):

Agriculture is both sink and source for carbon dioxide.

“Soil organic carbon (SOC) is stored in agricultural soils. The loss of SOC is caused by

- physical losses like erosion or leaching and by
- biological losses like soil respiration.

Soil conservation measures such as

- conservation tillage with cover crop during winter periods and
- no-till with cover crop during winter period

help to sequester SOC and result in improved soil quality” (KLIK, A., n. d.), “greater aggregate stability”. (TISDALL and OADES, 1982; KAY, 1998; LE BISSONNAIS and ARROUAYS, 1997 in KLIK, A., n. d.) and “reduced erodibility.” (LE BISSONNAIS and ARROUAYS, 1997 in KLIK, A., n. d.)

FORESTRY:

Forests are both source and sink for carbon dioxide:

“Enormous amounts of carbon are naturally stored in trees. As part of photosynthesis trees absorb carbon dioxide from the atmosphere and store it as organic carbon while oxygen is released back into the atmosphere.

Rapidly growing trees absorb a larger amount of carbon dioxide. Mature trees grow slower and thus have a lower intake of carbon dioxide. Trees consist of 50 % carbon by weight. While all trees die and rot, releasing most of the stored carbon back to the atmosphere, the forest as a whole continues to store carbon as dying or harvested trees are replaced by natural regeneration.” (web site of online encyclopaedia Wikipedia [4])

“The prevention and reduction of deforestation help mitigate climate change.” (website of Joanneum Research, IEA-Bioenergy, Task 38 [33]).

Possible effects on life on earth

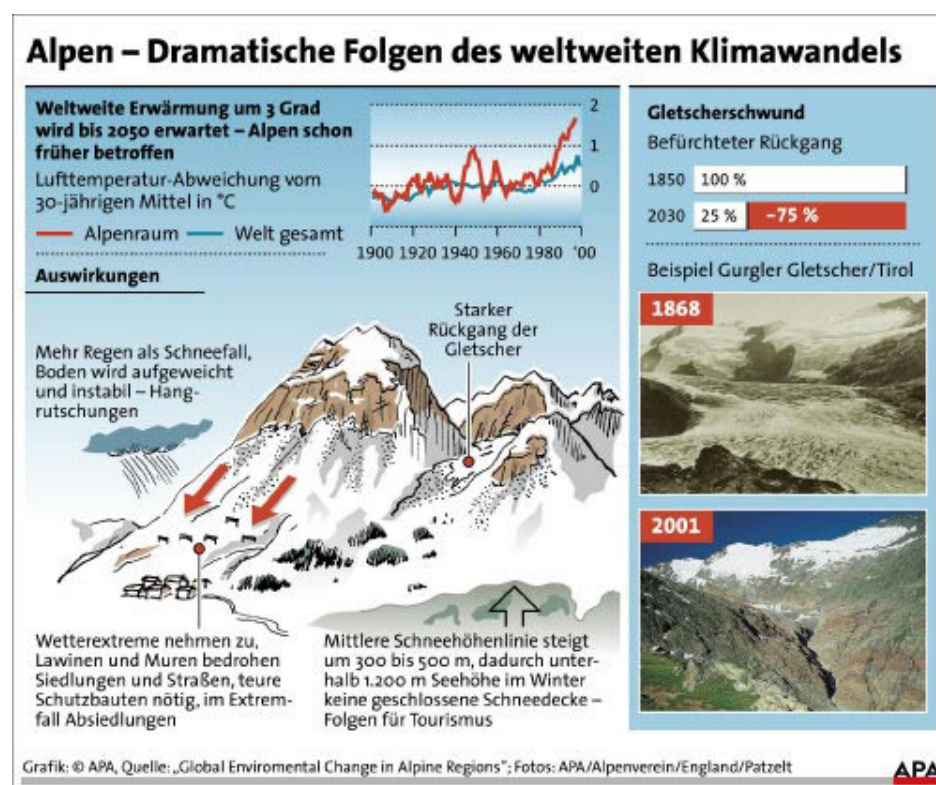
Every week new findings concerning impacts of climate change are published by eminent scientists in notable journals and newspapers:

The magazine New Scientist for example (Nr. 2512: 12 [37]) stated on August 11th 2005 that “scientists have found out that in western Siberia a permafrost area as big

as Germany and France together is melting. The average temperature there has increased by 3°C on average over the last 40 years. Billions of tons of methane could be unleashed." SERGEI KIRPOTIN, botanist at the Tomsk State University, Russia, stated that "the ecological landslide would probably be irreversible and would undoubtedly be connected to climate warming."

On September 13th 2005 the Austrian newspaper 'Der Standard' published an article about possible impacts of global warming in the Alps. "The renowned climate scientist WOLFGANG SEILER forecasted an increase of natural disasters influencing winter tourism, economy and finally living conditions."

Figure 2: Global Environmental Change in Alpine Regions



Source: Der Standard, online, 13.9.2005; photos: APA/Alpenverein/England/Patzelt

Figure 2 shows possible impacts of climate change on life in Alpine regions. "With a rise of the global average temperature by 2 °C over the next 40 years extreme weather situations will increase. This will lead to an increased need for protective structures against avalanches and mudflows. Sinking snowlines and decreasing snow depth will have impacts on tourism." (SEILER, W., 2005 in: Der Standard, online, 13.9.2005 [1])

“In recent years scientists have forecasted a range of possible impacts on life on earth for cases of up to a 6 °C increase of the average temperature in the next 100 years.

Permanently iced areas like glaciers and permafrost soils would melt and the sea level would rise. Islands and coastal regions would get flooded. The Gulf Stream, which is responsible for the warm seawater temperatures of Europe would collapse. Extinction of plants and animals could occur. The list of catastrophes seems to be endless.

But future predictions of climate scientists are never permanent and can be inconsistent with one to another. This makes them vulnerable to attacks from politicians, as it is especially the case with the current US government led by President GEORGE W. BUSH. Already several years ago institutes have been founded in the U.S. that set out to investigate and publicise the weaknesses in the research findings of climate scientists. These institutes had a major influence on the decision of the United States not to sign the Kyoto Protocol.

Although it is questionable whether the Gulf Stream will really collapse and whether the mass mortality of plant and animal species may indeed occur, one thesis is still unrefuted: Emissions will heat up the climate.” (Der Standard, 7.7.2005: 27)

Solutions:

There are uncountable possibilities to mitigate climate change.

The International Energy Agency (IEA) states two of high importance:

- “The reduction of the consumption of fossil fuels and
- The prevention and reversion of deforestation.” (web site of the Joanneum Research, IEA-Bioenergy, Task 38 [33]).

“The IPCC states that activities like the reduction of deforestation, worldwide afforestation programmes as well as support of the natural regeneration of tropical forests can balance 12 – 15 % of the total fossil fuel emissions until 2050.” (OBERTHÜR, S. and OTT, H., 2000: 182)

Further examples for such activities are:

- The use of Bioenergy

- Generation of power from other renewable sources like wind or solar power
- Increasing energy efficiency
- The creation of carbon sinks through afforestation/reforestation on non-forest land or changing of management practices on cropland, grassland or forest stands.
- Actions the general public can implement like:
 - buying domestic goods, e. g. fruits and vegetables that are in season. This will help reduce the thousands of kilometres of transport for overseas – goods and thus save tons of fossil fuels.
 - reducing the use of cars
 - saving electricity
 - etc.

The Kyoto Protocol described below is one step towards the mitigation of climate change. Its aim is a stabilization of the amount of GHGs in the atmosphere. Pundits think that the treaty does not offer an efficient solution of the problem. “A radical reduction of GHG emissions might be necessary to prevent a global disaster.” (SEILER, W. in: ‘Der Standard’, online, 13.8.2005 [1])

1.1.2. The Climate Convention and the Kyoto Protocol

From the beginning of the 1990s on, climate change has been paid more and more attention to. Governments from all over the world agreed that collective steps had to be considered in order to mitigate climate change. Concrete measures have been negotiated over years and in 1997 the legally binding Kyoto Protocol has been the first outcome of a still ongoing process.

The United Nations Framework Convention on Climate Change (UNFCCC)

“In 1992 the legal basis for the Kyoto process, the United Nations Framework Convention on Climate Change was adopted in Rio de Janeiro.” (OBERTHÜR, S. and OTT, H., 2000: 63 and web site of the UNFCCC [52]).

“The Convention was open for signature from 4 June 1992 to 19 June 1993. Within that year 165 countries and the European Commission signed the Convention. The Convention came into force on 21 March 1994.” (web site of the UNFCCC [52])

“The UNFCCC is an “overall framework for intergovernmental efforts to tackle the challenge posed by climate change.” (website of the UNFCCC [53])

“The ultimate aim of the Convention is to stabilize the amount of GHG in the atmosphere at a level which does not harm life on earth. The Framework Convention was important for the Kyoto Process because a target as well as basic principles and basic commitments were anchored.

In the framework there are commitments relevant for all the parties to the contract but there are also specific commitments for industrial countries only. Those industrial countries have been split into two groups:

Annex I covers the European Community and industrial countries in 1992: 24 OECD countries and Countries with Economies in Transition (CEIT). This list has been changed in Kyoto: The former Czechoslovakia has been divided into the Czech Republic and Slovakia; else Croatia, Slovenia, Liechtenstein, and Monaco have been added to the list.

Annex II is mainly a list of references for financial commitments under the UNFCCC; it covers all OECD-countries and the European Community (in 1992).

In general the Convention contains different rules for either 1) all the parties of the contract, 2) for industrial countries 3) for ‘OECD-countries’ or 4) for ‘Countries with Economies in Transition (CEIT)’.” (OBERTHÜR, S. and OTT, H., 2000: 65 – 66)

The Conference of the Parties (COP)

“The most important institution of the UNFCCC is the Conference of the Parties (COP). It is the highest decision making body of the climate regime

At the annual COP meetings, the implementation of the Climate Convention should be supported and checked.” (OBERTHÜR, S. and OTT, H., 2000: 69)

The summit in Rio de Janeiro in 1992 marked the onset of an international process. By the time the third Conference of the Parties’ (COP3) took place in Kyoto there had been a lot of heavy discussions about aims, commitments, rules, measures, scientific fundamentals and mechanisms to reduce GHG emissions.

The third Conference of the Parties' in Kyoto

COP 3 was held in Kyoto, Japan in 1997. At this conference, GHG emission reductions targets and limits were worked out, which would be binding according to international law.

“The Kyoto Protocol commits industrial countries to reduce emissions of 6 essential greenhouse gases by 5 % of 1990 levels in the period 2008 to 2012. The levels that countries that have ratified the protocol will have to reach are individual by country.

The greenhouse gases that should be reduced are:

- Carbon dioxide (CO₂)
- Methane (CH₄),
- Nitrous oxide (N₂O),
- Hydro fluorocarbons (HFCs),
- Per fluorocarbons (PFC) and
- Sulphur hexafluoride (SF₆)” (web site of the UNFCCC [56])

The Kyoto Protocol came fully into force February 16, 2005 when the Russian Federation ratified the accord.

“The United States of America being the biggest CO₂ emitter in the world has not ratified the treaty yet. President BUSH stated that the Kyoto Protocol would have destroyed the economy of the United States.” (Der Standard, 5.7.2005: 17)

How to meet the targets

There are many possibilities how countries can meet their individual targets. Emission reductions will be accounted for the sectors power industry and other industry. Countries can also implement the mechanisms Emission Trading, Clean Development and Joint Implementation under Kyoto Protocol requirements.

“In addition countries may offset their emissions by increasing so called carbon sinks in the Land-use, land-use change and forestry (LULUCF) sector (see chapter 1: Introduction).” (web site of the UNFCCC [56])

GHG mitigation activities in agriculture and forestry are defined in the Articles 3.3 and 3.4 of the Kyoto Protocol (see chapter 2.3).

Emission trading:

“Emission trading is an administrative approach with the purpose to reduce air pollution by providing economic incentives for reducing net emissions. A central authority (i.e air pollution control district, state agency, or Federal agency) sets limits or ‘caps’ on each pollutant. Companies that intend to exceed the limits may buy emissions credits from entities which stay below their designated limits. This transfer is normally referred to as a trade. In most emission trading systems a portion of the traded credits are required to be retired so the system achieves a net reduction of emissions from each trade.” (web site of the online enciclopedia Wikipedia [7])

“At the first Austrian auction on 28 June 2005 a certificate for 1 ton of CO₂ was worth 23.95 Euro. At this auction 7500 tons of CO₂ have been traded. Originally the price for one certificate had been forecasted with 7 Euro per ton between 2005 and 2007. The market for emission trading develops very dynamically.”(Der Standard, 29.6.2005: 15)

Besides trading with certificates there are so-called flexible mechanisms’ that can be chosen to meet the targets of the Kyoto Protocol: The Clean Development Mechanism (CDM) and Joint Implementation (JI).

Clean Development Mechanism (stated in Article 12 of the Kyoto Protocol):

“This mechanism offers companies in industrial countries the possibility to gain emission certificates when developing climate effective projects in developing countries. At the same time those projects help developing countries and economies in transition to invest in climate friendly technologies and infrastructure.” (Der Standard, 13.7.2005: 16) “The investor and the host country both have to agree on this type of transaction.”(SCHLAMADINGER, B., 2004)

Joint Implementation (stated in Article 6 of the Kyoto Protocol):

This project mechanism between two industrialized countries offers another way of collecting emission certificates. “Any climate effective project including all types of land use projects can be accounted for under this mechanism. “ Again, an agreement of both countries is necessary.” (SCHLAMADINGER, B., 2004) “Within this

mechanism the hosting industrial country loses as much emission certificates as the active company wins during this process.” (Der Standard, 13.7.2005: 16)

1.1.3. Article 3.3 and 3.4. of the Kyoto Protocol: Land use, land use change and forestry - LULUCF and sequestration

Background: What is a sink?

“A System that absorbs more carbon than it emits is called a sink. Forests have a very high carbon sequestration potential depending on the age and the constitution of the forest.

‘GHG sinks’ can have a big share in mitigating climate change. The Intergovernmental Panel on Climate Change states that activities like the reduction of deforestation, worldwide afforestation programmes as well as support of the natural regeneration of tropical forests can balance 12 – 15 % of the total fossil fuel emissions until 2050.” (OBERTHÜR, S. and OTT, H., 2000: 180 - 182)

In the Kyoto Protocol the reduction of GHG through sinks is positioned in article 3.3 and 3.4:

“Under Article 3.3. Annex I countries must account for all direct human-induced afforestation, reforestation and deforestation activities undertaken since 1990. The afforested or reforested land must have been non-forest in 1990.

Article 3.4 constitutes that activities in forest management, cropland management, grazing land management and revegetation may but do not have to be accounted. If a country has decided to choose one or all activity/-ies, it is binding for the country to account for both credits or debits in that category /-ies. For example any future changes of the GHG budget on the same unit of land will be liable for the country.” (SCHLAMADINGER, B., 2004)

To implement the activities fixed in articles 3.3 and 3.4 participating countries provide incentives to motivate their farmers (the target group) to make a change in their land use.

“A landowner or a company will not automatically receive credits or debits if a certain land-use type or a land-use change will be practised. It depends on the government and whether and how it provides incentives or disincentives for certain types of land use or land-use change.” (SCHLAMADINGER, B., 2004)

2. Objectives

The goal of the study is to

- investigate incentives of the past, present and future in agriculture and forestry in Annex B countries under the Kyoto Protocol,
- evaluate their success or failure,
- observe implementation barriers and
- give recommendations relating to the creation of successful incentives.

Incentives gain importance because industrial countries that have ratified the Kyoto Protocol have to reach their emission reduction targets. “Countries have to account for their activities under article 3.3 and may account for activities under article 3.4.” (SCHLAMADINGER, B., 2004) They probably need to create incentives for landowners/-users to make them change their land use.

Thus countries are currently implementing studies (see web site of the Joanneum Research, Sydney/Hatton [34] and the website of the New Zealand Climate Change Office [19]) to investigate the ecological and economical value of incentives.

If a country decides to implement a particular incentive, this present study should assist government and industry in creating incentives which can successfully be implemented.

It was my intention to find a wide range of different, innovative incentives leading to the implementation of GHG mitigation activities in forestry and agriculture.

I considered the point of view of governments as well as the point of view of farmers/landowners.

3. Methods

3.1. Data collection

The data collection period was from August 2004 to August 2005.

3.1.1. Internet investigation, library inquiry, phone interviews and e-mail enquiries

The first step was to collect **summarizing literature** about incentives in the 38 Annex B countries under the Kyoto Protocol, without nameable success.

To make sure that no literature had been overlooked, I contacted experts to ask for their support. Both Mr. GALINSKI (Joanneum Research, Graz, Austria) and Mr. RAMETSTEINER (University of Natural Resources and Applied Life Sciences Vienna, Austria) confirmed that they also were not aware of any summarizing literature.

Thus the next step of the data search had to be started: **a data collection of country by country.**

In the first month the search focused on the data that was available online from ministries and non-governmental organisations web sites. I consulted experts and undertook phone interviews, phone and e-mail enquiries at ministries and non-governmental organisations.

This kind of data collection turned out to be not very sufficient either. The most common answers have been: “We do not have the requested information.” and “There are no incentives related to the Kyoto Protocol yet”. A positive feedback came from the European Forest Institute: Mr. KACZMAREK provided unpublished country level reports about incentive programmes from 1990 to 1999 in Europe.

3.1.2. Questionnaire

Concerning the restrictions of the method described above, an additional way of data collection had to be found.

To simplify the data collection work a questionnaire was developed.

It was designed with the assistance of BERNHARD SCHLAMADINGER, WOJTEK GALINSKY, NEIL BIRD (Joanneum Research Graz, Austria), ERWIN SCHMID (University of Natural Resources and Applied Life Sciences Vienna, Austria), UWE SCHNEIDER (Research Unit Sustainability and Global Change, University Hamburg, Germany) and PETE SMITH (University of Aberdeen, United Kingdom).

The questionnaire² was concerned with 7 main issues:

- source of information
- eligible activities
- actors involved in the programme
- funding
- operation of the programme
- monitoring
- success

Finally the questionnaire was sent out to the following international mailing lists:

- Climate-L, a news and announcement list service that focuses on the climate change policy and issues [31];
- Forest-L, an e-mail list for news and announcements related to forest policy issues [32] and
- CLIM-FO, the 'FAO mailing list on Climate Change and Forestry', published in a newsletter format [16].

Additionally, questionnaires were sent out to several contact people at ministries and non-governmental organizations in all Annex B countries.

The advantage of sending out an e-mail questionnaire to big web mailing lists was that thousands of experts could be reached with just one e-mail.

²The original questionnaire is attached in the Annex

The handicap of this kind of data collection, however, was that people could not be addressed personally. Time was another limiting factor within the existing survey. Many experts were on travel or did not have the time to fill in a questionnaire within the given schedule.

Three weeks after sending the questionnaire to the lists, a reminder was sent out. At the deadline of this data collection, 22 questionnaires from 16 different countries were on hand. Still the feedback was meager considering the range of such an e-mail.

3.2. Data analysis

The data collected was stored in a Microsoft Access data base and have been preliminary analysed, put together and described.

Out of the whole data, an excel file was created. This excel file concentrates on incentives for which a high level of information was available.

Why was it necessary to create a summarizing excel file?

Information about 24 countries (e-mail questionnaires plus other sources) out of 38 Annex B countries under the Kyoto Protocol was collected via e-mail questionnaires and other sources as described under 3.1.1.

In detail 81 programmes were found and inserted into the data base. Some programmes were described in detail whereas only superficial information was available for other programmes (for example: Name of the programme and kind of incentive). Because of the big amount of data it was necessary to extract incentives for which a high level of information was available.

Those incentive programmes are listed in the excel file³ to provide a clearly laid out overview.

The EXCEL FILE contains five sheets. The sheets: "Subsidies", "Tax incentives and Loans", "CO₂ Credits", "Other Incentives" (like technical assistance) include a description of the programme, the target group, of the minimum/maximum area supported, the success, the management plan, the monitoring of the activity, the monitoring of GHG benefits, the funding, the communication and comments. The

³ please find the excel file attached at the CD Rom

sheet “Contact persons” contains information about national experts who made contributions to the survey.

It was my intention to give examples from different continents in the thesis (see Abstract).

In this respect nine significant examples out of the excel file have been extracted and are described here in detail.

3.3. Problems

The data collection turned out to be very difficult because:

- In order to provide current data, primary data had to be collected but only few experts provided such data.
- The data collection was taking place in a time when it was still uncertain whether the Kyoto Protocol would come into force or not. Incentives in the LULUCF sector provided with the intention to meet Kyoto targets were in many cases only just being developed during or after the preparation of this report.

A reasonable structure of the diploma theses had to be found but:

- On the one hand there were overlaps within the kinds of incentives: 23 % of the incentive programmes offered two or more incentives at the same time (see figure 5, chapter 4.1).
- On the other hand there were overlaps within the categories: Many programmes were designed for more than one category. To give an example the ‘Environmental Equality Incentive Program’ from the United States Department of Agriculture provides incentives for the categories forest management, cropland management, grassland management and revegetation.

As the main focus of the existing work was on incentives, the thesis was arranged according to the type of incentives (subsidies, special concessions, CO₂-credits, and others) in the end.

A major problem with the data collected was that the data were very heterogeneous and therefore not directly comparable:

- The time frame: It was not possible to concentrate on a time period of the last 5 to 10 years (for example 1999 to 2004) because a major part of the data (e. g. from the 'European Forest Institute') available was for the period 1990 to 1999 or about incentives from earlier times. The incentive programmes implemented before 1999 constituted a major part of the whole data collection and therefore could not be excluded. The disadvantage of not having a time frame was that programmes could not be compared in this spirit.
- The reasons for success or failure are very complex, varied from programme to programme and therefore were not comparable at all.
- The desired data per incentive programme were only complete in exceptional cases. In this regard the whole range of incentive programmes could not be compared issue by issue.

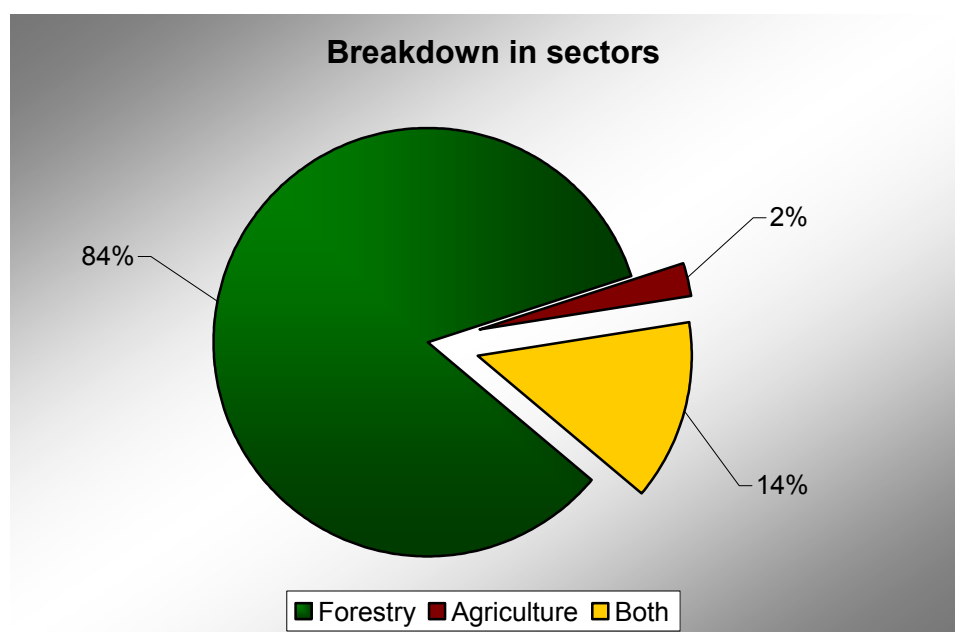
4. Results

4.1. Overview

Out of 38 Annex B countries under the Kyoto Protocol data have been collected about 24 countries⁴. In total 81 programmes have been on hand.

Out of those 81 incentive programmes, 22 have been collected via the e-mail questionnaire (see Annex and chapter 3.1.2.). Those filled in questionnaires derive from 16 different countries⁵, 11 of which are Annex B countries under the Kyoto Protocol⁶ describing 18 incentive programmes.

Figure 3: Number of programmes addressing forestry, agricultural or both sectors



Source: filled in questionnaires, e-mail interviews and literature mentioned in chapter 6, References and in the data base attached to this document on a CD-ROM

⁴ Australia, Austria, Belgium, Brazil, Canada, Costa Rica, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Mexico, the Netherlands, New Zealand, Norway, Paraguay, Poland, Portugal, Spain, Sweden, United Kingdom, United States of America

⁵ Australia, Brazil, Canada, Costa Rica, Denmark, Germany, Hungary, Ireland, Italy, Mexico, New Zealand, Paraguay, Poland, Portugal, United Kingdom, United States of America

⁶ Australia, Canada, Denmark, Germany, Hungary, Ireland, Italy, New Zealand, Poland, United Kingdom, United States of America.

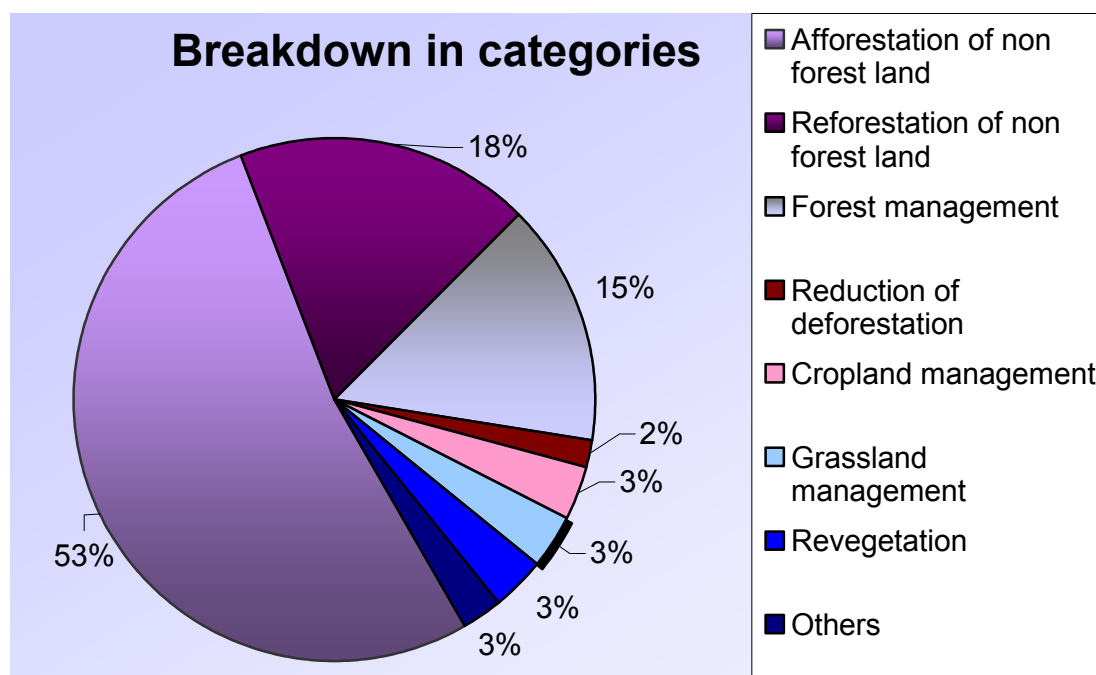
Figure 3 shows the breakdown of incentive programmes collected from August 2004 until August 2005 in the sectors forestry and agriculture. The diagram demonstrates the dominance of the forest sector within this work. There were hardly any incentives addressing agriculture only. Many incentives were addressing both the forest sector and the agricultural sector.

One has to consider that the data collected are not complete and therefore do not mirror the realistic relationship between incentives provided for the agricultural and the forestry sector.

Categories of interest

Figure 4 (below) shows that 88 % of the incentive programmes found are related to the forest sector. Within this sector, a majority, namely 53 % of the incentives are provided for the afforestation of non-forest land.

Figure 4: Breakdown in categories of the whole data collection



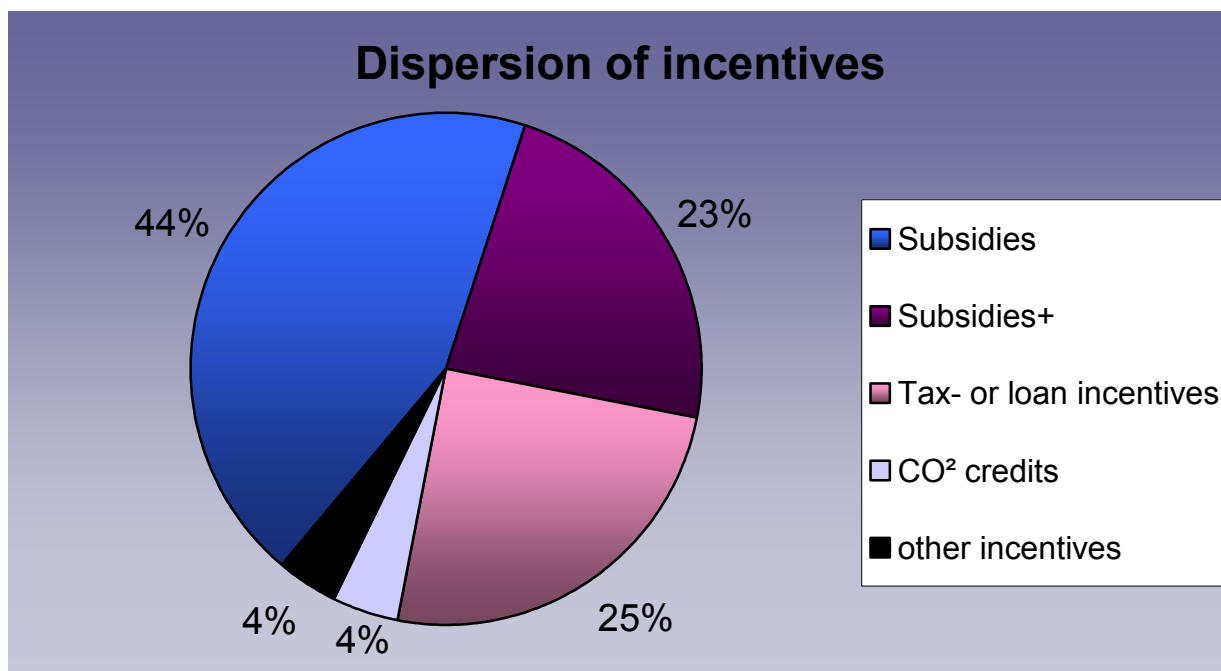
Source: filled in questionnaires, e-mail interviews, literature mentioned in chapter 6, References and in the data base attached to this document on a CD-ROM

The category 'others' also includes other categories not specified in figure 4, for example power industry or industry in general. In some cases, 'others' was not specified at all.

Incentives

67 % of the incentive programmes treated within this work offered subsidies to the target groups:

Figure 5: Dispersion of incentives



Source: filled in questionnaires, e-mail interviews, literature mentioned in chapter 6, References and in the data base attached to this document on a CD-ROM

Figure 5 shows that in among 23 % of the programmes subsidies in combination with other incentives are available (subsidies +):

- subsidies and tax or loan incentives (11 out of 17)
- subsidies and CO₂-credits (3 out of 17)
- subsidies, CO₂-credits and other incentives (2 out of 17)
- subsidies, tax or loan incentives and other incentives (1 out of 17)

25 % of the programmes offered tax incentives only, 4 % CO₂-credits only and another 4 % provided other incentives like technical assistance. (for more details see the attached Excel file)

Success:

To measure the success or failure of a programme, experts were asked within the questionnaire to judge the incentive programme on a scale from one to five. One stood for "very successful" while five stood for "not successful".

The following figure shows the spreading of the answers given to that question:

Table 1: Evaluation of incentive programmes through experts

Country/Programme	Evaluation results				
	1	2	3	4	5
Australia: Carbon Tender	X				
Austria: ÖPUL – The Austrian Agri-Environmental Programme		X			
Canada: Forest 2020 Plantation Demonstration and Assessment Initiative	X				
Denmark: Afforestation Programme		X			
Germany: Improvement of agricultural structures (GAK)			X		
Hungary: National Forest Programme				X	
Ireland: Afforestation Grant and Premium Scheme	X				
Italy: Accompanying measures of the CAP reform			X		
Italy: Rural Development Programme (2000-2006)			X		
New Zealand: Emissions & Biodiversity Exchange (EBEX)		X			
New Zealand: Permanent Forest Sink Initiative	no answer (not implemented yet)				
Northern Ireland: Woodland Grant Scheme (WGS) and Farm Woodland and Premium Scheme (FWPS)		X			
Portugal: RURIS – Afforestation of agricultural land					X
USA: Conservation Reserve Programme	X				
USA: Environmental Equality Incentive Programme	X				

USA: Forest Land Enhancement Programme	X				
USA: Grassland Reserve Programme			X		
USA: Wetland Reserve Programme	X				

Source: filled in questionnaires

Table 1 shows the evaluation of incentive programmes through experts who filled in the e-mail questionnaire (see Annex). The majority of incentive programmes were evaluated as being very successful (7 out of 17), only one programme was judged as unsuccessful.

In the following chapters, nine incentive programmes offering different kinds of incentives are presented. The allocation was made according to the main incentive. (see chapter 3.3.)

4.2. Subsidies

“In economics, a subsidy is generally a monetary grant given by government to lower the price faced by producers or consumers of a good, generally because they are considered to be in the public interest.” (web site of the online encyclopaedia Wikipedia [12])

In the context of sustainable forestry, subsidies are: *“direct payments in cash or kind designed to encourage sustainable management or new planting.”* (LAWSON, G. et al, n. d.)

4.2.1. Europe

“European forests have been expanding for many decades while global forests shrink. This expansion is connected partly with changes and adjustment in agriculture.

Main drivers for afforestation are economic incentives (subsidies) or the release of former agricultural land. The limitation of agriculture is among others linked to a

surplus of food production. Motives for incentives are timber production and environmental management in some form. In general reasons for afforestation are complex but more likely connected with the provision of services than with the production of timber.

Problems of afforestation are, among others, changes in the traditional cultivated landscape and monocultures. The current surplus of timber raises the question of the demand for timber from new forests. In addition it is questionable if timber-sale from European forests is a competitive market at all, considering cheap supplies from countries like Chile or the Russian Federation. Costs of a multi-functional managed European forest may widen the cost difference between Europe and countries, where environmental concerns are subordinate and where land and labour are cheap.

The trend towards broad-leaved species may fill a niche market and could be a chance for Europe in the global competition.” (MATHER, A., in WEBSTER, N., 2000: 11-19)

Forestry measures:

“In the European Union, there is no common policy concerning forestry but the EU finances forestry.

Practically all forest activities are carried out within the agricultural programs of the EU.” (web site of the Earth Council, Edinburgh Centre of Tropical Forests [24] and GILSENAN, R.,2003: 52) Within the 1990s the regulation 2080/92 was an important community aid scheme for forestry measures in agricultures. This regulation is still relevant for the currently operating funding programmes and therefore will be specified below.

Regulation 2080/92

“Regulation 2080/92 of 30 June 1992 was an accompanying measure to the Common Agricultural Policy (CAP) and authorised aid for environment, early retirement and forestry.” (DU BREIL DE PONTBRIAND, L., in WEBSTER, N, 2000: 23) The regulation has been trend setting concerning the design of following incentive programmes.

“2080/92 was binding to the member states of the European Union but each state could adjust the guideline according to its preferences.

The main aim of this regulation was the reduction of agricultural production areas while providing income opportunities in rural areas.

The targets should be reached by the

- afforestation of agricultural land and
- improvement of forests within agricultural holdings” (GILSENAN, R., 2003: 53)

These objectives should be met by offering

- “aid for afforestation of non-forest land
- aid for investment in order to create plantations
- premiums for maintaining the new plantations
- premiums to cover losses of income resulting from afforestation of agricultural land and
- investment aid for the improvement of woodlands which belong to farmers.” (GILSENAN, R. 2003: 54)

“Between 1994 and 1999 one million hectares of agricultural land were afforested under this regulation”(European Commission, 2003: 20) , “490,000 ha of which were afforested in Spain.” (BARBERO, A. in WEBSTER, N., 2000: 67)

“While the aim of afforestation of agricultural land was successfully reached, especially in southern Europe, agricultural areas have not been reduced. The land mainly chosen for afforestation was of low productivity.

Still afforestation was quite important in some member countries (like Ireland and Spain).” (GILSENAN, R., 2003: 55)

While GILSENAN 2003 states that afforestation of non-forest land constitutes only a small part of forestry incentive programmes in Europe, within this survey predominantly incentive programmes concerning the category afforestation of non-forest land(see chapter 4.1 and the attached excel file) were found.

Council Regulation (EC) No 1257/1999 of May 1999 is the recent ‘Rural Development Programme’ of the European Commission. “Support for afforestation under Regulation 2080/92 is continued under this scheme, taking into account the

experience of the implementation of that scheme.” (European Commission, 1999, p 4)

“The focus of this regulation is on:

- afforestation of agricultural land
- investments to improve the multifunctional role of forestry and the
- improvement of the forest protection values.” (European Commission, 2003: 16)

Table 2: Financial forecast of forestry measures in the framework of the rural development programmes 2000 – 2006: EU contribution under EAGGF

Country	Afforestation		Other forestry measures		Total
	in EUR Million	%	in EUR Million	%	in EUR Million
Austria	8	10 %	73	90 %	81
Belgium	3.5	24 %	11.3	76 %	14.8
Germany	127	30 %	303	70 %	430
Denmark	35	84 %	6.5	16 %	41.5
Greece	58	31 %	130	69 %	188
Spain	640.5	43 %	834.5	57 %	1475
Finland	23	57 %	41	43 %	64
France	46	17 %	227	83 %	273
Ireland	351	92 %	31.5	8 %	382.5
Italy	567.5	60 %	374.5	40 %	942
Luxembourg	0.014	1 %	1.1	99 %	1.1
the Netherlands	4.4	45 %	5.5	55 %	9.9
Portugal	347	55 %	288	45 %	635
Sweden	0.07	5 %	1.6	95 %	1.7
United Kingdom	175	88 %	23	12 %	198
Total	2385.5		2352		4737.5

Source: European Commission, 2003: 17

Table 2 shows the concentration of the expenses for afforestation on Southern Europe (Spain, Italy, Portugal) and Western Europe (Ireland and the United Kingdom). Other forestry measures are highly supported in Spain, followed by Italy, Germany, Portugal and France while Sweden, Luxembourg and the Netherlands receive a low percentage of the total expenditures for this measure.

A significant example of a European subsidy scheme under regulation 2080/92 is the Afforestation Grant and Premium Scheme which offers grants and tax incentives for the afforestation of non-forest land in Ireland:

4.2.1.1. Ireland

Mr. BYRNE VINCENT from the department of agriculture and food in Ireland stated that “by the end of the year 2003, the national forest estate stood at 689,428 ha. This represents almost 10% of Ireland's total geographical area. The average throughout the other EU Member States is at 33 % forest cover.

The majority of planting has historically been undertaken by the State. As a direct result of ongoing government and EU support for forestry, private investment in forestry has increased dramatically. The private estate now constitutes 40% of all forests growing in the country and 90% of new planting is done by private growers, most of whom are full time farmers.”

“While Ireland has one of the lowest levels of forest cover in the EU, the recent planting rate is among the highest in Europe.” (GILSENAN, R., 2003: 69)

“In the 1996 Growing for the Future Strategic Plan for Forestry the target of 17 % national forest cover was set out. This plan aimed at afforestation rates being 20,000 ha per annum.” (GREEN, C., 2005)

CARLY GREEN, Researcher at the University College Dublin suggests the Afforestation Grant and Premium Scheme “is very successful even though it did not meet the target with an average of 12.000 ha afforested per annum. In recent years the document is considered to be over ambitious and a revised strategy is due for release in 2005.”

The following data about the Irish Afforestation Grant and Premium Scheme have been provided by CARLY GREEN from the ‘Forest Ecosystem Research Group’, University College Dublin, through an e-mail questionnaire (see Annex):

Afforestation Grant and Premium Scheme

“The Afforestation Grant and Premium Scheme was established in 1990. This followed on from less attractive schemes which dated from the early 80's.

Eligible activities subsidized by the scheme are the afforestation and reforestation of non-forest land as well as woodland improvement of old forests that were not managed in the past.

The Kyoto Protocol was no key driving factor to implement the programme.

Category

Afforestation of non-agricultural land

Minimum area supported

For individual applications, grants are not issued for areas less than 1 ha for conifer species and 0.1 ha for broadleaf species.

Biodiversity and protection of native species

Payments depend on the species used. Increased grants are available for broadleaved species. Support for conifers is lower.

Land areas classified as areas of environmental significance can not be planted, even though these areas may be farmed.

Target group

The programme is targeting landowners and others (no specification of the item “others” was made). Farmers get higher premiums than investors and non-farmers.

Funding

The programme is administered by the Federal Government who funds € 115 million per annum including all existing and new commitments.

Subsidies

Plantation establishment

The target group receives payments from € 2150 to € 6730 per ha for establishment. The range is dependent on the species used and the site conditions.

Maintenance

Once the stands have reached 14 – 18 cm DBH (diameter at breast height), a grant is available for pruning: € 698.36 per ha for the first round and a further € 825 per ha are available for the second round about 4 years later.

Compensation for loss of income

Farmers receive € 209.51 per ha for conifer species and € 499.01 per ha for broadleaves for 20 years maximum. Non-farmers receive € 171.41 per ha for conifers and € 184.11 for broadleaves for 15 years.

Other justification for payments

Grants are available for forest roads to a maximum of € 571.40 per ha and for lorry access at harvest a maximum of € 851.10 per ha is available.

Tax incentives

Grants and Premiums are tax free. Income from the sale of the timber at harvest is also tax free.

Penalties

The landowner will be fined or will have to repay the premium for not fulfilling an agreement.

Ways of informing the target group

The target group will be informed via internet, extension service, newsletters, newspapers, radio, and TV. Farmers are informed through Teagasc⁷, also by forestry contractors such as Greenbelt⁸ and the Western Forestry Co-Op.

The way the Irish forest service communicates its scheme to the target group is worth mentioning. Brochures about the scheme have a very attractive design, are clearly expressed and easy to understand.⁹

⁷ The Irish Agriculture and Food Development Authority (www.teagasc.ie)

⁸ <http://irishforests.com/directory/greenbelt.html>

⁹ Author's Note

Monitoring of the activity

5 – 10 % of applications are visited annually by inspections by the Forest Service field officers. To confirm that activities have taken place, the site is monitored beyond the programme period.

Evaluation of success

Per annum 12,000 ha and total from the beginning of the programme 170,000 ha have been enrolled. The total planned area until the end of the programme is 1.9 million ha or 17 % of the total area of the country. Currently 10 % of the forest cover or 59 % of the set target have been reached.

Mr. GREEN stated in the questionnaire that the programme is very successful (1 in a scale out of 5, 1 = very successful, 5 = not successful, see chapter 4.1, entry 'success'), especially in recent years the document is considered to be over ambitious. Reasons for success are that

- grants cover full costs of establishment and
- tax free long term payments are available.

Barriers to implementation of the programme

- Environmental considerations in the conversion to forest land.
- A new rural development plan is being drafted by the Department of Agriculture. This new plan (yet to be approved) could see forestry establishment grants reduced from 100 % to 40 %. As the **grants and premiums are a main driver for farmers to convert their land** to forest, this is seen by the Forest Service as a considerable threat to maintaining 12,000 ha per annum.
- The Rural Environment Protection Scheme (REPS) has competed with the Forest Grants and Premiums Scheme in the past with afforestation restrictions in place for farmers who joined. This was removed from the programme in 2000 and planting is now allowed following identification of appropriate areas within a farm management plan.

Initially the programme described covered public and private lands and so targets set were for the combined sectors. The EU who provides financial support through the National Development Plan (NDP) ruled in 2001 that grants and premiums should not

be available for the public forestry sector. Forests planted by the state were subsidised by the EU up until that point. Since then afforestation rates in the public sector have substantially declined.”

4.2.1.2. Portugal

“Agricultural land occupies 43% of the country’s territory while woodland accounts for approximately 37 % of land cover. Since the beginning of the 20th century, forest cover has increased. Between 1972 and 1995 the woodland area increased by 470.000 ha. 87 % of the woodlands are privately owned. 85 % of the total number of plots have an area of less than 5 ha while only 1 % of the plots are greater than 100 ha.

To meet its Kyoto targets, Portugal counts on the expansion of woodland area.” (Ministry of Urban Affairs, Spatial Planning and the Environment, 2003: 34 - 36)

“A major aim is to expand the Portuguese forest cover land by 2 % in the next 10 years to reduce atmospheric CO₂.

Economic incentives have been given to reach this target. Two of these incentive programmes address categories treated within this survey:

- **RURIS – Afforestation of agricultural land** was designed to promote quality forest extension to agricultural lands with species compatible to the environment. Other objectives besides carbon sequestration have been
 - the rehabilitation of impoverished soils and
 - the mitigation of desertification effects by recovering soil fertility and regulating water resources.
- **AGRIS – Sustainable Management and Ecological Stability of Forests.”** (Ministry of Urban Affairs, Spatial Planning and the Environment, 2003: 50 [59])

The Programme RURIS - Afforestation of agricultural land which is the only Portuguese incentive programme concerning afforestation of non-forest land, will be specified as an example of an unsuccessful programme. Data about the programme were provided by JOSE FONSECA, a private stakeholder, through an e-mail questionnaire (see Annex)

RURIS – Afforestation of agricultural land

This programme supports landowners with periodic financial payments up to 20 years.

The Kyoto Protocol was no key driving factor to implement the programme.

Category

Afforestation of non-agricultural land

Minimum area supported

The area afforested must be at least 0.5 hectares.

Biodiversity and protection of native species

For fast growing species less money for a less period (10 years) can be received while for other species payments up to 20 years are available.

A minimum number of plants per hectare must be kept.

Target group

The programme is targeting landowners.

Funding

50 % of the programme is funded by the European Union, 50 % by the local government. 40 to 70 % of the total costs for afforestation are financed; the rest has to be paid by the landowner.

Subsidies

Plantation establishment

Up to 1000 Euros/ha are offered.

Maintenance

For the first five years there are periodic payments for maintenance.

Compensation for loss of income

For fast growing species less money for a shorter period (10 years) can be received. Other species are subsidised with more money for up to 20 years.

Penalties

For not fulfilling an agreement of the contract, the subsidies plus an interest rate have to be returned.

Ways of informing the target group

The target group gets information about the programme via the extension service.

Monitoring of the activity

The monitoring system to confirm that activities have taken place is called IFADAP. The fields are visited at least once during the whole period of 5 years. Sampling and self reporting are monitoring methods being used during the programme period.

Evaluation of success

1096 landowners have participated in the programme between 2001 and 2003.

FONSECA judges the programme as unsuccessful (5 in a scale out of 5, 1 = very successful, 5 = not successful, see chapter 4.1, entry 'success').

Reasons for failure were described as:

- Too much bureaucracy.
- There is a great fire risk and land owners do not want to spend money just for seeing a fire taking away everything.

Although this programme was not directed for the mitigation of GHG, today Portugal is counting with this programme to reduce GHG in order to comply with the Kyoto Protocol. But until now there was only a small increment in the subsidies in 2003 to try to call more participants until 2006."

4.2.1.3. Austria

Almost half of the total area of Austria is covered with forests. ALBERT KNIELING from the Federal Ministry of Agriculture, Forestry, Environment and Water management, Department of Forestry stated in a telephone interview that thus afforestation of non-forest land is not expected to lead to much further carbon sequestration. The Austrian focus is on the agricultural sector concerning the sequestration of GHGs:

The following data were provided by Mr. ALOIS POSCH from the Federal Ministry of Agriculture, Forestry, Environment and Watermanagement, Austria:

The Austrian agri-environmental programme ÖPUL (EU- Regulation 1257/99)

„ÖPUL (Österreichisches Programm zur Förderung einer umweltgerechten, extensiven und den natürlichen Lebensraum schützenden Landwirtschaft) is a voluntary programme offering compensation payments to farmers. It came into force in 1995 when Austria participated in the European Union. The last revision of the programme has been made in 2000.

The programme is designed to protect all environmental resources (soil, water, landscape, biodiversity and air) and has a direct connection to the Kyoto Protocol.

One of the aims of ÖPUL is to avoid emissions:

A reduction of dinitrogen oxide (N₂O), to give an example, is achieved by all the measures which lead to a reduction of the amount of nitrogen used such as organic farming, renunciation or reduction of yield-increasing input or nature protection measures with a limitation of fertilisation. Hence, the measure organic farming plays an important role in the strategy for the implementation of the Kyoto Protocol.

The measure called spreading of liquid manure close to the soil has also very positive effects because it reduces particularly the emission of methane.” (POSCH, A., 2005, personal communication)

Category

Cropland management and grassland management

The following data were collected at several web sites of the Ministry of Agriculture, Forestry, Environment and Water management, Austria: [39] and [40]

Minimum area supported

Concerning *the change of agricultural land into grassland and the reduction of nitrogenous fertilizers* at least 2 hectares (in certain cases 0.5 hectares) have to be managed. Annually at least 20 % of the total agricultural area have to be changed into grassland in the case of a participation in the programme *change of agricultural land into grassland*.

Target group

Every farmer can basically participate in ÖPUL provided that he complies with the eligibility criteria. The participation is on a voluntary basis.

Funding

The programme is partly funded by the European Union, the Austrian Government and the 'Länder'. The total level of funding in 2004 was 645.8 million Euro.

Subsidies

The applicant can participate in one or several of the 31 measures. It is also possible to subsidise several measures on one area.

Farmers will for example receive financial payments under the programme for

- "limiting their number of livestock per ha", (Österreichische Energieagentur & Umweltbundesamt GmbH: 174),
- changing a certain percentage (at least 20 %) of their total agricultural area into grassland (for a duration of up to 6 years),
- organic farming and for
- the reduction or renunciation of yield-increasing inputs on grassland or arable land.

Success

"74% of the farmers owning 88 % of the agricultural area have participated in the programme in 2002." Web site of the Federal Ministry of Agriculture, Forestry, Environment and Watermanagement, Austria, 2005:180 [43])

Mr. Posch from the Federal Ministry of Agriculture, Forestry, Environment and Watermanagement, Austria judges the program as successful (2 in a scale out of 5, 1 = very successful, 5 = not successful, see chapter 4.1, entry 'success').

Reasons for success of the programme are:

- "Environmental awareness among landowners
- Sensitiveness on environmental affairs
- Education of the target group" (Federal Ministry of Agriculture, Forestry, Environment and Watermanagement, Austria, 2004: 24)

Ways of informing the target group

Information about the programme is published on several internet sites, in newsletters, in the journal *Bauernjournal West* and by extension services.

4.2.2. United States of America

The United States of America are the biggest carbon dioxide emitter in the world. Under the government of President GEORGE W. BUSH the Kyoto Protocol was ratified because of economical reasons.¹⁰

Still GEORGE W. BUSH stated in 2002 that “America would look for ways to increase the amount of carbon stored by America’s farms and forests through a strong conservation title in the farm bill.” (web site of the ‘U. S. Department of State’ [51])

For that reason the United States Department of Agriculture (USDA) is taking a series of actions to respond to the challenge laid out by President BUSH in February 2002. In the fact sheet SDA Targeted Incentives for Greenhouse Gas Sequestration the USDA specified the implementation of greenhouse mitigation activities in agriculture and forestry in the United States:

“The actions the USDA implemented include financial incentives, technical assistance, demonstrations, pilot programmes, education and capacity building along with measurements to assess the success of these efforts.

The USDA estimates that the increase in conservation investments and a focus that includes carbon sequestration efforts both will reduce GHG emissions and sequester roughly 12 million tons of greenhouse gases (measured in carbon equivalent terms) annually by 2012.

In the fact sheet, the USDA also states that forests, crop and grazing land conservation actions can play a unique role in reducing the greenhouse gas intensity of the U.S. economy.

Thus the USDA focuses on changes in

- land use and land management to increase the carbon stock in cropland soils by converting them back into forests, grassland or wetlands as well as in
- land management practices such as conservation tillage (e. g., reduced or no

¹⁰ see chapter 2.2

till), residue management, cover cropping, increasing crop frequency, nutrient and water management and

- erosion control to increase soil carbon content while the land is still used for crop production.”

The following USDA programmes support these efforts mentioned above: The Conservation Reserve Program (CRP), the Environmental Quality Incentive Program (EQIP), the Forest Land Enhancement Program (FLEP), the Grassland Reserve Program and the Wetland Reserve Program.¹¹ The Environmental Quality Incentive Program and the Wetland Reserves Program will be specified as examples of incentive programmes in the United States of America.

Data about the Environmental Quality Incentive Program were provided by DAVID WEBSTER from the USDA – Natural Resources Conservation Service through an e-mail questionnaire (see Annex):

Environmental Quality Incentive Program (EQIP)

EQIP is a voluntary conservation programme for farmers and ranchers.

Actions that reduce GHG emissions are rewarded and recognized within a ranking system which may vary from state to state and from county to county.

EQIP offers financial and technical help to assist eligible participants install or implement structural and management practices on eligible agricultural land. The main focus of this programme is on direct financial incentives and for that reason it is discussed in this chapter.

The Kyoto Protocol was no key driving factor to implement the programme.

Category

Eligible EQIP activities concern the categories forest management, cropland management, grassland management and revegetation.

¹¹ for more information please view the excel file: Incentives for LULUCF activities_an overview”

Biodiversity and protection of native species

State and local ranking criteria may give priority to those who use native crop plant species.

Target group

Eligible participants of this programme are landowners, leaseholders, tribal lands and enterprises.

Funding

The programme is administered by the Federal Government and the total level of funding available for the programme is \$ 2.2 billion to date. \$908 million have been funded in 2004.

10 % or more of the costs of installation of the practices is paid by the participant.

Subsidies

Plantation establishment

Cost-share: Up to 75 % of the costs of certain conservation practices are paid. Limited resource producers and beginning farmers and ranchers may be eligible for cost-shares up to 90 %.

Maintenance

Payments may be set up in the individual states and by local designated conservationists to encourage producers to change what they are doing. The ranking process may allocate funds to the individual resource concerns and/or give higher ranking to those who will implement a group of practices that are covered by the incentive payment.

Incentive practices will be subsidized for three years maximum.

Other justification for payments

Grants will as well be paid for innovative practices.

EQIP offers contracts with a duration of payments for 10 years maximum. The minimum term ends 1 year after the implementation of the last scheduled practices.

Technical assistance

Farmers and ranchers may elect to use a certified third-party provider for technical assistance

Special concessions

There may be a tax deduction for implementing a conservation plan.

Penalties

Contract termination, repayment of the cost share and the payment of liquidation damages are consequences if agreements of the contract have not been fulfilled.

Ways of informing the target group

The target group will be informed via internet, community, district newsletters, FSA¹² newsletters, local work groups, state technical committees, state and national listening sessions.

The way the Natural Resources Conservation Service communicates its scheme to the target group is multifaceted. The content of the website is as complex as the scheme itself. [46]¹³

Monitoring of the activity

Self reporting is the monitoring system to confirm once a year that activities have taken place. Some practices require the participant to keep records and to comply with permitting requirements that are enforced by state and local government. The monitoring stops when the programme period is over.

Evaluation of success

30,251 individual contracts were enrolled in the year 2003. \$2.2 billion were provided for 152,000 individual contracts to date. Related to farmland and cropland approximately 120 million acres benefited. DAVID WEBSTER from the USDA –Natural Resources Conservation Service stated in the e-mail questionnaire that the

¹² FSA = Farm Service Agency

¹³ Author's Note

programme is very successful (1 in a scale out of 5, 1 = very successful, 5 = not successful, see chapter 4.1, entry 'success').

Reasons for success:

- Producers pay part of the costs of the practices and therefore are more committed to their implementation,
- The programme assists the participant to comply with local state and federal laws,
- Producers are dedicated to be good stewards of their resources and
- Local input and support are given.

Reasons for failure:

- Limited sources of technical assistance and
- A limited number of conservation contractors and suppliers.

Barriers to implementation of the programme

- Participants have a problem getting control of the land for the term of the contract.
- Low commodity prices limit the amount of funds available for conservation practices, even with substantial government cost share.
- On federal land there is a slow approval of the practice implementation.

Wetlands Reserve Programme

“The Wetlands Reserve Program is a voluntary conservation program. The USDA - Natural Resources Conservation Service (NRCS) offers landowners the opportunity to protect, restore and enhance wetlands on their property in exchange for retiring marginal land from agriculture by providing financial and technical support.”(website of the U.S. Natural Resources Conservation Service [47])

The Kyoto Protocol was no key driving factor to implement the programme.

The following data were provided by Mr. LEONARD JORDAN, USDA – Natural Resources Conservation Service through an e-mail questionnaire (see Annex):

Category

Reforestation of non-forest land, grassland management and revegetation

Minimum area supported

Conservationists may establish acreage limitations but there is no national limitation.

Target group

Party to a contract must be a landowner or tribe. The landowner must be able to provide a clear title.

Funding

The programme is authorized to enrol 2,275,000 acres up to the year 2007. For the year 2005 the NRCS is authorized to enrol 154,500 acres. Initial funding provided from the Commodity Credit Corporation is \$247,154,312.

For 30-year easements and cost-share agreements, the landowner or another partner contributes 25 % of the restoration cost.

Subsidies

Restoration cost-share agreement

This is an agreement (generally for a minimum of 10 years) to re-establish degraded or lost wetland habitat. USDA pays up to 75 % of the cost of the restoration activity. This enrolment option does not place an easement on the property.

Permanent easements

Easement payments for this option equal the lowest of the following three amounts: the agricultural value of the land, an established payment cap, or an amount offered by the landowner. In addition the federal government contributes 100 % of the restoration costs.

For 30-year easements and cost-share agreements the federal government contributes up to 75 % of what would be paid for a permanent easement and it pays up to 75 % of the restoration costs. The federal government pays for costs associated with filing an easement.

For both permanent and 30-year easements, the USDA pays all costs associated with recording the easement in the local land records office, including recording fees, charges for abstracts, survey and appraisal fees, and title insurance.

Ways of informing the target group

The target group will be informed about the Wetlands Reserve Programme via internet, community, extension service and newsletters or newspaper, radio and TV.

The programme seems to be well disposed. [45]¹⁴

Monitoring of the activity

The monitoring system in place for this programme is a combination of remote sensing, sampling and others (no specification of the item “others” was made).

Evaluation of success

In the years 2002 to 2004 on average 200,742 acres per year have been enrolled under the Wetlands Reserve Programme. In total 1.6 million acres of land have been enrolled and 8300 participants have been taking part in the programme until now.

LEONARD JORDAN judged the programme as very successful (1 in a scale out of 5, 1 = very successful, 5 = not successful, see chapter 4.1, entry ‘success’). As a reason for success he indicated that wildlife habitats have been restored.¹⁵

4.3. Special concessions

In the questionnaire the term “special” refers to incentives like:

- low interest loans
- tax incentives
- price guarantees

Most incentives found were tax incentives followed by low interest loans while price guarantees did not occur.

¹⁴ Author’s Note

¹⁵ This needs to be considered as a positive result of the programme, not so much as a reason for success.

As shown in figure 5, 25 % of the overall incentives were tax incentives or loan incentives. In detail, 78 % were tax incentives, 22 % were loans including combinations of subsidy and tax- or loan-incentives.

For programmes that offer special concessions as a main incentive, only superficial data, such as programme name and a short description was available.

This work can therefore only present an overview over special concessions without going into great detail.

The spectrum of tax and loan incentives is very wide and hardly any two incentives are of the same kind:

- In Alberta, agricultural and forest land is taxed at the same rate (Land Tax Assessment Categories, Canada).
- The Managed Forest Tax Incentive Programme (Canada) offers a municipal tax reduction of 75 % on qualifying land.
- The Czech Republic offers land-tax concessions in the forest management sector within the programme Land –tax concessions.
- In France, tax breaks can be claimed for farmers who convert agricultural land into forests (National Forestry Fund).
- Within the Irish Afforestation Grant and Premium Scheme grants and premiums are tax free. Concerning the capital gains tax the land is liable while the income from the sale of the harvested timber is also tax free. There is also a concession for the capital acquisitions tax: Transfers between parent and child are except up to a threshold (€ 422.148 in 2002).
- After four to five years, land that has been successfully afforested under the Polish Forestry Act is considered forest and lower taxes apply.

The complete list of “Tax incentives and Loans” can be viewed in the attached Excel file.

Besides tax incentives that lower the total costs of the implementation of certain activities (like tax reductions or tax exemptions), there are taxes which increase the total costs of implementing activities, like in the following case. Both kinds of incentives can encourage the landowner to implement GHG mitigation activities.

Taxes on emissions

“In general, taxes on GHG emissions can encourage the implementation of measures to reduce emissions or enhance sequestration.

The withheld taxes can be used to implement further GHG emission reduction measures.” (NEUWIRTH, J., and WEIß, G., 2005: 4)

4.4. CO₂ credits

4.4.1. Overview

“Carbon credits as defined by the Kyoto Protocol are one metric ton of carbon emitted by the burning of fossil fuels” (web site of the online encyclopaedia Wikipedia [2]) and trading with emission units is a very dynamic, ongoing market.¹⁶

Very interesting and innovative CO₂-credit offering programmes in the forestry sector have been found in Australia and New Zealand. The Australian Carbon Tender, a programme offering CO₂-credits as well as subsidies, is specified below.

4.4.2. Australia

Even though Australia has not ratified the Kyoto Protocol, the continent is in the front line of countries implementing innovative programmes to mitigate climate change.

While “the Australian Government together with the United States, China, India and South-Korea works on a new accord aiming at reducing GHGs without affecting economy and industry” (Der Standard, 28.7.2005: 5) several programmes addressing the mitigation of climate change have already been established.

Nameable programmes of the Victorian Government are Plantations for Greenhouse (P4G) and Carbon Tender.

The following data about the programme Carbon Tender were provided by JACK HOLDEN from the Department of Sustainability and Environment, manager of Carbon Tender, through an e-mail questionnaire (see Annex):

¹⁶ see chapter 2.2

The Carbon Tender

Landowners and leaseholders bid for contracts based on “dollar per unit of CO₂ offset”. Only the best value contracts are allocated in a sealed bid tender process.

Eligible landowners receive direct financial payments and 10 to 50% of the CO₂ credit units.

The Kyoto Protocol has been a key driving factor for implementing the programme.

The total GHG mitigation that could be achieved by the programme is estimated to be 200,000 tonnes CO₂-e¹⁷ until 2055.

Category

Reforestation of non-agricultural land

Minimum area supported

The minimum size of the area supported is 2 or 5 hectares depending on how valuable the biodiversity attributes of the sites are. The value of the biodiversity attributes is assessed on the ability of new vegetation to provide links and buffers for remanent vegetation to give the ecosystems more resilience in a changing climate.

Biodiversity and protection of native plant species

Incentives depend on the species used. Biodiversity milestones based on the number of life forms and the relative abundance can be achieved. The amount of milestones influences the performance based payments.

Target group

Eligible participants of this programme are land owners and leaseholders.

Funding

The programme is administered 100 % by the Victorian State Government with a total level of funding of 3 million Australian Dollars.

Landowners who maximise co-funding will be more competitive in the tender process.

¹⁷ e = equivalent

CO₂-credits

Some CO₂ credit units remain with the landholder (10 % to 50 %) by agreement. The balance goes to the investor (= the state government).

Contracts can be entered either for 15 or for 100 years. 100 year contracts will be more competitive because they have higher potential carbon values.

Subsidies

Plantation establishment:

The Victorian Government pays landholders to create carbon sinks on their property for the first five years.

Penalties

Participants of the programme will have to repay the costs when not fulfilling an agreement of the contract.

Ways of informing the target group

The Carbon Tender is well advertised. Media used for its announcement are the internet, the community, the extension service, newsletters and -papers, radio, TV and Land-care groups.

Informative literature from the Victorian State Government is clearly verbalized and concise.¹⁸

Monitoring of the activity

The monitoring within this programme happens once a year through:

- remote sensing
- sampling and
- self reporting

and is in place beyond the programme period.

¹⁸Author's Note

Monitoring of GHG benefits

GHG benefits will be quantified once a year beyond the programme period using a National Carbon Accounting System. The method used to measure the carbon sequestered is remote sensing verified by field sampling according to national standards.

The measurement costs are funded by the state government. They are estimated to be \$10,000 per year and will be very low after the first 5 years.

Evaluation of success

To date 167 out of the planned 500 hectares of land have been enrolled. JACK HOLDEN judges the programme as very successful (1 in a scale out of 5, 1 = very successful, 5 = not successful, see chapter 4.1, entry 'success') and justified this success as follows:

- There is an excellent interest level from growers. The programme is oversubscribed.
- The tender system provides an efficiency of 10 times a fixed price incentive.
- Biodiversity outcomes are now quantified.
- The confidence of the investor has increased as the government has gone beforehand acting as an investor and learnt valuable lessons about the technical, legal and accounting tools. The capacity of the growers has also increased.

Barriers to implementation of the programme

- Australia has not ratified Kyoto so there is no international demand likely to inflate the prices of offset supply.
- Currently there is no domestic trading scheme in place in Victoria which may have similar effects.

The primary objectives of the Carbon Tender are to reduce GHG levels and to increase biodiversity. However a secondary benefit is from "learning by doing". The government has acted as an investor and will use this experience to discover potential barriers to private investment and deal with these to enhance the credibility of the offset industry in this state.

All sites are designed to be “Kyoto compliant” despite Australia not yet having ratified.”

Worth mentioning is that the Carbon Tender unlike the Permanent Forest Sink Initiative in New Zealand (chapter 4.4.3.) focuses not only on the absorption of carbon dioxide but on the restoration of local ecosystems with native trees and shrubs.

4.4.3. New Zealand

“About a third of New Zealand’s plantation forest estate is covered with commonly called ‘Kyoto forests’.

In December 2004 the New Zealand Ministry of Agriculture and Forestry estimated that forest sink credits could be worth in the order of \$1billion to \$2 billion during Kyoto’s first commitment period 2008 to 2012.

But QUILTY et al from the Environmental Intermediaries and Trading Group Limited (EITG) stated in the online newsletter Carbon Monitor in June 2005¹⁹ that no incentives are given to afforestation projects in New Zealand. On the contrary there are incentives for projects like wind farms that will reduce GHG emissions.

The level of new planted forests is low – in the long-run about a third of the historical average. This low level is caused by

- The disappointment about the government retaining the credits from existing Kyoto forests
- The absence of any incentives for new planting
- Weak returns to forestry from the combined effect of world prices, the exchange rate and freight costs compared with bumper returns from pastoral farming.

QUILTY et al also stated that New Zealand does exactly nothing to encourage the establishment of new forests.” (QUILTY, T., et al, 2005: 1-3)

However detailed information about two schemes that are expected to start in 2005, both waiting for the bill to be passed, are on hand²⁰: The Permanent Forest Sink

¹⁹ Volume 10 issue5

²⁰ Status quo: April 2005

Initiative (PFSI) and the Emission & Biodiversity Exchange (EBEX 21). It is hoped that those two schemes will rise the annual afforestation/ reforestation rates in New Zealand.

The following data about the Permanent Forest Sink Initiative were provided by CLAYTON WALLWORK from the Ministry of Agriculture and Forestry, New Zealand, through an e-mail questionnaire (see Annex):

The Permanent Forest Sink Initiative (PFSI)

Initiated to promote the establishment of new permanent forest on previously unwooded land the PFSI offers land owners the opportunity to claim Kyoto Protocol compliant emission units from post - 1990 permanent forests. CLAYTON WALLWORK, manager of the Permanent Forest Sink Initiative states in the PFSI bulletin published in February 2005 (Permanent Forest Sink Initiative Bulletin, 2005 [36]) that the scheme is unique and not on offer anywhere else in the world.

“The Kyoto Protocol was a key driving factor to implement this programme.

Category

Eligible activities concern the category afforestation of non-forest land.

Biodiversity and protection of native plant species

The incentives do not depend on the species used.

Target group

Eligible participants of this program are landowners.

CO₂-credits

The Permanent Forest Sink Initiative offers fully tradable Kyoto Protocol compliant emission units in proportion to the carbon sequestered in their forests. The amount of units received will be equal to the increased amount of carbon dioxide stored in the forest for the period between 2008 and 2012. Emission units will be free to sell to whomever the landowner wishes.

Prerequisites

- The land must not have been covered with forest as of 31 December 1989.
- The new forest must be directly human induced.
- Limited harvesting is permitted on a continuous cover forestry basis and only after 35 years after establishment.
- Units from any carbon that is lost from the forest have to be replaced where this results in emission liabilities for New Zealand under the Kyoto Protocol.

Funding

The federal government and the landowner fund the initiative. The landowner is required to meet all costs of monitoring, administration, auditing and compliance and also carries the liability for maintaining the carbon stocks.

Penalties

The landowner is required to replace emission units for the carbon dioxide released, and to make a penalty payment if the forest was harvested for sale outside of the allowable limits.

Ways of informing the target group

The target group is informed about the programme through internet and other media (no specification of the item “others” was made)

Monitoring of the activity

Activities which have taken place will be monitored through sampling and self reporting every 5 years until the end of the programme.

Monitoring of GHG benefits

The monitoring system also quantifies GHG benefits. Monitoring methods are left to the landowner and will be funded by the landowner.

Climate change policy review

“In August 2005 the New Zealand Government has announced a review of his climate change policy.

Forecasts indicate that on current policy settings, New Zealand will not meet its emissions reduction target for the first commitment period (2008-2012) of the Kyoto Protocol.

A review of the current climate change policy is necessary because emissions grow faster than expected, especially in the transport sector. The government focuses on changes in his forest sink position. New implementation possibilities of the Kyoto Protocol will be discussed.

The review includes agricultural and forestry policies and measures. The report will be finalized by October 31st 2005, shortly before COP 11 in Montreal in November this year.” (website of the New Zealand Climate Change Office [19])

Like so many countries that have ratified the Kyoto Protocol, New Zealand is still figuring out a strategy to meet its emission reduction targets.

4.5. Other incentives

4.5.1. United States of America

The Greenhouse Gas Reporting Guidance for Farms and Forests (1605(b))

“New accounting rules have been worked out in March 2005 for the Section 1605(b) Voluntary Greenhouse Gas Registry. Within the voluntary reporting programme agriculture and forest landowners will be provided with the ability to quantify and maintain records of actions that have greenhouse gas reduction benefits. Activities included are:

- no-till agriculture
- improving nutrient management and
- managing forestland

Agriculture and forest landowners should also receive the opportunity to partner with industry in developing actions to reduce greenhouse gases.

COMET-VR

The new on-line tool called COMET-VR provides farmers and ranchers with a simple and reliable method for estimating soil carbon sequestration.

In addition forest owners will be supported by technical guidelines for forests.

Under the programme emitters of GHGs like utilities, manufacturers and other businesses will be able to register entity-wide GHG emission reductions which have been achieved after 2002 provided that they declare entity-wide emission reductions achieved. Small entities are encouraged to participate through simplified reporting and registration provisions.

The objectives of the programme are

- the reduction of GHG emissions and
- the improvement of the accuracy, verifiability and completeness of GHG emission data reported to the federal government.” (website of the U. S. Department of Energy [26])

Incentives

The programme described above does not provide incentives as usual. It may attract farmers who want to:

- “present information about their GHG related activities to their costumers or constituents who are concerned about global climate change,
- record their emissions and achievements,
- inform the public debate or
- participate in educational exchanges.” (website of the U.S. Department of Energy, Energy Information Administration (EIA)[26])

For the reasons mentioned above the programme will probably attract farmers who are familiar with the issue of a global changing climate. 1605(b) increases the awareness of the matter and will finally lead to the implementation of more GHG mitigation activities in agriculture and forestry.

4.5.2. Canada

“The Canadian Government currently explores the potential environmental and economic benefits of afforestation. A/R is considered one possibility for the country to help achieve its emission reduction targets. The policy objective is supported by two initiatives:

- **The Feasibility Assessment of Afforestation for Carbon Sequestration (FAACS)** initiative, a three year initiative that focuses on exploring afforestation carbon sequestration opportunities and the
- **Forest 2020 Plantation Demonstration and Assessment (PDA) initiative**”(web site of the Joanneum Research, Sydney/Hatton [34]) which will be specified below:

The following data were provided by TERRY HATTON, Senior Economist, Canadian Forest Service, Natural Resources, Canada through an e-mail questionnaire (see Annex):

With the Forest 2020 Plantation Demonstration and Assessment (PDA) Initiative, Canada offers a new approach for an incentive programme. The program is geared to learn how A/R activities can contribute to Canada's Kyoto obligations. The carbon that is sequestered in these plantations will be applied to Canada's Kyoto Protocol target. The total GHG mitigation that could be achieved by the programme will be up to 2 Mt. of CO₂-e until 2025.

Forest 2020 Plantation Demonstration and Assessment (PDA) Initiative

Delivery agents (DA) identify and establish demonstration sites on privately owned lands (farmers, municipalities, forest industry, woodlot owners, etc.), First Nations reserves and a small amount of other federal lands that are most likely to successfully support plantations. The Forest 2020 PDA initiative covers the costs for the establishment and maintenance of the sites over the first two years. The costs of maintaining these sites beyond the first two years to their maturity are the responsibility of the landowner. The landowner owns the trees on the land and any income that may be derived from the eventual sale of the fibre.

The Kyoto Protocol was a key driving factor to implement this programme.

Category

Afforestation of non-agricultural land, reforestation of non-forest land

Minimum area supported

The sites afforested or reforested have to be of 1 ha at minimum.

Biodiversity and protection of native species

- Species recognized as “fast-growing” by the Canadian Forest Service (CFS) are supported. Treatment regimes must be able to support projected “fast growth rates”.
- Efforts are being made to ensure that the right species are selected and planted on the right sites to ensure the maximum growth potential is achieved.
- The landowner agreements that have been signed stipulate that the plantations must remain in the ground for fifteen years.

Target group

Eligible landowners will be supported.

Funding

The programme is administered by the federal government. The total level of funding available for the programme has been \$20 million over three years.

Co-funding is needed by the land owner.

Subsidies

Plantation establishment

The costs for establishment are covered in total for the first two years.

Maintenance

In the first two years maintenance costs will be covered.

Ways of informing the target group

In some regions landowners were approached by delivery agents (DA) through DA's networks (internet), in some regions ads were placed on the radio and in appropriate newsletters and newspapers.

Monitoring of the activity

The sites are inspected by delivery agents and the Canadian Forest Service (CFS) staff. The method used for monitoring is sampling once a year. The CFS has an agreement with the landowner to continue with future monitoring of the plantation sites.

Evaluation of success

Until the end of the programme 6000 ha should be enrolled. 1000 participants have taken part in the programme until now. Over 90 % of the set target has already been reached.

TERRY HATTON judged the programme as very successful (1 in a scale out of 5, 1 = very successful, 5 = not successful, see chapter 4.1, entry 'success') and named the following reasons for its success:

- Well defined programme goals and action plan.
- CFS operational expertise and regional experience with stakeholders.
- Strong delivery agents and landowner commitments to achieving the primary objectives of the programme.

Barriers to implementation of the programme

- Landowners hesitate over changing practices.
- General dislike of some fast-growing species.
- Isolated resistance to agricultural land conversion.

“The Canadian Forest Service is currently investigating the fast growing plantation investment environment to determine what they believe to be a sound set of recommendations to shape Canada's future policies on afforestation. There are no plans to continue funding for fast-growing tree plantations in the future.

Although the F2020 PDA is wrapping up and there is currently no plan to continue direct government funding, new Government of Canada initiatives that were announced in the recent climate change plan for Canada (i.e. the climate fund) will likely provide new market based incentives for A/R projects.” (Data provided by JONATHAN BUTTLE, Canadian Forest Service through an e-mail interview.)

5. Conclusions drawn from the results

“A subsidy program that creates the intended effects without undue negative impacts is difficult to design.” (WILLIAMS, 2000: 1).

5.1. Success or failure?

Reasons for success or failure of the investigated programmes are among the following ones:

- a. the amount of money paid to the target group,
- b. the duration of the incentive given,
- c. the total area on which land-use has been changed,
- d. the promotion of the programme,
- e. the kind of incentive,
- f. presence or absence of disincentives,
- g. the number of participants,
- h. the amount of carbon sequestered,^{*21}
- i. the biodiversity value.*

General conclusions:

- The **culture** and the particularities of the target group (farmer, landowner,...) play a major role and so do²²
- **Regional disparities:** The same programme can be ineffective in one country while being extraordinarily successful in another country. The following issues may be different from country to country:^{23 24}
 - the importance of environmental concerns,

²¹ *These need to be considered as positive results of the programme, not so much as reasons for success.

²² for more information see the ‘Joint programmes for public and private owners, Regulation 2080/92’, Belgium

²³ for more information see the: European Commission, 2003: 17

²⁴ for more information see the ‘Forest 2020 PDA Initiative’, Canada

- the general like /dislike of species/practices used,
- the preference of certain kinds of incentives (see chapter 6.2.),
- the willingness of the target group to change their land use, etc.
- The **communication of the programme** constitutes an important factor of profit or loss:
 - If the incentive programme is complexly formulated and there are hundreds of linked prerequisites and other reasons that make it difficult to find out how to receive which incentive, failure is previsible. Many of the programmes addressed in this work are written in a far too complex style and one has to be very motivated to find out what the scheme is about. ²⁵
 - The target group needs to know about the programme!²⁶

*Success or failure of an incentive programme is generally not dependent on one fact alone but on the sum of factors.*²⁷

The following tables constitute abstracts of reasons for success, reasons for failure and implementation barriers stated by experts in the e-mail questionnaire (please find the original questionnaire in the Annex):

Reasons for success

Table 3: Reasons for success – selected examples

COUNTRY	PROGRAMME	REASONS FOR SUCCESS
Australia	Carbon Tender	✓ Tender system provides an efficiency of 10 times a fixed price incentive
Denmark	Afforestation Programme	✓ The programme is easy to understand and administer

²⁵ examples are the 'Austrian Program. for the Development of Rural Areas', 'Expanding of Forest Cover (KPZL)', Poland etc.

²⁶ examples are the 'Rural Development Programme', Italy or the 'Joint programmes for public and private owners, Regulation 2080/92 (Flanders)', Belgium

²⁷ Author's Note

Denmark Austria	<ul style="list-style-type: none"> ➤ Afforestation Programme ➤ ÖPUL – The Austrian agri-environmental programme 	<ul style="list-style-type: none"> ✓ Environmental awareness among landowners
Italy	Accompanying measures of the CAP reform	<ul style="list-style-type: none"> ✓ Compensation for the loss of income to promote the role of farmers in environment protection and sustainable agriculture ✓ Most species used were native*²⁸
New Zealand Australia Canada	<ul style="list-style-type: none"> ➤ Emissions & Biodiversity ➤ Exchange (EBEX21) ➤ Carbon Tender ➤ Forest 2020 PDA initiative ➤ Synergetic land management of agricultural lands 	<ul style="list-style-type: none"> ✓ Local authorities and farmers want the programme and see the benefits of it.
United Kingdom	The Rural Development Regulation Plan	<ul style="list-style-type: none"> ✓ Continuity from earlier programmes ✓ Good extension service ✓ Simple and accessible to private landowners
United States of America	Conservation Reserve Program	<ul style="list-style-type: none"> ✓ Carbon sequestered* ✓ Enhanced wildlife population* ✓ Improved water and air quality* ✓ Reduced soil erosion*
United States of America	Environmental Equality Programme	<ul style="list-style-type: none"> ✓ Producers pay part of the costs of the practices, therefore are more committed to their implementation

Source: filled in questionnaires, e-mail interviews, literature mentioned in chapter 6, References and in the data base attached to this document on a CD-ROM

²⁸ * These need to be considered as positive results of the programme, not so much as reasons for success.

Reasons for failure

Table 4: Reasons for failure – selected examples

COUNTRY	PROGRAMME	REASONS FOR FAILURE
Belgium	Joint programmes for public and private owners, Regulation 2080/92 (Flanders) ²⁹	❖ Poor knowledge of characteristics of the target group (farmer etc.)
Denmark	The Forest Act	❖ Competition for agricultural uses constrained implementation. Disincentive EU agricultural subsidies
Finland	Afforestation of actively cultivated arable land ³⁰	❖ target setting and expected behaviour of farmers
Italy	Rural Development Programme (2000-2006)	❖ large land owners have easy access to the grants, small land owners do not have easy access to grants ❖ lack of information ❖ farmers have no idea if the grant scheme will be funded or not
New Zealand	Forestry Encouragement Grants	❖ Complicated scheme ❖ changes within the programme
United States of America Italy	➤ Environmental Equality Programme ➤ Rural Development Programme (2000 – 2006)	❖ Limited sources of technical assistance

²⁹ EFI: Evaluating Financing of Forestry in Europe: unpublished data

³⁰ EFI: Evaluating Financing of Forestry in Europe: unpublished data

United States of America	<ul style="list-style-type: none"> ➤ Forest Land Enhancement Program ➤ Environment Equality Incentive Program ➤ Grassland Reserve Programme 	❖ Lack of funding
Hungary	<ul style="list-style-type: none"> ➤ National Forest Programme 	
United States of America	Grassland Reserve Programme	❖ Poorly specified objectives

Source: filled in questionnaires, e-mail interviews, literature mentioned in chapter 6, References and in the data base attached to this document on a CD-ROM

Examples of implementation barriers

Table 5: Implementation barriers – selected examples

COUNTRY	PROGRAMME	IMPLEMENTATION BARRIERS
Canada	Forest 2020 PDA Initiative	<ul style="list-style-type: none"> ○ General dislike of some fast-growing species ○ isolated resistance to agricultural land conversion ○ landowner hesitate over changing practices
Denmark	Afforestation programme	<ul style="list-style-type: none"> ○ Competition for land with high economic output in agriculture
Hungary	National Forest Programme	<ul style="list-style-type: none"> ○ Non - climate change environmental concerns
United Kingdom	The Rural Development Regulation Plan	<ul style="list-style-type: none"> ○ Uncertainty about the Common Agricultural Policy (CAP) reform and impact on new woodland.

Source: filled in questionnaires, e-mail interviews, literature mentioned in chapter 6, References and in the data base attached to this document on a CD-ROM

Solutions

- Incentives have to be designed with the **integration of the target group**³¹(farmers, landowners,...). Concepts can be discussed together and potential risks can be excluded in advance. The **interest level of the target group** will increase.
- **Local peculiarities** (e.g. the general dislike of fast growing tree species) have to be recognized.
- The **visibility and attractiveness** of the programme enhance its value. A clearly formulated programme, simple to understand and communicated through different kinds of media, makes a difference.
- Well **defined program goals** and an action plan are the basic principle of an incentive programme.
- It needs to be properly evaluated **which disincentives compete** with existing incentives (for example EU-subsidies for agricultural use).

5.2. Continental peculiarities

Europe

Mr. SCHLAMADINGER from Joanneum Research Graz, Austria stated in 2004 in a paper called "The Role of LULUCF Activities in International and National Climate Policies" that "at the moment in Europe there are hardly any national incentive programmes that are specifically initiated by climate-change and Kyoto Protocol concerns."

The findings of this survey, which was undertaken from August 2004 until August 2005, support the thesis cited above regarding the comments about incentive programmes initiated by Kyoto Protocol concerns.

The following findings have been detected:

The directive 2080/92 shaped incentive programmes supporting the afforestation/reforestation of non-forest land and the development of forestry

³¹ for more information see the European Commission, 2003: 17

activities on farms in Western Europe. This study investigated incentives under this regulation in Portugal, Spain, the United Kingdom, Ireland, Italy, France, Germany, Finland, Denmark, Austria, Belgium and Sweden. One of the objectives of directive 2080/92 has been the mitigation of climate change. During the data collection period mainly **subsidies** under this regulation have been found. Although governments could use the directive as a mere framework and create their individual incentive programme adapted to the needs of the farmers, incentive programmes look more or less the same in most countries and are characterized by the same features:

- Subsidies
- Broadleaved species are higher supported than coniferous species
- There are payments for the compensation for loss of income in case of afforestation of non-agricultural land
- Incentives provided are not dependent on GHG benefits

In addition to directive 2080/92 and the currently operating regulation 1257/99,

- Tax incentives are provided
- Incentives in the form of carbon credits play a less important role

Eastern Europe:

There is only information about incentive programmes in the Czech Republic, Hungary and Poland who provide:

- Indirect incentives like technical assistance and free seedlings
- Tax incentives and subsidized interest on credits and
- Subsidies

The mitigation of climate change is of little importance for governments:

- Incentives provided are not dependent on GHG benefits
- Incentives in the form of carbon credits are not provided.

North America

United States of America:

The United States of America offer new ideas:

- A ranking process: The greater the expected environmental benefits of the practices used, the higher is the possibility of the acceptance of the application for an incentive (example: the Conservation Reserve Programme)

- Payments for easement
- Subsidies plus credits for carbon dioxide sequestered
- 'California Climate Action Registry' and '1605(b)': Voluntary programmes assisting businesses, municipalities, non-profit organisations, other entities, state agencies in measuring and reducing their emissions. Future income opportunities from carbon trading are likely
- Tax incentives
- Incentives in kind of carbon credits play a minor role
- Incentives provided are not dependent on GHG benefits

Canada:

- The main focus is on different kinds of tax incentives
- In the near future the government focuses on tax incentives related to fast growing tree species to meet its Kyoto commitments[34]
- Subsidies are offered less frequently
- Innovative idea: Delivery agents identify and establish demonstration sites³². The landowners own the trees on the land and any income that may be derived from the eventual sale of the fibre. The carbon that is sequestered in these fast growing tree plantations will be applied to Canada's Kyoto Protocol target
- Biodiversity seems to be of less importance
- Incentives provided are not dependent on GHG benefits
- Incentives offered in kind of carbon credits play an underpart

Oceania (Australia and the pacific)

Australia

Australia joins traditional incentives with new ones:

- Subsidies plus carbon rights for the target group
- A tender system which is supposed to provide an efficiency of 10 times a fixed price incentive (Carbon Tender)
- Tax incentives occur
- Particular attention is drawn to the biodiversity value

³² for the afforestation of non-agricultural land

- There are incentives that depend on GHG benefits

New Zealand

Australia's neighbour focuses on carbon credits

- No subsidies but carbon credits
- There are incentives that depend on GHG benefits
- Biodiversity seems to be of less importance (see the PFSI – programme)
- Tax incentives

5.3. *New incentives for a new generation of farmers*³³

In addition to grants, tax incentives or carbon credits the incentives listed below could be provided. The main objective of those incentives would be their “long-term effect”. A major problem of incentives is that in many cases landowners abandon the activity they have been paid for when the incentive is taken away.

Education system for farmers

In addition to any kind of incentive offered, the target group should be legally bound to attend courses about environmental concerns (sustainable management methods, their implementation, profits or losses, etc.). The incentive received should be an internationally approved title that could help farmers to be in business in the (inter-) national competition.

Brand mark

The products of farmers who manage their land in a sustainable way should be labelled in a unique way for free. The brand mark should be internationally approved.

Advertisement

Farmers who manage their land in a sustainable way should obtain advertisement for their products for free.

³³ Author's Note

5.4. Future prospects

At the end of the data collection for the existing work a Swedish expert asked in an e-mail about the sense of incentives. He suggested that it might not be worth the money to decoy a horse with sugar, let it do something for you and hope that when no sugar is left the horse will keep on doing something for you without any bait.

The Swedish expert asked another question: Do we need any incentives at all? Wouldn't it be enough to prove that sustainable management would be more gainful than commercial management to motivate farmers to make a change?

The questions above are open to be discussed.

I believe that farmers who know about the benefits of sustainable management³⁴ will more likely keep their changed sustainable land-use beyond the incentive programme period. Therefore an education system as mentioned above would help prevent malpractice.

To sway a mass of farmers to change their commercial land use (practices) will have to be connected with incentives as long as there is no deep understanding for nature. The same effects without any incentives can for example be achieved if children are educated from the very beginning towards sustainability. Later when they are farmers, they will probably treat their land in a sustainable way as a self-conception. However, one has to consider that in the case of the establishment and maintenance of new forests support is still needed as the period without any income until harvest is too long to make a living.

“Forests by themselves are economically not a competitive land use. They need to be promoted through subsidies and other financial incentives.” (web site of the European Commission [13])

³⁴for more information see: Evaluierungsbericht zur Klimastrategie Österreichs: 177

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I. **ANNEX:** The original Questionnaire

COVER PAGE (to be filled in only once)	
Country	
Name	
Position	
Organisation, Ministry, Department...	
E-mail:	
Phone:	
Fax:	
How many programmes/incentives will you describe? (Please fill in only one programme per form)	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> More
Will you send material/brochures about this programme/incentive?	YES <input type="checkbox"/> (please specify) NO <input type="checkbox"/>
<p><i>If you received this questionnaire but feel it was wrongly addressed to you please let us know and, if possible, please supply us with the address(es) of person(s) who would better contribute to our survey. Also please feel free to forward the questionnaire to those who you think will be able to contribute information.</i></p>	

QUESTIONNAIRE

(to be filled in for each national programme/incentive)

Please use one copy of the questionnaire for each national programme/incentive that was, is, or will be implemented for any of the following categories:

(PLEASE CHECK ONLY ONE BOX)

- **Afforestation of non forest land (A)**
- **Reforestation of non forest land (R)**
- **Reduction of deforestation (RD)**
- **Forest management (FM)**
- **Cropland management (CM)**
- **Grassland management (GM)**
- **Revegetation (RV)**

The following areas are excluded:

- Reduction of emissions from energy use
- Production of biomass for energy (unless co-benefits in terms of terrestrial carbon stocks exist)
- CDM and JI projects

The programme does not necessarily have to be aimed at reaching the emission-limitation targets of the Kyoto – Protocol as long as the **management activities reduce GHG emissions or enhance GHG removals in the land-use sector.**

Regional scope of the programme (please specify)	Whole country <input type="checkbox"/> Certain regions <input type="checkbox"/> Other <input type="checkbox"/>
Does the programme apply to	PRIVATE LAND <input type="checkbox"/>
	PUBLIC LAND <input type="checkbox"/>
	BOTH <input type="checkbox"/>
Was the Kyoto Protocol a key driving factor to implement the programme?	YES <input type="checkbox"/> (please specify) NO <input type="checkbox"/> Do not know <input type="checkbox"/>

Source of information

1	Name of the programme:		
	Website (if available)		
	Relevant law or act:		
	Date of publication:		
	Date of enforcement:		
	Date of expiry		
2	Is the law or act available on the internet – preferably in English (web address if available)?	YES <input type="checkbox"/>	If yes please insert web address:
		NO <input type="checkbox"/>	
		Do not know <input type="checkbox"/>	

Which activities are eligible and under which circumstances

3	Which land management activities are eligible?		
4	What land attributes are addressed by the programme? (slope, soil quality,...)	1.	
		2.	
		3.	

		4.	
5	Are there any participation restrictions with respect to total land (or livestock) and other restrictions? (Minimum/Maximum area of land/livestock supported)	YES <input type="checkbox"/> NO <input type="checkbox"/> Do not know <input type="checkbox"/>	If YES please insert limits in ha (livestock):
6	Do incentives depend on the species/practices/measures used?	YES <input type="checkbox"/> NO <input type="checkbox"/> Do not know <input type="checkbox"/>	
	IF YES, which species/practices/measures are supported?		
	IF YES: Are there any extra payments/special concessions if native species/special practices are used?		
7	Does the target group need to have a management plan?	YES <input type="checkbox"/> NO <input type="checkbox"/> Do not know <input type="checkbox"/>	
	If yes, please specify the requirements concerning the management plan		
8	Other prerequisites to receive payments/special concessions,...		
Actors involved in the programme and funding of the programme			
9	Who is the target group?		
	a.) Land owners	<input type="checkbox"/>	
	b.) Leaseholders	<input type="checkbox"/>	
	c.) Other	<input type="checkbox"/>	(please specify)
	Is there any difference in payments/special concessions, ... between the above?	YES <input type="checkbox"/> NO <input type="checkbox"/> Do not know <input type="checkbox"/>	(please specify)
10	Who administers the programme? (please add financing rates and Currency Units/area)?	EU <input type="checkbox"/> % Federal Government <input type="checkbox"/> % Local Government <input type="checkbox"/> % Other (please specify) <input type="checkbox"/> Do not know <input type="checkbox"/>	
	Total level of funding available for the programme?		
11	Is there a co funding needed for the activities to take place?	YES <input type="checkbox"/> NO <input type="checkbox"/> Do not know <input type="checkbox"/>	(please specify)
	If YES, who is co funding?		
How does the programme operate?			
12	What are the incentives to join this programme?		
	a.) SUBSIDIES (cash payments) : please specify payments and the duration of payments as well as the activities supported		
	establishment <input type="checkbox"/> maintenance <input type="checkbox"/>		

	compensation for loss of income <input type="checkbox"/>	
	Other (please specify) <input type="checkbox"/>	
b.) SPECIAL CONCESSIONS: please specify		
	Low Interest Loans <input type="checkbox"/>	
	Tax Incentives <input type="checkbox"/>	
	Price Guarantees <input type="checkbox"/>	
	Other <input type="checkbox"/>	
c.) CO2 CREDIT UNITS: please specify payments and other concessions and their duration as well as the activities supported:		
d.) OTHER: please specify		
13	Do payments/special concessions,.. depend on the carbon sequestered, or greenhouse gas emissions (CH4, N2O and CO2) reduced within the programme period? (please specify)	YES <input type="checkbox"/> NO <input type="checkbox"/> Do not know <input type="checkbox"/>
14	What is the total GHG mitigation that could be achieved by the programme? By which date should this goal be reached?	
15	Are there penalties for not fulfilling an agreement? If YES, please describe penalties.	YES <input type="checkbox"/> (please specify) NO <input type="checkbox"/> Do not know <input type="checkbox"/>
16	How is the target group informed about the programme?	
	a.) Internet <input type="checkbox"/>	
	b.) Community <input type="checkbox"/>	
	c.) Extension service <input type="checkbox"/>	
	d.) News (letters) paper/radio/TV <input type="checkbox"/>	(please specify)
	e.) other <input type="checkbox"/>	(please specify)
How is the monitoring being implemented?		
17	Do you have a monitoring system to confirm that activities have taken place? Which monitoring system is or will be in place for this programme? (please specify) Frequency of monitoring?	YES <input type="checkbox"/> (please specify) NO <input type="checkbox"/> (please specify) Do not know <input type="checkbox"/> Remote sensing <input type="checkbox"/> Sampling <input type="checkbox"/> Self reporting <input type="checkbox"/> Others <input type="checkbox"/> Once a year <input type="checkbox"/> Every <input type="checkbox"/> years NO survey <input type="checkbox"/>

	How long will the monitoring system be in place?	Programme period <input type="checkbox"/> Beyond the programme period <input type="checkbox"/> Others <input type="checkbox"/> (please specify)
	Please specify the monitoring system	
18	Does the monitoring system quantify GHG benefits?	YES <input type="checkbox"/> (please specify) NO <input type="checkbox"/> (please specify) Do not know <input type="checkbox"/>
	If yes, which methods are used to measure the carbon sequestered and greenhouse gas emissions (NH ₄ , N ₂ O and CO ₂) reduced?	
	How often will be measured?	Once a year <input type="checkbox"/> years Every <input type="checkbox"/> years NO measuring <input type="checkbox"/>
	How long will be measured?	Programme period <input type="checkbox"/> Beyond the programme period <input type="checkbox"/> Others <input type="checkbox"/> (please specify)
	Estimated costs of measurement?	
	Who funds the measurement?	
	Please specify the measurement method	
Evaluation of success		
19	How much land (or livestock) has been enrolled under the programme?	
	a.) Per annum (average):	
	b.) Total from beginning of the programme:	
	c.) Total planned area (livestock) until end of the programme:	
20	Do you judge the programme as successful?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> (1=very successful, 5 =not successful) 1 2 3 4 5 Do not know <input type="checkbox"/>
	Reasons for success?	1. 2. 3. 4.
	Reasons for failure?	1. 2.
	How many participants took part in the programme?	
	What % of the initial target has been reached?	% (ha) % livestock
21	Are there any barriers to implementation of this programme?	YES <input type="checkbox"/> (please specify): 1. 2. 3. NO <input type="checkbox"/> Do not know <input type="checkbox"/>
22	Any other comments	1. 2.

		3.
		4.

THANK YOU VERY MUCH FOR YOUR HELP!!!

II. ANNEX 2: CD-ROM

The original questionnaire

Filled in questionnaires

Overview excel file

Thesis