Committee on Agriculture
U.S. House of Representatives
Biographical Form

Name

Timothy Martin (coordinating author), Pankaj Lal, Carmen Carrion-Flores, Janaki Alavalapati

Organization(s) you represent

University of Florida Carbon Resources Science Center

Address

PO Box 110410, Gainesville, Florida, 32611-0410

Email

tamartin@ufl.edu

If you are responding on behalf of an organization, please list the capacity in which you are representing that organization, including any office or elected position you hold or if you are a volunteer.

Director, University of Florida Carbon Resources Science Center

Part I: Carbon Reduction Program Design

1) **Members of Congress have introduced numerous bills to address the wide spectrum of climate change issues. Do you think Congress should enact a program that uses carbon taxes/fees, a cap-and-trade program, or a hybrid of these two approaches? Why?**
   Please respond in 600 words or less.

The Congress should enact a cap-and-trade program rather than carbon tax or hybrid of the two. The primary reason for favoring cap-and-trade regime is that the amount of greenhouse gas reduction can be quantified and set in advance. In contrast for the tax options the quantified emissions reduction is difficult to arrive at and transaction costs of monitoring this program may be higher. Further, the cap-and-trade system is a market based approach and promotes trade of emission allowances between low cost emission reducers and higher cost emission reducers. There is precedence for successful implementation of cap-and-trade systems in the U.S. The system developed under the 1990 Clean Air Act Amendments not only achieved 100% compliance in reducing sulfur dioxide emissions, but also cost much less than was estimated before its implementation. The European carbon cap-and-trade model can also be deemed a success in terms of environmental stewardship through millions of transactions held per day.

The cap-and-trade system is much more flexible than carbon tax and can be integrated with already existing systems in other parts of the world such as the one in Europe. Cap-and-trade can include carbon reduction activities such as planting a forest for carbon sequestration and reward entities that are undertaking sequestration; in contrast, the carbon tax fails to support these activities, instead focusing on the “polluters pay” principle. The inter-temporal nature in term of banking of emission reductions or carrying it forward for the next accounting year as well as borrowing against future emissions can be used easily in a national cap-and-trade system.

Even though carbon tax approach is considered more efficient than cap-and trade, it is much more difficult to implement due to its regulatory nature. There has been a suggestion to make cap-and-trade more efficient through mechanisms such as having a price ceiling or a '*safety valve'*. The price ceiling can be used to come out with new emission credits when prices reach a pre-determined higher limit dollar value. However, the *'safety valve'* approach impedes technological innovation targeted towards meeting the set emission caps as it lowers the emission cap already set and defeats the key aim of set ‘quantified emissions value’ in a cap-and trade system.

Challenges such as strict monitoring, proper enforcement, effective distributions of benefits and cost exist in all the three policy options (pure tax, pure cap-and-trade, hybrid of two) and can't be used as differentiating yardstick. However a single set up such as pure carbon tax or pure cap-and-trade is simpler to implement than a hybrid system. The decisions as to what mix of tax and cap-and trade options is implemented or in which

sectors/regions (or any other differentiating factor) for determining mix might lead to contentious arguments by stakeholders and also give rise to question of equity and skewed impacts.

The criticism of existing European cap-and-trade systems such as higher trading allowances in European trading system or price volatility of Regional Clean Air Incentives Market (RECLAIM) market in California are due to flaws in the design of these policy instruments rather than flaws in the cap-and-trade system itself. These flaws can be avoided through effective design, enforcement and integrated feedback mechanisms in the program that might be put forth by the Congress. Overall, the cap-and-trade system is suggested as a mechanism that is more beneficial in term of assured emission reduction and provides incentives for technological innovation that provides low cost emission reductions.

Potential problems associated with adoption of cap-and-trade system which will need to be mitigated include: 1) it will increase cost of the industries since under the system they have to search for permit sellers (Portney, 2003). 2) Strategic behavior of some industries may prevent an efficient market for these permits. 3) Industry lobby could influence which industries get the initial set of permits. 4) We could expect an increment of emissions when there is a large initial distribution of permits.

2) **Should the agriculture and forestry sectors be covered under a carbon reduction program? Why or why not?**

   Please respond in 300 words or less.

The agriculture and forestry sectors must be covered under a carbon reduction program. Agriculture must be included because this sector is a significant source of U.S. GHG emissions (~6%). Carbon reduction policies which cover agricultural operations will benefit farmers and ranchers as these will be compensated for delivering carbon-reduction services to society through emission allowances. This carbon reduction policy will also incentivize improved practices such as conservation tillage and improve sustainability of these sectors in particular and society in general. The forestry sector must be covered because forestry is the only major sector which is a net GHG sink: forests and forestry operations annually sequester CO_2 equivalent to 11-15% of total U.S. GHG emissions. The silvicultural technology and knowledge necessary to increase rates of forest C sequestration already exists, so this sector can be immediately mobilized to mitigate atmospheric CO_2, as opposed to other sectors where technologies are immature or not yet developed. Furthermore, displacing energy intensive products (gasoline and steel frames for example) with wood based products (cellulosic ethanol and wood frames) would offer permanent carbon reduction opportunities.

The benefit of including these sectors will also promote 'green' sources of energy and certainly act as a shot in the arm for nascent energy sources such as bioenergy. This nascent energy source in turn promotes energy security, improves trade balances and is in sync with existing policy initiatives such as Energy Independence and Security Act, 2007. Incorporating these sectors in the carbon reduction program is also economically

smart as these increase avenues for land-resource based solutions that are more cost-effective than quite a lot of options available in other sectors. Also many private and public mitigation approaches in these two sectors are economically tenable and technically feasible which outlines the important role that these two sectors in climate change mitigation.

A fragmented cap and trade system could create pollution havens in unregulated industries and/or regions. Therefore, the program should be applied at the national level and cover all major sources of emissions, either directly or indirectly. They have to include manufacturing sectors, such as electric utilities, transportation, and energy-intensive industries, but at the same time it should cover agriculture, commercial and residential sectors.

3) **If a cap-and-trade program is chosen, how should emission allowances be distributed? For example, should they be at no cost, auctioned, or a combination of both? How should Congress prioritize the distribution of available allowances? Should allowances for the agricultural and forestry sectors be allocated at no cost, if so, should there be a limit on the number of no-cost allowances?**

   Please respond in 600 words or less.

Most of the costs of cap-and-trade system will be passed on to consumers by the firm and can impact households in terms of higher cost of services or products. Free distribution increases the overall cost of the allowance and can be construed as already compensating the emitters for the price differential occurring due to emission cap. However, free distribution of allowance can be used effectively to reduce and manage economic burdens of a cap on entities that will be more severely affected such as coal industries and the low income consumer household. Not having such free distribution of allowances will inherently bias against entities which produce more emissions (such as coal or oil and gas) for producing a unit product (say electricity) than those which produce low emissions for same unit product (like clean coal or bioenergy) under current level of technology.

On the contrary auction generates revenue which will be captured by government and can be used to reduce carbon reduction programs cost for the whole economy. The allowance procurement can be integrated within cost aspect of business entities that fall within the purview of the cap. The auction system is economically more efficient, though, its efficacy depends on the use the auction revenue generated is put to and what type of auction mechanism is used.

Freely allocating all perpetual allowances to emitters would not be market efficient as it would result in overcompensating emitters resulting in not only increased cost but would also use up resources that could otherwise be used for actual carbon reduction initiatives. Thus, a combination of free allocation and auction system is envisaged. This hybrid system is based on the principle that free allocation in initial years increases acceptability while auction system reduces social cost by using the auction amount for tax reduction programs, clean energy technology research & development, energy benefit program for

low income households etc. Researchers such as Stavins (2007) have proposed an economy wide program where half the allowance is freely distributed, with the share declining to zero after 50 years and rest is auctioned off in the market. The free allocation component for this option comes to 15 %, at real interest rates 5 %. This suggestion is in line with the estimates of perpetual allowances required to compensate the sensitive entities like fossil fuel extraction sectors (13%) and primary energy producers and electricity generators (21%) to offset the effect of carbon reduction programs.

In our opinion the correct mix of free allocation and auction system should avoid overcompensation, and thus the free initial allocation should be set lower than 50%. Also, the actual allocation should be based on not only type of emitters (sectors) but also their numbers and economic characteristics. The amount of allowances should be reduced each year until emissions are 80% below 1990 emissions (in 2050). For agriculture and forestry sectors the auction mechanism might not be appropriate and free allocation is the way out due to large number of private agriculturalists or family forest owners who cannot compete in the auction market with large energy producers. The free allocation in forestry along with longer term carbon sequestration goals may also benefit biodiversity through measures such as growing long rotation species such as longleaf pine which provide habitat for a range of important species, rather than relying exclusively on fast growing, intensively-managed plantation projects which may not yield comparable desirable co-benefits. This mechanism will thus incentivize forest owners to adopt carbon reduction management practices. The limit on the number of such no cost allowances should be based on economic analyses for forest and agriculture sectors that needs to be undertaken to gauge the potential of emission reduction on per unit (hectare) basis

4) **Should a cap-and-trade program or a carbon tax/fee program be linked to existing or emerging U.S. regional or other carbon reduction programs (i.e. RGGI or individual state programs)? If so, which programs and why?**

Please respond in 600 words or less.

Yes the individual programs should be linked to existing state or regional carbon reduction programs. This linkage will bring spatial uniformity and provide level playing field to private ventures aimed towards reducing GHG emissions. This will also avoid duplicity and conflict with existing programs. The concentration or redistribution of carbon emission or carbon removal initiatives in specific geographical regions can also be minimized by such linkages. There should also be provision for integrating federal programs with future state or regional reduction programs.

5) **If a cap-and-trade program is established, should an existing government agency regulate it or should a new agency be created? Please explain.**

Please respond in 300 words or less.

6) **If a derivatives or futures market in carbon reduction arises in the wake of the creation of a cap-and-trade program, should the Commodity Futures Trading Commission (CFTC) continue its role as the regulator of this derivative carbon market, or should there be a different regulator? Please explain.**

Please respond in 300 words or less.

7) **Currently, derivatives of energy-based commodities can be traded through: a) highly structured instruments on regulated, transparent futures markets accessible to anybody and anyone; b) flexible instruments on lightly regulated, transparent derivative markets accessible to only major market participants, or; c) flexible instruments on unregulated, opaque over-the-counter markets accessible only to major market participants**.

Should derivatives markets in carbon reduction arising in the wake of the creation of a cap-and-trade program also be permitted to develop under similar options as for energy-based commodities? ***Please respond in 600 words or less.***

8) **Will enactment of a carbon reduction program have negative impacts for regions or populations whose welfare is of special interest to the agriculture community? Such groups could include: residents of rural areas; populations served by USDA nutrition programs; agricultural producers and forest landowners; or input, transportation, and processing sectors of agriculture and forest products.**

Please respond in 600 words or less.

Current research points out that costs of cap-and-trade or other carbon reduction programs will be passed on to consumers as higher cost of services or products. These higher costs will be borne by all consumers including residents of rural areas, USDA nutrition producers, agricultural producers and forest landowners, or input, transportation and processing sectors and forest product producers as higher prices for the energy they buy from emitters. This is possible since emitters can pass on the costs of their emissions credits to their customers in the form of higher rates. The detailed impact information of carbon reduction programs such as cap-and-trade on different demographic groups, different sectors or regions is currently limited. Research such as commodity use analysis of forestry or agriculture operations can provide estimates of such impacts. Generally speaking the processes or consumers who use more GHG emitted products will feel more impacts than others.

It is quite possible that forest industries such as pulp and paper, packaging, and other forest products will be impacted by increased cost of energy use passed on by energy utilities, as well as by added cost of emissions that they will have to bear under carbon reduction programs. In light of price responsive (elastic) markets for these products, they have limited potential to transfer added costs to consumers. Intense foreign competition as well as competition for wood supplies from emerging wood based bioenergy industry

can add to their problems. The supply chain for these businesses in term of transportation and input providers will also be affected in term of lower work and increased cost which might reduce economy of scale benefits.

Forest landowners and agricultural producers will also be adversely affected if 100% allowance auction system is put in place where reduction programs call for reductions in these sectors as well. In addition, the difficulty of verifying that additionality and leakage requirements have been met, and the lack of universally accepted mechanisms for doing so may result in increased verification costs for forest landowners, with some degree of uncertainty as to return on investment for these costs.

9) **How might revenue generated under a carbon reduction program be best used to offset any negative impacts?**
Please respond in 300 words or less.

The revenue generated under carbon reduction programs should be used for three basic purposes:

1. Transitional assistance to those bearing larger cost and facing elastic demand in international markets (such as pulp and paper industry)
2. Income tax assistance or other programs designed specifically to mitigate increased price impact of energy or utility services to individuals or industries. A targeted program for low income households as well as private agriculture and forestry landowners is suggested.
3. Innovation investment in terms of Research & Development to develop carbon reduction solutions. This investment can be used for researching greener sources of energy such as 'bioenergy' and focus not only on developing technology but also focus on acceptability of these resources through extension programs and developing partnerships with forest landowners.

10) **Should businesses that are affected (either indirectly or directly) by higher overall costs due to a carbon reduction program receive transitional assistance?**
Please respond in 300 words or less.

Yes, businesses that are affected by higher overall costs should receive transitional assistance. The amount of assistance should be based on the cost differentials accruing due to carbon reduction programs as well as the demand situation being faced by the business. Businesses with greater ability to transfer added costs to consumers should receive less assistance. This assistance is quite important for energy-intensive forest based businesses such as pulp, paper, wood products makers and packagers, who face tough foreign competition and difficulties in passing on increased costs to customers. These businesses apart from emission credit costs also face increased utility costs, and without assistance might face threat of going out of business. Moreover, the effect of carbon reduction programs will be detrimental to climate if manufacturing of these

products gets transferred to countries without carbon reduction caps. This is very much possible through market mechanisms unless safeguards are put in place to support these businesses. Not providing transitional assistance to these businesses might lead to unfavorable trade balances and loss of employment.

11) **What role should public lands play in helping to sequester carbon and/or reduce greenhouse gas emissions?**

Please respond in 300 words or less.

Public lands have important role to play in sequestering carbon. Public forests in U.S. have higher per unit carbon stocks as compared to private forest lands. Just because these lands are owned by government, these lands should not be excluded from gathering offset benefits under carbon reduction programs. However, these benefits should be assessed on the concepts of *'additionality*' in which rewards are not made for the sequestration that would have happened anyway. The benefits of carbon reduction programs so gathered should be used for environmental stewardship work such as wildlife conservation. The vast scale of public lands, such as those set aside for conservation management, may also play a significant role in carbon sequestration.

12) **Should carbon prices be determined exclusively by market forces or should limits on carbon prices be established? Please explain.**

Please respond in 600 words or less.

A limit on carbon prices in term of having a price ceiling ('safety valve') is proposed by many researchers. They argue that emitters are hedged against the risk of unlimited price increase caused by established supply of allowances and 'safety valve' need to be included to safeguard excessive price increases. However, we propose that there should not be a price ceiling neither a price floor (the level below which price should not decrease) as the safety valve approach changes the emission cap set at the outset. The emission reduction arrived at using safety valve approach would certainly be less than that without one, and runs contrary to the goal of making polluters face the full costs of their actions. The basic requirement of carbon reduction program such as cap-and-trade is a hard limit on pollution, and the price ceiling destroys that.

If we fail to have a hard cap, business can buy more allowances than the market system allows. The 'safety valve' will set a point at which business will not be bounded by the cap. If business can release carbon over and above the limit, it will be next to impossible to reduce emissions by ~2 percent a year. A price ceiling also limits investment in new projects and technologies. Some businesses argue that price ceiling remedies the problem by ensuring that permits trade below a reasonable limit. However, having a faulty limit can add to the problem rather than solving it and result in over-allocation or under-allocation of allowances.

13) What, if any, lessons can be learned from the European Union's Emission Trading System (ETS) or any other carbon reduction program already underway or being developed? Do any international carbon reduction programs currently exist for agriculture and forestry?
Please respond in 600 words or less.

Lessons that can be learned from ETS or other carbon reduction program include:

1. EU's Emissions Trading Scheme (ETS), experience in the last few years suggests that permit prices are far more volatile than equities, making longer horizon planning quite difficult.
2. As ingrained in the system, cost reducing emissions by a certain amount could vary from year to year depending on exogenous factors such as the weather, the availability of low carbon technologies, and level of economic activity.
3. The emission data flaw was observed in ETS and business could reap windfall gains by reducing emissions cheaper than what had been envisaged. The emission data flaw can lead to larger number of emission allowances where supply of allowances-the cap-exceeds the demand, collapsing the allowance price. The design flaw led to the experience that getting number of allowances right is critical for efficient functioning of such a system.
4. The fear that adding to the cost of European industries could reduce their ability to compete in global market resulted in distributing virtually all permits at no cost. The lower price of allowances is pointed out by many as a key cause of the market failure of ETS Phase1.
5. The learning phase such as ETS phase 1 is a good model to start with wherein system weaknesses such as larger number of allowances allocation can be dealt with. This also points to the need for an adaptive framework with strong oversight and better quality emission data.
6. The failure of uniform standards (with individual countries being allowed to set emissions levels and distributing the permits), resulted in favoritism in permit allocation to business.
7. The regional Greenhouse Gas Initiative (RGGI), which officially began in January 2009, is a program designed to reduce emissions from the electric power sector in ten Northeast States. All RGGI states have opted for auctioning a majority of their allowances and also set up a reserve price for allowances.

There are number of carbon reduction programs in forestry. Some of these are outlined below:

1. Kyoto Protocol's Clean Development Mechanism (CDM) or Joint Implementation (JI) for GHG reduction.
2. United Nations Reducing Emissions from Deforestation and forest degradation in developing countries (REDD) initiative which offers significant potential for reducing global warming emissions in developing countries. Countries such as Australia have come out with $200 million International Forest Carbon Initiative under REDD.

3. World Bank's Forest Carbon Partnership Facility (FCPF) which prevents deforestation by compensating developing countries for carbon dioxide reductions realized by maintaining their forests.
4. Carbon Finance Unit of World Bank which uses money contributed by governments and companies in OECD countries to purchase project-based greenhouse gas emission reductions in developing countries and countries with economies in transition.
5. Voluntary markets such as Chicago Climate Exchange in U.S. and the Carbon Reduction Fund (CRF) in Canada for developing carbon offset projects.
6. New Zealand Emissions Trading and Renewable Preference which aims to cover all economic sectors and gases regulated by the Kyoto Protocol through a mix of upstream and downstream coverage, starting with the forestry.

Part II: Carbon Reduction Program Administration and Implementation

The administration and implementation of an offset or allowance program will be a major topic during any potential climate change discussion. Please answer the following questions regarding the scale, scope, and limitations of any program as part of the larger carbon reduction debate.

14) What options or combination of options would be most effective for agriculture and forestry sectors in a carbon reduction program: a voluntary offset program, bonus allowances for selected agriculture and forestry activities, or agreed upon performance standards for segments of the agriculture and forestry sectors?

Please respond in 600 words or less.

All the three options should be used together in carbon reduction program for agriculture and forestry sector. However, bonus allowances for selected agriculture and forestry activities from "*a bonus allowance account*" seem more plausible and effective. This account can be allocated to sequester greenhouse gases through activities permitted by the '*Administrator'* for that purpose. A start cutoff date for such bonus allowances is critical to ensure that only the activities undertaken before the cut-off date is accepted for bonus allowance. Along with bonus allowances agreed upon performance standards for segments of forestry sectors are also required. These standards should incorporate spatial and species diversity in forestry sector, and should be set in consultation with all stakeholders. A voluntary offset program should also be promoted as it can co-exist as a flexible compliance mechanism in cap-and-trade system. Voluntary offsets differ from "compliance" offsets as these depict GHG reductions not under the purview of mandatory cap-and-trade schemes. These voluntary offsets can be developed by business, governments, NGOs, and individuals with motives such as demonstrating social responsibility or differentiating their product as 'green' or in expectation of early compliance offset benefits.

15) Should the total number of offsets issued annually by the government be limited? If so, how much?

Please respond in 300 words or less.

The number of offsets issued annually by the Government should be linked to the number of allowances issued. These offset projects can be used by businesses subject to emission caps to partially offset allowances mandates. The linkage between offsets and allowance in percentage terms is suggested to be in the range of 10-30% . As the percentage of offsets increases, the allowances needed for the businesses declines. This logic suggests that offsets are used as incentive for the business to reduce their own emissions or purchase offsets from other entities that reduce GHG. However, these offsets should not impede the cap-and- trade regime of allowances purchase, trade or retirement and thus a maximum limit of 30% is proposed. Further, these offsets should also be limited in term of purchase of domestic and international offsets in a given control period. A stage wise threshold limit for offsets such as the one proposed under RCGI can also be adapted at federal level. Facilities under RGGI's cap are allowed to purchase offset allowances to cover at most 3.3% of emissions in a control period. This increases to 5% if the price for carbon dioxide allowances reaches a "stage one threshold price" for a year and to 10% if the price reaches a "stage two threshold price.

16) How should Congress prioritize the distribution of available offsets (who gets them and how much)?

Please respond in 600 words or less.

The distribution of available offsets should be based on the criteria of 'greater public benefit' where non market benefits apart from carbon reduction benefits are accounted for. For example a forest sequestration offset project having co-benefits such as watershed conservation, aesthetic benefits, prevention of soil erosion benefits etc should be given higher priority than other offset projects which do not provide such co- benefits such as.

17) What should the criteria be for measuring (quantification, verification, and monitoring) and accounting for the legitimacy of offsets under the program?

Please respond in 600 words or less.

The following criteria should be used for measuring and accounting for legitimacy of offsets under the program.

Additionality: This determines where the project's emission reduction/sequestration is over and above the business-as-usual scenario. The offset project must demonstrate that it is not undertaken to comply with any law, statute or rule. In each project carbon storage that would have occurred without the project should be calculated and subtracted from the carbon benefits. A potentially negative consequence of strict additionality criteria is that "early actors", landowners who are already actively managing in a way that sequesters carbon, will be at a disadvantage. We encourage Congress to consider

creative approaches to this problem that will enable early actors to enter carbon markets. One potential approach is to consider whether existing projects provide environmental "co-benefits" in addition to carbon sequestration, such as preservation of biodiversity, watershed protection, etc., and to enable these consideration to potentially ease carbon additionality requirements.

Leakage **:** It should also be ensured that offset projects does not result in indirect effects of increased emissions outside the project boundary. Indirect land use change effects should be accounted for calculating offset amount.

Permanence: Offset projects that displace or permanently sequester greenhouse gas should be made eligible as offsets. Because of the difficulty of ensuring true permanence for forest projects, which are subject to carbon loss through disturbances such as wildfire and insect infestation, Congress should consider relaxed definitions of permanence. For example, a carbon renting approach could supply the benefits of traditional carbon offset projects, with a higher certainty of sequestration for any particular contract period.

Unambiguous ownership: Reductions generated by offset projects must have clear and defensible rights to ownership.

Single counting: The offset reduction and may only be allocated, awarded or counted one time and should be retired once counted.

*Verification and monitoring***:** A third party should verify that the project is not a business-as-usual activity and it should also undertake periodic emission reduction/sequestration accounting.

Quantification: Field measurements and quantification of forest growth and accruing carbon benefits should be based on well-established forest inventory and scientific principles. The methods followed to quantify such benefits should be made available for public consumption.

18) What should be the criteria for assessing offset projects?

Please respond in 300 words or less.

The offset projects should be based on the principle of greater 'societal benefit'. The projects that provide higher benefits (monetized and non-monetized benefits) are preferred. In forestry, apart from afforestation/ reforestation projects other projects that undertake green house gas sequestration should also be considered. These projects can take the shape of: Forest conservation projects (or avoided deforestation or soil carbon sequestration) in critical areas; Urban tree planting; Managed forests for increased carbon stocks (through increase in carbon density, longer rotations, decreased harvesting intensity or species substitution); and increased production of long-lived wood products (by displacing fossil-fuel intensive construction materials and though carbon stored in

durable wood products). These projects should also be assessed on the basis of whether neighborhood benefits such as local level employment and skill development accrue to society. Apart from this, small landowner projects or aggregated projects (combined projects for several landowners) should be preferred. Projects which install or modify infrastructure can also be prioritized. In sum, the environmental and community impacts of the offset project should be adequately and thoroughly assessed.

19) How should Congress design a system for verifying offset projects?

Please respond in 300 words or less.

The Congress should establish a third party verification system to undertake carbon accounting of offset projects. All emissions reductions must be verified by a well-regarded independent third party and should be based on realistic emissions baselines. Federal agencies such as USEPA and USDA should be entrusted with the responsibility of coming out with a list of third party auditors who can be employed for verifying offset projects. The auditors should be experts or organization that have expertise and experience to undertake this responsibility. In cases where such expertise is lacking, federal agencies should establish training programs to develop auditing expertise. A set of standards in terms of establishing baselines along with periodic (annual) GHG accounting is suggested. These verification systems should undertake a detailed life cycle analyses at the initial stage and in later years should follow 'management by exception' principle to account for deviations from the past management practices.

20) Should Congress establish a standards-based approach with pre-calculated values or a project-based approach that measures field results for establishing eligible offsets under the program?

Please respond in 600 words or less.

Congress should establish a project-based approach that measures field results for establishing eligible offsets under the program. Due to large scale diversity of forestry projects in term of species and spatial characteristics such as topography, fertility (site index), microclimate etc., a standards based approach might not be justified. Moreover, project based approaches can be deemed more valid for accounting sequestration/emission benefits than standards based approaches. Project assessment also facilitates verification and monitoring of the project activities. It is also suggested that projects should be allowed to be aggregated together to ensure that sequestered carbon is provided by an entity that has a large enough forest area under management to provide a stable reservoir of carbon over the usual cycle of growth and harvest for individual forest stands.

21) What should be the relationship between offsets and allowances?

Please respond in 600 words or less.

These offset projects are used by business subject to emission cap to decrease compliance costs. The linkage between offsets and allowance in percentage terms is suggested to be in the range of 10-30%. A stage wise threshold limit for offsets should be applied at federal level. However, the percentage of offsets that entities should be allowed to cover should be set higher than RCGI. Similarly, the threshold prices for different stages should also be set higher than the percentages allowed by RCGI. Limits to these offsets in terms of how much should be procured from domestic and international markets in a given control period also needs to be established by the Congress.

22) Describe the most important factors in establishing the permanence and duration of offsets under the program, including contract length and flexibility?

Please respond in 300 words or less.

The standard of permanence remains one of the most difficult to meet and verify for forest-based offset projects. Because they are subject to natural disturbances such as wildfire and insect attack, it is difficult to guarantee the sequestration of carbon in forests in perpetuity. These factors should be considered in the design of offset requirements, and Congress should assess whether the standard of permanence can be relaxed to span contract lengths of decades (e.g. 30-100 years), which would be long enough to ensure real atmospheric CO_2 mitigation, but short enough to plausibly guarantee sequestration in most forestry projects. This "carbon rental" approach may provide the best middle ground which allows forests to meet their potential in contributing to GHG offsets.

23) How should Congress address <u>existing</u> offset projects or credits established through a voluntary market or system (e.g., the Chicago Climate Exchange or an emission registry)?

Please respond in 600 words or less.

The Congress should allow existing offset projects and allowances registered under the Climate Registry, the California Action Registry, the GHG Registry, the Chicago Climate Exchange, the GHG Clean Projects Registry, or some other programs or registries, only if such offsets satisfy the requirements or criteria of the offsets outlined in future federal carbon reduction legislation. These existing projects need to be reevaluated and proportional allocation in term of amount of reduction and duration of the project. These offset projects in forestry sectors will thus be rewarded for achieving real, verifiable, additional, permanent, and enforceable emission reductions, or increased carbon sequestration.

24) The terms "additionality" and "stackability" are often used when discussing the details of an offset program. How should producers and forest landowners who may have been early-actors and already undertaken activities that sequester carbon or reduce greenhouse gas emissions be treated? Should activities undertaken to reduce carbon emissions also be allowed to count towards other environmental market activities, such as water quality or wildlife habitat creation, therefore allowing landowners to "stack" credits?
Please respond in 600 words or less.

The landowners who were early actors should be allowed to stack credits. However, this stackability should not follow concept of additiveness where all such benefits are summed together. Rather early actors should get a proportional benefit which is higher than carbon reduction/sequestration benefits or other market benefits separately but significantly lower than sum of the two. These stackable incentives should also consider size of landownership, where higher proportional payments are made to small landowners rather than larger ones. The stackability benefits in future can also be used to help landowners overcome the initial cost of converting their lands to carbon sequestering methods and programs that provide cash payments in addition to the carbon credits for lands.

25) How should activities that may have been paid for in part by assistance from Federal or state government programs (i.e. cost share, technical assistance) be treated? How should those activities be treated if the practice was not specifically implemented to address carbon sequestration or greenhouse gas emission reduction?
Please respond in 300 words or less.

In light of assistance by Federal or State government assistance, a proportional allocation mechanism should be used. Out of the total offset value a share should be diverted towards environmental stewardship program being implemented by Federal/State/County government. The share being diverted should be proportional to the assistance received by the project.

26) Should a producer be required to return revenue or be held liable if an offset project does not sequester carbon or reduce greenhouse gas emissions? How about in the event of a natural disaster or another event uncontrolled by the producer and/or landowner?
Please respond in 300 words or less.

Yes the producer be penalized (required to return revenue or be held liable) if an offset project does not sequester carbon or reduce greenhouse gas emissions. The penalty should not be equal to the returned revenue rather a distinction between natural and human made causes should be made. In case of natural disturbances the producer should be absolved of the liability if s/he undertakes compulsory reforestation/afforestation in the area damaged by disturbances. However, if the event of carbon stock reduction by forest landowner (where natural cause is not established), the landowner should be held liable and the revenue should not only be returned but destruction penalty should also be imposed.

In these cases a *'carbon rent'* approach where payments are made on an annual basis will minimize payment losses on the part of offset purchaser. It needs to be reinforced here that offset projects should employ a program design that accounts for the risk and uncertainty before offset are issued. This will result in protection of offset buyers from such uncertainty and cost of such risks will be borne by the sellers.

27) Should the protocols and procedures for the offset program be detailed in legislation, or should authority be delegated to the appropriate government agency to develop regulations? If so, which agency or agencies should be responsible for devising protocols and procedures?

Please respond in 300 words or less.

The protocols and procedures for the forestry offset program should not be detailed in legislation, rather authority should be delegated to USDA to develop protocols and procedures. Rather than having a uniform protocol or procedures for the whole country, USDA can develop these in light of local level spatial and species diversity observed in different forestry project sites. USDA possesses both the expertise and experience to design such regulations.

28) What are the obstacles faced by agricultural producers and landowners to implement practices and technologies?

Please respond in 600 words or less.

29) Do existing conservation and forestry programs provide sufficient incentives to encourage the adoption and implementation of practices that mitigate climate change impacts, sequester carbon and/or reduce greenhouse gas emissions? If not, what might Congress consider offering as additional financial incentives and technical assistance to speed up adoption/implementation?

Please respond in 300 words or less.

No existing conservation or forestry programs provide sufficient incentives to mitigate climate change impacts through carbon sequestration and/or GHG emissions reductions. This insufficient support is reflected in the fact that carbon benefits of forests do not play a role reflected in landowners' management decisions. Unless a measurable monetary value is attached to the carbon benefit of forests, the adoption and implementation of such practices will be weak. A strong extension and technical assistance program coupled with a *'carbon rent mechanism'* as proposed by Sedjo et al (2001) for landowners will accelerate the acceptance level. Further, most of the new incentive schemes, such as the subsidy of producing biofuels, are not directed towards landowners. Currently the biofuel subsidy is harnessed by the processor and forestry feedstock suppliers do not get any benefits. The risk and uncertainty also lowers acceptance as many landowners face additional uncertainty through participating in carbon markets as the cost of any change

in forest management will be based on the possibility of future carbon credits at an unknown price.

Part III: Carbon Reduction Program Additional Thoughts

Please use the next 1000 words to provide additional comments on subjects which may not be have covered by the questionnaire, such as a low-carbon fuel standard, life-cycle analysis, leakage, or biofuel incentives.

It is increasingly being recognized that environmental effects of bioenergy production are linked to net GHG reductions. Many authors argue that using wood instead of fossil fuel for energy can potentially reduce GHG. However, Searchinger et al. (2008), and Fargione et al.(2008), argue that life cycle studies have failed to factor in indirect land use change effect, such as carbon storage and sequestration sacrificed by diverting land from its existing uses and found that using U.S. forestlands for biofuels results in adverse land use effects elsewhere and thus harms the environment rather than helping it. The question for overall GHG balance of different bioenergy pathways thus needs to be evaluated in terms of whether these can lead to leakages such as indirect land use change from carbon rich land cover types (e.g. virgin grasslands or forests) to energy crops.

The Life Cycle Analysis for emission includes all stages from feedstock production till the use of finished fuel by the final consumer. The emission reduction from forestry projects such as use of forestry feedstock for bioenergy should be evaluated for indirect effects also. Some issues that need to be resolved for this are : reference (baseline) to be used for GHG reduction; emission calculation based on consistent (standard) approach to LCA so that comparative analysis is possible; what GHG gases should be included in calculations (CO_2, N_2O and CH_4 or other gases are also included); what should be the methodology that can be used measure the indirect impacts of biofuels production due to land use change; and what should be timescale of analysis for emission estimates related to land use change.

Please list specific types of ***forestry practices*** that should be available as offsets, and then use the terms provided to evaluate the practices.				
Type of Practice	**Effectiveness** at *sequestering carbon or reducing* GHG emissions *(Excellent, Good, Moderate)*	**Ability** to *verify* carbon sequestration or GHG emission reductions *(Excellent, Good, Moderate)*	**Cost** for agricultural producers and private forestland owners to *implement (High, Medium, Low)*	**Capacity** of agricultural producers and private forestland owners to *implement immediately (High, Medium, Low)*
Afforestation or reforestation	Excellent	Excellent	Low	High
Forest conservation projects (or avoided deforestation or soil carbon sequestration) in critical areas	Good	Moderate	Low	High
Managed forests for increased carbon stocks (through increase in carbon density, longer rotations, decreased harvesting intensity or species substitution)	Excellent	Excellent	Medium	High
Urban tree planting	Excellent	Excellent	Low	Medium
Long-lived wood products (by displacing fossil-fuel intensive construction materials and though carbon stored in durable wood products)	Good	Moderate	Low	Medium

Please list specific types of ***practices associated with livestock operations (e.g. manure management, grazing/pastureland practices)*** that should be available as offsets, and then use the terms provided to evaluate the practices.				
Type of Practice	**Effectiveness** at *sequestering carbon or reducing* GHG emissions *(Excellent, Good, Moderate)*	**Ability** to *verify* carbon sequestration or GHG emission reductions *(Excellent, Good, Moderate)*	**Cost** for agricultural producers and private forestland owners to *implement (High, Medium, Low)*	**Capacity** of agricultural producers and private forestland owners to *implement immediately (High, Medium, Low)*

Please list specific types of ***crop production practices*** that should be available as offsets, and then use the terms provided to evaluate the practices.				
Type of Practice	**Effectiveness** at *sequestering carbon or reducing* GHG emissions *(Excellent, Good, Moderate)*	**Ability** to *verify* carbon sequestration or GHG emission reductions *(Excellent, Good, Moderate)*	**Cost** for agricultural producers and private forestland owners to *implement (High, Medium, Low)*	**Capacity** of agricultural producers and private forestland owners to *implement immediately (High, Medium, Low)*