

## New Zealand Climate Change Target; Our contribution to the new international climate change agreement.

Submitted by:  
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### Introduction:

The document published by the Ministry of the Environment recognizes the difficulties in lowering our Green House Gas (GHG) emissions without incurring great immediate costs. It could also mention the very highly potential costs of not taking action; the cost of disaster relief on our numerous coastal towns and cities with more than a 2 degree global temperature rise. Having studied the scientific projections of tipping points, I believe that New Zealand must be a leader and make a profound target. There are a few areas we should focus on to reach a decent purposeful target of 40% below 1990 levels that will show great leadership for other countries to follow. In particular this submission focuses on land management (point 1 and 2 below).

To answer questions two and four from the discussion document on our unique situation and new opportunities, I would propose:

- Increased conservation efforts and new plantation of native plant hardwood forests on less productive lands; these forests would have much longer milling cycles and sequester carbon long term.
- Organic agriculture and organic dairy farming that reduces nitrous oxide, enables healthier soils that sequester carbon, and integrates a greater diversity of agriculture with dairy farming and ensures a more resilient economy.
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- Make any large capital investments towards infrastructure that we are sure will sustain over time. Such as renewable energy, light rail, bike trails, and durable warm buildings.
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- Provide seed funding for new businesses that are innovative, have strong core sustainability values and are localized in raw materials, production and consumption.

Our GHG Emissions per capita are one of the highest in the world currently. In response to question one, the most important thing to me is that we are ambitious and take up leadership in our contribution. It is only when there are leaders that all countries will follow with more ambitious targets. It is also important to me that we restore our natural wealth during this process. We have an opportunity to spend money on trading schemes, or to spend it on restoring ecosystems here in New Zealand. Long term the economics suggest we focus on restoring our environment.

In response to question three about the appropriate costs to reduce our GHG emissions, I would propose more comparisons:

- Create a thorough analysis of the painful environmental inflicted costs of business as usual – not taking action on strong targets, such as the cost of fixing our towns after major flooding, storm surges, and droughts for example. And use this information to better inform our strategic decision making as well as better inform the public. This information was not present in the discussion document.
- Morally, I don't think we can put a high enough cost to destructing wildlife survival in our oceans. Therefore, prevent any off-shore oil exploration and drilling and land coal mining that have been proposed; particularly in areas close to wildlife sanctuaries. The incredibly large sounds that pound through the ocean during exploration is a potentially severe hazard to our ocean mammals. Oil exploration in increasingly more pristine environments may become a regretful activity as it has been in other parts of the world - environmentally, socially and economically. It is time to use renewable energy sources.

Answering question number five:

A matrix of strategies for differing external factors should be drawn up clearly and shared with New Zealanders. There are certainties grounded in values that cannot be ignored. My proposal seeks for a future New Zealand that is more resilient in it's production and consumption. The more dependent the New Zealand economy is on foreign countries, the more uncertainties there are in this climate change target. Therefore, a core approach to major targets should be in the areas of resilience: renewable resources, community development, and a diversity of industries. The government's role is to create the incentives and boundaries to bring the country into this new phase.

### **1. Native forestry and carbon sequestration as a foundation to reach our targets below 40% 1990 levels:**

Provide incentives for transformation of low productive grassland, wasteland or inefficiently used public and private land to be planted with native hard wood trees that will be long term carbon sinks and will provide wealth for future generations. Currently as quoted in the discussion document, much of our forestry that has increased by plantation for carbon sinks and the forestry economy, will be going through short growing and cutting cycles for timber production, and therefore may not count towards much of our carbon sequestration efforts. This current situation will therefore not be suitable enough for the expansion of forestry for carbon sinks. My suggestion is to plant more native forest that will not be milled in the short term, and will provide habitat for native wild life meanwhile. This can be done on marginal lands and less productive lands of which there are plenty. Initially the most cost effective way is to fence off marginal land close to native forests and shrub lands, and allow plants to grow without being eaten by animals. As the price of carbon makes it economically feasible, these marginal or class 6 and 7 poorer productive lands can be planted on force, organized through the ministry of the environment.

To begin, LandCare Research already identified about 200,000 ha of “Kyoto eligible” Māori land nationally in 2007 (Payton). More recently, 2012 data from Land Resource Information Systems by Landcare Research has identified 1,661,001 hectares of low producing grass land in New Zealand (relative to 8,841,644 hectares of high producing grassland for comparison). And 172,617 hectares of depleted grassland (Barringer). Altogether, there is a considerable amount of low producing and depleted grassland that could be converted into native forest and or shrub land. Without volunteer schemes or public incentive programs, the economics (opportunity cost) will stack up when price per

tonne of carbon reaches above \$60 per tonne for low growth, and only \$5 per tonne of carbon for fully grown native forest. If the penalties for not meeting our targets by 2020 is \$60 as stated on the ministry of the environment website, then there is a strong incentive to begin planting. The reward for this needs to be administered by the Ministry of the Environment and facilitated clearly with a lot of publicity. This economic rationale can be derived from the following amount of carbon sequestered per hectare of native scrub land or native forest land:

Land Care Research based at Lincoln University provides information on carbon sequestration and storage of native forest land. Carbon storage averaged  $211.9 \pm 20.3$  tonnes/ha in native forests. The following native trees are widespread, and store the bulk of the carbon: beeches, kāmahī, rimu, tawa, southern rātā, kānuka and broadleaf. The size of the tree is what matters, so this is a long term strategy for New Zealand. Trees planted today will of course not reach the carbon storage capacity until some years pass. Therefore it is important to note that native shrub land has carbon storage of  $15.6 \pm 6.6$  tonnes/ha.

If we take what is stated in the discussion document box 7, that the price of carbon needs to be in the range of \$60 to \$200 per tonne by 2030, then we could save in the range of \$12,660 to \$42,200 approximately per hectare of native forest conserved or once established, and save in the range of \$936 and \$3,120 per hectare of shrub-land that we conserve or plant more of. If we were to plant the additional 1,661,001 hectares of low producing grassland in New Zealand, in time this can sequester approximately 351,966,111.9 tonnes of carbon ( $2119 * 1,661,001$ ). And if priced \$60, will make approximately \$21,117,966,714.

Looking at the opportunity costs for farmers: There are economic incentives for land-owners when we look at some of the alternative profits made from dairy farming. An economic survey published by dairy.co.nz for 2012 – 2013 shows that Operating profit per hectare in 2012-13 was \$1,830. And after accounting for the cost of borrowing and other farming activities, the profits were nearly half that amount. Comparing these figures to the figures above, there is a strong reason for planting native trees for the long term outcomes. With initial cost share incentives with the government for establishing the native trees, both the land-owners and the government would be able to make a shared profit in coming years when little management is needed, relative to business as usual.

The work in establishment of native trees can be viewed in a variety of ways:

Once land has been agreed for planting, a means of doing the plantation work without relying solely on a labor force is to provide an incentive to citizens to come and plant. The discussion document recognizes the potential cost / impact to each household per annum for a target of 40% below 1990 levels as \$1,800. There could be a tax rebate to individuals that enrol a number of weekends to help plant. Thus making our Climate Change target not economically challenging for some households. Such an opportunity would have numerous other benefits, such as community engagement with our native forestry and wildlife, fitness, appreciation for Aotearoa, and community development, as people can make meaningful connections.

## **2. Organic Agriculture and carbon sequestration**

As acknowledged by the discussion document, our farming sector is one of the greatest contributors to New Zealand's GHG Emissions and also our economy. The good news is that sequestering carbon in our soils through organic regenerative farming approaches is a concrete proven option for us to adapt

throughout our industry. Furthermore, organic agriculture prevents the need for large amounts of nitrogen fertilizer and can bring down the current 11% of our GHG emissions.

The Rodale Institute has published research on Regenerative Organic Agriculture and Climate Change. They suggest an obvious and available solution to lowering GHG emissions.

“Simply put, recent data from farming systems and pasture trials around the globe show that we could sequester more than 100% of current annual CO<sub>2</sub> emissions with a switch to widely available and inexpensive organic management practices, which we term “regenerative organic agriculture.” These practices work to maximize carbon fixation while minimizing the loss of that carbon once returned to the soil, reversing the greenhouse effect.” (Smallwood).

I would propose that there are strong incentives and free assistance for a transition to organic regenerative agriculture. Since New Zealand has a large amount of dairy farming, the solution would be to have more agriculture and dairy farming in close proximity, so that the high nutrients from the cows can be captured and used as nutrients for other kinds of food production. In other words, multi-functional farming. Furthermore, it may not be wise to continue dedicating such a large amount of productive land to dairy farming. We ought to increase our farming diversity and recycle nutrients from one process into another. I personally believe this is the safe and sustainable method, and I would not support a vaccine or inhibitor to reduce methane emissions from animals. I feel strongly that the money spent in this area could be directed into bringing about change on our farms as suggested above, with methods that are proven already to make a difference.

In terms of economic sense, the organic food industry provides premiums that have made organic farms sustainable and profitable. In the United States, the supply for organic farming cannot keep up with the demand. This is explained in some of the USDA publications.

The Rodale Institute and Finca Luna Nueva and EARTH University have established the Farming Systems Trial and have found the following results (figure 1) below. This is just one example of many trials done at agricultural institutions. It shows that organic agriculture is ahead in all areas; particularly in lower GHG emissions, energy inputs, and higher profits.

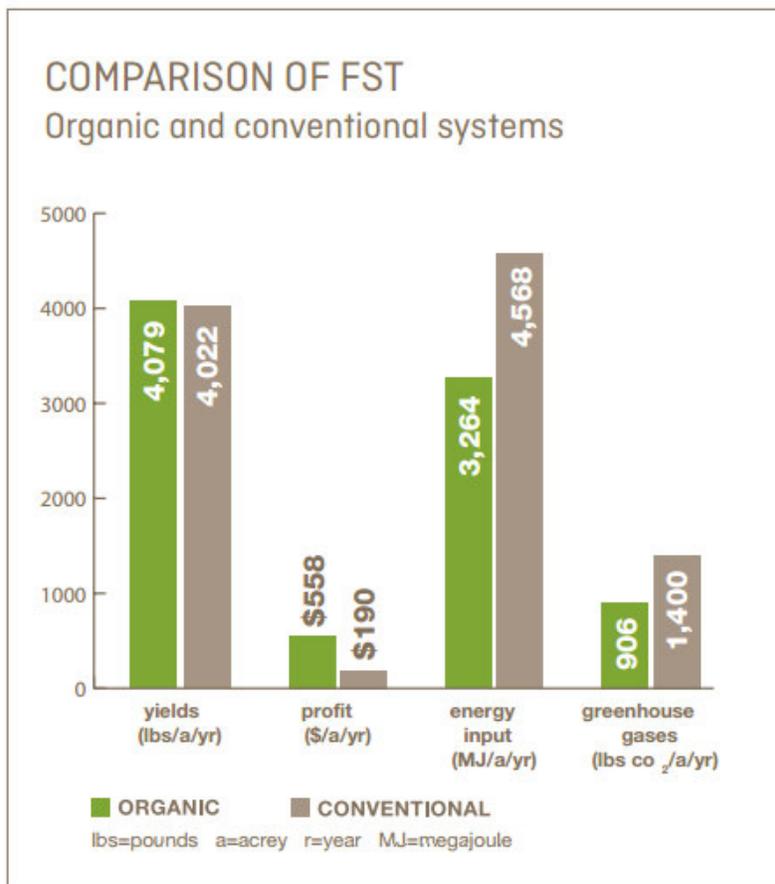


figure 1. (page 3 of *Organic Agriculture and Climate Change, 2014*).

### Conclusion

The discussion document provided by the Ministry for the Environment is a good starting point of information, whilst it also missed some important points. As stated, there are opportunities to make profound targets for lowering our GHG emissions that have stable and certain results. Based on the research presented here, I believe New Zealand should take an approach that tackles all major areas of our GHG emissions that we can, and particularly in the area of land management where there are concrete solutions. These solutions of native forestry planting on less productive lands, and widespread organic regenerative farming have many other additional benefits to them that are social, economic and environmental. All finances and energy spent in these areas will not be wasted, and will be a source of fortune for future generations. These solutions can be put to action immediately and will bare fruits in years to come. Some of the other research in technology development can also continue, but cannot be depended upon as a solution. So these areas should be marginal in terms of money spent, and expectation to perform to reach our targets.

Thank you for providing the public with the opportunity to share our opinions on such an important topic that will affect us all.

Sincerely,  
 Elizabeth Guthrey  
 03/06/2015

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USDA Organic website:

<http://www.usda.gov/wps/portal/usda/usdahome?contentidonly=true&contentid=organic-agriculture.html>