



C⁶ Forest to Farm envisions a world in which thriving rural communities are set in healthy, resilient landscapes, secure from the threat of uncontrollable mega-fires. Currently, the cost of removing unmerchantable forest biomass is preventing urgently needed restoration of fire resilience.

We have an idea we are working to test, which is converting unmerchantable forest biomass into carbon-sequestering biochar that will enrich agricultural and garden soils. Our current work is to begin research-scale proof-of-concept biochar production that will allow us to demonstrate the benefits of biochar. A brief project description is included below.

METHOW VALLEY BIOCHAR RESEARCH AND DEMONSTRATION PROJECT

C⁶ Forest to Farm is an organization dedicated to reducing the risks of extreme wildfire, and we need your help. The Methow Valley is a microcosm example of the enormous challenges facing much of the earth: unhealthy forest conditions that are fueling uncontrollable wildfire. Recent studies by the U.S. Forest Service capture the problem: three Methow Valley communities – Methow, Twisp and Winthrop – are identified as being among the top ten most at risk from wildfire in the state of Washington; and, among the 19 national forests in the Northwest, the Okanogan-Wenatchee National Forest (which includes the Methow Ranger District) is most in need of forest restoration. Only by restoring our forests can we protect our community and climate.

Large quantities of unmerchantable forest materials (waste materials such as tree-tops, branches and very small diameter trees) must be removed from our forests to reduce fire risk and restore forest health. However, the cost of hauling these materials to distant facilities is far greater than any value that can be recovered. This has long been an obstacle to restoring fire resilience to our forests.

C⁶ Forest to Farm aims to create local uses for unmerchantable forest materials. Our plan is to establish a local biochar¹ production facility to utilize the waste materials generated by forest health treatments. Biochar is made by heating organic matter in an oxygen-free environment, driving off the volatile compounds and fusing the carbon rings into a highly stable form – a process known as

¹ Charcoal made from biomass.

pyrolysis. Although biochar has been made in pits for thousands of years, modern manufacturing equipment has the capability of precisely controlling processing conditions, allowing for clean and efficient production of biochar with specific desired physical and chemical properties. Thus, biochar can be manufactured to provide benefits targeted to a variety of applications.

Biochar has many uses, but currently is primarily used as a carbon-sequestering soil amendment that can greatly increase crop yields (particularly in poor, sandy soils). There are several mechanisms that account for increased soil fertility. Similar to clay particles, biochar bonds with positively-charged nutrients such as nitrogen, potassium, calcium, etc., holding them in the root zone where they are available to plants. It benefits the soil ecosystem, with its porous structure providing habitat for soil microorganisms and protecting them from predation. It can conserve water, acting something like a sponge, and increasing the soil's capacity to hold plant available water. And, it can be processed to achieve a desired pH through a wide range of values, so it can also be used to adjust soil pH. None of these benefits involve consumption of the biochar: it remains in the soil for hundreds, or even thousands of years. Effectively, biochar used as a soil amendment is coal mining in reverse.

Demonstrating 'proof of concept' is a critical step in raising public awareness of the environmental, social, and economic benefits of biochar production, and that is our immediate goal. We plan to accomplish this by operating a research-scale biochar processor in the Methow valley for one year and conducting demonstration projects for a range of uses.

A year of operation will allow us to identify the best processing conditions for locally sourced materials (ponderosa pine, Douglas-fir, mixed conifers, softwoods and yard waste), targeted for locally common soil types. We plan on producing 40-60 tons of premium quality biochar. Transportation, and set-up and training to operate the equipment will cost \$7,500. We estimate that the cost of leasing, feedstock acquisition and operation for a year will be \$80,000.

Following this effort, our goal is to establish production facilities that will allow us the move many thousands of tons of carbon a year from 'Forest to Farm'. The plan for doing so is described in detail in our 'Proposal for Methow Valley Biochar Pilot Program'.

Please help us protect our forests, community and climate. Visit our website or call for further details, to donate or to get involved.