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## Offtake Roadmap for U.S. Agroforestry Producers

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### KEY TAKEAWAY

Agroforestry remains a nascent practice and industry within the United States, as described in our September 2023 [U.S. Agroforestry Primer](#). That said, we continue to believe that agroforestry holds great promise for farmers and landowners, investors, and society writ large. To date, many stakeholders within the regenerative agriculture space have been focusing their attention upstream within on-farm operations – and for good reason – as this is where action is urgently needed to limit greenhouse gas emissions, rehabilitate soils, restore nutrients to our food supply, and protect rural community members from compressing margins, flooding, and increased climate vulnerability. However, a successful transition to sustainable agriculture only works if there are markets for which to sell these products. For agroforestry, specifically, entirely new markets will need to be created for non-traditional crops that work well in combined tree, crop, and animal systems, while new supply chain structures will need to be forged to aggregate and market crops that may be coming from 50 or 100 acres, as opposed to a conventional 4,000 acres. Indeed, without attention to downstream functions, agroforestry risks becoming a trap for those enacting change upstream. Luckily, there are solid blueprints in place for this discussion: pistachios and herbs.

### KEY POINTS

**Agroforestry Upstream.** Much of the focus on agroforestry development in the U.S. thus far has been upstream, on-farm. This, of course, makes sense given that the very act of agroforestry starts with the commingling of trees, crops and animal systems. Additionally, on-farm is where the world urgently needs to deliver on both environmental and social outcomes like air quality, water quality, soil erosion, biodiversity, and rural livelihoods.

**Don't Forget About Downstream.** However, for all the good that can come from agroforestry development on-farm, these actions upstream will prove to be short-lived if markets aren't properly structured for the offtake of their products downstream. Two main challenges come to mind as agroforestry develops in the U.S. First, many of the tree and shrub varieties attractive for agroforestry systems produce specialty crops that aren't well known by American consumers. These products can be thinly traded without mature distribution networks in place. Second, the very nature of agroforestry sometimes introduces production inefficiencies that retard large-scale production of goods, thus relegating production to smallholder plots in many instances. If the agroforestry sector is to be successful ahead, it will need to develop demand for its products and then further respond by cooperating together to pool supplies and create delivery mechanisms for distribution to end customers.

**Offtake Roadmaps: Pistachios & Herbs.** Downstream development efforts take meaningful, coordinated work, but the good news is that analogues already exist from which to follow. Agroforestry developers can look towards industries like U.S. pistachios and U.S. herbs for how they have handled related challenges, with each providing important lessons to a combined set of problems that we expect to impact agroforestry crops, ahead.

The **pistachio** industry largely arose in the 1970s and 80s, finding a way to grow within a mature global market by growing its share of demand, both internationally and domestically. The industry started by first recognizing its key competitive advantages in order to take share on the international market while establishing an important baseload of demand for its growers. It then followed this action by meeting consumer demand domestically and building this demand further through a branded product offering and clear, consistent marketing to domestic end consumers. Today, pistachios are a very popular American snack, with farmgate prices having risen from \$1.00/lb in 1980 to roughly \$2.50/lb today, despite considerable production growth during this time.

Within the **herbs** space, smallholder specialty growers in the U.S. compete against larger domestic rivals and substantially resourced global traders by creating regional coalitions that solve for management, processing, and distribution hurdles in a way that consistently allow them to garner premium prices for their value-add products. Small forest farmers of “wild-simulated” product in Appalachia have been able to compete with more efficient field-grown producers, both domestically and abroad, due to important organizations like the [Appalachian Beginning Forest Farmer Coalition \(ABFFC\)](#) and [Appalachian Sustainable Development \(ASD\)](#), both of which work to support small, sustainable herb growers and their access to markets.

## ADDITIONAL DISCUSSION

### Agroforestry Upstream

To date, much of the focus on agroforestry development in the U.S. has been upstream, on-farm. This, of course, makes sense given that the very act of agroforestry starts with the commingling of trees, crops and animal systems. The industry itself remains very nascent, as described in our [Agroforestry Primer](#) published in September last year. Thus, it is a natural course of action to begin by planting trees on conventional farm and ranch land. There is also a very urgent need to deliver climactic outcomes associated with agroforestry, namely the avoidance of nitrous oxide (N<sub>2</sub>O) emissions, the sequestration of carbon dioxide (CO<sub>2</sub>), the protection and rehabilitation of our soils and freshwater supplies, the replenishment of nutrients in our food, and the restoration of biodiversity to our landscapes. We also need to deliver on important social outcomes for rural producers of food that are seeing their incomes wither and communities dissolve. It is therefore imperative that society recognize the potential domino effects from a lack of action on these issues and move swiftly to address them via means like agroforestry, whereby the planting of trees and development of their root structures can accomplish a great deal of positive impact (please read our “Power of Trees” [report](#) from June 2023 for more information).

### Don't Forget About Downstream

For all the good that can come from agroforestry development on-farm, these actions upstream will prove to be a short-term band aid if markets aren't properly structured for the offtake of their products downstream. One cannot exist without the other. Two main challenges come to mind as agroforestry develops in the U.S. First, many of the tree and shrub varieties attractive for agroforestry systems produce specialty crops that today fly under the radar of American consumers. These products can be thinly traded, without mature distribution/marketing networks in place. Second, the very nature of agroforestry sometimes introduces production inefficiencies that retard large-scale production of goods. Instead of producing corn on 4,000 acres, an agroforestry operator may be producing chestnuts and hay on 100 acres. Commercial food and agribusiness buyers wish to purchase raw materials in known, sizable quantities using efficient forms of dependable logistics networks. Thus, the agroforestry industry needs to develop demand for its products and then it needs to further respond by cooperating together to pool supplies and create delivery mechanisms for distribution to end customers. This will take meaningful, coordinated work ahead, but the good news is that food and agribusiness companies want to buy regenerative products like those produced from agroforestry systems, and they are willing to pay a premium price for these goods. As we discuss in the next section, there is also good news existing in the form of analogues for which this work has already been done: pistachios and herbs.

The food industry is willing to pay premium prices for sustainably produced products, mainly because of increasing consumer demand for these products together with regulatory pressures to report its actions and progress against financial disclosure frameworks like the Task Force on Climate-Related Financial Disclosures (TCFD) and the Task Force on Nature-Related Financial Disclosures (TNFD), among others. As food companies set targets to expand the number of acres from which they source regenerative ingredients, buyers will be forced to pay higher prices for these raw materials while also reformulating their own products to account for sheer availability of regeneratively produced crops in the marketplace. Thus, if agroforestry operators are able to collaborate, communicate, and deliver on these demands, the industry should be able to successfully deliver on offtake of its products while realizing intended economic and nature-based returns for its entire stakeholder set, to include investors and farmer/landowner partners.

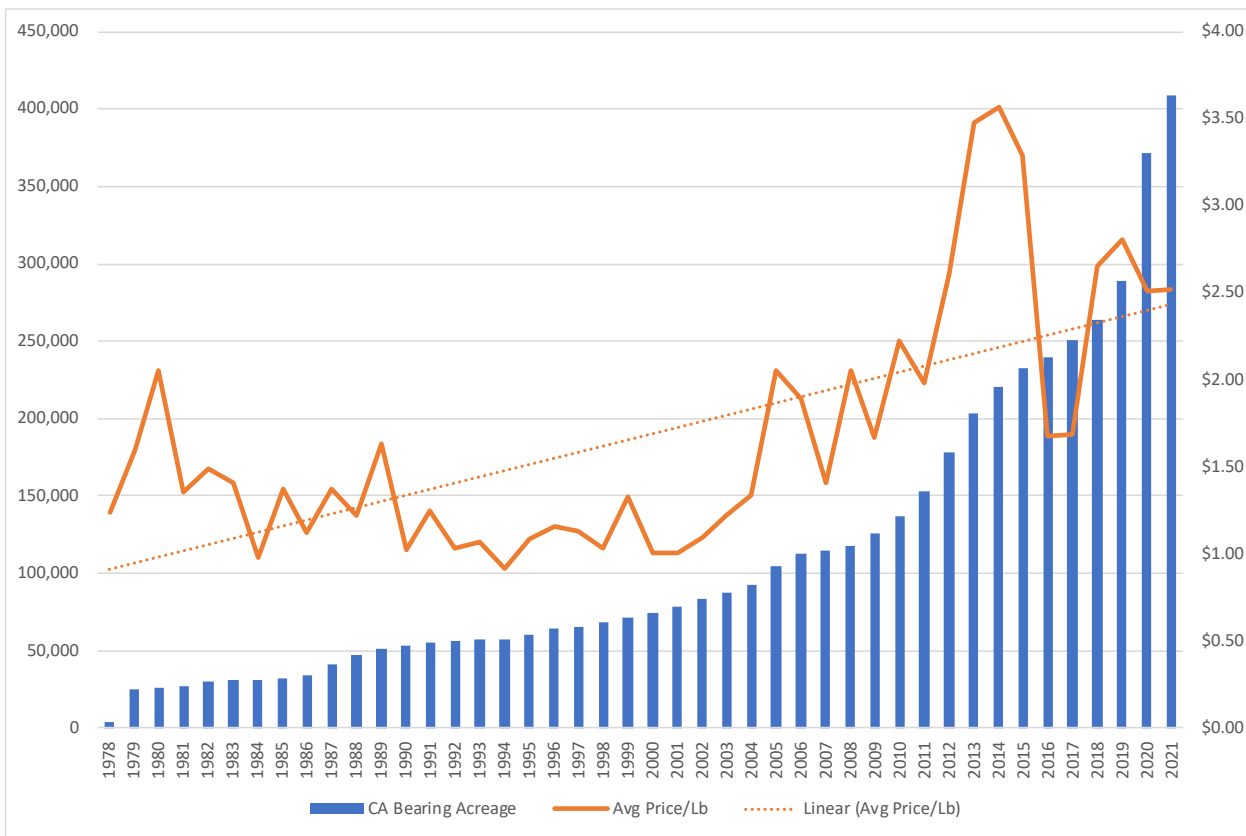
### Offtake Roadmaps: Pistachios & Herbs

Important analogues for successful offtake programs are already in place for agroforestry participants in the U.S. today. The pistachio industry largely arose in the 1970s and 80s and found a way to grow within a mature global market by growing its share of demand, both internationally and domestically. In the herbs space, smallholder specialty growers in the U.S. compete against larger domestic rivals and substantially resourced global traders by creating coalitions that solve for management, processing, and distribution hurdles in a way that consistently allow them to garner premium prices for their value-add products. Below, we discuss what we think are important proxies for those wishing to expand agroforestry.

#### *Pistachios*

According to *Market Research Future*, the global tree nuts market is valued near \$47 billion, with pistachios representing 12% of the total for a \$5.6 billion value. Although pistachios are native to Western Asia and grown in significant quantities across India, the Middle East, and Southern Europe, the U.S. is now responsible for upwards of 65% of worldwide pistachio production, with virtually all of its output coming from California. It wasn't always this way, however. The U.S. produced its first commercial crop in the late 1970s based on just ~3,000 acres of land (see **Figure 1**). Today, the country farms close to 430,000 acres of pistachios. As **Figure 1** shows, U.S. pistachio prices have trended higher over time as California has consistently added new acreage into production. How did this happen?

**Figure 1: Historical U.S. Pistachio Production & Pricing**



Source: [www.acpistachios.org](http://www.acpistachios.org)

First, the U.S. meaningfully expanded its export market presence from 1990 to 2010, taking share on the international market as it focused on an American “food safety” message while meeting key shipment dates for important holiday consumption periods around the world. This helped to establish a critical baseload of demand for the nascent industry as it began to ramp production higher. Demand baseloads offer consistent offtake avenues for producers while helping them to recover fixed costs early in the industry life cycle. Second, the Atkins diet took off in the U.S. in 2003, promoting the consumption of high fat, healthy whole foods (for which nuts were a natural fit). Although fortuitous, the pistachio industry recognized broader consumer trends in the marketplace and further expanded production to meet this demand. Third, the industry benefitted from a related force when the *Wonderful* brand launched in 2008 and moved aggressively to increase domestic awareness of pistachios as a convenient, tasty snack item with splashy Super Bowl ads and relevant health and wellness marketing. Today, the *Wonderful* brand sells its pistachios everywhere from grocery stores to gas stations to hardware stores.

In sum, a nascent American pistachio industry was able to grow and compete within an established global market by first recognizing its key competitive advantages in order to take share on the international market and establish an important baseload of demand for its growers. It then followed this action by meeting consumer demand domestically and building this demand further through a branded product offering and clear, consistent marketing to domestic end consumers. Today, pistachios are a very popular American snack, with farmgate prices having risen from \$1.00/lb in 1980 to roughly \$2.50/lb today, despite considerable supply growth during this time.

### Herbs

Herbs have many valuable consumer uses, including culinary, medicinal/supplemental health, and cosmetic applications. Common herbs include ginseng, oregano, and basil all the way down to lesser known varieties like black cohosh, goldenseal, and bloodroot. They generally take the form of fresh or dried plant flowers, leaves, barks, roots, or seeds, and can consist as whole, ground, or oil-based products. Herbs are believed to have therapeutic properties, and they also add flavor to our food and beverages. As consumers

increasingly focus on natural products and remedies, the market for botanical herbs has grown at an impressive rate in recent decades. The global market for dried herbs is large, with estimates ranging from \$2 billion to \$6 billion in value. More credible reports seem to coalesce around \$4 billion+ in market size, with the North America region representing roughly 55% of the total, according to *Maximize Market Research*. This would equate to a market value near \$2.2 billion, with much of this centered in the United States, we believe.

As with many other established industries, the herb space is dominated by large traders like McCormick, Frontier, and Naturex, along with semi-vertically integrated brands like Herb Pharm, maker of its own branded herbal supplement tinctures sold in many retail/grocery outlets around the U.S. (**Figure 2**). However, there remains space for smaller, premium producers of herbal raw materials, thanks to the existence of two complementary forces: 1) higher prices paid for specialty products, and 2) a thoughtful, adaptive system established in the main specialty herb producing region of Appalachia in the U.S., enabling smallholder producers to learn, cooperate, and aggregate their supply together in a way that affords a viable business model to compete with other larger entities in the industry.

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**Figure 2: Herb Pharm Tinctures**



Source: [www.herb-pharm.com](http://www.herb-pharm.com)

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Although many herbs are mass-produced on large “cultivated” farms in the U.S., smaller specialized producers are able to realize sizable price premiums for their “wild-simulated” herbs produced under forest canopy. Wild-simulated product is believed to carry more nutrients at higher concentration levels, relative to field-cultivated product, and it also many times is void of synthetic fertilizers, fungicides, and pesticides that have been proven to negatively impact human health – either directly or indirectly. However, wild-simulated herbs produced under forest canopy (classified as Non-Timber Forest Products, or NTFPs) are relatively inefficient ways of producing herbs, with longer production cycles, higher labor costs, and lower per-acre yields. As a result, their overall production base is smaller, comprised mainly of hobbyists and smallholder growers that lack ongoing price discovery, stable end market demand, and economies of scale to compete with larger enterprises. Newer entrants and hobbyists can many times struggle with a lack of educational resources and/or expertise for myriad of factors that can affect production, as well. Finally, producers of NTFP herbs may not have the capital to purchase and maintain processing equipment necessary for sale to end users, and they may also lack assurance programs that buyers deem necessary within their value chains. This is where a properly organized system of disparate parts can make all the difference.

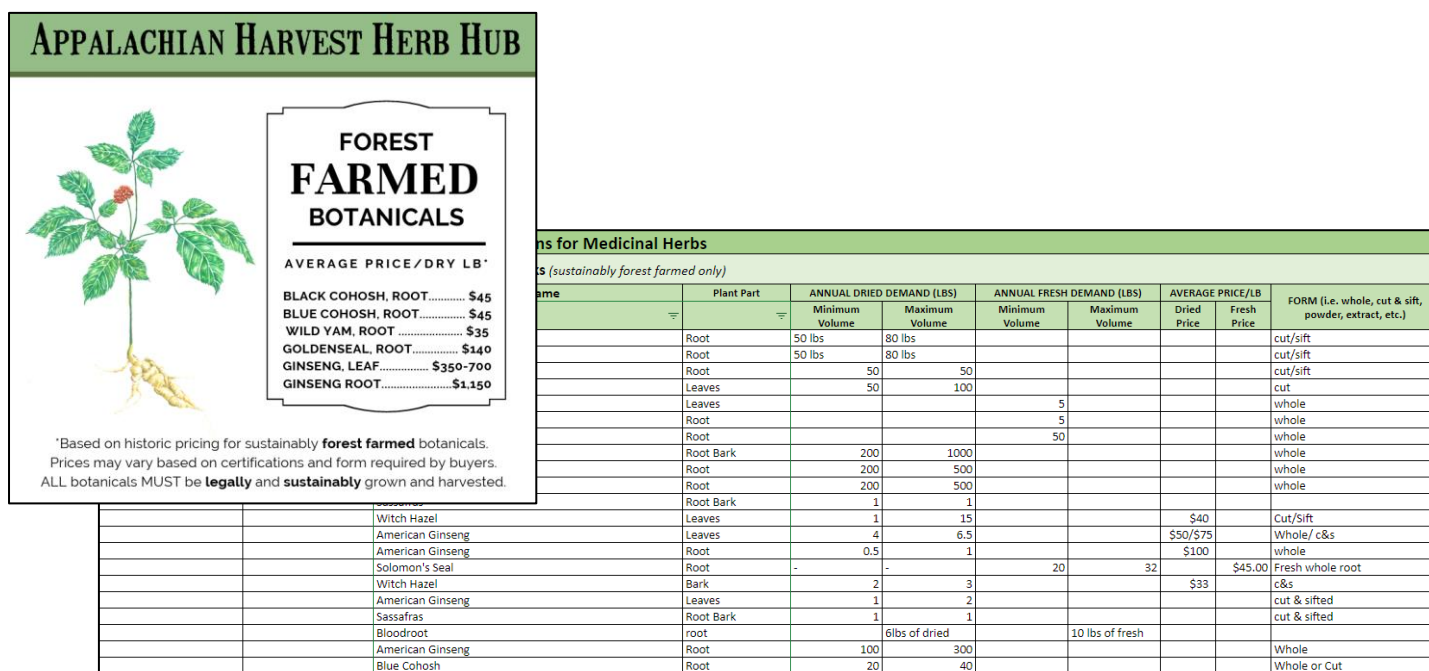
Appalachia is a key growing region for NTFP herbs. To help support these growers, the [Appalachian Beginning Forest Farmer Coalition \(ABFFC\)](#) is housed within Virginia Tech University in Blacksburg, VA, and is a network of forest farmers, universities, governmental, and non-governmental organizations that share a goal of improving agroforestry production and farming capabilities in forest environments. Through education and relationship building, the ABFFC aims to increase awareness of NTFPs through planning

strategies and technical assistance. Included in this coalition is [Appalachian Sustainable Development \(ASD\)](#), an organization whose mission is to support growers, food access, workforce development, and sustainability in the region. One of ASD’s most important contributions to the specialty botanicals space is the Appalachian Harvest Herb Hub, established in 2017. Through the Harvest Herb Hub, ASD offers the following:

- **Seed to Sale Training:** workshops on plant propagation, forest farming practices, and post-harvest handling
- **Technical Assistance:** assessment of a location’s potential for growing forest botanicals and medicinal herbs
- **Cost Share Funding:** grants to help offset startup costs, including certifications and planting stock
- **Herb Processing Equipment:** shared root washers, herb dryers, and other equipment for processing
- **Aggregation & Marketing:** cooperative sales services + connection to domestic and international buyers

In addition, ASD can help growers achieve third party verification for forest botanicals that are produced and harvested in a sustainable and legal manner, such as the Forest Grown Verified (FGV) program. Ongoing price and volume discovery are other important services provided by ASD, as evidenced by its herb price lists and projected herb demand spreadsheet published on its website (**Figure 3**).

**Figure 3: ASD Price/Demand Discovery Tools**



Source: [www.asdevelop.org](http://www.asdevelop.org)

Ginseng is perhaps the best example of how price premiums can be pursued by American forest farmers using key systems for aggregation and distribution in the U.S. market. From 2010 to 2020, “field-cultivated” ginseng prices out of Wisconsin – where 95% of American ginseng is grown – averaged around \$50/lb. In 2017, it’s estimated that the state produced over 1 million pounds on roughly 500 acres of land. In comparison, “wild-simulated” ginseng prices from forest farming activities averaged in the \$300-\$600/lb range during this time, with an estimated 50 acres, or more, of considerably less-efficient woodlands being used for wild-simulated production in the country (with much of this taking place in the Appalachia region). To be sure, consider that Appalachian Sustainable Development’s (ASD) anticipated ginseng demand for 2024 amounts to roughly 325 pounds of production, a small consideration when compared to Wisconsin’s annual output and distribution. Still, the important services provided by ASD allow Appalachian forest farmers to compete within the vast herb space and garner related price premiums for their NTFP herbs.

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