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Alternatives to Forest Gathering of Plant Materials for *Hula Lei* Adornment

Gary R. Vieth, Linda J. Cox, Margaret Josephson, and James Hollyer
Department of Agricultural and Resource Economics

Hawaii's population, including visitors, increased by 61 percent from 1970 to 1995. During the same period, the amount of land in forest decreased by 52 percent. The result is less forest more intensively used, particularly on Oahu where most of Hawaii's people live.

Hawaii's forest land includes both state-managed ("reserve" forests) and privately managed forests. Reserve forest includes both forests owned by the state and privately owned forest lands surrendered by agreement to state management. The Hawaii Department of Land and Natural Resources Division of Forestry and Wildlife manages the reserve forest lands. A permit system regulates harvesting of forest products and recreational uses of reserve forests, but enforcement of regulations on forest use is limited by a shortage of state personnel. Thus, there is little actual control, and use of the reserve forests is, in effect, unrestricted.

The "open access" forest management system and increasingly heavier use of forests for many purposes have led policy makers and citizens to become concerned about the future health of Hawaii's forests. One use that has received some attention is the gathering of forest plant materials by *hula halau* (dance groups) for *hula lei* adornment. There are few substitutes for forest gathering of certain *lei* materials, and excessive collecting might lead to endangerment of the plant species. Our study found that although there are some opportunities to purchase the desired plant materials from commercial sources, and there is some backyard growing by members of *hula halau*, over two-thirds of the *hula halau* gather *hula lei* materials from the forest.

Community gardens have been suggested as an acceptable alternative source of plant materials for *hula* adornments. Cooperators can harvest the desired plant materials from the community garden if they help with the garden's upkeep. Some policy makers feel that such community gardens are a reasonable alternative to forest gathering.

We conducted a small survey to determine the conditions under which alternatives to forest gathering are acceptable to *kumu hula* (dance group leaders). Three alternative *hula lei* material sources—forest gathering, community gardening, and purchasing—were evaluated. Backyard growing was disregarded because its potential to meet the demand for the materials is considered limited.

The *kumu hula* makes the decision about the type and source of the *lei* plant materials. Thirteen *kumu hula* were asked to rank the three alternative sources of *lei* materials from most-liked to least-liked. The *kumu hula* surveyed live on Oahu and currently use forest gathering. Important factors for consideration were defined for each source: search time and chance of finding the desired material for forest gathering, work time for community gardening, and price for purchasing. Our study used an estimated amount of *lei* materials from three plant sources sufficient for the adornment of one participant in a traditional (*kahiko*) *hula* performance.

Forest gathering is collecting the desired *lei* plant materials from untended forests, for free. Two factors affect the value of this source to the *kumu hula*. *Chance* is the probability that the desired material is actually found, and *search time* is the amount of time that the *hula halau* members spend looking for and collecting it. As plant species become more rare (closer to extinction), the chance of finding them decreases and search time increases.

The community garden is an area of tended land. Materials can be harvested from the garden only if some

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given amount of time (*work time*) is devoted to its upkeep. The hours of upkeep required in exchange for the right to harvest determines the value of this *lei* material source to the user.

The third alternative, commercial purchase, is buying the desired materials in the market, and *price* is the critical factor in the value of this source.

Kumu hula are more likely to choose forest gathering when the chance of a successful search is high. Work time for a community garden, price for market purchases, and greater search time for forest gathering are expected to be considered negatively by the *kumu hula* and thus can be considered *costs* of these sources. A source is less likely to be chosen when any of these three factors is high.

We examined the conditions under which *kumu hula* who currently use forest gathering would be willing to change to purchasing the desired materials. Figure 1 shows the relationship between these alternative sources. At a market price of $36.00 for the materials for one person, less than 40 percent of the *kumu hula* will choose commercial purchase over forest gathering by the time chance decreases by 70 percent. Some will never choose the purchase option if the price is $36.00. However, at an $18.00 market price, all of them will like commercial purchasing better than forest gathering when chance decreases by 70 percent. The *kumu hula* would be more willing to purchase their materials when the price is even lower. Thus when commercial purchase prices are lower, it is less likely that plant species in the forests will be overharvested.

The conditions under which *kumu hula* would choose community gardening rather than forest gathering as a *lei* material source are shown in Figure 2. If work time is 25 hours, about 60 percent of the *kumu hula* will prefer the community garden to forest gathering when chance falls by about 60 percent. Some will never change their source choice with work time at 25 hours or higher. However, if work time is 10 hours, all of them will choose community gardening over forest harvesting by the time chance decreases by 60 percent. Forest gathering will be even less desirable when the garden work time requirement is lower than 10 hours. Thus overharvesting of rare plant species from the forest is less likely if community garden work time is lower.

Summary and implications

The key to reducing the harvest and endangerment of forest plant species is to encourage switching to sources other than forest gathering. Alternatives to forest gathering are community gardens and commercial purchase. Some *kumu hula* on Oahu indicated that they are willing to use the community garden and commercial purchase sources under certain conditions. Programs that lower the work time required for community gardens or the costs of commercial production may be the most cost-effective way to reduce the likelihood that increasingly rare forest plant species will become endangered or be harvested to extinction.

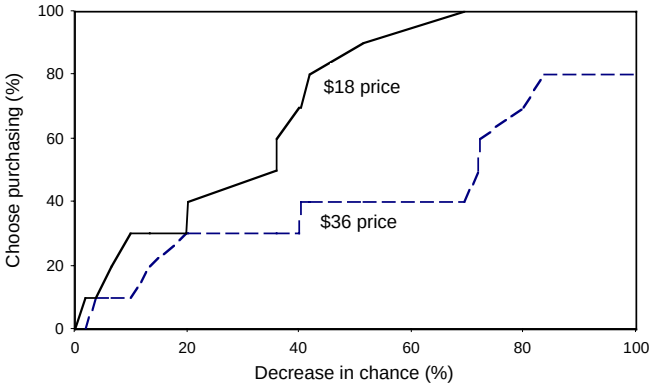

Figure 1. As the chance of finding a *hula lei* material in the forest decreases by a given percentage, the number of *kumu hula* who would choose purchasing over forest gathering varies with the price of the purchased material.

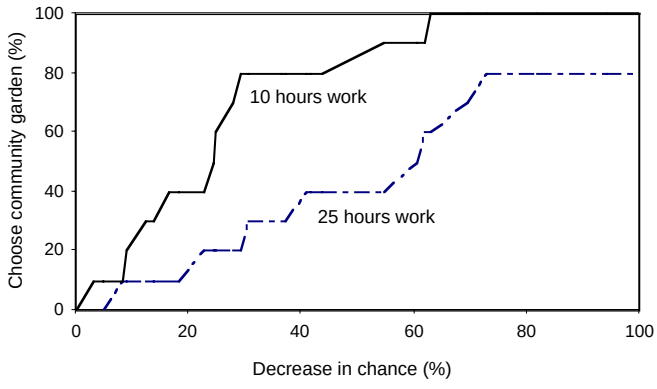

Figure 2. As the chance of finding a *hula lei* material in the forest decreases by a given percentage, the number of *kumu hula* who would choose community gardening over forest gathering varies with the amount of work time that would have to be devoted to maintaining the garden.

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