Onions, lotus root, tree ears, and water chestnuts—never had been consumed by some respondents in China. Likewise, several traditional Chinese foods are not eaten by Chinese in our study area, despite their availability. Foods in this class include: bok choy, bean sprouts, bamboo shoots, lotus root, pea pods, tree ears, and water chestnuts.

**Fruit.** More apples and peaches are consumed in America than in China, while largest decreases are with lychee, mandarin orange, persimmon, pineapple, and watermelon. Again, decline in consumption of these foods cannot be attributed to availability because fresh, dried, and canned products are widely available at specialty shops within the study region. Examples of fruits consumed in nearly equal frequencies in China and America include banana, grape, honeydew melon, and orange. It is interesting to note that peaches—symbol of longevity in China—never had been consumed in China by at least two respondents. Furthermore, one respondent never had eaten lychees in China and four never had eaten persimmons—despite these fruits being especially associated with Chinese by Westerners—and at least 50 percent of our respondents never eat them in the United States, even though they are readily available.

**Resulting questions**

Our data illustrate several dietary trends in food behavior of Chinese immigrants to north-central California. First, some “characteristic” Chinese ethnic foods were not regularly consumed even in China, and such items continue to play inconsequential or nonexistent roles once the immigrant arrives in America. Second, some frequently eaten Chinese ethnic foods are readily abandoned after the consumer arrives in America, despite the availability of these foods in fresh or preserved forms.

An explanation for the first finding may lie in rapidly occurring dietary change within China, a pattern whereby Chinese food behavior once considered correct may no longer be so. The second finding may be due to considerations of cost and perceived food quality. Although all foods itemized on the questionnaire are available to respondents, some foods may be too expensive, or might be perceived as inferior in taste, texture, or quality. (Whether such perceived differences between foods in China and America are real or psychological remains an important area for future research in sensory evaluation.) After abandoning many Chinese ethnic foods, Chinese immigrants have turned to American foods or to items characteristic of other ethnic groups, as with tortillas.

When evaluating characteristic diets of ethnic minorities after immigration, three food-use categories emerge: increased frequency, decreased frequency, and constant frequency. Whereas our data are limited, we have shown that nontraditional foods play major dietary and nutritional roles in Chinese-American families. Thus our study raises several provocative questions that remain to be answered. For example: What factors determine whether or not an individual readily adopts nontraditional foods? Why have some immigrants steadily maintained ethnic-food consumption while other groups have quickly accepted a wide range of American food patterns? Why are some foods adopted quickly, others slowly?

Preconceived notions about ethnic food behavior may be quite erroneous, and nutrition educators need to be sharply tuned to both minority and majority food behavior. Let us not be surprised when we counsel Asians who do not eat rice, Hispanics who do not eat tacos, or American Indians of California who have never eaten acorn-flour bread. We can be better nutrition educators when we examine what our clients actually eat.

**Based on an article in the Journal of Nutrition Education, Vol. 10, No. 3, July-Sept. 1979.** Louis Evan Grietti is Assistant Professor of Nutrition and Geography, UC, Davis, and Marie B. Paquette was Research Assistant, Department of Nutrition, UC, Davis.

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**Attitudes of farmers toward using crop residues as fuel**

Clarence F. Becker □ Bryan M. Jenkins □ Brian Horsfield □ John R. Goss

Growers favor use of rice straw and prunings as sources of energy by utility companies, but only if the collection system is practical, timely, and reliable.

Agricultural residues—the renewable by-products of farming, lumber production, and food processing operations in the state—are now attractive alternative energy sources to oil and natural gas. Twenty-seven million tons of residue containing the equivalent energy of 65 million barrels of oil are produced each year in California. Utility power companies in California are especially interested in the potential for developing agricultural residues into a useful and stable fuel supply for electric power generation. This article deals principally with the attitudes of farmers toward the utilization of their crop residues by utilities for power generation.

In a recent study (August 1977), we explored with the Pacific Gas and Electric Company the economic and technical feasibility of using agricultural residues as fuel. We evaluated methods and costs for collecting, transporting, and converting residues, and found energy production from residues to be competitive with that from coal, provided that utilities can establish long-term contracts with farmers for the use of residues produced on farmers’ lands. These long-term contracts are vital to both the utilities and the farmers—assuring the utilities of a firm fuel supply and the
farmers of a firm market for residues. Because, residues present significant disposal problems or costs to some farmers, the use of residues by the utilities will benefit not only the utilities but the farmers themselves. However, the use of residues for any purpose may affect the way some farmers are performing their field operations now. Therefore, to better understand how farmers feel about utilities using their residues as energy resources, especially if modification of existing practices should prove necessary, we contacted farmers and asked for their opinions and ideas.

A survey, prepared by us at the Agricultural Engineering Department at UC, Davis, was mailed with the cooperation of farm advisors in Sutter, Colusa, and Fresno counties and the executive secretary of the Butte County Rice Growers Association. The surveys were mailed only to rice growers and orchardists, because rice straw and tree prunings were, at the time of the survey, the two residues with the highest initial potential for utilization in large central station power plants, and because modifications in present field practices may be needed to collect these residues.

Survey responses

All farmers contacted were willing to participate in a practical program for collecting and utilizing the residues. The word “practical” is often underscored: the collection system must be reliable under all weather and field conditions, and the market for the residue must be established before a utilization program can be substituted for burning. Farmers feel that such a disposal system has advantages over open-field burning, which has been the cause of increasing public concern.

We asked participating farmers to: (1) list their present residue disposal practices, (2) express their willingness to participate in a utilization program, (3) give their preferences on how they would participate, either by contracting with a custom operator to collect the residue or by delivering the residues to the power plant themselves, (4) discuss their requirements for a collection operation, including needs for storage space on their properties, speed and timing of the operation, economic returns from the utility to cover costs to the grower, and (5) predict any problems they anticipated for collection systems operating on their lands.

Pruning being buckraked for burning (upper left) outside of the rows where they had been placed (upper right). Open-field burning of straw (center), the most common technique for disposal of field residues in California, has elicited public concern over smoke pollution. Incorporating straw into soil, however, is expensive, can impede subsequent field operations, and is fraught with such difficulties as clogged plows (below).
Survey respondents are strongly in favor of having the residues collected by custom operations, primarily to save themselves time and effort, and secondarily because storing residues until pickup is a major concern. Residues will most likely be stored in roadside piles for one to several months. Most farmers contacted can provide the space for these piles, but would like not to be burdened with the management responsibilities caused by heavy rains on exposed piles; fires; strong winds scattering the residues; piles harboring diseases and pests; and esthetics of piles.

Timing of the residue collection operation is critical. Collection must not impede soil preparation, planting, harvest, chemical application, or other field practices. These factors must also be carefully considered in collection system design.

Farmers responding to the survey indicated that obtaining long-term commitments was more important than making a profit. But if the utilities are successful in this venture, farmers would, of course, like to receive a share of any profits. Some farmers fear that if they gave up open-field burning for even a short time, they might permanently lose this disposal method, even if the utilization program became unfeasible for any reason.

The number of conclusions that can be drawn from the survey are limited, for only rice growers and orchardists were involved. The attitudes of other farmers, including growers of cotton, cereal grains, other field crops, grapes, and vegetables, and operators of dairies and feedlots, are equally important to long-term attempts to utilize residues, and the selection of rice growers and orchardists for the survey does not necessarily indicate that these would be the first to participate in utilization programs. The survey was only a preliminary contact with farmers to discern their general opinions; all residue utilization programs, for whatever purpose, can only be initiated with the cooperation of the farmers. The positive response to the survey is encouraging for continuing research. By participating in utilization programs, farmers can develop new ways to dispose of residue and obtain a practical source of energy, while helping preserve our oil and natural gas.

Clarence F. Becker was Visiting Research Professor, Brian Horsfield was Assistant Professor, Bryan M. Jenkins is Graduate Student, and John R. Goss is Professor, Department of Agricultural Engineering, U.C., Davis.

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