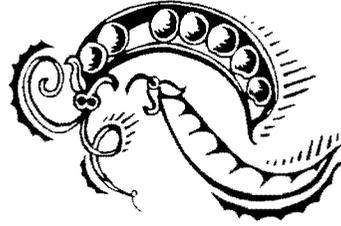


APPENDIX A



COMMODITY SYSTEMS ASSESSMENT METHODOLOGY

The primary source for materials found in this appendix is the manual:
LaGra J. 1990. *A Commodity System Assessment Methodology for Problem and Project Identification*. Moscow, Idaho: Postharvest Institute for Perishables.

The following information will help you look at your operation within the context of your local, regional or national commodity system to determine whether any of the practices you are now using to produce, handle or market your horticultural crops are the cause or source of postharvest losses, quality problems or loss of economic value or nutritional quality.

Step 1: Assessing Postharvest Losses in Your Operation --CSAM

A postharvest loss assessment method known as Commodity Systems Assessment Methodology (CSAM) was originally developed by Jerry LaGra (1990), and modified during its implementation over the course of many years. The commodity system is made up of 27 components that together account for all the steps associated with the production, postharvest handling and marketing of any given commodity. Ideally, teams of 4 or 5 people work together while investigating a commodity system. For example, a horticultural producer and a trader might be teamed up with a marketing specialist and an extension agent. If you would like to conduct a simplified survey of losses for your operation using CSAM, you can form a "team" made up of yourself and at least one other person, preferably someone with skills in areas of horticulture complementary to your own.

CSAM Sample Questions

The following is a list of system components and sample questions for investigating the commodity system within your operation. Begin by considering these questions in relation to one commodity of interest, and feel free to add any other questions about information you feel is pertinent to your own situation. Some of the questions can be answered directly by you or your managers, extension personnel or others who are knowledgeable about the commodity. Often, information can be found in the printed literature in agricultural libraries, journals or trade magazines. Many questions, however, require the team to visit, observe and ask questions of those who harvest, handle and market the product. Do not assume that you know what is actually happening until you observe the situation-- for example, workers can misunderstand instructions and mishandle produce, or unanticipated delays during shipping can cause temperature management problems.

CSAM can assist a loss assessment team to determine 1) the sources of postharvest losses (who within the marketing chain is responsible), 2) the causes of those losses (what handling or marketing practices are responsible) and 3) the economic value of the losses compared to the costs of current and proposed postharvest practices. Many times weight loss via water loss (wilting, shriveling, loss of volume) will be directly related to loss of income, and quality changes (over-ripeness, browning, decay) will also be determined to reduce profits when produce must be culled during handling. These losses must be assessed in terms of the costs associated with adopting new postharvest practices. Fill out the worksheet at the end of Appendix A after reviewing the chapters of the book related to the postharvest losses and quality problems you have uncovered in your assessment. Once you have collected this kind of information, the handlers responsible for losses can be targeted with appropriate information on the most cost effective improved postharvest technologies.

CSAM Components 1 - 7: Pre-Production

These components help you to put the commodity into perspective within the horticultural market, and gain some understanding of how much competition you may face, whether there are any political, economic or environmental constraints or incentives, and if there is any technical or marketing assistance available.

1- **Importance of the crop.** What is the relative importance of the crop (number of producers, amount produced, area of production (local, regional, national), economic value)? What crops compete with this one for shelf space?

2- **Governmental policies.** Are there any laws, regulations, incentives or disincentives related to producing or marketing the crop? (example: existing price supports or controls).

3- **Relevant institutions.** Are there any organizations involved in projects related to production or marketing the crop? What are the goals of the projects? How many people are participating?

4- **Facilitating services.** What services are available to producers and marketers (for example: credit, inputs, technical advice, extension services, subsidies)?

5- **Producer/shipper organizations.** Are there any producer or marketer organizations involved with the crop? What benefits or services do they provide to participants? At what cost?

6- **Environmental conditions.** Does the local climate, soils or other factors limit the quality of production?

7- **Availability of planting materials.** Are seeds or planting materials of adequate quality? Can adequate supplies be obtained when needed?

CSAM Components 8 - 11: Production

Many of the choices you make during production will later affect postharvest quality, food safety, produce losses and economic value. The first step in identifying possible improvements is to determine whether any of these production components are contributing to postharvest problems. As you collect information on each component, compare current practices to known recommendations for producing the commodity. Calculating production costs at this point will help you to make useful comparisons between current practices and any new practice that you may be interested in adopting.

8- **Farmers' general cultural practices.** What is the average area planted? Do any farming practices have an effect on produce quality (planting density, planting pattern, irrigation, weed control, fertilization practices, field sanitation)? What are the grower's sources of labor?

9- **Pests and diseases.** Are there any insects, fungi, bacteria, weeds or other pests that affect the quality of produce?

10- **Preharvest treatments.** What kinds of physical or chemical preharvest treatments might affect postharvest quality (such as use of pesticides, pruning practices, thinning)?

11- **Production costs.** Estimate the total cost of production (inputs, labor, rent, etc). What are the costs of any proposed alternative methods?

CSAM Components 12 - 21: Postharvest

Postharvest handling practices will have an enormous impact on produce quality, losses and safety. Postharvest handling maintains the quality of produce, but cannot improve it. Understanding each step of the postharvest chain will enable you to determine whether any of your current practices are causing problems. Sometimes it is possible to measure losses at each step, and determine whether making a simple change can have a major impact.

12- Harvest. When and how is produce harvested? by whom? at what time of day? Why? What sort of tools and containers are used? How do harvesters determine the proper maturity for harvest? How should harvest maturity be determined?

13- Grading and inspection. How is produce sorted? by whom? Does value (price) change as quality/size grades change? Do local, regional or national standards (voluntary or mandatory) exist for inspection? What happens to culled produce?

14-Postharvest treatments. What kinds of postharvest treatments are used? (Describe any curing practices, cleaning, trimming, waxes, chemical treatments, hot water dips, etc.)

15- Packaging. How is produce packed for transport and storage? What kind of packages are used? Are packages reused or recycled?

16- Cooling. When and how is produce cooled? To what temperature? Using which method(s)? How do current practices compare to recommendations for the commodity?

17- Storage. Where and for how long is produce stored? In what type of storage facility? Under what conditions (packaging, temperature, RH, physical setting, hygiene, inspections, etc.)? How do these compare to recommendations for optimum storage life?

18- Transport. How and for what distance is produce transported? In what type of vehicle? How many times is produce transported? How is produce loaded and unloaded? What are the conditions of the roads?

19- Delays/ waiting. Are there any delays during handling? How long and under what conditions (temperature, RH, physical setting) does produce wait between steps? Who is responsible for delays and who suffers financially?

20- Other handling. What other types of handling does the produce undergo? Is there sufficient labor available? Is the labor force well trained for proper handling from harvest through transport? Would alternative handling methods reduce losses? Would these methods require new workers or displace current workers?

21- Agro-processing. How is produce processed (methods, processing steps) and to what kinds of products? How much value is added? Are sufficient facilities, equipment, fuel, packaging materials and labor available for processing?

CSAM Components 22 - 27: Marketing

Marketing is not simply the last step of handling fresh produce, but must be part of the overall plan to provide produce that best meets the needs of the consumer. Consumer preferences play a large role in determining the economic value of the produce you sell.

22- Market intermediaries. If you do not handle the commodity yourself, who are the handlers of the crop between producers and consumers? How long do they have control of produce and how do they handle it? Who is responsible for losses /who suffers financially?

23- Market information. Do you have access to current prices and volumes in order to plan your marketing strategies? Who does the recordkeeping? Is information accurate, reliable, timely, useful to you as a decision maker?

24- Consumer demand and preferences. Do consumers have specific preferences for produce sizes, flavors, colors, maturities, quality grades, packages types, package sizes or other characteristics? Will they pay more for the characteristics they desire? Is there any sign of unmet demand and/or over-supply? How do consumers react to the use of postharvest treatments (pesticides, irradiation, coatings, etc.) or certain packaging methods (plastic, styrofoam, recyclables)?

25- Exports. Do you produce this commodity for export? What are the specific requirements for export (regulations of importing country with respect to grades, packaging, pest control, etc.)?

26- Marketing costs. Estimate the total marketing costs for the crop (inputs and labor for harvest, packaging, grading, transport, storage, processing, marketing, etc.). What are the costs for any alternative methods proposed? Do you have access to credit? Are prevailing market interest rates at a level that allows you to repay the loan and still make a profit?

27- Supporting infrastructure. Is supporting infrastructure adequate (roads, marketing facilities, management skills of staff, communication systems such as telephone, FAX, e-mail services)?

Step 2: Review and Evaluate Recommended Practices

You may notice that many of the questions posed during a commodity system assessment are directly related to the common practices that lead to high produce losses, quality and food safety problems and loss of value. Others relate to the market value of the produce, and may depend upon the season of production, packaging materials or consumer demand. By comparing the facts you have gathered using CSAM with the recommended practices and small-scale technologies for postharvest handling and marketing of the commodity which are presented in this book, you can make beneficial changes to reduce fresh produce losses, maintain quality and nutritional value and ensure food safety. If you uncover problems with no known technical solution, you can pass this information on to the university researchers and postharvest extension specialists in your state or region.

On the following 4 pages are example questionnaires from LaGra J. 1990, *A Commodity System Assessment Methodology for Problem and Project Identification*. Moscow, Idaho: Postharvest Institute for Perishables. You should develop suitable questionnaires for each component when you do your own Commodity Systems Assessment.

| COMPONENT 12 | Crop Harvest | |
|---|--------------------------|---------------------------------|
| NAME OF DATA COLLECTOR: _____ TEL: _____ | | |
| TITLE: _____ INSTITUTION: _____ | | |
| 1. Who harvests the crop? _____ | | |
| 2. Describe in detail the harvest operation: _____ _____ | | |
| 3. Why is the crop harvested in this particular manner? _____ _____ | | |
| 4. When is the harvest undertaken? Time of day _____ | | |
| 5. Under what conditions? Temperature _____ Relative humidity _____ | | |
| 6. Does the present method of harvest appear to affect: quantity of produce available for market(), quality of produce available for market(), value of produce available for market()? Explain _____ _____ | | |
| 7. Does the volume of produce unsuitable for market appear to be: high(), medium(), low()? Describe the causes, e.g., size of product, weather damage, pest damage, disease damage, lack of soil nutrients, sun damage, harvest damage, others _____ | | |
| 8. Estimate percentage of crop suitable for market: _____ % | | |
| 9. Identify and describe the harvesting tools: _____ _____ | | |
| 10. Is all of the crop harvested at one time? yes() no(). If no, why not and how is selection made for that part which is harvested? _____ _____ | | |
| 11. Identify harvest seasons for each cultivar or variety of crop (if more than one): | | |
| <u>Cultivar</u> | <u>Months of harvest</u> | <u>No. months in crop cycle</u> |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |

12. Which, if any, cultivar produces off season? _____
13. Optimum harvesting parameters:
Moisture content _____
Color/appearance _____
Tenderness/texture _____
14. Maturity index known: yes() no(). If yes, describe: _____

15. What criteria are used by the pickers in selecting the product for harvest?

16. For the principal cultivar(s):
What is a good yield per hectare under good growing conditions? _____ tons
What is a good yield per hectare under average conditions? _____ tons
17. Sensitivity to mechanical damage during harvest: high(), medium(), low().
18. Sensitivity to dehydration: high(), medium(), low().
19. Summarize the problems occurring at harvest which may affect the processing, postharvest handling, or marketing of the product.
1.
2.
3.
4.
5.
20. Observations:

Source: LaGra J. 1990. *A Commodity System Assessment Methodology for Problem and Project Identification*. Moscow, Idaho: Postharvest Institute for Perishables.

COMPONENT 24**Consumer Demand**

NAME OF DATA COLLECTOR: _____ TEL: _____

TITLE: _____ INSTITUTION: _____

1. What percent of total national production of this product is sold on the domestic market?
 _____% export market? _____%

2. What percent of the production in the geographical area under study goes to the domestic market? _____% export market _____%

3. Which consumers purchase the product in domestic and export markets.

| | Domestic market | Export market |
|--------------------------|--------------------|------------------|
| -low income consumers | _____ % | _____ % |
| -medium income consumers | _____ % | _____ % |
| -high income consumer | _____ % | _____ % |
| Total(%) | 100 | 100 |

4. Indicate ethnic group consumption of this product:

| Ethnic group | Domestic market | Export market |
|--------------|--------------------|------------------|
| _____ | _____ % | _____ % |
| _____ | _____ % | _____ % |
| _____ | _____ % | _____ % |
| Total(%) | 100 | 100 |

5. For each important consumer group identified above, provide the following information for the applicable questions:

- a. Preferred cultivar? _____
- b. Preferred size? _____
- c. Preferred color? _____
- d. Desired flavor? _____
- e. Desired texture? _____
- f. Preferred degree of maturity? _____

- g. Preferred type of package? _____
- h. Desired number of units/products per package? _____
- i. Consumer willingness to accept pest or disease blemishes?
will accept() will not accept()
- j. Which of the following is most important to this consumer group: quality() or price()?
- k. How sensitive is this consumer group to fluctuations in product prices?
() very sensitive (small price increase decreases consumer purchases)
() moderately sensitive
() slightly sensitive
() not very sensitive (large price increase won't decrease amount purchased)
- l. Desired product characteristics for religious, cultural, and medicinal uses:
religious: _____
cultural: _____
medicinal uses: _____
other: _____
6. Summarize the characteristics of consumer demand which are most likely to affect the marketability of the product in question.
- 1.
 - 2.
 - 3.
 - 4.
 - 5.
7. Observations:

Feasibility of reducing postharvest losses due to pre-harvest factors and postharvest handling practices causing problems in both technical and economic terms.

| PHT STEPS | Source of postharvest loss or quality problem | Reducible in: | | | |
|--------------------------|---|----------------------|----|-----------------|----|
| | | Technological terms? | | Economic terms? | |
| | | yes | no | yes | no |
| land prep | | | | | |
| seeds/planting materials | | | | | |
| fertilization | | | | | |
| irrigation | | | | | |
| pests/diseases | | | | | |
| pruning/thinning | | | | | |
| harvest | | | | | |
| sorting/grading | | | | | |
| postharvest treatments | | | | | |
| packing/packaging | | | | | |
| delays | | | | | |
| cooling/RH mgmt | | | | | |
| loading/unloading | | | | | |
| transport | | | | | |
| storage | | | | | |
| loading/unloading | | | | | |
| transport | | | | | |
| delays | | | | | |
| wholesale | | | | | |
| loading/unloading | | | | | |
| transport | | | | | |
| delays | | | | | |
| retail | | | | | |
| other | | | | | |