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Rural Waste Recovery

ASPI Technical Series

INTRODUCTION

Many rural groups take nothing to landfills or incinerators and often live far from such waste disposal facilities. Their means of waste disposal are often old-fashioned and in some cases quite destructive to the environment. Garbage is dumped in washed out ditches, sinkholes or abandoned wells. Such practices may not have seemed serious a few decades ago, but in this era of dangerous organic chemicals, excessive packaging and short-lived consumer products the cumulative consequences can be hazardous.

Today, rural farms, households and communities are threatened with a deluge of waste materials. Evidence indicates that the per capita amount of waste materials is equal to or greater than that of urban areas. The reason for this is that people in both areas have similar consumption patterns. In addition people in rural areas have a greater tendency to buy secondhand products with shorter lifespans. Scrap building materials, agricultural waste, and other materials that would be carried off in the urban non-domestic waste stream also increase the rural domestic waste stream.

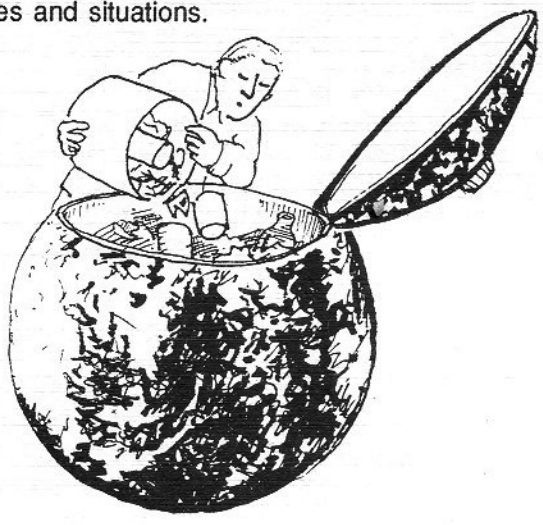
If rural dwellers can reuse a product or byproduct at home, savings are immediately accrued by curbing resource use throughout the production and disposal phases of the lifecycle. By reducing our wastefulness we free the environment of materials which can be difficult to reuse, unsightly and unpleasant. We also conserve resources which would otherwise be required for storage, safeguarding, and eventual disposal (the methods of which are often questionable and costly).

In a February 1992 workshop in Santa Monica, California state officials calculated that the cost of removing an average container of hazardous waste from the home was $100 per carload and an astounding $3.75 per container, small or large. In many cases the cost exceeded the original price of the product. This implies that domestic hazardous waste disposal comes at a cost many rural communities cannot possibly afford. Preventing the material from entering the home in the first place is far superior to any type of roundup or disposal technique. Actually, no hazardous chemical should be allowed in the home unless in the hands of an experienced applicator and then only if there is no alternative.

Controlling or regulating the domestic scene is not a favorite item on the current political agenda. The home is a castle to most people. Much of the average person's lifetime is spent at home -- sleeping, eating, recreating, and performing occupations which range from craftwork to school homework. It may be the most lived in, most unregulated, and the most polluted environmental space in the ecological landscape -- but it is traditionally the individual's domain.

Encouraging people to make lifestyle changes for the purpose of environmental conservation can be just as difficult as regulation. Modern technology has acted as a handmaiden to our wasteful culture with its "out of sight, out of mind" attitude. Overcoming this individualistic, wasteful mindset is a great challenge which must be met with some aggressive yet simple environmental education. Innovative regulatory procedures and appropriate technology are also essential for overcoming the barriers to a conservation ethic.

At ASPI we field-test environmental innovations, including those for handling waste in its many forms (junk, garbage, litter, trash, sewage, grey water). We have developed methods which could be applied beyond our local circumstances by people in a wide variety of places and situations.



BETTER RESOURCE USE

Keeping the 4 R's of sustainable resource use in mind (in order of decreasing sustainability: reduce, reuse, repair, and recycle), one may consider several minimization practices:

Composting of Garden and Yard Wastes -- Home composting doesn't require a costly commercial bin. A satisfactory compost bin can be easily built from bamboo, wood slats, pallets, or sticks. All food scraps (except meat and greasy products) can be composted. Compost needs to be aerated and watered. Also, proper layering of direct waste (e.g. kitchen scraps) and carbonaceous materials (e.g. soil, grass clippings, etc.) adds to decomposition speed. Inoculation with a commercial activator or manure is not necessary if previously composted or rich soil is added to introduce friendly bacteria.

Ensure that the composted materials are covered with layers of soil to reduce odor and enticement of rodents. Screen may be added to bins for rodent or insect protection. However, this is usually unnecessary in a healthy, balanced composting system. See ASPI Technical Paper 11 for a more detailed discussion.

Composting converts a major waste burden into a backyard resource for immediate addition to flowers, bushes, trees, and other plants. The domestic waste stream (including sewage) can be reduced in volume by up to 1/3 with this single practice. Note: we include here human wastes as part of the waste stream, whereas many studies only refer to municipal solid waste.

Dry Composting Toilets -- A wide variety of composting toilets are available, either commercially (generally more costly) or build-your-own. ASPI discusses four types and has developed a very low cost fifth (constructed with less than $500 worth of materials). It is now being field tested. Compost toilets eliminate sewage, a major domestic waste product, in favor of a bed of composting bacteria and a blend of carbon materials (e.g. sawdust). This replaces the carrier medium, water, which normally needs to be purified at great environmental cost. Compost toilets are low cost, low maintenance, low environmental impact, and create a useable product. See ASPI Technical Paper 2.

Fabric and Clothing Choices -- Affluent fashion-conscious people will often discard their wardrobe contents each year or so. This fills the waste stream with materials that are burdensome to land-fill or incinerate. Choosing fabrics by need and utility reduces this excess of materials, is easier on the budget, and ultimately saves resources. People should think of reuses for fabric, e.g. making throw rugs with worn out jeans. (A beautiful example by Joni Morgan hangs in the ASPI library), stuffing pillows with old materials, and making insulated window shades with discarded cotton and other products. Quilts are also a traditional way of utilizing waste fabric. Useable clothing and fabrics can be placed in a yard sale or made available to the needy through charity or thrift shop outlets.

Newsprint -- A sizeable volume of our garbage (sometimes up to 10 percent) is in the form of newsprint, which can be recycled provided the system can accept it. Increasingly, recycling centers will not accept newsprint, or those that do are too distantly located. ASPI has no newsprint outlets near. By eliminating the daily newspaper we cut our paper problem in half. We advocate greater use of electronic reporting (radio, television and computer network) along with high quality printed commentary. The current glut of recycled newsprint on the market, while new pulp and chip mills using virgin materials continue to be built tells much about non-ecological economic priorities.

Other uses of accumulated newsprint include: shredding for plant mulch and packing for shipment of materials; pressing into logs for fuel; shredding and treatment with flame retardant for insulation; and as tinder for wood stove fires.

Food Purchasing -- The packaging of many foods and other products is extremely excessive. In the case of soft drinks, the packaging requires more than double the resources to produce compared to the drink itself. ASPI finds that consumer food purchasing habits significantly affect total waste generation. For example, the packaging in a one pound bag of dry beans is a small percentage of that required for 4 or 5 cans of processed beans (producing equal amounts of cooked beans). With many foods (e.g. flour, nuts fruit, etc) there is often better economic and nutritional value in items purchased in bulk.

Several practices can make a major reduction in the trash produced: purchase bulk quantities, reduce purchase of processed foods (e.g. frozen dinners); buy from food cooperatives and "bring your own bag" markets; home grow, or buy fresh rather than canned fruits and vegetables; and eliminate or reduce soft drink purchases.

Wood Utilization -- A large wood chipper can be useful for rendering yard wastes and especially tree branches of sizeable thicknesses to wood chips for much and footpaths. Small

Better Resource Use cont...

branches can be good tinder for wood burning. It would probably make more sense to occasionally rent a large chipper than to buy one. The small models, sold for home use are slow and only handle small branches. There is some question about the ecological impacts of wood burning, both for resource depletion and smoke emissions. However, it is a better heat source than fossil fuels when the wood is harvested sustainably and burned efficiently. New types of catalytic stoves are very efficient and less polluting than older models. Masonry stoves can be designed to burn recirculated gases. These are also highly efficient and low on fuel wood demand. ASPI's Technical Paper 12 discusses these stoves.

Scrap wood is best dried and cut into lengths for burning. Using open fireplaces may have aesthetic appeal but is grossly inefficient for space heating. At ASPI we also use some wood to fire a small water heater on cloudy days as backup for our solar water heater.

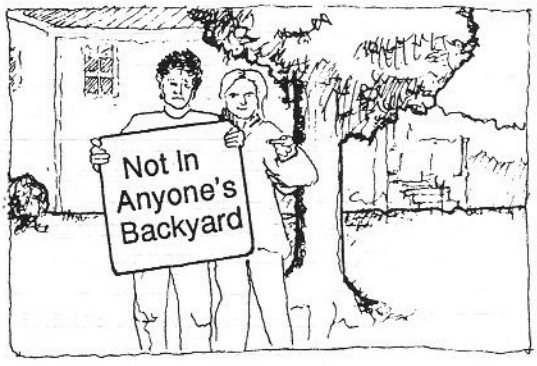
Gardening and Greenhouse Cultivation -- Growing produce at home saves transportation and some storage costs when coupled with seasonal eating habits. Home-grown vegetables and fruits are more nutritious, have less spoilage, are more easily stored, reduce market trips, furnish an inexpensive recreational outlet, and are less susceptible to environmental contamination. We strongly encourage year round gardening using solar greenhouses (ASPI Technical Paper 4) and season extenders. (Technical Paper 7).

AUDIT YOUR WASTE STREAM

Watch your waste stream for one month. Weigh the products thrown away and list them in categories:

- yard wastes
- kitchen compostables
- plastics
- hazardous materials
- newsprint, cardboard, office paper
- metals (aluminum, steel, other)
- glass
- building materials

What can be composted? How much can be recycled in your community? What could you reuse? How much hazardous material was there? Where will it end up? Are there non-hazardous alternatives? What is the largest component of your trash? How could you reduce your trash stream now that you know it better?



ALTERNATE USES FOR DISCARDED MATERIALS

Uses of discarded materials at ASPI include:

Glass
crushed bottles -- in concrete as sand substitute
colored bottles -- placed in cordwood building walls as light apertures

Grey Water
watering plants in the greenhouse

Metal
cans -- flattened into roof shingles and siding
containers -- wind protection for garden plants and iron supplement for fruit trees
scrap -- concrete reinforcement
sheets -- termite barrier
washing machine tub -- planter
55 gallon drums -- heat storage in solar house
ice box -- permanent cold frame (after removing CFCs and PCB capacitor)

Newspaper
Mulch in garden to block weed growth. Superior to black plastic, keeps soil moist. Black plastic can scald plants in hot weather.

Plastic
covers and containers -- for growing vegetables, flowers and seedlings; food storage
sheets -- cold-frame covers; insulating windows
jugs -- greenhouse heat storage; cut-out to blanch celery

Rubber
bike inner tubes -- covers for locks and latches
tires -- concrete block forms and stacked as vertical potato beds

Wood
general -- many building purposes
slabs from pine posts -- siding and ceiling slats -- fences and gates; boxing for dog houses
tree trunks -- lawn seats or tables
dead branches and fallen trees -- nests and wildlife sanctuaries

COMPARING MINIMIZATION TECHNIQUES

When deciding to reduce our wastefulness and personal impact on the environment, we need to weigh different practices and materials against one another. "Lifecycle Analysis" (LCA) research tries to determine the full environmental impact, from production through disposal of a product. The great difficulty with LCA is that the multitude of chemical, health, economic, social, and other factors have rendered the analysis so complex and unwieldy that it becomes too time-consuming and costly to complete. This gives the manufacturers of suspect products an advantage over people who are trying to minimize their impact on the environment.

* Total resource expenditure: Does the new practice require fewer materials and energy than another practice? Most of the methods mentioned above obviously do, but just how much? These calculations are a major challenge to any waste minimization analysis.

* Total environmental impact: Are toxic chemicals used in the manufacturer of this material, or are there hazardous byproducts of its use or disposal? Organic gardening is done without toxic pesticides. In most cases, the natural alternative is less harmful to both host, other friendly plants or insects and the consumer.

* Feasibility: What are the barriers to implementing potential changes? Are there legal (e.g. local ordinances) or social (e.g. neighbor's concerns) hurdles which alternative practices might involve? Do you have to weigh deeper values against convenience, as when choosing a compost pile over a garbage disposal.

* Overall investment: Is the device or technique replacing something that costs less or more? Some compost toilets cost about $5,000 while other do-it-yourself varieties cost as little as $500. These are good alternatives to municipal systems, which cost upward to $10,000 per household for water, sewer lines and purification plants.

* Maintenance: Is the replacement simpler to keep operating? Some wood substitutes do not last long thus requiring continued painting or early replacement. There also may be cases where it is better in the long run to use new construction materials than poor quality second-hand articles.

* Space requirements: Does the method or practice require more space? In many households space is at a premium.A composter may take up space, but so do the garbage containers. Newsprint is a space consumer if one subscribes to a large municipal daily.

* Regulatory barriers: Are there hurdles too great to overcome at this time? Many of the techniques discussed here face a variety of municipal or state regulations. These could be regarded as challenges to be overcome. We often need to take an active role in changing laws to improve our environment.

* Contamination problems: Are the waste materials in the current or anticipated treatment a source of rodents, flies, other insects or odors? This may apply to existing or anticipated practices. In many cases safeguards that will answer these difficulties can be installed (for example a rat screen at a compost bin).

* Ease of operation: Is the new technique simpler than alternatives? Do you have the skills to use it? Installing a compost toilet can be easier than putting in a septic tank or sewer line.

* Replication potential: Is the technique one that others can easily imitate and will desire to do so when the benefits become obvious?

NOTE FOR WASTE TARGETED AREAS

While the emphasis here is on reducing one's own wastes, a social activist agenda is in order for rural communities targeted to receive wastes from other areas. Don't be mislead by the "not in my backyard" (NIMBY) guilt trip. It is imperative that each area solve its own waste problem and not send it to another less fortunate community.

Expose the practice of targeting rural areas for waste. Mobilize citizens to fight importation of waste materials. Help them realize that wastes come at large social costs to the community, which must be addressed long after the waste managers have left the scene. Get other experienced groups to offer technical assistance but handle activities at the local level yourselves.

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