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# *Agriculture, Energy, and the year 2000*

ALONG WITH THE inevitable drying up of our petroleum supplies, most experts are forecasting a doubling or tripling of our annual energy demands by the year 2000. If these two predictions are to be believed, most of us will live to see a *real* energy crisis. If they are to be believed, we need to explore all promising alternatives to increase our energy resources.

As we seek the next generation of energy supplies we must look for sources that are renewable, non-polluting, and safe. Unless non-depleting energy sources are discovered, we will face succeeding cycles of diminishing supplies and increasing prices that compound other problems in our economy—the kind of situation now confronting us. Unless safe and less polluting sources are developed we will face costs and hazards that will increase as population increases and energy expenditures are increased to meet the needs of the expanding population.

We know enough about the problems and detrimental effects of energy production and utilization to know that our future options must be weighed carefully. For example, we know something about the hazards to health and the environment connected with coal mining and the use of fossil fuel in combustion engines. We have learned about oil spills and the difficulties of finding acceptable sites for nuclear power facilities. The controversy over large-scale strip mining, heavy use of river water for heat dispersal, and atmospheric pollution from coal combustion, illustrates the kinds of problems we can expect from large-scale coal and shale operations. The control of radioactive wastes will present long-term problems if we have to depend on fission reactors for nuclear power production. The environmental problems may be as difficult and complex as the problems of developing the energy sources we need for the future.

Nuclear fusion may be the eventual answer to our energy problems because it produces less radioactivity and, unlike the fission process, does not depend on diminishing and costly materials like uranium. Unfortunately, at this point, the fusion process is an uncertain and unproven possibility.

All of this suggests that we need to explore all the alternatives and complementary sources if we are to meet our future energy needs. The fact that 99 per cent of the energy now used by man comes from the sun—stored in fossil fuels, photosynthetic plants, and water power—suggests that agriculture may be one of the alternatives to consider.

Man's development and manipulation of the energy stored in plants enabled him to move upward from his primitive hunting and foraging beginnings. The enormous productive capacity of modern American agriculture could become an energy source of the future. Agricultural products and by-products represent a very large reservoir of usable and storable energy. A bushel of corn or wheat can yield three gallons of fuel in the form of alcohol. Crop residues and forestry wastes constitute a large source of organic matter that could be used to produce energy. Animal manures are a potential source of methane gas. Soybeans and other oil crops can provide excellent fuel.

Agricultural crops provide a way to trap and store the unlimited, ever-renewable, essentially non-polluting solar energy. If our scientists can find a way to increase the green plant's efficiency in the conversion of energy—and if biochemical research were to be given the priority and support of nuclear research—agriculture in the future may be able to make an even larger contribution that it does now to the welfare of man.