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Planning for the new land frontier.

Alarm that our cropland will disappear into the urban maw serves the useful purpose of alerting us to the need for planning. Enough thought about the dynamics of areal and regional growth often can reduce waste of resources. Sound plans are instruments for saving productive farm units. By *Hugh A. Johnson*, Farm Economics Research Division.

I RETURNED to the United States recently after a long absence. My absence in itself is of no particular significance or interest. What was noteworthy, though, was that I could not recognize approaches to the university town where I had lived for several years and that when I drove into farming areas to visit friends I could not find their farms.

Villages had become cities. Small, sleepy county seats had taken on an industrial bustle. Regional centers had sprawled far beyond their former boundaries. New suburbs had sprouted from the countryside, and new highways connected them in a metropolitan complex.

During those years my father had retired. The buildings on his farm had been removed. His fields had been added to those of an adjoining farm. An uncle had sold his farm to a partnership of father and son, who needed more land on which to use their equipment and labor. Another relative had sold his farm to a subdivider.

The changes had seemed gradual to my stay-at-home relatives and friends. We began to realize the extent of the shifts as we discussed the old days of really not so long ago: Hundreds of other farms had disappeared from the rural scene, and many more would follow them if the cities and industries I saw across the country and the new highways I drove over were to continue normal, healthy growth.

As we discussed these changes, we knew that our points of view differed, depending on whose ox was being gored. We concluded that many city people do not understand farm problems and that many farmers do not understand city problems—or, to generalize even more broadly, people in one region may not be aware of the dynamics of other regions.

On this we agreed: Everyone has problems. Some problems apply to the management of the home farm business. Some apply to local or community situations. Some are statewide or regional. Some are national and international in scope. We seldom separate our problems into neat categories. Decisions to act in one way often cause unexpected institutional changes harmful to individuals: New roads, airfields, and subdivisions disturb the established patterns of land use, change the lives of those who are on or near them, and add another piece to the regional and national jigsaw picture that is changing day by day, faster and faster.

The fact of change we cannot escape, much as we would like to think that our fathers' farms should always remain for us to go back to, that the scenes of our schooldays will always be as we experienced them, that the new highways and airports will not actually spoil or devour the landscape we love. But we might as well be realistic about it.

We have to face the fact that every year thousands of acres of tillable land in the United States are going into such uses as urban subdivisions, industrial sites, defense establishments, highways, railways, and airports, and that since 1940 about 17 million acres of our flattest and most fertile farmlands have been converted to nonagricultural uses. If these withdrawals continue at the present rate for another 15 years, a total of about 100 million acres that once were tilled will have been converted.

A fact that we are apt to ignore is that large sectors never should have been in farms. We only now are squeezing out the surplus and getting our resource base of land more nearly in balance with production needs.

For example, 10 to 20 percent of the tillable land in 13 Northeastern States has been removed from agriculture since 1940.

Lester E. Klimm, in the Geographical Review, estimated that perhaps 85 percent of the empty areas in the Northeastern States was characterized by steep slope, poor drainage, or poor soil and that perhaps 60 percent also has some climatic handicap.

The National Resources Board estimated that nearly half of New Jersey is nonagricultural and mostly suitable for forest.

Some areas are empty because people tried to farm them and failed. Others are empty because people knew better from previous experience. Some areas are losing population because of isolation, severe climatic conditions, and better opportunities elsewhere.

The grasping tentacles of an urban octopus and the specter of a land-starved future are widely publicized fears. We seem to welcome a boggy of soil scarcity and impending starvation, even though we have been in a period of great prosperity. Our attitude toward land resources is almost diametric to the one we held during the drought and depression years of a short time ago. The wide arc that marks the pendulum swing of public knowl-

edge and opinion often measures only gross distortions of facts. Let us look at some facts.

Farms have been combined, subdivided, and abandoned, and the type of farming has changed over a long span of years. Adjustments actually began in colonial times. The longtime trend simply has been accentuated. Yet the markets are full, and controls of farm production appear to have become a continuing national problem. The face of our land has changed—and not all the changes are pleasant, desirable, or necessary. Many of these changes are only remotely related to physical growth of urban and industrial communities. Most are related to changes in our national social, economic, and technological growth.

Agriculture, since about 1940, has joined the technological revolution. As a result of improved technology, one farmworker now can feed himself and about 18 other consumers. His productivity has grown 2.5 times during one generation. Efficiency in farming methods has created technological underemployment for millions of farm people and management problems in the economics of size and adjustment of resource inputs for millions of farm operators.

We have continued to produce about 5 percent more agricultural goods than domestic and foreign markets will absorb. Our productive potential lies in a magnitude about 40 percent above our output in 1958. Each improvement in technology increases that potential.

Studies by men in the Department of Agriculture indicate that, even if present rates of alienation of farmlands continue, we could come within about 5 percent of feeding the population of 220 million we will have in 1975 and 300 million in 2000 at its present levels of living. Expected improvements in technology will make the difference.

T. W. Schultz, professor of agricultural economics in the University of Chicago, thinks that, under conditions of changing demand and technology, the farm income in an area in the long

run depends primarily on its relative ability to adapt its agriculture to changing conditions.

A. M. Tang, professor of economics in Vanderbilt University, put it this way: "Longtime, increasing disparity in agricultural income [per worker or per farm person] among areas is related to the pattern of local industrial-urban development whose positive income effect is transmitted to local agriculture through its impact upon local factor and product markets."

You and I know that farmers have been unable to reduce appreciably their farm output during periods of low prices. Their fixed costs continue, and their main hope lies in increased efficiency of production, greater volume of production, and smaller unit costs. It follows, then, that periods of prosperity and strong demand are the time to bring farming into adjustment with other segments of our economy.

We shall return to this point later and fill in some of the details.

Let us consider now some of the changes in several parts of the Nation.

Professor Tang and his associates studied the longtime development pattern and income characteristics of 21 counties in the upper part of the Georgia and South Carolina Piedmont, a relatively homogeneous area and one of uniform natural resources. Its agriculture and its people had a long history of low production.

Industry and cities have grown in parts of this region since about 1900. The rates of growth were fast, but highly uneven, during the 1940's. The counties with industrial developments had significantly higher agricultural incomes and labor returns per farmworker in 1940 than did the undeveloped counties. The correlation between industrial-urban development and farm income per worker was even greater in 1950. Thus the industrially developed counties have continued to move ahead of the underdeveloped counties in productivity of farm labor. Why did this occur during a period of full employment when disadvantaged

farm people had so many alternatives?

An examination of the situation brought out that real reductions in the farm labor force were more important than increases in farm capital, yet changes in output were related primarily to changes in capital and only to a limited extent to changes in labor. Thus the presence of an imbalance in the application of resources came to light. Farms were overcapitalized on labor, and substantial underemployment was widespread. Reductions in farm labor did not appreciably lower output; rather, they increased the effectiveness of the labor that remained on the farms. The movement of 54 thousand persons out of farming in the area, however, still was insufficient to meet the low-income problems of agriculture.

Farmers near industrial-urban developments received benefits not available to their fellows living farther away. They tended to receive higher prices for their products and to pay lower prices for their inputs. Creation of new markets for some farm products, as a result of urban growth and rises in per capita income, and opportunity to market their products in the most favorable form, such as fluid milk, gave them additional opportunities for desirable adjustments in their farm business organization.

The part-time farms of the developed counties were no larger than those of the undeveloped counties in 1950. Yet, with far less labor per farm, these operators received comparable incomes per farm.

Professor Tang drew the conclusions that an increased ratio of capital to labor (primarily through decreases in labor) had been the major type of adjustment on part-time farms and that modern part-time farms represented small subsistence units of the past, which had contained much initially underemployed farm labor. The diversion of a substantial part of this surplus labor to off-farm work did not appreciably affect output per farm.

The availability of any nonfarmwork

within reasonable commuting distance is vitally important in determining the extent to which farm families may work off the farm without actually changing residence. Since this type of adjustment was easy to make in areas where nonfarmwork opportunities are prevalent, it is no surprise that families of part-time farmers responded with alacrity to the changed situation.

Dr. Tang pointed out that off-farm employment of farm persons tends to select those in the most productive age groups. The unfavorable age composition of the remaining labor force (the elderly and otherwise less employable) on part-time farms accounts in part for the apparently low level of income per farmworker.

(I might add, however, that the same general situation applies in commercial farming. The most mobile segments in the labor force gravitate to the better opportunities, and the less mobile make other adjustments in place. This "adverse" age distribution of farmworkers will continue until the time that returns to labor from farming are competitive with other forms of livelihood for the mobile segment of the labor force.)

Thus, agriculture of the Southern Piedmont has benefited from the growth of industry. Absorption of formerly underemployed farm labor has made possible substantial increases in farm income per farmworker without appreciably affecting total farm output. Benefits have accrued first to families relatively near the nonfarmwork opportunities. It follows that continued industrial growth and activity will encourage further transfers of farm labor and, as nearby underemployment disappears, the effects must reach farther afield.

Continued disappearance of disguised unemployment in the developed areas might be accompanied eventually by larger and larger reductions in farm output until a point of equilibrium is reached in demand for farm products, which will justify profitable production by the remaining farm laborers. The

underdeveloped areas still faced with unemployment of their labor force will improve their economic position and farm-labor productivity as outmigration and opportunities for off-farm work drain off the surpluses and allow better organization of farm resources.

SEVERAL OTHER STUDIES across the Nation provide variations in the application—but the same tone and theme—of favorable trends in adjustments.

A study by men in the Department of Agriculture and the West Virginia Agricultural Experiment Station disclosed that 96 percent of rural residents in that State were partly or fully nonfarmworkers in 1957. Only 5 percent of the households in the Upper Monongahela Valley depended solely on agriculture. Forty-one percent were part-time operators who also received income from nonfarm sources. Another 40 percent did no farmwork, and 14 percent received income only from such nonfarm sources as rent, royalties, public assistance, retirement funds, or social security. Eighty percent of the workers had industrial or business experience. They had adjusted to regular employment and acquired skills valuable in nonfarmwork.

Harold G. Halcrow, head of the Department of Agricultural Economics in the University of Illinois, made a study of part-time farming—in which the income from work off the farm equals receipts from the sale of farm products—over the Nation.

Items that have influenced the growing trend to part-time farming include improved transportation, farm mechanization, the establishment of industries in or near rural sections, and a desire to live in the country.

In 1954, Professor Halcrow pointed out, 1,334 thousand farm operators (27.9 percent of all farm operators) were working off their farms 100 days or more; in 1929, 700 thousand (11.5 percent) worked off the farm 100 days or more. Between 1929 and 1954, the number of American farm operators declined by nearly one-third.

Off-farm employment has become a notable factor in agriculture in most of the main farming areas of the United States. Such employment used to be largely among farmers who sold less than 1,200 dollars' worth of farm products in a year, but lately the number of operators of larger farms who work off the farm has increased.

L. A. REUSS, of the Agricultural Research Service, reported that recent trends in Florida included a rapidly rising urban population, a moderately increasing rural nonfarm population, and a declining farm population. Projections to 1970 indicated a possible slight increase in the number of farms, a moderate increase in urban areas, and a marked growth in the rural non-farm population.

Spreading urban and suburban areas intensify problems of providing roads, electricity, sewerage, police and fire protection, schools, and shopping facilities. Tax and zoning problems are multiplied. Premature subdivisions often do not provide for services.

Urbanization has a strong impact on the attitudes and goals of farm people as they are brought into closer contact with nonfarm or part-time farm people, urban employment, and ways of life. This impact is greater in northern and western Florida, where the culture of the rural population is more homogeneous than in the rest of the State. Increased opportunities for nonfarm employment increases interest among rural people in education and training.

The number of noncommercial—part-time and residential—farms has dropped in northern and western Florida and increased in central and southern Florida. In some counties there were decreases or only slight increases in the number of farm operators working off their farms 100 days or more; largest decreases in this group were reported in Duval and Nassau Counties in the Jacksonville area.

A study in Duval County by Daniel Alleger, an economist at the Florida Agricultural Experiment Station,

showed that two-thirds of part-time and retirement farmers were gainfully employed, one-fourth were retired, and the others were self-employed.

Two-thirds of the home-farm units had fewer than 6 acres. More than half had fewer than 4 acres. About half of the operators planted one-half acre or less in crops. Nearly 90 percent of the enterprises were gardening types of agriculture. About 80 percent of the operators kept poultry or meat animals. The economic advantages of part-time farming came more from savings than from increased earnings.

As population and economic activity have grown in Florida, there have been tendencies toward a gradual upgrading in the use of land: Subdivisions replace citrus groves, citrus groves replace improved pastures, and pastures replace native rangelands.

The acreage of bearing citrus groves increased about 25 percent (an estimated 567 thousand acres in 1958) and the nonbearing acreage doubled (94,500 in 1957-1958) from 1949 to 1958, according to Mr. Reuss. Some established citrus groves were being cleared for subdivisions, highways, and industrial parks. Some estimates indicate that only 50 thousand to 100 thousand acres suitable for citrus have not been planted, and of these 25 thousand to 50 thousand acres would be taken up for homes. All ridgelands in some places are occupied, and new groves are being set out on flatwoods land after ditching and bedding. Demand for land for citrus in central Florida affects the supply and the cost of land available to producers of other farm products.

The area of improved pasture in Florida was estimated at more than 1.6 million acres. Continued expansion is expected. Florida has perhaps 10 million acres that could be converted from native rangeland into improved pastures. Some loss of acreage of improved pastures occurs when new citrus groves are set out and when residential and commercial subcenters are established in open country.

The acreage of truck crops increased by more than 50 thousand acres between 1949 and 1957 (410 thousand acres for harvest in 1955-1956).

The demand for land for truck crops in 1958 was not in serious conflict with other uses of land. Urbanization encouraged increases in the acreages in truck crops in rural areas such as the Everglades, some expansion in acreage around urban markets, and some outward movement of production areas at the perimeter of expanding urban centers.

The acreage in general field crops has declined slightly. Demand for land by pulp and timber companies affects the economy of general farming in northern and western Florida.

Several examples are at hand of some of the effects of a high demand for land. Dairy farmers near Miami have sold land for subdivisions for 1 thousand dollars or more an acre and moved their operations to cheaper land north of Palm Beach or near Lake Okechobee. The same type of movement is taking place near towns like Tallahassee. In the process, the dairymen may increase greatly the size of their farms and boost land values at their new locations. Cattlemen are refraining from investing funds to improve pasturelands that may be in demand as sites for citrus groves or subdivisions. In areas where the land market is highly active, especially the coastal and metropolitan areas, investors are permitting much land to remain idle, pending resale or the anticipated change to a higher use. Dwellings in rural areas are in demand as housing for part-time farmers and for nonfarmworkers. Market values of tracts that have dwellings seemed in 1958 to exceed current or prospective values for agricultural purposes.

IN LOUISIANA, according to Robert W. Harrison, of the Agricultural Research Service, the subsistence economy of Acadians is giving way to a suburban economy. Many country people are employed in the expanding

oil, sulfur, salt, and related industries on the gulf coast. Extensive ranching enterprises are developing in the great Tensas Basin of Louisiana and Arkansas.

The dominance in economic and community affairs of the traditional sugarcane and cotton plantations, with their distinctive labor organization and social structure, is giving way to newer economic and social patterns.

The migration from the alluvial valley of the Mississippi of thousands of young and capable farmworkers and the movement of many other farmworkers to nearby cities and villages have made it necessary to reconsider the role of labor in the economy. The lack of trained workers for mechanized farming and of workers who have knowledge of livestock and diversified farming is increasingly a factor in shaping the agriculture in the valley.

Harald A. Pedersen, of Mississippi State College, has pointed out the close relationship between the general economic level of the Nation and the availability of farm labor in Mississippi. Between 1940 and 1950, an estimated 400 thousand persons, mostly farmworkers, left the State every year. Many of them were young sharecroppers. As long as the wide margin between industrial wages and the returns to farmers persists, the high mobility of the surplus farm population will continue. Plantations and large farms have adjusted to the reduced supply of workers by mechanization. A business recession would cause a damming up of surplus workers, and possibly a reversal of migration would result in sizable increases in the labor force.

J. R. Bowring, M. C. Purington, and O. B. Durgin, economists at the New Hampshire Agricultural Experiment Station, made comparisons of population changes in New Hampshire in 1940 and 1950. They found a drop in the number of rural farm and urban age groups and a rise in the rural non-farm residents. The latter can be explained by the movement of city resi-

dents to neighboring rural areas and small towns, partly because of industrial development and partly because they preferred to live in the country and commute to jobs in industrial centers. Improved roads and transportation facilities and improved incomes have accentuated this preference for living in small towns.

They discovered facts they believe are of great significance to planners for future balanced agricultural-urban relations: "The decrease in the number of farms has been accompanied by an increase in the level of living of the remaining farm families. The number of farms in New Hampshire declined from 18,786 in 1945 to 10,411 in 1955 (45 percent), but the average size increased from 107 to 140 acres. The major sources of farm income are dairy and poultry. Cow numbers decreased somewhat during the decade from 65,000 to 59,000. At the same time, however, milk production per cow increased at least 25 percent. The movement off farms does not indicate a decline in the economic significance of the industry so much as an economic reallocation of resources to increase the total product of the State."

Economists at the Ohio Agricultural Experiment Station also reported the trend toward fewer and larger farms and more farmers working away from home. Thirty-seven percent of farmers in Ohio worked off the farm more than 100 days in 1954; in 11 counties, mostly in northeastern Ohio, the proportion exceeded 50 percent. About half of the part-time farmers were employed in factories. Others worked only seasonally in industry or sought work with more flexibility.

The increase in the proportion of Ohio farmers who took other jobs was associated more directly with the availability of industrial opportunities than with the quality of land or type of farm. Some operators of farms that were larger than average in northwestern Ohio had taken advantage of industrial developments to hold full-time jobs in industry. Industrial ex-

pansion in the Ohio River Valley has encouraged part-time farming by giving many operators a chance to overcome their longstanding problem of low farm incomes.

In Arkansas, William H. Metzler, an economist in the Agricultural Research Service, noted that farming had lost almost 800 thousand persons in 30 years. The net movement was greater for Negroes than for whites. More tenants and sharecroppers moved than farmowners. Net outmigration had been partly to nearby towns and cities, but was even greater to towns and cities in other parts of the country.

Dr. Metzler noted a situation with vastly improved relationships between population and resources in the Ozark area of Arkansas. The farms averaged 50 percent larger in 1957 than in 1939, and the investment per farm was four times greater. A change from intensive row-crop farming to livestock and dairy enterprises has occurred. Lumbering and other industries have developed significantly. Total retail sales ran five times higher in 1954 than in 1939.

The decline in numbers of farms and farm families reflects the movement of thousands of marginal farmers from the Ozark area. This has permitted farm enterprises to grow to a size better adapted to present-day use of capital equipment and labor. Thousands of other underemployed people have moved to other areas where employment and income are more regular. The net result has been better living for farmers and nonfarmers alike in a region historically poor in land resources.

J. Z. Rowe, of the Federal Reserve Bank of Dallas, reported that almost half of the farmers in the five Southwestern States had off-farm work in 1954. Thirty-eight percent of the farm operators had outside income that exceeded agricultural income in 1954.

This rising trend is the result of pressures to supplement family income and the attractiveness of alternative non-agricultural employment.

Dr. Rowe said, however: "On balance, the increase in off-farm work and the smaller farm population probably have resulted in a gain to the southwestern economy as a whole. . . . For persons remaining on part-time farms, supplementation of the family's income through off-farm employment has resulted in a higher and more stable income and has contributed to the growth of the economy."

California has been thought of as a State of burgeoning urban population and dwindling resources. Yet, for the State as a whole, Varden Fuller reported in the February 1955 issue of *California Agriculture* that between 1930 and 1950 the amount of cropland increased by 2.3 million acres, of which 1.8 million was irrigated, although none of the changes increased the total number of commercial farms. Farms of fewer than 1 thousand acres (except the small units of fewer than 10 acres) actually declined.

Dr. Fuller concluded that agriculture in California does not offer opportunities to new commercial farm operators except as replacements on presently existing units. There also will be less demand for seasonal workers, because skilled and technically trained workers operate and maintain equipment designed to perform the more exacting procedures of technologically advanced agriculture.

California's large-scale commercial farmers, except milk producers, have specialized in production for markets outside the State rather than in it. The growth of population within California, according to Dr. Fuller, would have little effect in itself on what its agriculture produces, other than such commodities as market milk. Future changes are likely to be influenced much more by national and world markets than by the size of the State's markets or the need of an expanding occupational base to absorb its growing population.

DETAILED AREA STUDIES of changes in land use due to urban growth have

been made less frequently than have analyses of social changes, employment, taxation, local government, or attitudes. The few studies centered on changes in uses of land complement in many ways the illustrations I have given.

They are unanimous that the rural change would not have occurred without the urban catalyst. Each area apparently has reacted differently under the impact of the various stimuli, however.

Three localities in Michigan, Wisconsin, and Utah illustrate some common adjustments in land uses.

Sociologists and economists in the University of Michigan have studied several suburban areas in Michigan.

J. Allan Beegle and Widick Schroeder described land use on the edge of North Lansing as a blend of densely populated residential areas, large sections of tilled soil, and a sprinkling of commercial and industrial structures concentrated along the main transportation artery. Because there are no zoning regulations, they said, different types of structures are allowed next to one another, and many new dead-end streets and roads are indications of a rapid growth and the lack of coordinated planning.

E. Howard Moore and Raleigh Barlowe studied the effects of suburbanization of land use in two localities between Okemos and Williamston. Both were settled more than a century ago and until recently were used primarily for farming. The impact of suburbanization is causing a gradual change in both. The Okemos area, being closer to Lansing, felt the impact of suburbanization first. A few city workers resided here before the Second World War, but the major influx has been since the war.

Much of the suburban development has resulted from piecemeal sale of lots and highway frontage from farms. Both areas, however, contain subdivided properties. Some of these platted areas are having a high type of development. The subdivisions generally are less built up and concen-

trated than are subdivisions at the outskirts of Lansing and East Lansing.

Nearly 60 percent of the land in the Williamston area and 35 percent in the Okemos area was owned by full-time farmers in 1951. Part-time farmers held about 25 percent of the land. In the Okemos area, 40 percent of the land was owned or rented by rural residents, as compared to 15 percent of the Williamston acreage. Most of the rural residents held relatively small tracts. A preponderance of their cropland was idle or in relatively extensive use through rental to nearby farmers for pasture, hayland, or grain fields.

Farms occupied by part-time farmers also generally were smaller than those of full-time operators. Much of their cropland was rented out.

Two of three full-time farmers operated units of 100 acres or more. Fields rented from rural residents or part-time farmers often were part of the units. Younger operators tended to operate the larger farms.

Neither the size of farm nor the nearness to suburban developments seemed to have much effect on the use of land for crops and pasture. Part-time farmers, however, tended to use more of their land for crops and less for pasture (probably because they had less need for pasture) than full-time farmers. Part-time farmers and small operators tended to concentrate on one or two crops. Most of the active full-time farmers used a 4-year rotation based on corn, oats, wheat, and hay.

A general air of impermanence seemed to prevail. Many farmers in both areas, but particularly those in the Okemos area, felt that suburbanization has resulted in poorer farming practices. Fewer livestock were kept. Less attention was paid to good cultural and soil conservation practices. Cash cropping, rather than regular fertility-building rotations, were common. Mining the soil generally was related to the relative imminence of platting for nonfarm uses. Under the circumstances, however, this practice is not to be condemned too harshly.

Full-time farmers farthest from Lansing indicated plans to continue their current rotation system of farming. Most had in mind sale or lease for future nonfarm development. Forty percent of the part-time farmers indicated plans to continue present uses of their land; 25 percent planned shifts to beef or other livestock; 20 percent planned more crops; and 15 percent had no plans. Rural residents generally had no well-defined plans for future land use except for gardens and small orchards.

About one-eighth of the total land in these areas was idle or unused. Some idle land was associated with suburbanization and use for rural residences, but much of it was on farms operated by full- and part-time farmers. Some was left idle because of low fertility. Other tracts that could have been used to advantage were idle because of the age or health of the operators or because of alternative work opportunities off the farm.

The findings of Professors Moore and Barlowe coincide with several others over the country that proportions of idle or unused lands tend to be high in areas of rapid suburban development. This practice of nonuse is one of the hidden costs of rural residence and industrial development that can be attributed to lack of unified planning.

These places in Michigan were beyond the zone of most intensive subdivision, and a high proportion of full-time farmers still were trying to farm efficiently. This fact definitely affected the demand for fields that could be rented for cash crops, particularly wheat. Some farmers went several miles to rent fields, but there was little interest in fields smaller than 5 acres. Modern machinery and effective use of labor require larger acreages for full efficiency.

Both of these areas are in a region where dairying used to be regarded as the most profitable farm enterprise. Both have experienced a general shift from dairying to cash crops. Part of the reason for the change is the favor-

able prices of wheat and corn in recent years. Part is due to the effects of suburbanization.

The rural residents generally kept no livestock. A few had chickens, pigs, riding horses, cows, or calves. Part-time farmers also tended to keep small numbers of livestock. In fact, 60 percent of those in the Williamston area and 75 percent of those in the Okemos area had fewer than 5 animal units per farm. Part-time farmers placed less emphasis on dairy animals and more on beef, considerably less on sheep and hogs, and slightly more on chickens than did the full-time farmers. Thirty-four percent of full-time farmers had fewer than 10 animal units.

Almost all the residents of the two areas felt that suburbanization had caused a rise in property taxes. Practically all of the increase went for school purposes. Assessed values were highest on properties of full-time farmers and lowest on rural residences.

Tracts along the highway or in places that promise a high level of development command the highest prices. Lots within a mile of a main road seem to be preferred, but sometimes hilly land close to developed centers brought as much as good bottom land, and residential buyers were forcing up the prices of both good and fair farmland.

Changing uses of land in the fringe areas near Milwaukee, Wis., were studied by Arthur J. Walrath, of the Agricultural Research Service. Milwaukee County was one of the early leaders in the field of suburban zoning. Of six counties in southeastern Wisconsin surrounding Milwaukee, four have county zoning laws, although the laws did not apply uniformly in all townships within the counties.

Dr. Walrath concluded that zoning had provided relatively little control in development of nonfarm uses: Zoning often was only a slight obstacle to be overcome when the owner decided to subdivide his land.

The trend in numbers of farms has been downward in the six counties—Ozaukee, Kenosha, Racine, Walworth,

Washington, and Waukesha. It began before the depression and continued at a faster rate after the 1930's. The number of farms dropped 14 percent during the 1940's and another 9 percent between 1950 and 1955. The decline is apt to continue for some time if economic forces are allowed to make desirable adjustments in factor inputs between farm and nonfarm enterprises.

Continued subdivision, commercial and industrial developments, scattered housing, and modification and improvement in the highway system no doubt will reduce the number of farms. A further reduction in numbers will occur through the consolidation of uneconomically small units and the adjustment of farm size to modern technology. The retirement of older farmers and transfers of the younger operators to nonfarmwork will make tracts available.

Dr. Walrath found no clearcut pattern in the decreases or increases in the numbers of farms by townships in relation to the distance from cities. The land in farms was less in the counties, and the number of farms declined, but the average size of farm increased through absorption of other units going out of production. Smaller farms tended to disappear.

The remaining cropland is used more intensively. An additional acreage, which was not accounted for in subdivisions and rural homes, has shifted from agriculture to temporary nonuse. There is little prospect that it will return to agriculture. Present owners are holding it in a nonuse status until it can be developed profitably for urban use. Some of it may be available for annual cropping by nearby farmers, but there will be fewer and fewer farmer bidders for it as the area becomes more and more urban.

Relocation of highways can affect the future of individual farms by taking essential acreages of cropland and by cutting a farm in two. A limited-access thruway might make one part of a farm inaccessible and usually would disrupt the farming and marketing.

These six counties have been important in the production of fluid milk and vegetables for city markets.

Unlike the previous example of a dairy area in Michigan that had changed to cash crops and rural residences, the Wisconsin dairymen had maintained their milking herds, increased their corn acreage, reduced their small grain acreage, and were farming more intensively.

Dr. Walrath's data bring out the anomalous conditions that may develop in situations of rapid change. We normally would expect some kind of relationship between the kinds of crops that are grown and urban concentrations (besides the type of soil). Farmers in southeastern Wisconsin evidently do not follow a norm, as land uses in adjoining townships often differ.

The several farming communities vary remarkably in the adjustments to various stages of urbanization. Total production for the six counties, however, has not suffered. The value of all production in 1954, even after adjustment for price levels, was 101.2 percent of what it was in 1949. The composition of the total had changed, however. Sales of whole milk had increased 2 percent; sales of eggs had dropped 3 percent; sales of chickens increased 10 percent; corn harvested for grain increased 39 percent; and small grains dropped about 15 percent.

Changes in acreage of tame hay seem to be associated with new growth of urban areas. The acreage in hay in some sections was expanded because of the acquisition of farmland by persons whose only interest in farming is to keep weeds down by cutting hay or by selling the standing crop. In other sections, with only a slightly different ownership pattern, these acreages would be untended and would be considered to be idle.

The increases in farm production resulted from shifts in enterprises and higher yields. In Waukesha County, for example, yields of corn increased from an average of 49 bushels an acre in 1941-1945 to 58 bushels in 1949-

1953; tame hay, from 2 tons to 2.4 tons; canning peas, from 1,872 pounds to 2,109 pounds; and milk per cow, from 6,879 to 7,380 pounds.

Urbanization had little effect on farm acreage before 1940. Fewer than 1 thousand acres were subdivided in 1941-1945, but in the next 5 years more than 3,500 acres were in newly recorded subdivisions. Another 7,400 acres of subdivisions were recorded in 1950-1955, when an additional 44,427 acres disappeared from farming. About 40 percent of this was cropland, which often is held for development or speculative rises in land values.

The six counties and Milwaukee have lacked an overall plan of development. Spasmodic growth into predominantly agricultural sections all too often has been followed by an unorderly urban sprawl. One result is that islands of undeveloped land may remain after a large part of a section is in the new use. More serious results are in heavy public charges for ill-timed and poorly adapted services and facilities. Suburban living loses many of its amenities under these conditions.

MORE THAN 50 PERCENT of the farms in Utah sold less than 2,500 dollars' worth of farm products in 1954. Nearly 65 percent of the farmers worked off the farm for pay. About 45 percent worked more than 100 days off the farm.

Davis, Salt Lake, Utah, and Weber Counties, which include much of the nonfarm population and business activity of the State, contain nearly half of the low-income farmers in Utah. Sixty-eight percent of the farmers in the four counties worked off their farms, and 57 percent worked more than 100 days off the farm, primarily because they had greater opportunities for off-farm work.

Clyde E. Stewart, in *Farm and Home Science*, published at Utah State University, wrote: "Farm mechanization and large off-farm employment opportunities are strong forces in our economy, and tend to increase

the size of farms. At the same time, more off-farm work opportunities and shorter working hours probably have encouraged part-time and residential farms. Many of our farmers operate land in combination with off-farm employment. Frequently this arrangement gives a profitable return.”

Dr. Stewart believes that many of the small farms were acquired as a supplementary operation in an effort to develop desirable aspects of a two-income plan in areas where industrial employment is available. Dependence on this kind of small commercial, part-time, and residential farm is growing in Utah, especially in terms of farm numbers, land use, and people.

The population of Davis County, whose county seat is Farmington, nearly doubled between 1940 and 1950. A major reason was the general industrial expansion in Utah and the establishment of military projects and installations in the northern parts of the county. Several large oil refineries were developed, and an increase in all types of business occurred.

Suburban expansion occurred in communities near Salt Lake City.

Small towns grew as young married couples moved in for employment in defense industries or commuted to jobs in Salt Lake City or Ogden.

Farmland, much of it of low-intensity use, near city boundaries was transmuted into new towns.

Settlement had taken mainly the pattern of single-family dwellings, with lawns and backyards. Enough land for building purposes made this type of development possible. Because the platted residential areas were interspersed with farmlands in some communities, an unutilized margin was available for future expansion. Some communities controlled housing developments so as to maintain standards and prevent undesirable uses.

George T. Blanch, of Utah State University, reported that 27,545 acres in the four counties were changed from agriculture to other uses between 1937 and 1952. An estimated 13 thousand

acres underwent change between 1952 and 1957.

The 27,545 acres were only 1.5 percent of the total land area of the four counties—but 16,651 acres of it were irrigated and amounted to 7 percent of the total irrigated land. The rest was dry cropland, grazing land, foothill range, and wasteland.

Of the land taken out of agriculture, about one-third had been within the boundaries of incorporated towns or cities but used for farming before 1952. Residential uses account for about 80 percent and industrial and commercial uses for about 20 percent of the land whose use was changed in incorporated areas. All the military and most of the industrial developments were placed outside incorporated areas.

About half of the acres removed from agriculture are in residential uses, although some tracts are large enough to support part-time farms. About a fifth of the area serves industrial and commercial purposes. The third that is in military reservations may return to agriculture if it is needed.

The four counties exemplify regional economic problems at work. The developed agricultural community has invested time, money, and effort into developing a relatively stable economy, based on irrigated small farms and a settled way of life. The readily available water supply was utilized almost wholly to meet needs of the established community.

The new growth of cities and industries and new demands for water upset the balanced economy and introduced some problems. As previously irrigated lands sprouted roofs instead of roots, the irrigation companies began worrying about recovering their outlays for dams, ditches, and laterals to farms that were going out of existence. They also had to raise additional funds for new and probably more expensive projects to irrigate former drylands lying above present ditches or beyond reach of them.

Farmers that were being displaced had the same kinds of problems in sunk

costs for leveling, ditching, and developing productivity; problems of water supply; and distance from markets.

But to say that the presently developed farmland is all the land available for use would be misrepresenting the case. More correctly, this acreage was all that was available at the time, the place, and the price.

An investigation of agricultural prospects in the Weber Basin was conducted by the Bureau of Reclamation and the Department of Agriculture. The report said that several thousand acres suitable for irrigation lie on the periphery of lands that have been under irrigation for several decades. The Weber Basin Project, besides providing water for municipal and industrial uses, proposes to provide a full water supply to approximately 50 thousand acres not under irrigation and a supplemental supply to about 24 thousand acres of presently irrigated land. The investigators expressed the belief that an economically and socially satisfactory system of agriculture would result and that, besides supporting the farm families and community institutions at a reasonable level, agriculture can contribute substantially toward the cost of operating and constructing the project.

Granting that bringing these new lands into production would be expensive, it is clear that unutilized land resources several times greater than those already removed by urbanization and other nonfarm uses remain to be developed when the time is ripe—when the food is needed.

Similar situations exist in many parts of the Intermountain region, the Pacific Northwest, the eastern slope of the Rockies, and in the East. The effect of drainage programs in the Mississippi Delta and in parts of the Southeast will contribute additional lands for intensive cultivation. In the final analysis, the cost or availability of water may place a much greater limit on production than will the availability of land.

AMONG THE POINTS brought out in the foregoing examples is that there is

no set pattern of desirable growth. Each situation varies with topography, transportation facilities, the type of landownership, and happenstance.

Because urban dispersal into agricultural areas assumes different forms, different kinds of planning and control are required to insure the best use of land.

I list four major forms of dispersal:

Gradual encroachments, in which the metropolis slowly pushes out into its hinterland and which results in a fringe area;

Encirclement, in which urban developments surround agricultural areas by joining prongs of settlement along main arteries of traffic or several communities grow together along isolated points of contact;

Growth through diffusion, which has no particular pattern—single families invade agricultural areas beyond the normal boundaries of urban areas in their search for homesites and some developers leapfrog to pick up tracts wherever they can find them for development; and

Industrial decentralization, which has grown as the space requirements of companies have increased, transportation facilities have been improved, and employees have become more mobile.

Planned dispersals have occurred in communities that acted in time and had development plans available before an influx began.

As for agriculture, unplanned and unregulated growth almost inevitably must result in a decline in producing acreage, uneconomic transitions in land use, inequities in tax burdens, excessive costs for public services, too much speculative development, and general instability.

Advance planning cannot prevent urban and industrial spread into rural areas and it should not attempt to do so, but it can guide, formalize, and make a kind of schedule for growth. Rural communities often can plan a program whereby healthy agriculture, healthy industry, and healthy urban

communities can abide happily side by side.

Individuals and businesses have wide choices concerning locations in urban communities. Many factors other than cost of transportation to the urban center influence decisions on where to live and work. Accessibility to a broad region largely has displaced the concept of accessibility to the urban core.

Relative suitability of available lands for the alternative uses is a significant factor in the land market. Land developers like to plan entire communities as units. They buy well-located farms as they become available and take options on adjoining properties if necessary. They need large blocks of land to meet requirements for complete communities.

The economic force of human wants, as expressed by what people are willing to pay for goods or services, is the key to land values. Land is like any other commodity whose use is determined by its value in the market place. Among the values is site or location. Each tract being considered has a variable value for each kind of farming as well as for residential, commercial, industrial, transportation, or other uses. Unfortunately for agriculture, land productivity is a relative thing and weighs less heavily on the site values than do other values. Tracts well located for other uses command a higher price because they are worth more to the buyers than the capitalized value of potential farm products and related other values are to agriculture.

If our national economy is to continue its growth, urbanization must grow with it, and uses other than agriculture will continue to press values and prices of desirable tracts beyond the economic reach of agriculture.

As our population expands, it is inevitable that our residential and industrial areas must expand to accommodate it. It also is inevitable that much of this expansion will cause many social, economic, and institutional problems which can be resolved only by dislocation of vested users, loss

of certain improvements, and expense for new facilities.

It is inevitable that families, communities, and regions will have their economic activities turned completely upside down in the maelstrom of our national reconstruction and adjustment to the age of the atom and jet.

It is not inevitable that bad or ill-timed land uses need supersede agricultural uses. There is no need for leapfrogging suburbanization, for ill-planned highway networks, for industries scattered hit or miss over the countryside. There often are adequate satisfactory sites for airfields and military establishments on other than first-class cropland—although factors other than engineering features enter into the considerations that determine their location.

The issue is not agriculture versus nonfarm developments. We need both—in balance. The real problem is to protect the more productive lands of agriculture from ill-planned or un-planned and ill-timed conversions. Directing nonfarm growth along desirable channels is one of the critical problems facing agriculture today.

THERE REMAINS the need for us to put some of these ideas and developments in a larger frame, especially if we are worried that cities and highways are taking all our good farmland.

The maintenance of a healthy economic position of agriculture over the years depends largely on its ability to adapt to changing conditions. Continued depression of an agricultural area or a sector of the agricultural economy indicates that at least some factors of production are badly out of balance in the farm business.

I have heard John D. Black, of Harvard University, state that there is no such thing as marginal land. It is the misuse of resources in relation to the ability of the land to produce that creates marginal and submarginal situations.

Sherman E. Johnson wrote in *Science in Farming*, the 1947 Yearbook of Agri-

culture: "Scientific progress enables some people to live better, and more people to live. . . . But history affords evidence that technological improvements, which bring profits to the producers who can adopt them and which benefit mankind in general, also bring misery and distress to the individuals who cannot adjust themselves to the new conditions. Such individuals are likely to resist and may be strong enough to delay technological progress. . . ."

Farmers in the United States cannot afford to stop technological progress any more than they can afford to use horses for farm power or grow open-pollinated corn. Farm prosperity depends as much on efficient farm production as it does on a virile market.

A virile market in turn depends on a growing population with high levels of economic activity and employment—high purchasing power.

Carl P. Heisig, director of the Farm Economics Research Division, in testimony prepared for the Joint Economic Committee of the 85th Congress, said:

"Over the longer term, our production problems may continue to be centered around the need for adjusting the pattern of production to changing market outlets, rather than on an all-out effort to raise our production capacity. . . . It is possible that production may continue to press on market outlets for many years, with consequent pressure on farm prices and incomes. . . . The question is not so much whether we can produce food enough, but whether we can obtain the necessary readjustments in agriculture at reasonable cost and with net incomes in agriculture comparable to those in other occupations. . . ."

Agriculture must recognize realities. Too many of us, trained in scarcity economics, are oriented to the past. We are in the midst of a peacetime socioeconomic revolution in which land is of decreasing importance relative to other resources utilized in production of food and fiber.

We tend to forget agriculture's place

in our present national economic organization. Whether we like it or not, the fact remains that we can exist only at the call of nonfarm populations. A growing population and a virile economy mean expanding markets for products of the farm. A declining population and a stagnant economy would mean the opposite.

ENGLAND is an urban country and imports much of her foods and feeds. We can learn from actions of the English during an emergency and their plans for the future.

In February 1954, in the Albert Howard Memorial Lecture in London, L. Dudley Stamp pointed out that Britain has been overpopulated "for at least a thousand years, judged by the productive capacity of the time. . . . Now our land [in Britain] is underdeveloped by comparison with its potential."

He estimated that practically the same land surface now in use can be increased by 20 percent in productivity and concluded, "There is much underdeveloped land in Britain: Only man-made barriers stand in the way of its more effective use."

Anthony Hurd, an English farmer and wartime liaison officer in the Ministry of Agriculture, reported that Great Britain had increased her tilled acreage 65 percent during the years of the Second World War. Even under conditions when supplies of material, labor, and money were extremely critical, the total production of calories was increased by 70 percent, primarily by growing more wheat and potatoes for human consumption and replacing imported feedstuffs by homegrown feeds, including grass. The net output of agriculture—the true output of the soil and measure of skill in agriculture—rose, fell, and recovered during the war years as adjustments were made to less imports, but by 1948–1949 had risen to 35 percent above the prewar period. Better methods, better cultivation, better seeds, better use of machinery and fertilizers, and new de-

velopments of all kinds were used in this effort.

Even so, W. R. Mcad, of University College, London, concluded in late 1956 that: "In many parts of Britain [already improved lands] are not yielding their maximum, and the return from additional investment in them is likely to be greater than from that invested in marginal moorland."

Some of the best planners have worked on Britain's town and country pattern. They recognize that protection of good agricultural lands is essential. Yet the Nuffield College Social Reconstruction Survey noted: "The value of even the best agricultural land is so low in relation to suburban building values that it is to no one's financial interest to save it from building, for which it is often particularly suitable."

THERE WAS a decrease in the number of farms in every State except Florida and in all except 180 of the 3,067 counties in the United States between 1950 and 1954. The number of farmworkers has continued its long-term decline. But the average size of farm has increased from 215 acres to 242 acres and total farm production has continued at high levels.

About 22 million people now live on farms; in 1975 it is estimated only about 15 million in a population of more than 220 million will be on farms. Today about 13 percent of our population provides food for 87 percent of the total; by 1975 it is estimated that less than 7 percent will feed and clothe 93 percent.

Today there are nearly 5 million farms in the United States, but almost 3 million of them are small full-time farms or small part-time operations. This 60 percent of farms produces only 14 percent of our crops and livestock. The small farmer who depends entirely on the income derived from his undersized, uneconomic unit is in real trouble.

The agricultural resources of operators of small units usually are insuffi-

cient to produce an adequate volume of crops and livestock or to utilize fully the labor of the farm family, except where highly specialized production is feasible. Production of high-value commodities on small farms is seriously limited by inadequate market outlets or location factors.

The remaining roughly 2 million farms are classified as commercial in that they produce an annual minimum of 2,500 dollars in farm sales. This 40 percent of farm families produces about 90 percent of all farm products sold.

The family farm is stronger today than ever before. It is changing because it is part of a dynamic economy. The family-size commercial farm is larger than ever before because technology has made it possible—and necessary—for operators to use laborsaving equipment, more productive cropping and livestock practices, and better management techniques.

The increased proportion of very large farms, particularly in the drier areas of the country, is of concern to some people. We must recognize, however, that most of these farms are in areas where considerable acreage is needed for a sufficiently large output to be economically feasible. These farms often are on the extensive margin of land use, just as many small farms are on or below the intensive margin.

Urban expansion creates some problems for agriculture and serious problems for some areas, but the degree of severity from the national interest, now and in the foreseeable future, seems to have been exaggerated.

Agriculture should aid continued urban-industrial growth. Continuation of a dynamic national economy requires it, and agriculture cannot be prosperous without it. A healthy urban economy provides agriculture with employment opportunities for its technologically surplus labor and provides wages to augment farm income. Urban growth helps agriculture balance production with the markets, allocate productive resources, and get the use of land in balance with modern needs.