

ADJUSTMENTS THAT SEEM NECESSARY

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WE HAVE three important criteria by which to measure balance in agriculture:

The kinds and amounts of foods and fibers that people want and need for adequate diets and comforts;

The tools and efforts needed to bring our soil budget into balance and, once balanced, to maintain the physical resource upon which agriculture is based; and

The ways in which farmers can best organize and operate their farms to utilize their individual resources efficiently and thus achieve sustained optimum farm incomes and improved levels of living.

Here, keeping in mind the potential demand for food and fiber and proved practices for efficient farming, let us examine the third point, some of our recent explorations into what would constitute a balanced and profitable pattern for agricultural production.

Even in peacetime too few farmers used systems of soil management that adequately sustained a high level of productivity of their lands. Then the war took a still heavier toll of their soil. To meet wartime needs, farmers in the Corn Belt alone increased their acreage of intertilled crops such as corn and soybeans by 11 million acres, mostly at the expense of grassland. Wheat growers increased their acreage of wheat, mainly in the Great Plains, from 62 million to nearly 72 million, mostly at the expense of grass and fallow. And stockmen in parts of the range country overburdened the range with too many grazing livestock.

Thus we have even farther to go now than before the war toward establishing a balanced agriculture. At least half of the acreage that our farmers are now using for intertilled and close-growing crops needs protection from damage by erosion. And even though during the war farmers increased their use of lime and fertilizers and

such practices as contour farming, strip cropping, and growing cover crops, balancing the soil budget would mean even greater increases in the use of these materials and practices.

Almost as soon as the heavy demands of the war could be foreseen the need for a long-range production pattern that would serve as a bench mark for adjusting to a balanced agriculture was generally recognized. Even before hostilities had ended in Europe, State agricultural colleges and the Department of Agriculture began exploration of the opportunities for postwar agriculture. The opportunities for growing more grass and legumes for protecting and rebuilding depleted soils and for providing cheap and nutritious feed for livestock stand out among the many prospective adjustments appraised. Each suggested improvement in systems of farming, including the production and utilization of feed crops, was appraised on the basis of what would be both technically and economically feasible.

Preliminary results of these studies definitely suggest that within a reasonably prosperous national economy farmers can produce abundantly, profitably, and with progressive improvement of agricultural resources.

More specifically these studies indicate, first, that farmers in the United States may plan to maintain the total acreage of land used for crops and summer fallow at approximately the present level. Total cropland did not increase very much during the war. But to maintain and improve their soils for an efficient level of productivity, they should return to an even greater acreage of grass and legumes than before the war. The percentage increase needed in rotation hay and pasture combined would be about 20 percent more than the 1943 acreage.

Because of the increasing practice of using grass on cropland for both hay

and pasture in the same year, it is difficult to separate the two uses. But the percentage increase in rotation pasture would probably be somewhat greater than that in tame hay. The percentage increase in permanent pasture would be small, about 2 percent, but the increase in acreage would be almost half as much as the increase in acreage of hay and rotation pasture.

Less attention has been given to improved practices in hay production than to any other feed crop except pasture. With favorable market outlets and favorable prices for livestock products, it would be profitable to go much further in the substitution of higher yielding and higher quality legumes for lower yielding and less nutritious grass hays. It would also be profitable to use more lime and fertilizer on more acres. And improved methods of harvesting and curing would enhance the nutritive content of the hay.

Available estimates indicate that under favorable conditions these improved practices would raise the United States yield of tame hay to about 1.8 tons (compared with an average of about 1.4 in 1937-41), an increase of about 25 percent. The combined increases in acreage and in yield per acre would increase total production of hay to about 40 percent more than was produced in 1943 and about 50 percent more than the average production from 1937 through 1941.

Considerable expansion in the acreage of grass and legume hay is desirable in all parts of the United States, except possibly in the Northeast. Compared with production in 1943, the largest increases (30-40 percent) would be in the Northern Great Plains, the Lake States, and in the Southern States that are largely outside the peanut-hay area. In the peanut-hay area there would be considerable substitution of other hays for peanut hay. The increases in the Corn Belt and other major agricultural regions would range between 15 and 20 percent.

Increases in yield per acre and improvement in the quality of the hay

crop are feasible and would be profitable in all major groups of States. The opportunities appear to be greatest in the Mississippi Delta States—about 65 percent above the 1937-41 average. Regional increases in yield per acre ranging from 30 to 40 percent are estimated for the Lake States, the five Corn Belt States, the Appalachian States, and the Southeastern States.

Reference already has been made to the wartime shift of land from pasture to other more intensive uses, especially in the Corn Belt, the Lake States, and the Northern Great Plains. From the standpoint of a long-time program that will maintain or improve the soil and produce feed economically, pasture should occupy a more important place in those regions than it did during the war. Increases of about 25 percent in both the Corn Belt and the Northern Great Plains, and of about 15 percent in the Lake States seem desirable.

In the Appalachian and Southern States larger than usual acreages of better quality pastures are needed as a basis for a conversion to more diversified farming, including more livestock production. Increases in acreage of approximately 25 percent in these groups of States would be mostly in permanent pasture, although the percentage increase in rotation and permanent pasture would be about the same.

An increase of about 35 percent in rotation pasture in the Pacific States and 15 percent in the Mountain States would largely represent desirable increases in irrigated pasture.

The opportunities for improvement of the carrying capacity per acre by the use of better pasture-management practices are greater for open permanent pastures than for rotation pastures, measured in terms of animal-unit-months of grazing.

In the States east of the Great Plains, the estimated optimum carrying capacity for an average acre of open permanent pasture is about 30 percent above what it was in 1943, whereas for rotation pasture it is only about 15 percent more. Over-all gains

in the carrying capacity of rotation pastures seem possible only in the central Corn Belt, the Lake States, and the Mississippi Delta States. In other groups of Eastern States, any improvement in carrying capacity of rotation pasture would likely be more than offset by the addition of more acres of lower potential carrying capacity. By the use of profitable improved practices, farmers in both the Corn Belt and the Lake States can probably increase the carrying capacity of the average acre of rotation pasture to 25 percent more than its carrying capacity with the pasture-management practices in use in 1943 and in normal growing weather.

In the same two groups of States—central Corn Belt and Lake States—comparable increases in the carrying capacity of an average acre of open permanent pasture are about 35 and 65 percent, respectively. A comparable figure for the Appalachian States is about 25 percent; for the Mississippi Delta States and the Northeastern States, about 15 percent.

Comparable estimates of the carrying capacity per acre of ranges and pastures in the Great Plains States and States farther west cannot be made from the available data.

Companion estimates for the four principal feed grains (corn, oats, barley, and sorghums), the other half of the "feed base" for livestock production, total in round numbers 150 million harvested acres and 127 million tons of feed. The combined acreage would be 3 percent more than the prewar (1937-41) average, but 4.4 percent less than the wartime acreage in 1943. Corn acreage would be about 4 percent less than the prewar average; the acreage of small grains would be about 10 percent more and that of sorghums harvested for grain almost 50 percent more. The production of feed grains would be 27.5 percent more than the average production from 1937 through 1941, and 14.5 more than was produced in 1943. The explanation of considerably larger pro-

duction on approximately the same total acreage is the possibility of obtaining higher yields per acre under favorable conditions.

Besides better rotations, to which a reduction in corn acreage would contribute, it would pay more corn growers to use more fertilizer, green manures, barnyard manures, and crop residues; proper water disposal and moisture-conserving practices; and special practices to control insects and diseases. Hybrid seed is now used for almost 100 percent of the corn produced in the central part of the Corn Belt, but the development and use of varieties of hybrids better suited to other areas will considerably improve yields in those areas. Furthermore, adequate supplies of improved machinery will facilitate better cultural practices and make it possible to concentrate more of the work on corn in the periods when it is most effective.

The larger acreages of sod crops that are essential to balanced cropping systems would require a larger acreage of small grains in some of the Corn Belt States, to serve as a companion crop for new seedings of the hay and pasture crops. In the Southern and in the Appalachian States a considerable increase in production of feed grains is desirable and oats have been producing slightly more feed per acre than corn in these States since rust-resistant and higher-yielding varieties have been available. The opportunities for further improvement in yield appear to be more promising for oats than for corn.

The system of sustained feed-crop production here outlined would produce 34 percent more tons of tame and wild hay, 16 percent more animal-unit-months of pasturage, and 14.5 percent more tons of feed grains, than was produced in 1943. These larger supplies of forage and grains would provide feed for the production of about 8 percent more livestock and poultry products for food than was produced in 1943, and about 36 percent more than was produced in 1937-41. This estimate makes allowance for nonfeed uses of

The Old and the New in Dairy Farm Management on Trumbull County, Ohio, Experiment Farm

| Item | Average of 3 years | |
|---|---------------------|---------------------|
| | The old, 1927-29 | The new, 1940-42 |
| Milking cows in herd number | 13. 9 | 19 |
| Annual production per cow: | | |
| Milk pound | 10, 694 | 11, 570 |
| Butterfat do | 368 | 382 |
| Annual production per farm: | | |
| Milk do | 148, 650 | 219, 815 |
| Butterfat do | 5, 118 | 7, 262 |
| Concentrates fed annually per cow: | | |
| Corn and oats do | 1, 791 | 1, 604 |
| Oil meals do | 976 | 312 |
| Bran do | 807 | 199 |
| Gluten feed do | 139 | |
| Total do | 3, 713 | 2, 115 |
| Total concentrates fed to herd annually ton | 25. 8 | 20. 6 |
| Pounds of milk per pound concentrates fed pound | 2. 9 | 5. 3 |
| Pounds of concentrates per hundredweight of milk do | 34. 5 | 19. 0 |
| Approximate daily winter ration: | | |
| Corn silage do | 45 | 20 |
| Hay do | 12 | 1 30 |
| Hay purchased ton | 3 | None |
| Hay sold do | None | 16 |

¹ More than 30 pounds placed in mangers. Uncaten part used for bedding or for other livestock.

the feed grains, use of forage crops for green manure, and some margin of safety in the feed-livestock balance.

The larger production of higher quality hay and pasturage would provide efficient rations of these feeds, which involves greater substitution of forage for concentrates, for about the same total number of animal units of cattle and sheep as were on farms at the wartime high points of the cattle and sheep cycles; but with some shift from sheep to cattle in the interest of the most profitable utilization of the range and farm pastures. This would mean nearly 30 percent more cattle and calves than were on farms during the 1937-41 period, and about 5 percent downward change in the number of sheep and lambs.

The carrying capacity of hay and grazing land in terms of number of

cattle and sheep has been increased progressively, especially in the humid regions, since 1918 by the decline in the number of horses and mules. Since 1918 the decline in the number of horses and mules has released enough hay and pasture to feed the equivalent of about 19 million additional cattle and calves at current rates of feeding. As the introduction of mechanical power gradually makes further progress, especially in the South, the numbers of cattle can be increased, because of the feed that will be released and because systems of farming are likely to be developed that include more hay, pasture, and grain.

Liberal feeding is one of the fundamentals of successful dairying. Improvement of the quantity and quality of hay and pasture would favor an expansion in the number of cows

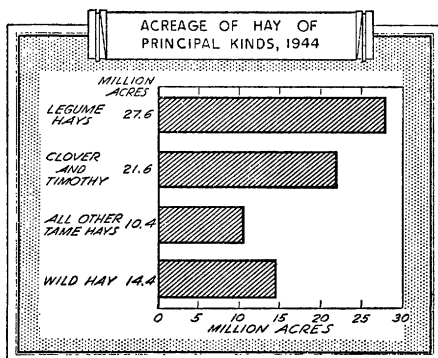
milked somewhere near proportional to the expansion in the total number of cattle. An increase, compared with the number in 1937-41, of about 25 percent in the number of cows milked would appear to be a profitable adjustment to the previously mentioned changes in feed supplies.

In prewar years 55 percent of the Nation's milk cows were in the Lake States, the Corn Belt, and the Northeastern States. About the same proportion of the suggested number would be in those three groups of States. But as the opportunities for increasing the feed base appear to be greater in the Lake States than in the Northeastern States, dairying would be expected to expand more in the Lake States. The expansion in milk cows in the Corn Belt would be about proportional to the total expansion in the United States.

Production of hogs and the supplies of corn are closely related. If farmers produce about $3\frac{1}{4}$ billion bushels of corn on about 89 million acres by using improved practices to increase yield per acre, and if the hog-corn price ratio is reasonably favorable, they would find it profitable to raise an annual pig crop of about 100 million head. This would be 18 percent less than the record pig crop in 1943, but 30 percent more than the average pig crop during the 5 years 1937-41.

An estimate of the total available supply of feed does not provide nearly so adequate a basis for estimating the numbers of poultry as for cattle and hogs. But on this basis, and keeping in mind a balanced agriculture, about 425 million hens and pullets on farms would seem to be comparable with the foregoing estimates. This would be about 13 percent more than the average number on farms from 1937 through 1941. Chickens, exclusive of commercial broilers, are ordinarily raised primarily for replacement of laying flocks, and thus would be in about the same relationship to prewar figures as the laying flocks.

Furthermore, under favorable con-



ditions, livestock and poultry producers would find it more profitable to give more attention to improved production practices. Estimates that have been made indicate that for beef cattle this would result in 6 percent more production per animal, with 5 percent fewer pounds of concentrates per 100 pounds of gain in live weight, compared with the 1943 figures. An estimated increase in the percentage calf crop from an average of 82.4 during 1937-41 to 84.6 with improved practices would be reflected in increased production per animal. Comparable estimates for sheep and lambs are 10 percent more production per animal with about the same number of pounds of concentrates per 100 pounds of live-weight production, and an increase in the percentage lamb crop from 84.1 to 87. The estimated average production of milk per cow and of eggs per hen is 13 and 24 percent, respectively, more than during the prewar (1937-41) period.

Combining these estimates of the numbers of livestock and chickens and of the rates of production per animal or per bird that would constitute an adjustment to a balanced agriculture, we get the following percentage increases in production over that in the prewar (1937-41) period: For milk, about 36 percent; net live-weight production of cattle and calves, about 40 percent; net live-weight production of sheep and lambs, about 10 percent; net live-weight production of hogs, about 40 percent; and for eggs, about 30 percent.

These estimates are to be considered as part of the potential production of a balanced agriculture in a national economy geared to full production. They are in a setting of full employment and a high level of national income, and they include the effects of the adoption of known improvements in farm practices that would be profitable under those conditions.

In this setting farmers of the Nation gradually can supply adequate diets for all of our people with a pattern of production that stresses soil-conserving practices and the livestock enterprises associated with grassland farming, and do it profitably and with pro-

gressive improvement of their land. To move rapidly in this direction, however, more intensive educational and operations programs would be needed to encourage and accelerate the adoption of the improved practices that would be necessary for realizing the full potentialities of the grassland crops in the United States.

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