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FOOD PRODUCTION POLICIES IN WARTIME ^{1/}

An address by Sherman E. Johnson, Chief, Production Programs Branch, Food Production Administration, at annual meeting of the Western Farm Economics Association, Berkeley, California, June 25, 1943.

Food needs are now pressing on the limits of potential production in a manner characteristic of wartime. At the beginning of the present war in Europe many persons felt that this war would be "different" as far as agriculture was concerned. There would be no pressure on food supplies. Unfortunately, this was the general public attitude toward the food situation up to the early fall of 1942, when we were suddenly confronted with a meat shortage even though meat slaughter for the year was about 30 percent above the relatively high output of the years 1935-39. As long as this attitude prevailed it was difficult to obtain full support for an "all out" war food program. In considering the food production problem it is well to remember therefore that the need for increased food production has not been generally recognized for more than 8 to 10 months. Now there is fairly general recognition that our food and fiber needs for military, civilian, lend-lease, and war relief are so great that even maximum production from our tremendous agricultural plant will not be adequate to meet these needs.

In building a wartime food production program we need, first of all, to consider the pattern of food needs. Second, we should analyze the most economical food sources for meeting each of those needs, and their priorities in event that some needs cannot be met. Third, we should determine what constitutes maximum production in accordance with the needed pattern. And, fourth, we should develop the type of programs that are most likely to obtain maximum production. It goes without saying that effective execution of the programs that are developed is most important of all.

Pattern of Food Needs

Foods differ greatly both as to types of essential nutrients which they provide and as to quantities that can be produced with given amounts of land, labor, and production materials. From the nutritional standpoint foods may be classified in the following five major groups. Good nutrition requires a combination of foods from each of these groups. ^{2/}

- (1) Grain products: Important as inexpensive sources of energy and protein. The lightly-milled products are also excellent sources of iron and vitamins of the B group.
- (2) Fats and sugars: Economical sources of food energy. Some of the fats also carry important amounts of vitamin A. These foods add flavor and satiety value to diets which are highly prized in many parts of the world.

^{1/} The views expressed by the author in this statement are advanced for discussion purposes. They do not reflect any Bureau or Department viewpoint on the problems considered.

^{2/} From material prepared for consideration by the United Nations Conference on Food and Agriculture, May, 1943

- (3) Meats, poultry, eggs, fish, legumes, and nuts: Important sources of proteins and certain of the vitamins of the B group. Eggs are sometimes classed separately because of their richness in vitamin A.
- (4) Milk and milk products: The outstanding economical source of protein of high quality, calcium, and riboflavin. Also important for many other vitamin and mineral elements.
- (5) Vegetables and fruits: These differ widely in their nutritive value. Special emphasis would be given to the leafy green and yellow vegetables for their vitamin A value; tomatoes and citrus fruits (among others) for vitamin C value; potatoes and other starchy tubers as economical sources of energy and for some of the mineral elements and vitamins.

Our wartime pattern of food needs is considerably different than it would be if we were producing only for expanded civilian needs in this country. Military food needs are different from what would be required by the same population in civilian life. We are also called upon to supplement the food resources of our allies. The supplements that are most needed are high-protein foods and fats. To save shipping space it is necessary to prepare these foods in the most concentrated form.

If feed and other resources were ample, it would be desirable to concentrate on meeting our requirements for proteins and fats from animal sources. But since expansion along these lines is definitely limited, it will be necessary to fill a part of these requirements with vegetable proteins and vegetable oils. The need for milk solids to balance the food ration is so great that it seems necessary to place major emphasis on milk products among the animal proteins. A question arises as to how far the shift from animal products to food crops for direct consumption could be carried if necessary. Nutritionists tell us that the psychological limits to such a shift in diets are likely to be reached long before the physical limits.

The quantity as well as the pattern of our food needs points toward increased emphasis on the high-protein direct food crops and the oil crops, which are sources of both oil and proteins. Looking forward, there will be need for diverting an increasing proportion of soybean, peanut, and cottonseed meals to edible uses. Dry beans and peas are important sources of high-protein foods among the direct food crops. In the vegetable group, Irish and sweet potatoes must be provided in adequate quantities to furnish the basic energy requirements that can be obtained from starchy vegetables. Other vegetables will need to be increased for utilization both in fresh and processed form. Somewhat larger consumption of grain products is anticipated.

Economical Sources of Food Nutrients

The pattern of food needs already described implies emphasis on the most economical sources of providing the needed food supplies. Emphasis on increasing meat production was justified when we had ample feed reserves, and as long as food requirements did not press too heavily on our ability to produce food. Now, however, we are approaching a period of dwindling feed reserves. Under these circumstances we must be selective both as to

the size of the entire livestock enterprise and as to relative emphasis on different types of livestock. Looking forward, it may be necessary to reduce total livestock production below the record levels of 1943 in order to balance our livestock numbers with the feed supplies that we shall be able to grow or import. Meat animal slaughter in 1943 is likely to average about 149 percent of 1935-39. This means that a very considerable reduction could take place if necessary, and meat output would still remain above normal levels. The amount of reduction in the different types of livestock should be considered on the basis of output for feed, labor, and other resources used in production. Grain finishing of beef cattle may be one of the first places to make some reduction in feed consumption. Meat output per unit of resources is relatively much less than from hogs. Cattle and sheep enterprises should, however, be maintained to the full extent that they can be supported on range, pasture, and roughage feeds. Livestock produced from range and roughage represent very economical additions to our food supply.

About 40 percent of the total consumption of concentrated feeds by livestock goes to hogs. Therefore, the recent upward curve in hog production will have to be leveled off considerably in order to effect material savings in concentrate feeds. Egg production is a relatively economical use of feed for the food values obtained. Moreover, on many farms poultry is a sideline enterprise, which means that much of the labor used could not be shifted to other types of production. Broiler and other specialized poultry meat production are relatively less economical in feed and labor utilization.

When all the milk solids are utilized, the dairy enterprise provides the most economical source of some of the needed animal proteins as well as of calcium and riboflavin. It therefore seems desirable to maintain dairy production at least at present levels, and even to encourage some increase in output. A larger portion of our milk should go into channels which will utilize all the milk solids for human food.

Among the direct food crops, emphasis should be given to those which supply the most nutrients in their particular food group for the land, labor, and materials used in production. Recognition must be given, of course, to other factors such as bulk and palatability of particular foods.

Analysis of relative economy in producing different foods cannot be based entirely on average relationships. Many foods are relatively economical users of land and labor when produced at present levels of output, but production increases would use resources much less economically. Therefore, it becomes a question of considering the resources used for prospective increases in production as a basis for our decision on choice of crops or livestock. A recent study by the Bureau of Agricultural Economics analyzes the relative economy in the production and marketing of different types of foods. ^{3/} This study recognizes that conditions vary greatly among different producing areas and that the economy of producing different kinds of foods must be analyzed area by area in order to draw valid conclusions

^{3/} "Using Resources to Meet Food Needs," by Raymond P. Christensen, Bureau of Agricultural Economics, U.S. Dept. of Agriculture, May, 1943 (mimeographed).

as a basis for local production plans. A first approach to such analyses is being taken in the maximum wartime production capacity study that is being carried on in cooperation with State and Federal agencies. ^{4/}

Pattern of Food Production

From the pattern of food needs and a study of the most economical sources for supplying those needs at different levels, we arrive at a first approximation to a food production pattern. Although much work is needed to fill in the details, the general outlines are fairly clear:

Every effort should be expended to maintain, and even to increase, milk production for utilization of milk solids. Livestock other than dairy cattle must be balanced with the feed supply that can be grown after our needs for direct food crops and fiber and special crops have been met.

Any reduction of livestock numbers from present high levels that might be necessary should take place in accordance with the relative economy of producing each type of livestock at different production levels as indicated above.

Among the direct food crops, major emphasis should be given to the high-protein and oil crops, and to Irish and sweet potatoes, as well as to other vegetables. A sufficient acreage of wheat and other food cereals should be grown to supply our direct food needs. In addition, wheat should be grown even for feed in areas where it will produce more feed nutrients per acre in relation to labor requirements than other feed crops, and where production does not conflict with more urgently needed direct food products, such as beans and potatoes. Even though wartime cotton consumption is making heavy inroads on reserve stocks, some of the acreage usually devoted to cotton may better serve the war effort by producing peanuts, sweet potatoes, fresh vegetables, and feed for dairy cows in milk shortage areas. In areas adapted for peanuts about three times as much oil can be obtained per acre from peanuts as from cotton, and with the use of only two-thirds as much labor. On the other hand, there are areas, such as the Mississippi Delta, where nearly as much oil can be produced from cottonseed as from soybeans, and at the same time we get increased supplies of longer staple cotton.

The geography of food production should be determined from analyses of the relative efficiency of each area in supplying the needed increases for different products. If we can approximate the most economical pattern of food production for each producing area in relation to national needs, we still will have before us the problem of combining these into a balanced pattern of national production that gives proportionate emphasis to each product. That involves assigning values to different products in accordance with needs in such a way that the last unit of each product is just as valuable as additional units of any other product.

It is necessary to give much more than usual attention to producing the bulky and perishable products as close as possible to consuming centers.

^{4/} Some of the material prepared as a part of this project has been used in the preparation of this paper.

The increased output that will be needed of potatoes and other bulky and perishable products will severely tax transportation facilities.

Maximum Production Capacity

It is recognized that our maximum capacity for food production is not represented by one fixed level. But perhaps the most realistic approach is to analyze capacity in terms of a specific pattern of production designed to meet the pattern of food needs, and in the light of decisions with respect to how far we can go in shifting toward the most economical sources of meeting those needs. Maximum production possibilities must also be considered within the limits imposed by the operation of the general economy in a situation of wartime scarcity. In other words, output could be increased very considerably if land were the only fixed factor and if agriculture could obtain labor, equipment, and supplies such as fertilizer in whatever quantities would be needed for maximum production.

Increasing Cropland

All of the resources used in agricultural production have physical limits under wartime conditions. This is true even of our land resources. It is estimated that the acreage of land used for crops can be increased to 377 million acres from the 351 million acres used in 1942, and the 339 million utilized for crops in 1939. The source of this increase would be about 75 percent from idle or fallow land (much of it in the Great Plains) and 25 percent from a reduction in plowable pasture. Some additional increase could be obtained from stepping up irrigation and drainage developments. However, many developments of this type require large amounts of labor and scarce materials and some would not be available for crop production in the next 2 or 3 years.

Shifts in Production

Since the land base cannot be greatly increased it will be necessary to depend largely upon shifts in production to obtain greater output of needed products from land now in crop production. This means a shifting wherever possible to the more intensive crops indicated by the pattern of food needs. That is a conversion job similar to converting automobile factories to tank or airplane production. If it is to be achieved to the extent necessary to meet our needs, we must be ready to pay for the conversion cost. That cost is represented by new investments in equipment and storage facilities and also by compensation to new producers for shifting to production of a product with which they have had no experience. In many instances such shifting will mean lower yields than in old producing areas or on farms now producing the same product. Therefore, it means higher cost production. Even when the additional output comes from farms that are already producing the same product, the increase will usually be produced at higher cost.

In considering this conversion job we must be bold in our thinking about its possibilities. It will not suffice to project increases from recent trends. No one projecting acreage trends in peanuts would have

been bold enough to assume in the fall of 1941 that the acreage of peanuts harvested for nuts would be increased from 1.1 million acres in 1941 to 3.6 million in 1942. Despite all the difficulties encountered, that increase represents a marvelous achievement in wartime conversion. The 1943 production goals call for 5.5 million acres. It may be difficult to obtain that acreage without giving more consideration to meeting the conversion cost that is involved. Moreover, an even larger acreage will be needed in 1944.

Taking a product more familiar to the West, we planted 2.1 million acres of dry edible beans in 1942. Our goal for 1943 is 3.3 million acres, which has been very difficult to obtain in the old producing areas. Looking forward to 1944, we will need at least 4 million acres in beans. It seems necessary to go into new producing areas for the increased production. This will require analysis of the areas with the best potentialities in view of the need for other products and then the provision of adequate inducements to farmers to carry out the conversion job.

Improved Practices

A third means of increasing production from a given land base is, of course, to increase the rate of output per acre and per animal. Over a period of years there are many opportunities in this direction. However, if educational methods alone are to be depended upon to achieve the increased efficiency required, our progress is likely to be rather slow. One of the greatest opportunities to increase quickly the output per acre seems to be the application of fertilizer. This opportunity should be exploited to the fullest extent that fertilizer can be made available.

It has been estimated that yield increases ranging from 5 to 25 percent could be obtained from some of the major crops and from plowable pasture if a strong national program were adopted to facilitate carrying out certain improved practices including greater use of fertilizer. If confined to individual crops, even larger increases could be obtained. 5/

Labor, Machinery, and Materials

Regardless of the source of increases in production they will require somewhat larger inputs of labor, machinery, and materials. The labor shortage in agriculture has been emphasized a great deal in the last 8 to 10 months. In considering labor needs we should distinguish between operator and other family labor, year-round hired labor, and seasonal peak labor. It is probably easier to meet the seasonal peak loads with inexperienced labor from unusual sources than it is to meet the year-round labor needs. Because of the demands for labor from other sectors of the economy it will be necessary for agriculture to solve its labor problem largely within its own occupational group and with some aid from the unusual labor sources in surrounding towns.

5/ Estimated by a joint committee of the Bureau of Plant Industry, Soils and Agricultural Engineering and Bureau of Agricultural Economics as a part of the study of maximum wartime capacity.

Some estimates have been made which indicate that agricultural production could be increased from 5 to 10 percent above the 1942 level with only about a 3 percent increase in the labor supply if measures were taken to utilize more effectively the labor now in agriculture that is somewhat under-employed. Relative under-employment exists on small farms in all States. If voluntary measures could be taken within each State for better utilization of farm labor which is now somewhat ineffectively employed, production could be increased considerably without drawing on any outside sources for additional labor. In addition, women and children, older men, and part-time workers from surrounding towns, if properly mobilized, can assist materially in the relatively unskilled peak-season jobs.

Machinery and equipment shortages can be just as serious as labor shortages and sometimes more so when the lack of a key machine prevents harvesting a crop before damage or spoilage occurs. To a certain extent labor-saving machinery is a substitute for labor. Therefore, more adequate supplies of certain types of farm machinery would help materially in increasing production with a given labor force. On many farms an older man or a youth can replace an able-bodied man in operating a machine although they may not have the strength to do a full man's work at heavy hand labor. Where considerable shifting in crop enterprises requires new types of equipment, it is necessary, of course, to make available a minimum amount of such equipment in order to make the shift.

Potential Production

If fairly effective measures can be taken to meet minimum needs for labor, machinery, and materials, it may be possible to increase food production as much as 6 to 8 percent above the record production of 1942. This statement assumes average crop yields and balancing livestock production with current feed supplies, whereas the 1942 output had the benefit of extremely favorable crop yields and large feed reserves. Actually therefore, the increase suggested would amount to an increase of about 15 percent above 1942 output adjusted for normal yields and feed supplies from current production. More important than the actual increase in output would be the changing pattern of production if the pattern were shifted in the direction indicated above. It would mean that a much larger population could be fed adequately from the food output.

If we could develop programs which would obtain wide adoption of improved practices it might be possible to increase total output another 5 to 10 percent above 1942 levels.

Programs to Obtain Maximum Production

Any discussion of the type of programs that might be devised to obtain maximum production must recognize the different elements in the present situation which form the starting point for program making. Among these are existing legislation, both with special reference to agriculture and for the control and guidance of the wartime national economy. The state of public opinion with reference to a food program is

of primary importance, and we cannot ignore the fact that certain production operations are already under way and that they can be neither completely reversed nor greatly accelerated except at the beginning of the new production cycle. Within that setting it might be worth while to examine five different program approaches that might be considered as alternatives in attempting to achieve maximum production. In practice it would be possible to use the measures that are discussed in somewhat different combinations. Although the advantages and disadvantages of each approach are mentioned, no advocacy is intended. Neither should this discussion be taken as a forecast of next year's food production program.

1. Uncontrolled Prices

Although a policy of uncontrolled prices could not be carried out within present legislation, this alternative should be mentioned because there are some persons who apparently believe that it is futile to attempt to control the price structure. These persons say that if price controls were eliminated the prices of farm products would rise more rapidly than other products and therefore stimulate maximum production. This argument is usually supplemented with a statement that effective price control is not possible and that all it does is to postpone an inevitable inflation, which will go even higher because of the control attempted at the beginning stages. It should be pointed out that under uncontrolled prices some agricultural products that are badly needed from a nutrition standpoint are likely to fare very badly because they have an institutionalized price structure. This is especially true of dairy products. Moreover, existing legislation prescribes price changes for certain farm products. These, therefore, could not be adjusted automatically in an uncontrolled price economy unless that legislation were repealed along with the Price Control Act.

The crucial question, of course, is whether such a program of uncontrolled prices would be effective in maximizing agricultural production. Although reasoning from analogy is dangerous, and one cannot argue that prices were completely uncontrolled in the last war, we do know that despite the stimulus of highly inflated prices there was no startling increase in the total volume of farm production during the last war. From the period 1910-14 to 1918-19 the total increase in output was about 10 percent as compared with a 28 percent increase in output from the period 1935-39 to 1942. Total production in the period 1935-39 was nearly 10 percent higher than the war years 1918-19. The recent increase therefore took place from a higher starting base, but weather conditions have been more favorable in the recent war period. Moreover, the laissez faire approach with uncontrolled prices would not induce the type of shifts in production which were indicated as desirable in the early part of this paper, and these shifts will result in feeding more people adequately than is reflected in the increase in the production index.

2. Support Prices and Government Assistance in Providing Labor, Machinery, and Other Supplies.

If we accept the framework of present price control legislation and certain specific legislative provisions for farm products, such as the

Steagall Amendment, it is possible to establish a system of support prices for farm products that will tip the alternative income balance in favor of the products most urgently needed. Price ceilings on farm products that are less urgently needed would need to be adjusted proportionately in such a program. In order to be most effective, a support price program should be announced in advance of the beginning of the production period for each product, and the support prices should not be changed during the production period. It is also important that a farmer know what the support price means in terms of the prices received at his point of sale.

If a price support program of this type is accompanied with effective measures in providing some increases in labor, equipment, and supplies, it would furnish considerable stimulus to maximum output in a desirable pattern of food production. Perhaps the best illustration of farmer response to favorable prices is the sustained increase in hog production which has resulted from the maintenance of a very favorable hog-corn ratio. Some very difficult problems arise in carrying out a purely voluntary program of this type. For example, wheat production for the 1944 harvest is likely to seem so profitable that it will be carried beyond the limits of safety in high hazard areas. The need for conservation practices as well as for other crops than wheat may be disregarded. In certain other areas it may seem much more profitable to grow what might under wartime conditions be classified as luxury crops -- those which require a large amount of labor, materials, and transportation -- in preference to crops which would make a much greater contribution to our food supply for the resources used. One way of meeting this problem would be to make specific allocations of, or to assign priorities on, supplies and transportation in line with production goals distributed to individual farms. It would also be possible to condition price supports and other program provisions on adherence to goals. To be successful such measures would have to be carried out in an equitable manner, and that becomes a difficult administrative job.

Support prices supplemented only with assistance in obtaining labor, equipment, and supplies may not achieve maximum production. There are some 6 million farms in this country. Maximum output implies that each of the 6 million farms makes as full utilization of the land, labor, and equipment resources as is possible with the variable resources that are obtainable. Some farm operators perhaps can make their most effective contribution by working all or part of the time on more productive farms. Others will need assistance in obtaining livestock, seed, fertilizer, and perhaps some equipment, either by purchase or by arrangements for custom work. To obtain maximum production on all farms it may be necessary to go somewhat further than a generalized program which provides for support prices and assurance of certain supplies of labor, machinery, and other materials.

3. Support Prices, Goals, Material Grants, and War Risk Insurance.

A program of support prices such as outlined above could be combined with a program which also develops national, state, local, and individual

farm goals for all important farm products. If they are to be at all effective, goals for individual farms must represent the farm by farm potentialities for maximum production of a locally adapted food production pattern. The following procedure might be used. First, there would be an intensive educational program stressing the products that need to be increased in each locality. This would be followed by distribution to each farmer of a copy of a farm plan work sheet on which the farmer would work out for himself the individual goals for the principal products that were best suited to his production resources. Later, after conference with a representative of the Food Administration the farmer might adjust his original intentions to provide for maximum output. The revised and completed farm plan would then serve as the basis for any programs designed to facilitate maximum production. All the agencies would need to work on an individual farm basis to supply the resources that constitute the limiting factors on each farm. In that way partially idle or additional resources would be utilized to the fullest extent. Certain production materials, such as fertilizer and seed, might need to be provided for the crops indicated on the farm plan in the same way as conservation materials are now handled by the AAA program in order to assure maximum production of certain critical crops. This would be one way to stimulate directly the use of improved practices to increase production.

In the Great Plains and Pacific Northwest wheat areas and in some humid areas as well, certain practices need to be maintained to prevent irreparable damage to the soil and to maintain yields even for the war period. For instance, strip cropping and certain summer fallow practices are partial insurance against failure in wheat production. Bean production in the Great Plains can be made much less hazardous if strip cropping is practiced. Payment for conservation practices of these types might be provided for in a production program of this type.

Of primary importance as a stimulant to production of new crops such as dry beans and flax in some high risk areas would be a program of war risk insurance. Such a program would be most effective if it did not involve a premium payment and if it were available to all growers of the specific crops on which it was applied. Local government representatives could inspect the insured crops to assure workmanlike performance, and losses could be paid in accordance with the stage of development of the crop at which the loss is sustained. Since increases in production which necessitate expansion into new high hazard areas are desired in the interest of national welfare, it seems equitable to insure farmers who undertake such expansion against the risk of losses which would not be taken if the crops usually grown were produced.

4. Production Contracts

It has been suggested that one way of obtaining maximum production would be for the government to contract with individual farmers for raising the products for which they are best equipped up to the level for each product that would represent a balanced production pattern. In support of this proposal it is argued that the government makes contracts with other suppliers to obtain war materials. The large number of farms and the

varied production on each farm would make such an approach difficult to administer.

War Hemp Industries, Incorporated, a subsidiary of the Commodity Credit Corporation, has contracted with individual farmers for the production of hemp in 1943. Contracts have been written for sufficient acreage of hemp to utilize the plant facilities to be established in each hemp producing area. The same procedure might be utilized for some other products of which greatly increased production is desired and where new producing areas must be established. It would be a partial application of the contract approach.

To write contracts with all farmers covering their total output would, of course, require a very large administrative set-up and would have to result in large additions to production if it were to be justified in a war situation which requires economical use of manpower for all types of work.

One conceivable means of approaching the production problem would be to ask farmers for bids on their output based on average yields of each product. Bids would be accepted up to the levels that would be desired for each product. This would mean differential pricing for each product based on the farmer's estimate of the compensation he would need to produce at the level indicated by his bid. It is obvious that tremendous administrative problems would be involved in such an approach. One advantage, however, would be that it would tend to compensate for the extra costs incurred by the additional output. If any type of contract provision were to be used, it would be necessary to give priorities on the allocation of scarce supplies of labor, machinery, and other materials to producers who agree to carry out their contracts.

5. Production Allocations

The most extreme alternative would be to use the War Powers Act as a basis for making farm by farm allocations of production quotas for each product, or for the major products. Such allocations would, of course, have to be made on the basis of resources available for production of the particular product or on assurance of making available such resources. Equitable returns for carrying out production of assigned quotas would need to be guaranteed. Such a step would mean national control of production in the agricultural industry. When the automobile industry was forced to abandon the manufacture of cars, the actual conversion to war work was carried out on a contract basis. Although other countries have taken such steps to gear agricultural production for war needs, it seems very doubtful that they are needed in this country, or that they would increase farm production.

In Summary

Production of farm products is carried out on 6 million farms. To attain maximum output of the products we need most on that many different producing units is no simple task. At one extreme are those persons who

would abolish all attempts at directing the course of agricultural production. They prefer alternative number 1. At the other extreme are those who say we cannot fight a successful war without gearing all production closely to our specific war needs. It may be questioned that such drastic steps would increase output. It might be difficult to obtain support of the rank and file of farmers for such a program. On the other hand, perhaps the inherent patriotism of farmers can be stimulated to greater effort by encouraging voluntary action to the fullest possible extent. This will require considerable work with individual farmers on their production problems.

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FOOD PRODUCTION POLICIES IN WARTIME

A discussion of Dr. Sherman E. Johnson's Paper at an Annual Meeting of the Western Farm Economics Association at Berkeley, California, June 24, 25, 26, 1943.

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Dr. Johnson's well-balanced presentation has given us a broad picture of the problems of wartime food production including a review of essential food needs and available productive resources. In view of the time limits allotted for discussion, it appears desirable to concentrate on that portion of the paper which deals with public production policies proper. Only a short remark may be permitted with respect to the concept of "maximum production capacity" because of its bearing on questions of policy.

Maximum food production in physical terms has economic meaning only if the productive services employed in agriculture were fixed and if food output could be measured by one common denominator, for instance, by calories. Actually, productive services employed in agriculture may be varied by shifting services between agriculture and nonagricultural industries, or even between countries -- importation of labor from Mexico, for instance -- and by depleting durable productive services (soils, buildings, equipment) presently used in agriculture. Food output, on the other hand, shows great qualitative differences with respect to dietary functions, culturally determined requirements of consumers, demands of lend-lease, burden on the transportation system, and others. Thus, maximum productive capacity can be understood merely as a goal which is quantitatively as well as qualitatively flexible, which may represent upward as well as downward changes from some historical base, and which is dependent upon a set of very specific assumptions.

In peacetime the goal itself -- in this case satisfaction of free consumer's choice -- and the employment of productive services to obtain the goal are mutually determined through the price system in such a way that the marginal value product of services is equal to their marginal unit costs in all employments. In wartime changes of demand are so great and so sudden that reliance on the price system alone to bring about shifts in employment of services would lead to socially undesirable effects in the field of consumption. The two main causes are, first, existing inequalities in the income distribution and second, imperfect adaptability of productive services. Consumption goals are therefore determined by public policy. Price regulation of consumption goods and rationing are necessary consequences. The question arises whether the same causes or merely the existence of price regulation and rationing in the field of consumption prevents the functioning of the price system in the field of production.

Regulation of consumer's prices requires regulation of producer's prices in order to bring consumption and production into balance. Production policy in wartime is largely concerned with the management of this double or multiple price system and its relation to more direct production controls through subsidies, penalties, production contracts, and allocation of productive services or production quotas. Thus far we are in agreement with Dr. Johnson's conclusion regarding uncontrolled prices. What follows will be concerned with the management of a controlled price system and its relation to more direct measures of production policy.

It may be noted first that controlled producer's prices do not appear effective in obtaining production goals if it is desired to increase over-all agricultural production by shifting productive services employed in other industries into agriculture. Allocation of manpower, equipment and raw materials is determined by military needs and a rigorous system of priorities. Under these conditions an over-all increase of agricultural prices would have little effect upon shifts of services, but would merely lead to rapid and excessive price increases of these services. A controlled system of producer's prices must, therefore, be mainly concerned with the price ratios between different agricultural products and between agricultural products and those productive services which are mainly employed in agriculture. These are especially protein feed, fertilizer, and agricultural machinery. To guarantee and to modify price ratios in order to bring about shifts of productive services within agriculture in accordance with production goals appears as the most important task of food production policy in wartime.

Secondly, it may be noted that guaranteed price ratios may not be sufficient to bring about shifts within the desired time interval if imperfect knowledge of managers and imperfect adaptability of productive services for technological and institutional reasons act as brakes. It must be remembered that in all so-called instantaneous concepts, such as supply schedules, elasticity of supply, elasticity of substitution and elasticity of productivity, a time dimension in terms of clock time is implicit. However, the elasticity of substitution of individual products and productive services within farms and farming regions is generally quite considerable and can proceed in relatively short periods of time.

This is particularly true for that shift which rightly plays an important role in Dr. Johnson's paper, namely, the shift of production for final consumption from animal to vegetable calories and proteins. Let us assume that such a shift is feasible on the consumption side and desirable in view of the great transformation losses of calories and proteins in feeding operations. It appears then that past and present price ratios established by the government through price ceilings and support prices have influenced and are influencing production in a direction opposite to that which is desired. Moreover, these price ratios have tended to make feeding operations much less efficient. Hogs have recently been slaughtered at materially heavier average weights than last year, and beef cattle production has expanded absolutely and relatively much more in the Central and Western Corn Belt States, where the feed basis is corn and small grain, than in the Range States. ^{1/} Hogs and beef fattened on grain compete directly with human consumption of calories and proteins. It is also well known that the efficiency of hog feeding decreases with increasing weight and that beef cattle are particularly inefficient transformers of calories and proteins.

^{1/} Compare: U.S.D.A. The national food situation. May 1943. And: U.S.D.A. The agricultural situation. April and May 1943. Also: New York State College of Agriculture. Farm economics. April 1943. The increase in the number of beef cattle by January 1, 1943 in per cent of 1938-1943 was 14 per cent for the Western States plus Oklahoma and Texas, 26 per cent for Corn Belt States east of the Mississippi, and 46 per cent for Corn Belt States west of the Mississippi. Absolutely the increase in the first group of states was 2.0 million head, in the second 0.7 million, and in the third, 4.2 million.

Another aspect of the control of price ratios as a part of public production policy deserves attention in this connection. This is the cyclical character of livestock production which is so closely related to feed/product price ratios. In looking back over the last decade, it appears that governmental action has nearly always increased the violence of the livestock cycles because action came too late, or was taken without consideration of the cyclical character of agricultural production. There is reason to believe that this holds also for the present and the future. During the last year low price ceilings on feed and high ceilings or support prices on livestock have accentuated the upswing of the beef cattle and hog cycles. It seems probable that the downward phase of the cattle cycle would, in any event, begin this fall and of the hog cycle next spring. Government action in the next months will probably be in the same direction and if, by chance, the feed harvest this year should be below average, the liquidation of herds may proceed farther than is desirable.

Besides grain/livestock price ratios, the skim milk/hog and whole milk/calf price ratios -- the latter particularly because of the different labor requirements of the two products -- may need attention in the near future. If present price ratios persist, we may soon have a situation that milk will go into livestock rather than into drying plants for lend-lease and into direct human consumption.

Other important price ratios are those between protein prices and livestock prices and fertilizer prices and crop prices. Protein feeds and fertilizers cannot be used for human consumption directly and can be shifted relatively easily from one product, region, or farm to another. For this reason their allocation may well be left to economic forces provided the price ratios for the final products are set in accordance with production goals. Present production policy has not taken this course. Low ceilings on protein feed prices have led to waste of protein feed and to serious local "shortages."

These so-called shortages lead us to the relation between a controlled price system and more direct forms of allocation of productive services. Dr. Johnson believes that production quotas are not needed in this country and that support prices supplemented by subsidies, insurance without premiums -- which is merely a special form of "subsidy" -- and possibly production contracts will be sufficient. If the present policy of low ceiling prices on productive services persists, it is difficult to see how waste and shortages can be avoided without direct allocation. Ceiling prices on productive services without allocation are no more feasible than ceiling prices on consumption goods without rationing. The difference between allocation of productive services and allocation of production quotas does not seem very significant. This is, of course, economically speaking. As a matter of political expediency production quotas may be disguised through allocation of productive services or through production contracts with strong pressure for participation and penalties for nonfulfillment, and in other ways.

The more direct measures of production policy such as subsidies, contracts, and allocations make it possible to deal with individual farms or at least with a number of farms grouped on a regional and type-of-farming basis. The advantage of this procedure is that marginal costs of production increases could be taken into account. The disadvantages are higher administrative costs, which may not be too serious in view of the existing administrative apparatus of the A.A.A., and the danger that productive services are wasted in inefficient producing units.

In the latter connection it is of interest to note that Dr. Johnson expects great production increases on those farms and in those regions where chronic

underemployment of family labor is believed to exist. He qualifies this point somewhat which, however, occurs in more extreme form in several recent articles in our professional journal. ^{2/} A production policy is advocated which would allocate feed, fertilizer, equipment, and supplies, to such farms and regions where family labor is underemployed or inefficiently employed. This suggestion may be analyzed somewhat further.

On the basis of recent U.S.D.A. figures of agricultural employment, it seems doubtful whether much underemployment of family labor still exists. Between April 1940 and April 1943 actual or potential farm workers decreased by 4.2 million. In spite of this loss, total farm employment in the first quarter of this year was only about 1 million less. If the figures can be trusted, it must be concluded that previously nonworking farm people, particularly women, older men, and boys, took a more active part in farming operations. Regardless of whether these conclusions are correct, some questions may be raised with respect to the soundness of the above policy. It is true that underemployment of family labor means largely inability to obtain sufficient amounts of cooperating productive services. However, such inability is usually caused by factors which make the farm an inefficient producer, not necessarily from the standpoint of providing a living for the farm family, but from the standpoint of providing a commercial, salable output. The most common of these factors are small size in combination with poor and depleted soils, difficult topography in hazardous climate. These factors cannot be changed quickly. War production policy is concerned with increasing the commercial output of agriculture and not with improving living conditions on self-sufficient farms. The latter is doubtless desirable, but should not be confused with the former. Productive services such as feed, fertilizer, and equipment should be allocated to those farms where their marginal product in terms of salable essential (as indicated by goals) output is greatest. These farms are not likely those in which family labor is believed underemployed. Furthermore, the present may be a good time to solve the problem of chronic underemployment in certain agricultural areas by moving people permanently to areas with better agricultural resources or into industrial employment. This movement seems already under way in certain sections of California.

By way of summary it may be stated first, that public production policy in wartime should give more attention to the management of price ratios rather than absolute prices, and should anticipate rather than lag behind cyclical changes in production. Second, allocation of productive services should be left as far as possible to economic forces and the fact should be boldly faced that ceiling prices on productive services without allocation must lead to waste and shortages with economic repercussions much more undesirable than "natural" price increases of those services. Third, in supplementing a controlled price system by direct measures on a more individual basis, care should be taken that productive services are allocated to those farms or groups of farms where their marginal productivity in terms of salable essential output is greatest.

^{2/} Schickole, Rainer. Obstacles to agricultural production expansion. Journal of Farm Economics XXIV, No. 2. May 1942. Forster, G. W., Contribution of farm management research to attainment of productive goals. Journal of Farm Economics XXV, No. 1. February 1943. Dr. Forster cites in support the article of Robert W. Rudd and David L. MacFarlane. The scale of operations in agriculture. Journal of Farm Economics XXIV, No. 2. May 1942.