

# EXISTING INFORMATION SYSTEMS

### INTRODUCTION

The U.S. Department of Agriculture (USDA) and the Food and Agriculture Organization of the United Nations (FAO) are the major institutional sources for world food and agricultural information. Other institutional sources—such as national systems, international organizations, and the private sector—either have perspectives limited to their particular needs or use USDA and FAO data as their benchmark for further analysis. Likewise, USDA and FAO draw upon such outside sources as the International Wheat Council<sup>1</sup> and cooperate and share information from other international organizations,<sup>2</sup> U.S. executive agencies, national governments, and multinational grain exporters. A

The thorough review of world agricultural information systems prepared for OTA by Mr. Howard Hjort, Schnittker Associates, reinforces this point.

While many private and public organizations operate partial world agricultural information systems, only two operate full-fledged systems—the United States Department of Agriculture (USDA) and the Food and Agriculture Organization of the United Nations (FAO). USDA and FAO collect, maintain, and publish world agricultural statistics; develop and maintain world, regional, and country supply-demand estimates for agricultural commodities; continually analyze the supply-demand balances and the factors or events influencing supply and demand; and release reports containing the results of their assessments of the current situation, near-term and longer range outlook for food and agriculture.<sup>5</sup>

He also noted the dependence of USDA and FAO on other sources:

Both USDA and FAO depend heavily upon national agricultural information systems of varying sophistication and reliability, but both have the analytic capability to develop current supply-demand estimates in those situations where the national agricultural information systems fail to generate timely or reliable estimates. USDA and FAO draw upon sources outside their own system for agricultural information and intelligence.<sup>6</sup>

This summary and analysis focuses on USDA's and FAO's food information systems. To appreciate suggested changes requires an understanding of the existing systems and their deficiencies. Participants in OTA's study provided insights into the nature of the USDA and FAO systems, highlighting both the strengths and weaknesses of these systems and suggesting a number of improvements for OTA to review and include in its options for possible congressional action. T

The USDA system will be discussed first, followed by a review of the FAO food information system.

### THE USDA SYSTEM: DEFICIENCIES AND OPTIONS FOR IMPROVEMENT

#### Responsibility for the System

The Department of Agriculture is the only operator of both a national and a world agricultural information system. The responsibility for the world system rests with two USDA agencies, the Foreign Agricultural

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Service (FAS) and the Economic Research Service (ERS).<sup>8</sup>In addition, the Statistical Reporting Service (SRS) provides time series data that, although limited to domestic information, is invaluable to FAS and ERS in their activities.<sup>9</sup>

The agricultural attached network of FAS provides foreign agricultural statistics and intelligence, and the Foreign Commodity Analysis Unit maintains, analyzes, and publishes world agricultural statistics and reports on the situation and outlook for major commodities. The Administrator of FAS reports to the Assistant Secretary for International Affairs and Commodity Programs.<sup>10</sup>

Mr. David Hume, Administrator of FAS, presented a detailed description of the Foreign Agricultural Service (see figure 3), noting that of FAS personnel, 125 are stationed overseas as agricultural attaches at American embassies and consulates and 63 foreign posts.<sup>11</sup>The functions of FAS are widespread, including food aid, market development, international trade policy negotiations, a Commodity Credit Corporation (CCC) export credit program, intelligence gathering, and export reporting. Commodity analysis is basic to all these operations. The task of an FAS commodity analyst is:

...collection, analysis and dissemination of agricultural commodity situation and outlook information relating to our foreign market and competitor countries. . .The emphasis is on historical data series, analysis of the current commodity situation, and short-term forecasts,<sup>12</sup>

The Foreign Demand and Competition Division of ERS reports its assessment of the world and regional agricultural situation and outlook, The Administrator of ERS reports to the Director of Agricultural Economics. (See figure 4.)

In his testimony to OTA's Board, Mr. Howard Hjort set forth some general evaluation criteria to use in judging the strengths and weaknesses of information systems. He said:

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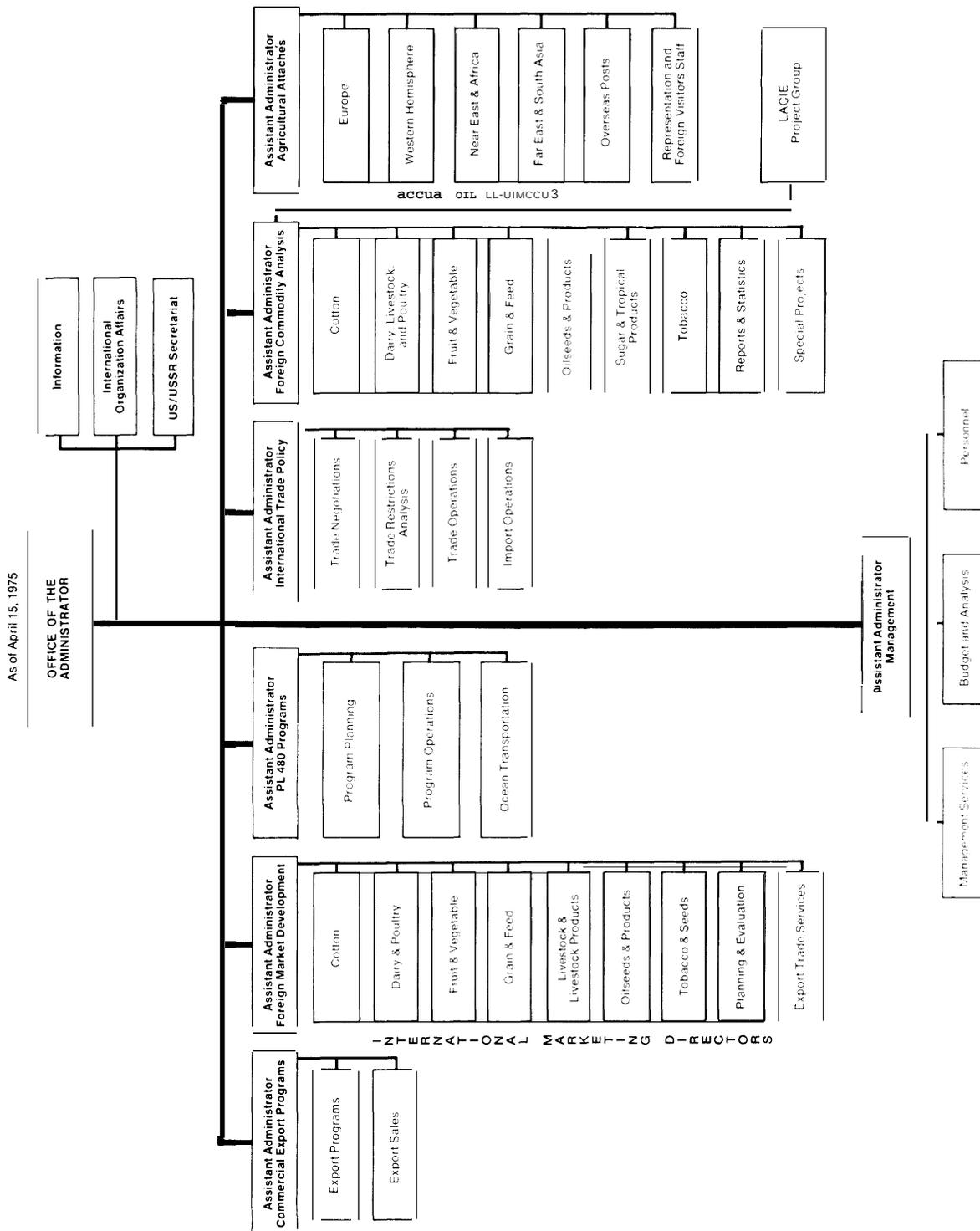
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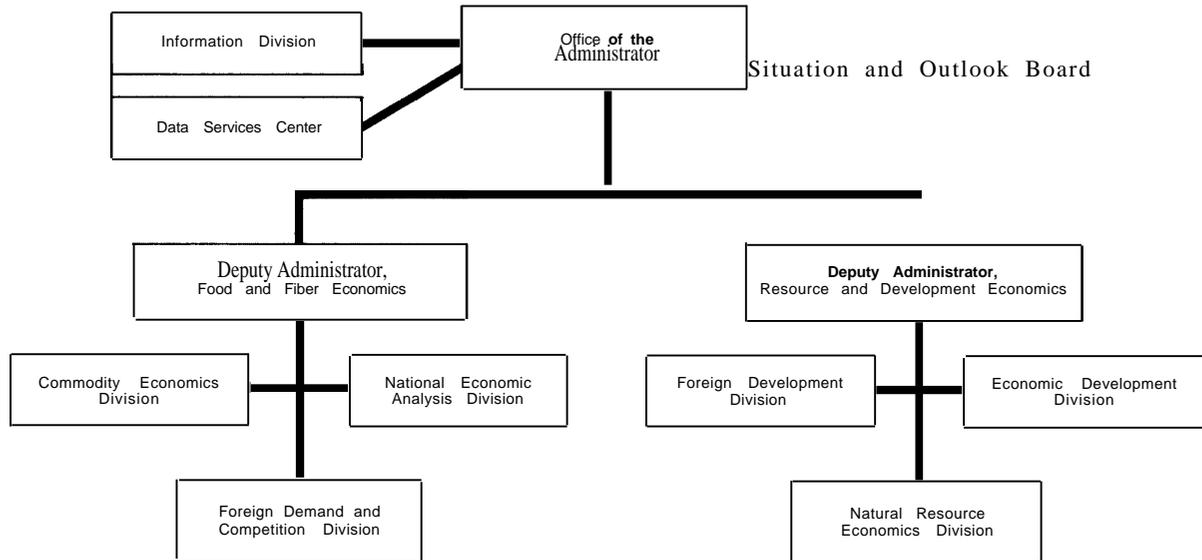
The factors that must be taken into account in developing judgments about the relative strengths and weaknesses of a world agricultural information system are objectivity, reliability, timeliness, adequacy in terms of coverage, efficiency, and effectiveness. The ideal is a system that provides users timely, unbiased interpretations of the current situation and outlook based upon estimates of known reliability for all commodities and countries through the use of the most cost effective procedures known to mankind.<sup>13</sup>(Emphasis supplied. )

The objectivity of the estimates transmitted by the attache depends to a large extent upon the accuracy of the estimates released by the host government and the attaches judgment.<sup>14</sup>

The **reliability** of the estimates that attaches transmit is a function of the methods used to collect and assess agricultural statistics. The reliability of estimates from national agricultural information systems varies significantly from one country to another. Estimates of questionable reliability must be subjected to consistency criteria and modified to make them internally consistent either by the attache or by the analytic staff in Washington. In general, the attache submit estimates based on their own and local staff's judgment after reviewing the estimates with others on the scene. The reliability of the estimates transmitted by the attache from countries that fail to provide reliable current estimates depends heavily upon their judgment--a function of experience, interest, analytic capability, and the importance they attach to the task of developing estimates. These attributes obviously vary significantly from one attache to another but in general are influenced by what they perceive to be their mission and by the length of time they are posted to a country, **Few attach& perceive the collection of agricultural statistics and the development of supply-demand estimates to be their primary mission;** instead, just as is the case for FAS, they believe their primary mission to be the expansion of foreign markets for U.S. farm commodities.<sup>15</sup>Mr. E. A. Jaenke, president of E. A. Jaenke & Associates, Inc., believes the United States has relied "far too

Figure 3.—Organizational structure of USDA's Foreign Agricultural Service (FAS)



**Figure 4.—Organizational structure of USDA's Economic Research Service (ERS)**

long on the educated guesses of agricultural attaches. ”<sup>16</sup>

The **timeliness** of agricultural intelligence depends upon directives from Washington, the initiative of the attache, and the ability of national systems to generate timely information.<sup>17</sup>

### Collecting Foreign Agricultural Information

Reports from the agricultural attache are the heart of USDA's world agricultural information systems.<sup>18</sup> Scheduled, coverage-specified reporting procedures are standardized by officials in Washington. The reports include assessments of the overall agricultural situation and the factors influencing production, consumption, and trade—such as prices, price and nonprice policies and programs, and input supply availabilities. Monthly highlight reports provide updates to previous reports—for example, quarterly on grains; semiannually on fats and oils; and annually on the overall food and agricultural situation.

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In addition, special publications, press releases, and news conferences are used to report events of major significance more speedily.

### Assessing and Disseminating Information

The Foreign Commodity Analysis Unit of FAS and the Foreign Demand and Competition Division of ERS share the responsibility for analyzing and disseminating information on world agriculture. Both rely mainly upon attache reports but obtain intelligence from numerous other sources, including the Central Intelligence Agency (CIA).<sup>19</sup> USDA personnel noted that they cooperated with CIA and were pleased with the interaction.<sup>20</sup>

In addition to USDA, there are many users of FAS information, with each user having somewhat different needs: first, the general public—i.e., farmers, private trade, researchers, and consumers; second, U.S. Government agencies—i.e., administration policy and program decisionmakers, Congress, and the analysts of the overall domestic and

international economic situation; third, international organizations and foreign governments.<sup>21</sup>

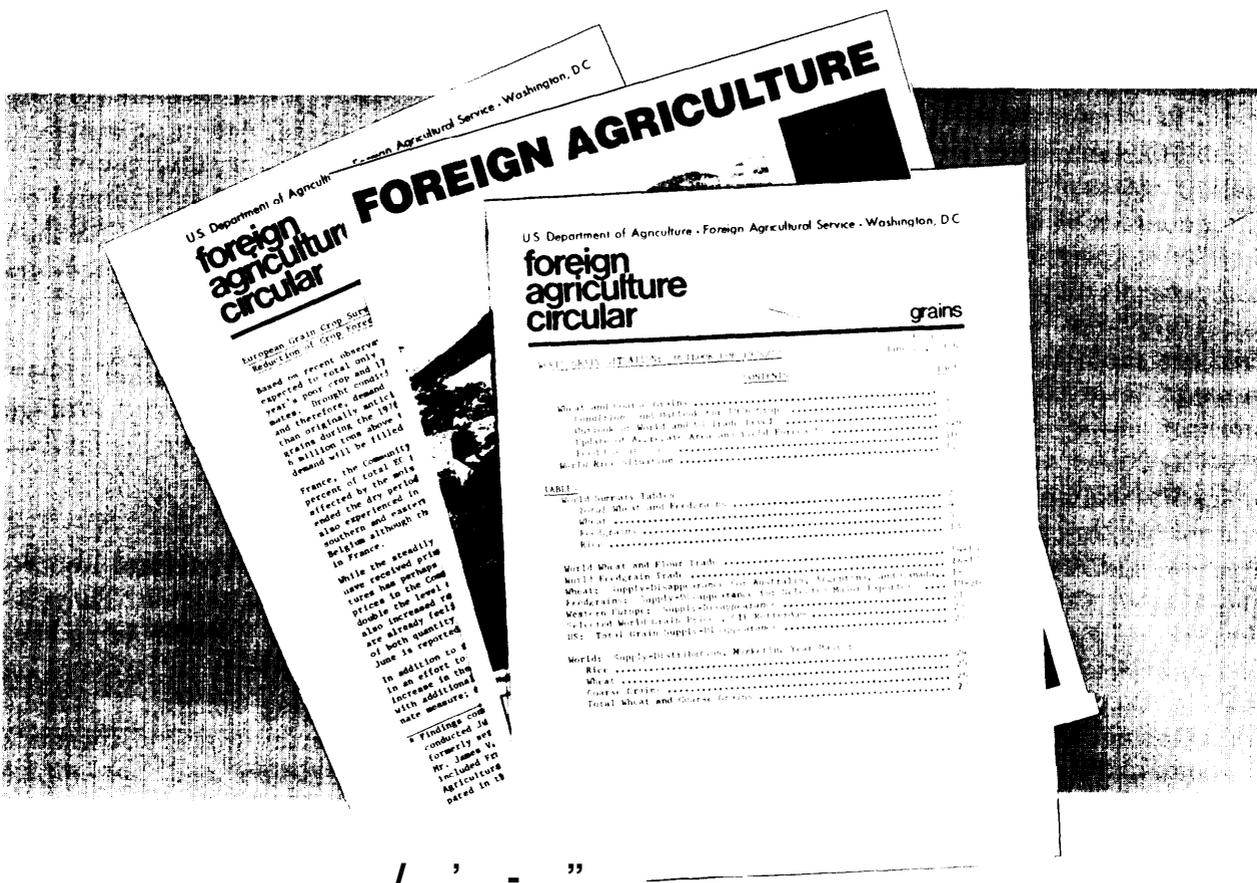
FAS reports and analyses are published in a number of forms<sup>22</sup> to meet the needs of the different users: 1) foreign agricultural circulars, 2) foreign agricultural reports, and 3) the weekly magazine Foreign Agriculture. (See figure 5.)

Realizing the strategic role that FAS and these publications play for users and decision-makers, Mr. Hume indicated that the FAS information publications would be reviewed in 1976 in order to eliminate duplication and to provide more timeliness of information and improved analytical input.

ERS conducts a program of research and analysis that results in reports containing assessments of the current world and regional agricultural situation and near-term outlook, the longer range outlook for world agriculture, and the implications of changes in the international monetary situation, world agriculture and trade policies, and economic development and trade patterns. ERS also monitors and publishes foreign agricultural trade statistics of the United States.<sup>23</sup>

Dr. Quentin West, Administrator of ERS, said that ERS develops economic information for use by both public and private decision-makers and provides it in a variety of ways to diverse audiences:

Figure 5.—Publications of the Foreign Agricultural Service



NOTE: Footnotes appear at end of chapter,

The audience is wide because our information covers many subject matter areas including farm inputs, farm production, and food processing and distribution as major components of the U.S. food and fiber systems; foreign agriculture production and trade; development and use of land and water resources; and the principal social and economic factors affecting life in rural America.<sup>24</sup>

Dr. West agreed with the conclusion reached by the OTA Food Advisory Committee report, which in his view underscores the difficulties in trying to get information to diverse groups:

The economic models and supply-demand price equations which had performed satisfactorily in the more stable conditions of the 1950's and 1960's had little value in light of the changes which occurred in the domestic and world markets when the size of the 1972 world grain crop became known.<sup>25</sup>

Since the basic source of data for analysis is the same for the analytic units of both FAS and ERS, improvements in the objectivity, reliability, timeliness, and adequacy of information released by them depend upon the other sources of intelligence they draw upon, their own analytic capability, and the consistency checks they employ prior to releasing information and reports. Estimates from the field are subjected to consistency checks, and in some cases estimates are developed by the analysts using analytic models that have generated reasonably reliable results in prior years. For example, estimates of grain production for the Union of Soviet Socialist Republics are developed by specialists in the Foreign Demand and Competition Division of ERS. Analysts in FAS rely more on simple consistency checks, experience, judgment, and trend analyses than on models or sophisticated techniques of analysis in checking or developing estimates. They do not conduct indepth analyses of issues or factors influencing supply and demand.<sup>26</sup>

The FAS analyst is a commodity specialist, while ERS is more research-oriented. ERS analysts are better trained in research methodology and have more experience in the use of sophisticated analytic techniques and models. They conduct the indepth analyses of issues and factors influencing supply and demand. ERS is the source of agricultural intelligence; FAS is the source of agricultural statistics and commodity information. In recent months, the flow of unanalyzed data from USDA's system has increased significantly, much more than the increase in reports containing carefully reasoned assessments of the current situation and outlook.<sup>27</sup> Users of such data, including media, must be aware of the quality of this material.

The world and regional agricultural situation and outlook reports of ERS are approved by the Outlook and Situation Board, The reports on the world situation and outlook by FAS for the various commodities are not approved by a similar board. Attempts to ensure objectivity and reliability are thus more evident with respect to the world agricultural information developed and released by ERS than is the case for the information developed and released by FAS.

In addition to FAS and ERS, other USDA agencies collect basic data, sort and arrange the data into useful tables, analyze the data, or disseminate it.<sup>28</sup>

The activities of USDA's Statistical Reporting Service (SRS) deserve attention. The SRS is the Department's major collector of current data on domestic agriculture. In cooperation with State crop-reporting boards, it collects and disseminates data on crop and livestock production and utilization and agriculture prices.

In addition, SRS takes an annual inventory of livestock on farms, surveys farmers on their intention to plant, and during the growing

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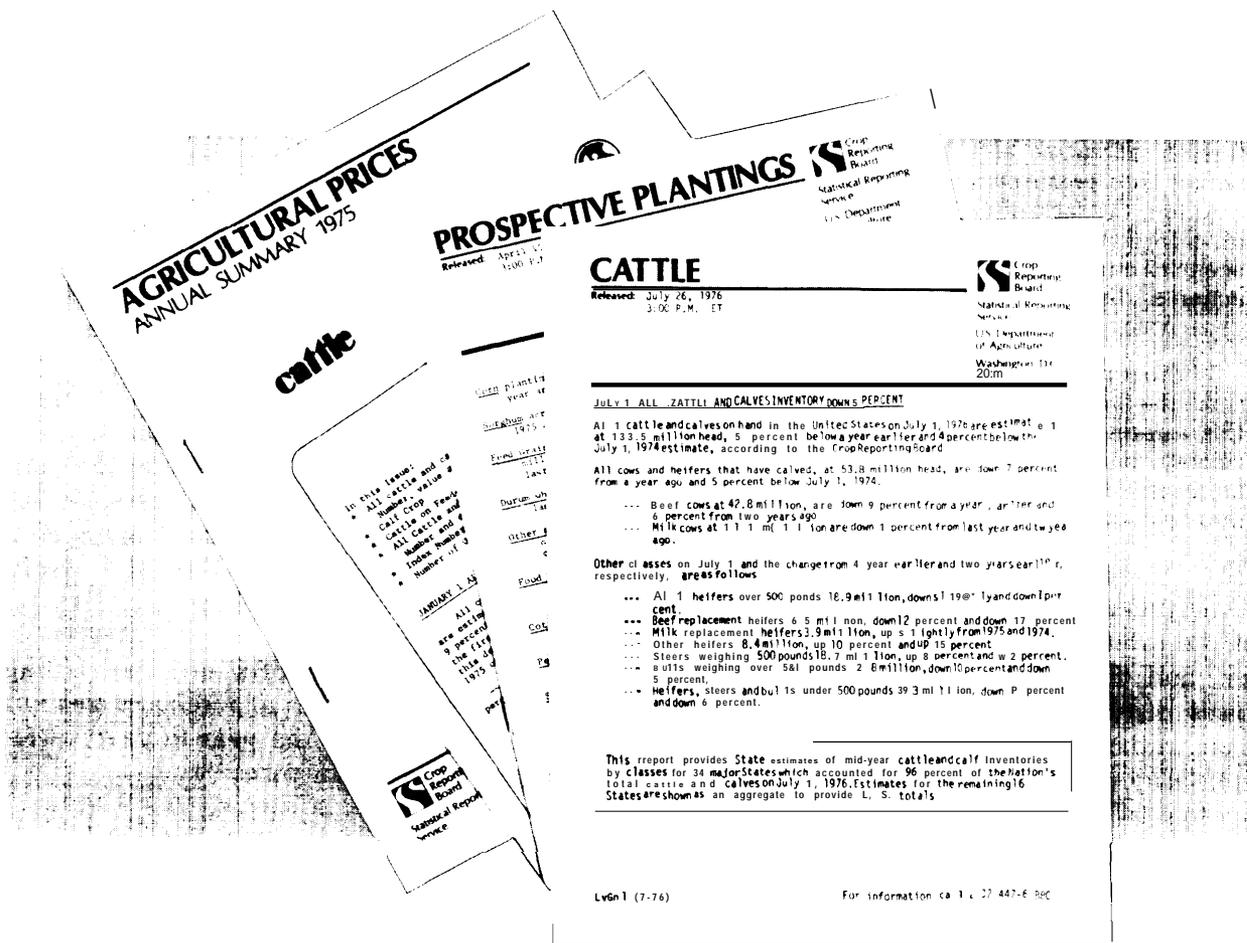
season provides monthly information on crop conditions, The SRS makes production projections, assuming normal growing conditions, up until crop harvest. (See figure 6.)

The Statistical Reporting Service is among the premier agencies in the world with responsibility for collecting, processing, and reporting agricultural statistics. It is thought to be the world's best with respect to timeliness and

among the very best with respect to statistical reliability of the results.<sup>29</sup>

In sum, although numerous Federal departments, agencies, and other institutions are involved in food information systems, the key generator of the information is USDA, especially SRS, FAS, and ERS within the Department. The analysis of deficiencies and

Figure 6.—Publications of the Statistical Reporting Service (SRS)



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suggested improvements necessarily must focus on these key units.

**Soviet Grain Purchases**

U.S. grain sales to the Union of Soviet Socialist Republics in 1972 and 1973 are acknowledged to be the prime event that focused attention on the lack of information about the Soviet food system. The manner and consequences of these sales exacerbated the world food crises, Mr. Jaenke's testimony before the Technology Assessment Board members Senator Humphrey and Congressman George Brown lays the blame on poor intelligence and poor cooperation:

The Soviets would not have been able to buy up such a substantial portion of the world's grain reserves in 1972-1973 at low prices had it not been for the failure of our intelligence systems to furnish adequate and timely information on Soviet crop prospects and buying intentions. In addition, the lack of coordination and exchange of information between various Government agencies and departments handicapped effective action by the appropriate U.S. officials,

Without pointing the finger of blame at anyone since the Soviets went to great lengths to conceal this information, we wish to point up this excellent example of the importance of establishing more effective and better coordinated information systems.<sup>30</sup>

Analysts are careful to point out that it was not the sales per se but rather their manner, size, and timing, Buying secretly and big causes disruptions in the market, high food prices, and calls attention to the sales, Senator Humphrey concluded that the primary issue is how to regularize trade with the Soviets in the context of an orderly marketing system. al

The significance of Soviet purchases as a destabilizing factor is clear from table 1,

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which shows total Soviet imports of U.S. grain during the 1970's, in which the sharp fluctuations in Soviet grain purchases from the United States are evident,

Table 1—Total Grain Shipments From the United States to Japan and the Union of Soviet Socialist Republics  
(Thousands of metric tons)

Fiscal years	Japan	U.S.S.R.
1970, , , . . . . . , . . . . .	8,841	0
1971 .., . . . . . , . . . . .	8,786	0
1972 . . . . .	5,988	2,513
1973 .0... , , . . . , ..	11,779	12,880
1974. , , , . . . . . , . . . . .	13,304	6,775
1975 . . . . .	10,241	2,153
1976 (preliminary). , ,	11,320	13,380
<b>TOTAL ... , ..</b>	<b>70,259</b>	<b>37,701</b>

Source: Foreign Agricultural Service, USDA (June 30, 1976).

The average yearly sales were in reality moderate, less than 6 million metric tons. Other countries actually import more, For example, Senator Humphrey noted that "last year (1974), the Chinese actually bought more wheat and corn from the United States than did the Russians.<sup>32</sup> Another country that purchases large quantities is Japan, as shown in Table 1 which indicates that Japan has imported more in 5 out of 7 years since 1970 and that the difference in the other 2 years was insignificant. Japan's purchases have not been a destabilizing factor on the U.S. and world markets.

Dr. D. Gale Johnson, FAC member, noting the variation in Soviet grain purchases account for ". . .80 percent of the year-to-year variations in world grain imports. "<sup>33</sup>

Dr. Martin Abel, an OTA Food Advisory Committee member, consistently underscored the implications of this by suggesting that the key to improving the world food information system required quantum jumps in U.S. knowledge of the Soviet food supply-and-demand situation, In short, concern over ade-

quacy of data depends upon the impact the specific country has on the market. Dr. Dale Hathaway, director of the International Food Policy Research Institute, elaborated:

...it is completely unrealistic to talk of an adequate food information system that does not have timely and reasonably accurate information on agricultural conditions in the world's second and third largest grain-producing countries—the Union of Soviet Socialist Republics and the People's Republic of China. On the other hand, the absence of such data from a country whose population or food production is small is not of major significance to world markets and to other countries' well-being. Thus, "the adequacy of data for countries with small production and consumption levels is primarily their concern, and if they choose for one reason or another not to provide such information, they are more likely to be harmed as a result than is the rest of the world. On the other hand, timeliness of information provided is just as important for small countries as large ones when issues of food aid, disaster relief, and similar matters are involved; a starving person in a small country is just as badly off as one in a very large country if food aid is too late. Thus, timely information is essential for the effective operation of world food programs or a bilateral aid program."<sup>34</sup>

Dr. Hathaway concluded:

Accuracy of information is always of importance to policy makers, but here again it relates to magnitude of the populations and production involved. A 10 percent error in production estimates for large countries such as India, the Union of Soviet Socialist Republics, China, or the USA creates substantially greater problems for world policy makers than a 50 percent error in the production estimate of a country that produces or consumes a few hundred thousand tons of grain annually. Unfortunately, statisticians are often more concerned about estimating errors than policy implications of such errors and thus may be overly concerned with accuracy in some cases.<sup>35</sup>

The Food Advisory Committee report found that the consequences of the increases in U.S. farm production and food prices caused by

grain sales to the Union of Soviet Socialist Republics " , , was" not publicly predicted by authoritative sources inside or outside Government."<sup>36</sup>

Mr. Melvin Sjerven, senior markets editor of Milling & Baking News, agreed, He was "absolutely convinced that no one in the Department of Agriculture, no one in the Government, had any idea how much grain the Soviets were going to buy in 1972."<sup>37</sup>

Senator Humphrey and Assistant Secretary Bell agreed that the real problem" is the Soviet buying habit:

They have bought large amounts one year, small amounts the following year, large amounts the next year, small amounts the next year. small amounts the following year. This has tended to add" a degree of instability to the market.

... and the purpose of the long-term agreement, . is to try to smooth out that buying pattern and bring more stability to the market.s~

Assistant Secretary Bell said we need the Soviet market:

...if we are going to continue to run American agriculture at full capacity, We still have more resources available to us under our system of agriculture than we can adequately use to feed our own people and generally Western allies and the developing countries,

So I think the main benefit we get from selling grain to the Soviet Union is that we run American agriculture at full capacity, In the longer term, that means lower food prices for everyone.<sup>39</sup>

Assistant Secretary Bell explored the significant steps that the United States had taken to better understand Soviet food supply and demand conditions. These were:

- June 1973, "Cooperation in Agriculture Agreement Between the United States and the Union of Soviet Socialist Republics;"<sup>40</sup>

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- . Improved interagency cooperation and increased use of collaborative data, such as weather data; and
- . Internal USDA changes.

In reviewing the Soviet record under the Agriculture Information Exchange Agreement, Assistant Secretary Bell gave the Soviets good marks. He said: "On the whole, the Soviets have followed the reporting schedule rather closely for the initial 10 categories of data."<sup>41</sup>

Information received under the agreement contributes to quicker access to data on actual values (but not forward estimates) of commodity production or related information for the current or most recent year. It also provides some data not previously published on a systematic basis by the Union of Soviet Socialist Republics—for example, numbers of livestock slaughtered, oil and meal production, and fertilizer use by major crops, ". . . information of a very current nature that will enable a better assessment of foreign trade prospects in grain and feeds."<sup>42</sup>

On the other hand, some of the deficiencies that continue to impede a more complete U.S. understanding of the supply-demand conditions in the Union of Soviet Socialist Republics are related to:

- delays in transmission;
- . lack of forecasting data; and
- . lack of historical data.

Bell said:

Allowance must be made, of course, for delays in transmittal. The first-of-the-month livestock count, for example, which the Soviets have agreed to provide in mid-month, typically arrives in the USDA analysts' office during the first week of the following month. The usefulness of

new data series has been limited in several instances because the Soviets frequently have not provided historical data in the series.

In addition, there has been some feeling that the Soviet data are less detailed than was expected. . (The most serious problem seems to be that) the Soviets have not yet demonstrated willingness to implement the forward estimates provision of the agreement.qs

...when we ask for forward estimates, they say, well, this is what the plan says, . And not until the year has been completed will they admit that the plan was not fulfilled. And it gets involved in how the Soviet system works.<sup>44</sup>

He indicated that the United States has tried to overcome this gap and improve the availability of Soviet data by sending teams to the Union of Soviet Socialist Republics in an attempt to better understand their economy and to meet and interact with the Soviet decisionmakers, economists, and agriculturalists, In sum, the Assistant Secretary indicated that the U.S./U.S.S.R, agreement is enabling the United States to get information on what is going on in the Soviet farm sector much sooner and in a much more useful form than prior to 1972.

It is recognized that:

Data acquired under the agreement probably will continue to make only a marginal contribution to current situation and outlook work on grains and feeds until a program is worked out to implement the provision of forward estimates.<sup>45</sup>

In addressing the question of whether the Union of Soviet Socialist Republics actually has more data that could be made available, perhaps on a more timely basis, Assistant Secretary Bell concluded:

I am confident, though, that there are regular data which are flowing toward Moscow on the crop conditions and the crop situation during the harvest. How this is put together and who it goes to we have been unable to really find out, though we did have a team over there that did look at how they gather statistics and so forth,

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Hopefully, some day we will be able to tap into that system and get something. But as of now we have not.<sup>46</sup>

Dr. Abel, in summing up for the Food Advisory Committee, said:

The adequacy of data on Soviet food and agriculture continues to be a problem. . .The present long-term grains agreement between the United States and the Soviet Union is an alternative way of obtaining some information from the Soviets about trade prospects. However, this agreement is only a partial answer to minimizing the erratic price movements in grains caused by large changes in Soviet purchases.<sup>47</sup>

He also suggested that:

It may be time for the agricultural committees to take another hard look at just how far we have come in getting needed information from the Soviet Union, why we are not getting more information, and what can be done about it.

., it might be worth considering ways by which the United States might help improve the timing and reliability of Soviet data. If . . . such collaboration is not possible or desirable, then continued efforts will have to be made to find ways to keep the Soviet Union from unduly disrupting world grain markets.<sup>48</sup>

### **Interagency Cooperation: Weather Data**

Interagency cooperation in the U.S. Government also makes an important contribution to USDA's analysis of the Soviet situation. This is exemplified in the gathering and application of weather data both to confirm Soviet reports and to assist in estimates of current Soviet crop prospects. The significance of this improvement was underscored by Assistant Secretary Bell, noting that the Department of Agriculture's principal difficulty has been in the 1-year forecast, where the weather forecast is much more difficult to deal with.<sup>49</sup>

He pointed out that:

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The weather data are by far the most important source of information used in making Soviet grain forecasts as the crop progresses. so

Weather data permit the USDA researchers to estimate regional weather indexes of grain crops and to estimate national grain yields.

The principal source of weather data used by Soviet analysts in the Department of Agriculture is the Air Force Environmental Technical Applications Center (ETAC). ETAC regularly brings this weather data and their timely monitoring of radio stations together in a computerized system for USDA.

The ETAC weather data are supplemented by other sources—for example, more current but less processed weather information is available through facilities of the National Oceanic and Atmospheric Administration (NOAA). This information is checked to supplement ETAC data at critical stages of Soviet crop development.

Assistant Secretary Bell added that the Department of Agriculture is able to validate to some extent ETAC's information, since:

The Soviets also publish 10-day weather and crop reports in their daily agricultural newspapers. The information. . . generally is available in Washington within not more than 1 week at the end of the reporting period. (This information is) of some use in evaluating the stage of crop development and the probable impact of varying weather conditions on crops.<sup>51</sup>

Dr. Robert White, NOAA Director, substantiated and underscored the fact that:

., emerging technology for observing and predicting weather conditions can make our agricultural information systems more effective in increasing agricultural productivity and assist in policy decision making.<sup>52</sup>

Dr. White discussed three ways in which weather information can be of increased value:

- (1) It can help the farmer directly, enabling him to carry out his daily task with greater efficiency. Weather information a day or two in advance can affect the way in which he protects, sprays, harvests, or sows.
- (2) It is useful to Government policymakers as a part of an agricultural warning and assessment system.

Such weather information from our country and others plus an understanding of the relationship between the weather and crops can enable us to assess the impact of the recent past and present weather conditions on crop production, thus generating a basis on which both operating and policy decisions can be taken.<sup>53</sup>

- (3) It can help Government and private grain trade to assess the problems of climate and anticipate its further changes.

An ability to predict changes in average weather conditions over a period of months, seasons, or years could be valuable in alerting us to possible adverse or beneficial growing conditions both in this country and around the world. Such information could be useful in planning decisions on agricultural production, storage of agricultural reserves, food export policies, and preparation of disaster assistance.<sup>54</sup>

### Organizational Changes

Assistant Secretary Bell pointed to organizational changes made within USDA since 1973 to improve its food information resources. Organizational changes were designed to improve and strengthen the Department's analytical capacity of the Soviet food sector. An interagency task force was established in 1973.

This task force on Soviet agriculture has provided a means of coordinating information on the Soviet Union and making this information

public on a prompt and systematic basis. It includes representatives of four USDA agencies—the Foreign Agricultural Service, the Economic Research Service, The Agricultural Marketing Service, and the Agricultural Stabilization and Conservation Service. During the principal production and marketing seasons, it meets every 2 weeks under the chairmanship of the Director of the FAS Grain and Feed Division.

Discussions within the Task Force have brought together information which has provided the basis for policy decisions within the Government this year, relative to Soviet trade. It was this group that first alerted people within the Government to the drought developing in the Soviet spring grain areas this year—and then made this information public in a series of reports and releases.<sup>55</sup>

Other organization changes were noted as the OTA Board probed a suggestion made in the FAC report that Congress hold hearings to “determine what improvements in the Foreign Agricultural Service and Economic Research Service have been made since 1972–73 and what further improvements are feasible.”<sup>56</sup>

Mr. Hume detailed other steps that have been taken by USDA since 1973 or those actions that were to be taken:

- Thorough review of the USDA agricultural attache system. Noting that the agricultural attache system is the heart of USDA's data gathering, Mr. Hume indicated that in 1976 USDA would complete “. . . a detailed review of the attache reporting system with the objective of consolidating and refining it to tie information more closely to the needs of information users and to our analytical system.”<sup>57</sup>
- Improving the analytical capability of individuals within FAS. Mr. Hume said that to accomplish this 1) commodity analysis specialists are receiving additional training; 2) increased qualifications are being demanded, especially in economic techniques and the use of computers; and 3) a better rotation system is being developed,

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in order for junior personnel to develop a thorough understanding of the USDA Washington operation before accepting a field assignment.

To emphasize the demand side of the supply-demand equation and to improve its automatic data-processing (ADP) facilities FAS has established an ADP Steering Committee to coordinate data processing and computer support within the Department of Agriculture.<sup>58</sup> Likewise, ERS has made changes since 1973 to assure more timely, accurate, and objective information. Noting that the basic contribution of ERS to the food and agriculture information system is economic analysis, Dr. West said:

...we have placed our first priority on improving our analytical capabilities, especially in our major economic situation and out 100 k programs.<sup>59</sup>

He also discussed improvements in the type and timeliness of information provided and the efforts of ERS to improve the flow of data as raw material or input to their analytical process.<sup>60</sup>

The three major steps taken to improve ERS's analytical capability has been to:

1. Reorganize its resources to focus on subject matter areas and to bring the research program into more direct support of the situation and outlook work.
2. Reprogram \$600,000 and relocate 19 staff positions to the situation and outlook work and longer-term programs.
3. Request about \$500,000 in additional resources to provide an increased number of highly capable, quantitatively oriented economists. These additional resources should strengthen the commodity situa-

tion and outlook staffs and establish forecast support units, which have become the focal point for development of commodity, cross-commodity, and foreign country models that are becoming increasingly operational as a part of USDA's forecasting work.

Another important change reported during the last 3 years is improved forecast procedures. USDA has developed a regular program of producing new forecasts each quarter on what they consider to be the most likely changes for the 3 to 4 quarters ahead. An informal matrix in figure 7 illustrates the organizational structure of the ERS long-range projections program.

Then we supplement this forecast with contingency analysis using alternative assumptions on such key variables as weather and levels of exports. The results of these analyses and the underlying assumptions are then discussed in group meetings with other key staffs from USDA, Council of Economic Advisors, and the Federal Reserve Board, Treasury Department, and the Library of Congress. This interaction helps test the soundness of our assumptions and analysis.<sup>62</sup>

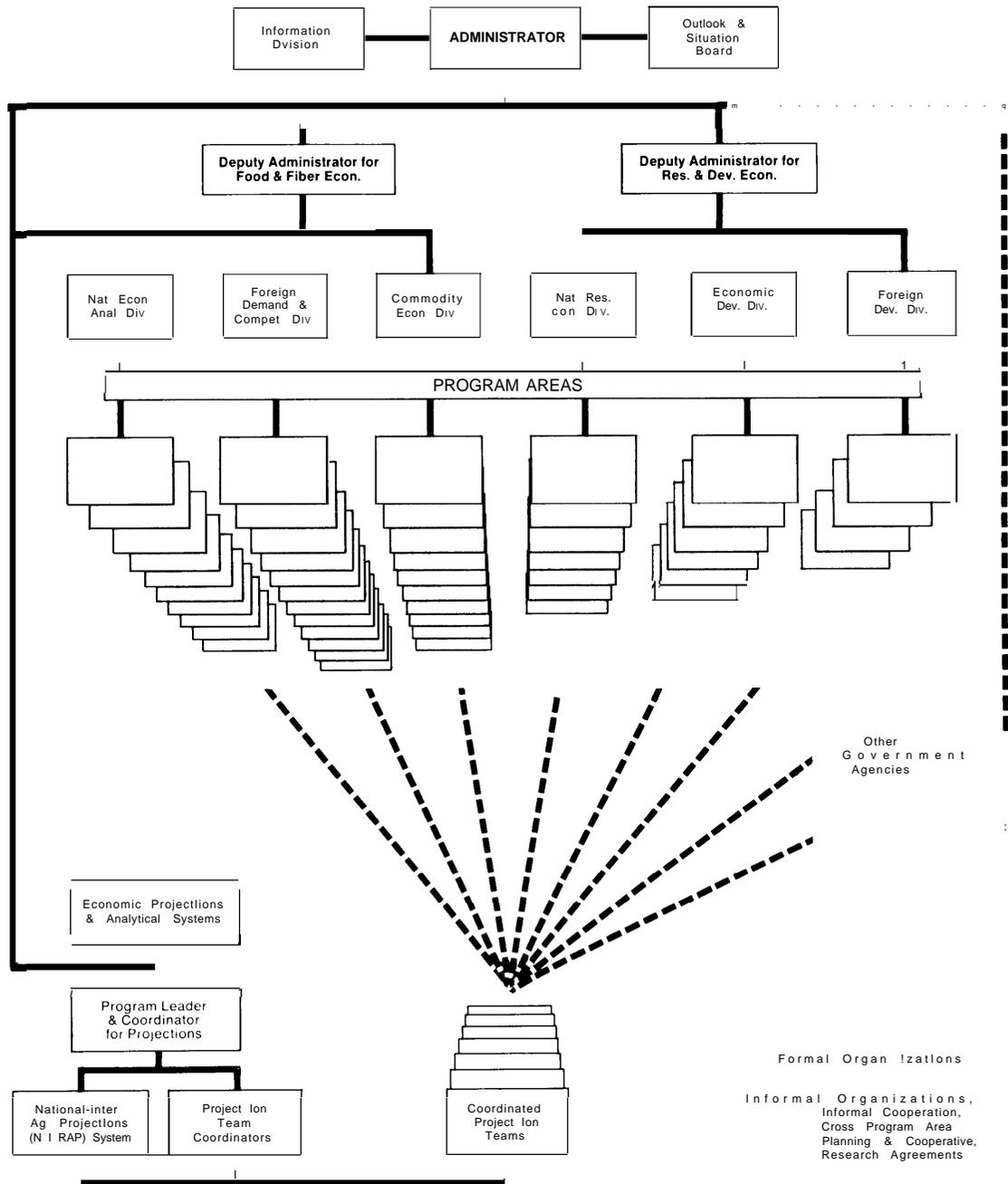
Major improvements have also been attempted in ERS's publications program:

Most conspicuous has been our new monthly Agricultural Outlook situation report. This serves as an outlet for brief reporting on our continuing appraisal of the situation for commodities, farm income, farm inputs, foreign production and trade, transportation, and farm-retail price spreads. Our target is to furnish through this new publication full updates of our forecasts each month to provide our best estimates of the agricultural situation. Other changes in publications to provide more timely information include issuing the report, "Agricultural Supply and Demand Estimates," containing updates about monthly important basic commodities going from once a year to three times a year in publishing World Agricultural Situation and from annual to quarterly assessment and publication of Outlook for U.S. Agricultural Exports.<sup>63</sup> (Figure 8.)

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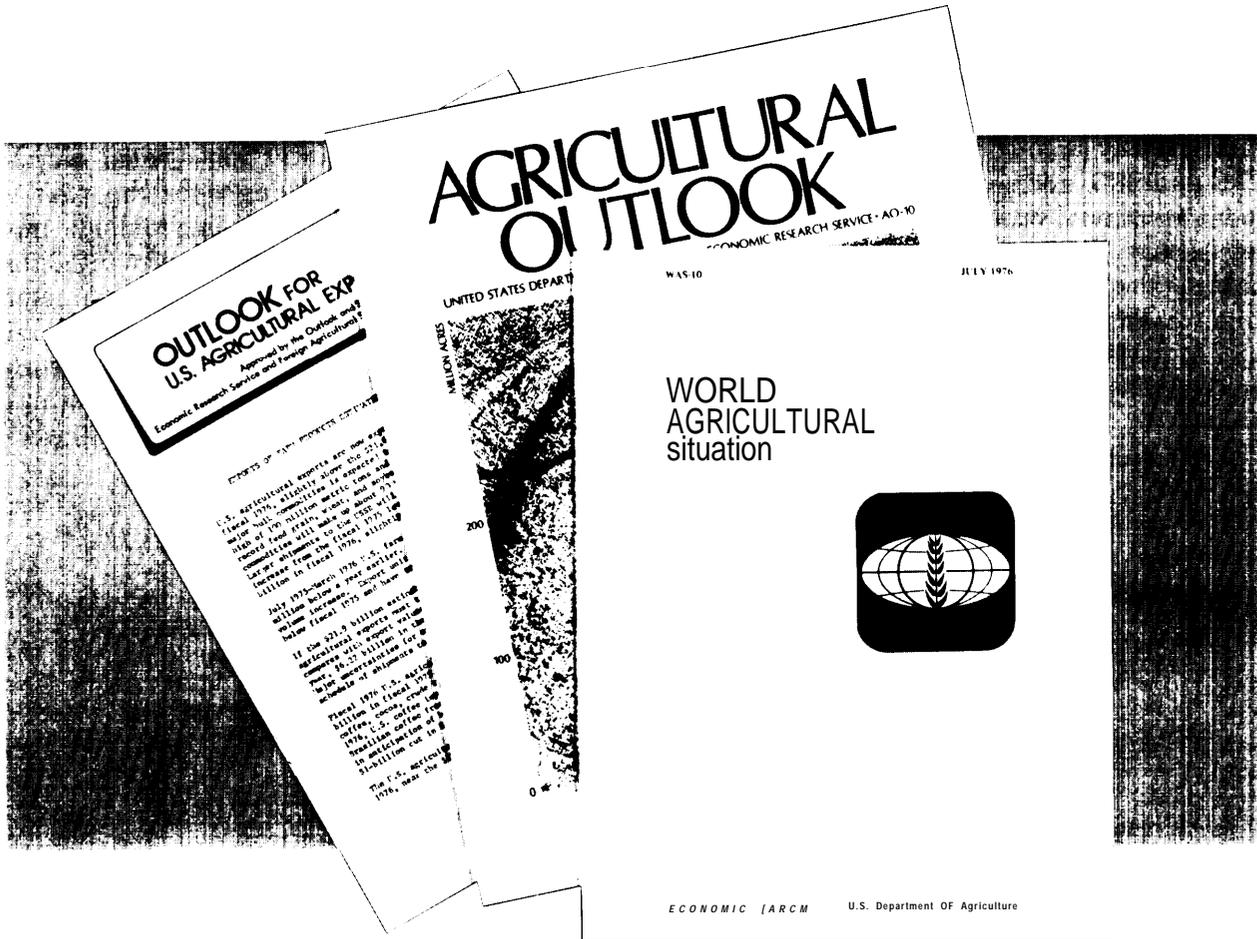
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**Figure 7.—informal research matrix of the organizational structure of the ERS Economic Projections Program**



Source: *Agriculture in the Third Century*, May 1976, Number 1. Compiled by Or Leroy Quince, USDA ERS.

Figure 8.—Publications of USDA's Economic Research Service



Concern over the obsolescence of agricultural data systems was evidenced by Dr. West:

We feel that ERS should take the lead in reviewing and changing data series that no longer provide the most meaningful descriptions of food and agriculture. . . (ERS) has the special task forces to assess the farm income and price spread, market basket and market bill statistics and make recommendations for improvement.<sup>64</sup>

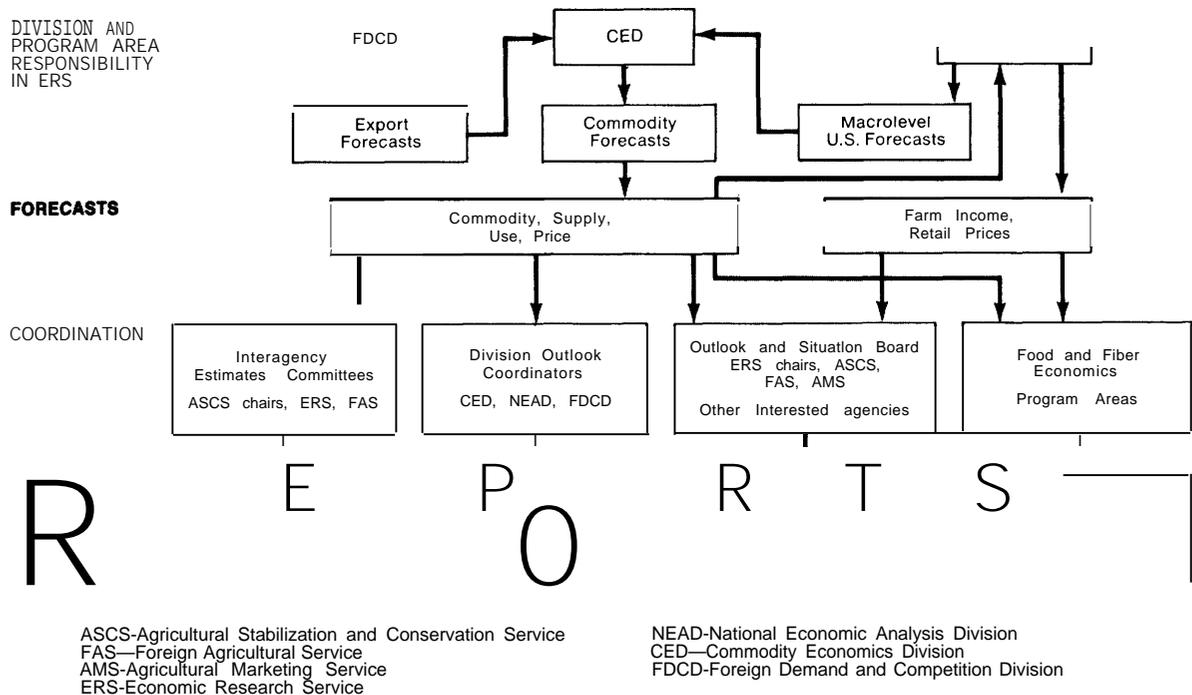
Dr. West discussed the steps that ERS was taking to develop a flow of data that would fill its major gaps in data available for analysis. First priority is to combine some programs of ERS and SRS, add some resources, and implement an annual economic survey of the farming sector. This would provide data for improving the supply-response analysis, farm income estimates, capital accounts, consumption of major inputs, and some environmental analysis. Second priority is to start collecting

data that would allow significant improvements in ERS's analysis of the structure, cost and performance of the farm input, food-processing, and food distribution industries.

ERS still must improve its data on foreign agriculture. Dr. West indicated that ERS worked closely with FAS to establish a more complete data base on world production of grains, that they have worked with FAS and FAO to improve information on fertilizers, and that they are continuing discussions with FAO about more access and use of an extensive supply-utilization information system which they have been developing over the past 4 years. Finally, he said, "An increasingly important part of our effort for improving data flow is to more fully apply current computer technology and capabilities in managing and analyzing the large volume of data we work with."<sup>65</sup> Figure 9 illustrates one such information flow, the ERS shortrun forecasting process.

NOTE: Footnotes appear at end of chapter.

Figure 9.—Information flow in USDA's shortrun forecasting process



He also looked toward future improvements:

Our first priority is to bring to fruition the plans we have laid out for improving the flow of data. This includes both the plans for getting more of the data we need and for more effectively managing and analyzing the data we already use. . . Our most immediate needs are for a continuous survey of food purchases by consumers, a flow of data on the economic aspects of land and water resource use, and data on structure, cost and practices of the farm input, food processing and distribution industries. . . To improve the flow of foreign data, we plan to critique the grains data base improvement work we have been doing with FAS.<sup>66</sup>

In sum, these highlights presented by USDA officials Bell, Hume, and West attempt to show the specific actions taken since 1972 to improve the timeliness and accuracy of the key units in USDA responsible for food information resources.

### NON-USDA COMMENTS

Naturally, USDA statements of pride in their resources and the steps taken to improve their information resources since 1973 might be viewed as self-congratulation and puffery. To test this, OTA asked principal user groups, grain and processing industries, and farm organizations to comment. To a person, it was agreed that:

- The USDA system is excellent, the best in the world;
- USDA has taken numerous corrective steps since 1973 which seem appropriate, and USDA seems to be receptive to further suggested changes; and
- Additional perfecting improvements could be made.

A good example of this is found in the comments of Mr. Hosea Harkness, director of plan-

ning of Cook Industries. He made it clear that an international grain trading company lives day by day with the agricultural statistical information which is available and taps every source it can locate. In addition, it continuously attempts to verify by its own intelligence the most recent market developments.

Commenting on the Economic Research Service, Mr. Harkness noted that since 1972 the Situation and Outlook Board has improved its operation. He suggested, however, that each Supply-Demand Report could be broadened to give further explanation of the parts of the supply-demand balance tables.

Regarding the Foreign Agricultural Service, Mr. Harkness feels that:

...it does the best job in the world in putting world statistics together on a comparable basis. They have speeded up their release of data considerably since 1972.<sup>67</sup>

He emphasized that the Outlook and Situation Board reports of the ERS were the only economic type of information which a large segment of private industry has and noted that this was especially critical for any firms or organization which cannot afford a staff of economists.

...we must recognize that there are many people, and companies and organizations, which are smaller than we (Cook Industries) are who cannot afford to have this type of personnel on their payroll, and ERS is very essential to them.<sup>68</sup>

Comments made by Mr. Melvin Sjerven of Milling & Baking News, one of the most read and respected weekly trade magazines for managers of grain milling and baking, underscored Mr. Harkness' conclusions and recommendations. Mr. Sjerven said: ". . . we have been very much impressed with improvements (since 1972) . . . and that commendation is accompanied by strong urging for further improvements."<sup>69</sup>

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NOTE: Footnotes appear at end of chapter.

Mr. Sjerven said that there is almost a surplus of information in 1975, which is an improvement from the scarcity of information in 1972. With a few notable exceptions, he found the current informational reports of the Department of Agriculture to be timely and accurate. These exceptions were:

1. The conflict between wheat export inspections data as provided by the Agricultural Marketing "Service and accumulated exports as reported by the Foreign Agricultural Service in its weekly issuance of the U.S. export sales.
2. A need to coordinate information derived by the various agencies before releases are made.<sup>70</sup>

Mr. Sjerven, as did every OTA witness, held in high regard the integrity of the publications of USDA's Statistical Reporting Service. He was favorably impressed by the Situation and Outlook Reports of ERS and recommended the expanded use of such advanced technologies as remote sensing and analysis of weather data. He also suggested that advances in information technology be pursued and utilized and that:

...Government agency responsibilities should shift from providing a proliferation of projections and estimates to a coordination of information with special emphasis on consumer needs.<sup>71</sup>

A suggestion for organizational changes was also noted by Mr. Sjerven.

...in the process, some shifting of responsibilities among the agencies would undoubtedly be in order. Certainly, conflicting data should be reconciled as much as possible.<sup>72</sup>

Mr. David Keefe, general partner and head of the Lamson Commodity Group, a 101-year-old New York Stock Exchange member, firmly agreed with the accolades and commented that:

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The USDA has done an admirable job of adapting to the dramatic changes that have occurred in the world food/feed grain situation in the last 3 to 6 years.<sup>73</sup>

He felt that it had "aggressively initiated programs to improve on the accuracy and timeliness of reports on the world food situation..." and that "...USDA is doing a tremendous job in surveying and reporting on this rapidly changing and complex world agricultural situation."<sup>75</sup>

Testimony by representatives of farm organizations was complimentary on the issue of the Departments' food information system. Mr. Reuben Johnson, legislative representative of the National Farmers Union, said:

I may shock a few people for making this statement—but we in the Farmers Union generally find the Department of Agriculture's statistical information and related resources to be highly useful to us.<sup>76</sup>

Mr. Charles Frazier, director of the Washington staff of the National Farmers Organization, echoed the comments made by Mr. Johnson in terms of the good job that the Department of Agriculture does in providing information.<sup>77</sup>

Mr. Eugene Hamilton, chief economist with the American Farm Bureau Federation, agreed with his colleagues:

On the whole, I think the Department of Agriculture and its statistical agencies do an excellent job. . . . And while I'm certainly in favor of improvements, I think the Department's batting average is very good. . . .<sup>78</sup>

Mr. Johnson suggested some specific improvements that USDA might make:

- . Devote more of its energy to reporting on the relationships between price that the farmers receive and the price (costs) that they pay.
- . Do a better job reporting on the parity ratio.

- Provide guidance to the farm community in the area of supply and demand—i. e., regarding crop projected supplies.
- Provide better information on marketing margins<sup>79</sup> because of their considerable effect on farmers and consumers.
- Attempt to resolve differences in numbers when they occur, just as differences are hammered out by the Crop Reporting Board before the Board makes its forecast.<sup>80</sup>

Differences developed over Mr. Frazier's suggestion that USDA find a method to regularize the distribution of informal, unevaluated marketing information.<sup>81</sup> This was not acceptable to Mr. Hamilton who was concerned that the Department could not escape criticism if it put out information hurriedly and made mistakes.<sup>82</sup>

Mr. Frazier recognized that this would be highly speculative information and that individuals would have to be willing to accept it without any guarantees of certitude, with indications for example, "at the top and bottom of every page that this is a projection—this is an estimate. . ."<sup>83</sup>

## SUMMARY

The U.S. Department of Agriculture (USDA) maintains one of the two key food information systems. USDA operates both a national and a world system and is regarded as the best source of information. Other institutions—such as international organizations, private firms, and other countries—acknowledge their dependence on USDA data as their benchmark.

Substantial changes have been made since 1973 in FAS and ERS to improve USDA's system. These changes include:

- modifying the agricultural attache' system;
- Inadequate analysis;<sup>87</sup>
- USDA's fragmented organization structure;<sup>88</sup>
- attempting to get better information on the Soviet food situation;
- releasing more timely crop forecasts;
- effecting changes in organizational structure;
- placing more emphasis on demand, including collecting new data areas; and
- using modeling and remote-sensing technologies.

Participants, while noting this progress, pointed to a number of deficiencies that persist and additional changes that they felt should be made. Deficiencies and suggested improvements are discussed in the following text.

## DEFICIENCIES

Interspersed with the favorable review of USDA's food and agriculture information system were several comments on deficiencies that, if corrected, would improve USDA's effectiveness and efficiency.<sup>84</sup> These deficiencies can be grouped into four categories:

- Poor national systems; as
- Collection of inadequate and/or obsolete data;<sup>86</sup>
- improving staff analytical competence;
- upgrading publications and eliminating duplication;

### Deficiencies Due to Poor National System

The supply-demand estimates produced by national agricultural information systems

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vary greatly in reliability, timeliness, and adequacy. There are a number of countries where estimates are seldom released in a timely manner.<sup>89</sup>

This problem is especially acute in developing countries and has impacts on both the USDA and FAO information systems. The FAO report, in discussing this deficiency in developing countries, said:

In perhaps 100 or more of the developing countries, the national information systems are so poorly staffed that the data supplied by FAO is lacking in reliability. There is great variation in the agricultural information systems found in these less developed countries. Many countries lack even a recent census of agriculture, Others have agricultural census data collected at regular intervals supplemented by sample surveys and by reports of knowledgeable people at regular periods throughout the year.<sup>90</sup>

The supply-demand estimates produced by some national agricultural information systems lack objectivity. To prevent this problem from impairing the objectivity of USDA's system, USDA analysts must develop a deeper capacity to generate unbiased estimates for the country of concern; and those managing the USDA world system must be prepared to defend the revised estimates.

The scope of the intelligence system operated by the attaches is broad, but its **adequacy** is impaired by the lack of uniformity of coverage in terms of both content and geography.

Attache discussions of the factors that influence production and supply tend to be more complete and frequent than their discussions of the factors influencing the demand for agricultural products, The attache or their staffs base their discussions of demand upon extremely simple analytic techniques or pure judgment instead of on formal models. that generate results of known reliability.

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The adequacy of the intelligence system operated by the attache also remains below its potential due to inadequate coverage of several important agricultural countries. The most notable gap in this respect is the lack of an attache in the People's Republic of China. Our intelligence gathering in many centrally planned economies is weak to nonexistent.

Efforts by the USDA to improve its agricultural attache system is a recognition that improvement in data systems of the developing countries is a long-term expectation at best. Thus, the USDA must improve its capacity to make judgments in light of poor and nonexistent information. Seth and Cochrane rate this deficiency as so critical that the United States should take appropriate steps to improve national data:

In order to make the best possible estimates. . the Department of Agriculture needs the best possible political and economic intelligence about world supply and demand. The U.S. Government ought to take the leadership in helping to improve crop and livestock reporting services for other countries, the United Nations Food and Agriculture Organization, and the new World Food Council.<sup>91</sup>

### **Deficiencies Due to Collecting Inadequate and/or Obsolete Data**

The reliability of the supply-demand estimates forwarded by attaches varies significantly. In addition to the problems with national systems, reliability is reduced due to the low priority given the development of estimates by some attache, the lack of knowledge about the country due to frequent reposting, and inadequate training or interest in the use of analytic techniques.

The issue of obsolete data was discussed in the OTA Food Advisory Committee report, which Dr. Don Paarlberg, Director of Agricultural Economics, U.S. Department of Agriculture, found to be quite comprehensive.

(I feel) it... serves the very useful purpose to highlight concerns about inadequate information. . .The problem of obsolete data series. . .is a pertinent one, primarily caused by changing structure and changing flow of economic activity in our food and agriculture system.<sup>92</sup>

Mr. Eugene Hamilton noted that some agricultural data series are obsolete and that this was well illustrated by the Food Advisory Committee's discussion on broiler prices.<sup>93</sup>

The fact that USDA had some inadequacies in the data they collected was discussed by Dr. Quentin West in terms of work that needed to be done:

Our staff has also done a lot of work in planning how to meet some of our other major data problems. One of these is a continuous survey of consumer food purchases so we can improve our forecasting and analytical capability with respect to food prices through better measures of price and income elasticities and demand shifters. A second longer range plan is to fill in the many economic and social data needs on the use, the changes in use, and potential capacity of our land and water resources.<sup>94</sup>

“ He indicated that USDA is in the process of trying to identify major data gaps and that it plans to provide the resources to fill these voids, It is Dr. Paarlberg's view that such improvements can best be made by:

■ the managers of the key agencies, those who know the data problems and the difficulties of change most thoroughly, and who must carry through on commitments for change. They are in the best position to modernize, coordinate, and standardize the food and fiber data series.<sup>95</sup>

Referring back to the OTA Food Advisory Committee discussion on “Technical and Institutional Obsolescence of National Food and Agriculture Information Systems,”<sup>96</sup> He added that the point on obsolete data series:

...is well taken. Agriculture changes rapidly and it is important to keep our statistical series updated, and some of them are frankly a bit out of date.

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We have had the review committees come in and work with us on this from the American Agricultural Economic Association, and the American Statistical Association. We have reviewed several of our specific series, particularly the farm income series. We are updating the definition of a farm which I think will bring us more current with regard to the present nature of the farm,<sup>97</sup>

In a statement on April 28, 1976, before the Subcommittee on Family Farms and Rural Development of the House Agriculture Committee, Dr. Paarlberg said, the definition of a farm that has been in use since the late 1950's is any place under 10 acres with annual sales of \$250 or more of agricultural goods, and any place of 10 or more acres selling \$50 or more of goods. The new definition would be any establishment from which \$1,000 or more of agricultural products is sold or would normally be sold during a year.

### **Deficiencies Due to Inadequate Analysis**

The analysts in FAS rely almost exclusively on experience, judgment, and trend analyses in making initial forecasts of supply-demand balances for the commodities. However, trend analyses in recent years have failed to provide reliable results. More detailed analyses of the factors that determine production and consumption are required to improve the reliability of USDA's world estimates,

There is clear imbalance in USDA's system; more data for analysis are being provided from the field and other sources than are adequately analyzed, This imbalance stems from insufficiently precise data and from an inadequate analytic capability, It is also a function of the organizational structure USDA uses to operated the world system. There is need for more precise reporting from the field on the input situations and outlook and the factors influencing consumption requirements.<sup>98</sup>

Mr. Hume commented on USDA's analytical deficiencies. He noted that:

Most of our analytical work is currently based on simple trend models, experience and commodity knowledge, and common sense. We think this has given us a pretty good track record, and with the re-emphasis on reporting, etc., we have shown improvement over the past 2 years. This is not to say, however, that we have achieved perfection. We have been criticized at times for shortcomings in providing timely data and for a lack of sophisticated, econometric input to our analysis. We think that with (additional) professionals we will be able to move forward in this area but we feel we should add a note of caution in that there are severe limitations in econometric modeling and in the data requirements for these models. Progress and improvement from this source will be slow.

We are moving forward in other areas as well. To date, most of our work has been on the production and trade side. We are now moving to emphasize the demand side. We have added a specialist in macro-economics to provide our commodity specialists with forecasts and analysis of the general demand situation in major countries.<sup>99</sup>

In essence, Dr. West recognized the need to make improvements in USDA-ERS analytical capability and outlined the steps and actions being taken in personnel, organization, forecast procedures, and publications.<sup>100</sup>

Mr. Harkness noted that the techniques which Cook Industries and other grain companies utilize in their analytical process are mainly geared for timeliness:

...the attitude that we must take on most Government statistics is that this is the base, but there is necessity for timeliness here. . .And one point I would like to make along this line is the fact that I repeatedly hear out of FAS, "Well, we haven't heard from the cable we sent two weeks ago." If we want to know something today we pick up the phone and call. We don't wait to send a cable, . . .And I don't know if this can work within the Government, that you pick up the phone and call, but by the same token this is one solution we have to the timeliness problem. . .We're continuously analyzing all the known components of what makes a crop report.<sup>101</sup>

Harkness noted that the grain industry places a high premium on information and that at Cook Industries he has an unlimited budget;

...in other words, if there's a job to be done I'm there. So I don't even know what my budget is as a part of the total. . .It's just a matter of timeliness, because these things can't wait.<sup>102</sup>

### Deficiencies Due to Organizational Structure

The organizational structure used by USDA to operate its world agricultural information system seems to impede efficiency and effectiveness. Mr. Hjort's comments indicate the difficulty in using analysts efficiently and effectively when responsibility for the output of a system is divided between two completely separate agencies.<sup>103</sup>

Permitting the responsibility for the world agricultural information system to be shared by two different agencies—with the key agency, FAS, having program and policy responsibilities—seems to make the system weaker and open to the possible charge of lack of objectivity.

Cochrane and Seth's prepared remarks and discussion makes this point, while adding a suggested way to resolve this conflict:

There is a confusion of functions in this setup and a potential conflict of interest that may contaminate the quality of the information and analysis.

The Foreign Agricultural Service (FAS) has a primary responsibility to expand foreign markets for U.S. farm products. This makes suspect the assessments of world commodity situations and outlook prepared by the Foreign Commodity Analysis Unit of FAS. One way to overcome this apparent conflict of interest would be to transfer this analysis unit to the Economic Research Service (ERS). Commodity specialists in ERS already perform much of the same kind of analysis in foreign commodity situations. It is logical to combine the two staffs and to place them under ERS, which has no "action" responsibility. Its duty is to provide economic in-

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Intelligence for users of its reports and for government policymakers.

FAS also has a responsibility to collect facts and collate information about world food and agriculture conditions. To achieve the maximum objectivity, it would be desirable to separate this fact-gathering function from the sales promotion agency and to assign it to the Statistical Reporting Service (SRS), which has the sole function of preparing factual reports on agricultural data. However, the responsibility for collecting foreign agricultural data necessarily must remain with the agricultural attaché under FAS until such time as specialists in crop and livestock reporting can replace them.<sup>104</sup>

The mission of FAS is to expand foreign markets for U.S. farm commodities. The mission of ERS is to develop and carry out a program of economic research designed to provide economic intelligence for users. FAS has responsibility for administering action programs; ERS does not. The mission of FAS and the vested interest that FAS thereby has in U.S. and world estimates may make it difficult for those in the Foreign Commodity Analysis Unit or the attaches to maintain objectivity with respect to assessments of the world situation and outlook. The consensus of **OTA hearing witnesses was that it would be extremely difficult for USDA's world agricultural information system to reach full potential under the present organizational setup.**

Another organizational question was raised by Mr. Hjort. He pinpointed a serious flaw in the national agricultural information system operated by USDA, and said:

The responsibility for outlook and situation reports rests with ERS and the Outlook and Situation Board, but the authority for U.S. commodity supply-demand estimates is outside ERS. The reliability of the U.S. agricultural information system is, as a result, seriously impaired.<sup>105</sup>

Mr. Hjort concluded:

U.S. supply-demand estimates are developed by Interagency Commodity Estimates Committees (ICEC) chaired by the Agricultural Stabilization and Conservation Service (ASCS). Members of the committees are drawn from the Economic Research Service and Foreign Agricultural Service. Responsibility for foreign trade estimates rests with the member from FAS; the responsibility for domestic estimates rests with the representative from the Economic Research Service. The Agricultural Stabilization and Conservation Service has the responsibility for administering price support programs for farmers, and FAS has responsibilities for administering export expansion programs. Both, therefore, have a vested interest in U.S. supply-demand estimates. USDA's Outlook and Situation Board approves outlook and situation reports on U.S. agriculture, but the ICEC's supply-demand estimates are taken as given by the Board. USDA's supply-demand estimates for the United States have been wide of the mark in recent years. While both domestic- and foreign-demand estimates have been in error, the magnitude of the error in the export estimate has been much larger either due to changes in the basic world food situation, faulty analyses, or bias. Investigations of the reasons for errors in the estimates have centered upon ERS, the agency with responsibility for the estimates but without authority (analogous to the Outlook and Situation Board).<sup>106</sup>

Several participants in the OTA study noted this need for organizational changes, either consolidation as noted by Mr. Keefe<sup>107</sup> or major reorganization as outlined by Mr. Hjort.<sup>108</sup>

In sum, the analysis shows two types of deficiencies in USDA's system, one caused by deficiencies in other systems—i.e., national and FAO, which require compensatory USDA action—and another caused by the USDA organizational structure, grounded in a potential for conflict of interest. Suggested improvements follow.

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NOTE: Footnotes appear at end of chapter.

## SUGGESTED IMPROVEMENTS

The Office of Technology Assessment (OTA) study generated numerous suggestions as to how the existing USDA food information system might be improved. These suggestions have been grouped into three areas; the suggestions are listed first, followed by discussion on the significant items.

### L Improving the Accuracy and Timeliness of the U.S. Food and Agricultural Information System

#### A. U.S. Department of Agriculture

1. Congress should hold hearings to determine what improvements have been made in the Foreign Agricultural Service and Economic Research Service since 1972-73 and what further improvements are feasible. (Food Advisory Committee, Hearings, pp. 9, 22-23.)
2. The USDA should create an economic intelligence agency which will combine the commodity analysts from FAS and ERS into one unit. (Hjort, Hearings, p. 95.)
3. The Agricultural Stabilization and Conservation Service must no longer head the Interagency Commodity Estimates Committees, and the chairmanship of the ICECS ought to be transferred to the agency responsible for the operation of the U.S. agricultural information system. (Hjort, Hearings, p. 95.)
4. The USDA should coordinate the information that its various agencies generate before the release of such information. (Sjerven, Hearings, pp. 138-1 39.)
5. The USDA world and feed grain summaries and outlook reports should be updated monthly. (Keefe, Hearings, p. 144.)
6. The USDA should generate summary reviews and speculative comments on new crop prospects, purchasing intentions, and the political pressure involved in other countries. (Frazier, Hearings, pp. 159-1 60.)
7. A World Crop Reporting Board should be set up within USDA that would review all sources of country production information (attache reports, foreign-released statistics, etc.) from all departments of the Government on a timely basis. This Board would set a forecast or estimate that would be acknowledged within Government (USDA, State, etc.) as the best number. (Harkness, Hearings, p. 134.)

8. The Secretary of Agriculture should be requested to establish an agricultural statistical review committee charged with the responsibility of making recommendations to the Congress and appropriate executive agencies for modernizing, coordinating, and standardizing the food and fiber series. (Food Advisory Committee, Hearings, pp. 7, 19-21 .)
9. The USDA should make an effort to report the farm input prices actually paid by farm and ranch operators in order to obtain timely information on the rapidly rising costs of production at the farm level. (Frazier, Hearings, p. 159.)
10. USDA's Economic Research Service should assume full responsibility for world food intelligence now shared by three agencies within USDA. (Cochrane and Seth, Hearings, pp. 201 -202.)
11. The ERS should:
  - a. Strengthen its ability to analyze, evaluate, and interpret current world information on a monthly basis during the crop-growing and early harvest season;
  - b. Increase its ability to analyze current world weather data and interpret their significance in terms of probable crop production in the current season;
  - c. Develop world models of production, utilization, trade, and prices for more important agricultural commodities, especially grains, which permit timely evaluation of new data on a monthly basis during the growing and early harvest season. (Food Advisory Committee, Hearings, pp. 22-23.)
12. The ERS should have exclusive jurisdiction over the analysis and publication of outlook information. (Keefe, Hearings, p. 143.)
13. The Foreign Agricultural Service should train its attach& in data collection, expand its reporting capabilities in the critical developing countries, improve its data transmission and the timeliness of its summaries, improve its reports for the major commodities on probable import requirements of the importing countries, and finally, improve its reports on world agricultural requisite supplies and requirements, especially on fertilizer. (Food Advisory Committee, Hearings, pp. 22-23.)

## **B. Bureau of the Census**

1. The U.S. Congress should study the desirability and feasibility of integrating the staff and activities of the Census of Agriculture with those of the Statistical Reporting Service of the Department of Agriculture. (Food Advisory Committee, Hearings, pp. 6, 21.)

2. The Census of Agriculture should be replaced by sample surveys, and much of the census data would be better obtained annually over a 5-year period, with emphasis once every 5 years on generating county estimates. (Paarlberg, Hearings, p. 11 9.)
3. The Census of Agriculture ought to be abolished. (Trelogan, Hearings, p. 367.)
4. The Statistical Reporting Service ought to integrate the gathering of all agricultural data in its probability sampling programs. (Trelogan, Hearings, p. 356.)
5. The responsibilities for the Census of Agriculture should not be transferred to the Statistical Reporting Service. (Office of the Director, Bureau of the Census, Hearings, p. 373.)
6. It is exceedingly important to preserve the independence and integrity of the Bureau of the Census. The collection of benchmark data from a complete Census of Agriculture enterprises is a critical national priority. (Bureau of the Census, Hearings, p. 373.)
7. The Bureau of the Census should issue the reports of the Census of Manufactures on a more timely schedule. (Sjerven, Hearings, p. 138.)

### **C. Fertilizer**

The several congressional committees having responsibility for the executive agencies that collect and publish the various series of data relating to fertilizer should conduct studies and hearings to determine ways, means, and costs of improving the fertilizer information systems. (Food Advisory Committee, Hearings, pp. 8, 20-21.)

### **D. General**

1. More studies are needed to examine domestic wheat utilization by class and to treat livestock feeding in greater detail. (Sjerven, Hearings, p. 138.)
2. The food information institutions ought to use more simplified graphs or charts in order to summarize pertinent changes that may occur on a monthly basis in the food economy. Such a procedure would be beneficial to both marketing participants and consumers. (Keefe, Hearings, p. 1 44.)
3. Better world statistics on livestock numbers should receive appropriate priority. (Harkness, Hearings, p. 133.)

4. There should be a continuous flow of data on the economic aspects of land and water resource use and of data on the structure, costs, and practices of the farm input, food-processing, and distribution industries. (West, Hearings, p. 127.)
5. Government agency responsibilities should shift from providing a proliferation of projections and estimates to a coordination of the information they generate. (Sjerven, Hearings, pp. 138-1 39.)

## II. Integrating Nutrition Information Into the U.S. Food Information System

- A. Consumer needs should receive a special emphasis in the management of information generated by the U.S. food economy. (Sjerven, Hearings, p. 138.)
- B. There should be a continuous survey of food purchases by consumers—i.e., a weekly or monthly data survey of consumer food preferences and developing trends in the public's purchasing habits should become institutionalized. (West, Hearings, pp. 126-1 27.)
- C. The Congress should request that USDA's Food and Nutrition Service expand substantially its program evaluation studies. (Food Advisory Committee, Hearings, pp. 9-10.)
- D. The United States should develop a national nutritional status surveillance program. A first step in such a development ought to involve the adequacy of design and integration of the ongoing nutrition surveys being conducted by the Department of Health, Education, and Welfare and the planned Household Food Consumption Survey to be conducted by the Department of Agriculture. (Food Advisory Committee, Hearings, pp. 9-10, 29-33.)

## III. Using Advanced Technologies

- A. Experiments and analyses utilizing new technologies for obtaining and analyzing data should go forward on an expanding scale. (Food Advisory Committee, Hearings, pp. 9, 23-24.)
- B. Remote sensing and weather data technologies reports should reach their users on a timely basis. (Sjerven, Hearings, p. 138.)
- C. The United States should broaden its capabilities in satellite weather technologies in the context of a more comprehensive food information system. (Hathaway, Hearings, p. 79.)
- D. Should Congress decide to support a global food information system based on advanced satellite technologies, it is strongly recommended that a centralized data-processing and analysis facility be established for the

multidisciplinary group of scientists responsible for its operation. Such a team ought to be self-contained and autonomous. (Park, Hearings, p. 327.)

- E. The immediate employment of the LANDSAT satellite is an urgent priority. (Park, Hearings, p. 327.)
- F. The global needs of agricultural weather forecasting demand a considerable increase in the number of agrometeorological stations and the reporting of their climatic information at the very least once every 10 days. (Park, Hearings, pp. 333-335.)
- G. The National Oceanic and Atmospheric Administration (NOAA) should have advanced computers with enough capacity and speed to use data for the development of global climatic models. (White, Hearings, pp. 273-274.)

### **I. IMPROVING THE ACCURACY AND TIMELINESS OF THE U. S., FOOD AND AGRICULTURE INFORMATION SYSTEM**

Although the Economic Research Service and the Foreign Agricultural Service have made substantial improvements since 1973, OTA participants noted additional improvements that they felt should be made. Timely and accurate information on food production, stocks, and prices in foreign countries is as important to the Congress as information on the domestic food industry. Yet USDA agencies that collect, analyze, and disseminate foreign information do not follow the same rigorous procedures in handling it as they apply to domestic crop, livestock, and price reports.

Objectivity is a prime requirement of a food and agriculture information system. At the present time the agency (FAS) which collects the foreign food information and issues most of the reports on foreign food production also has the mission of expanding farm exports. Both the quality and the objectivity of information gathered and analyzed under these conditions may be compromised.

Reports received from the USDA's attache network are the primary source of foreign food and agriculture information. Attache's prepare many reports and provide much information,

but few are specialists in the collection or analysis of food data. These tasks are not perceived to be their primary mission. Frequent changes in attache assignments also adversely affect the quality of information they provide.

**A long-range solution** to this problem would be the employment of specialists in the collection and analysis of food information posted for extended periods in major food exporting and importing countries. **The near-term solution** is to require the attache to provide more precise data and information on the use of land, use of agricultural inputs, animal populations, income, prices, and other supply and demand factors. Inadequate analysis of available data, however, is recognized as an even greater and more serious weakness than inadequate data; thus the overall short-run improvement in the international food and agriculture information systems depends mainly on how many analysts are employed and how effective they are.

Neither USDA nor FAO (to be discussed in the following chapter) has the analytic capability to generate timely and reliable information for all commodities and countries

where existing national food information systems are now inadequate. A deeper analytic capability must be developed to improve the reliability of current assessments of the world situation and outlook for food and agriculture.

**The consensus of OTA participants was that a key way to harden this analytical capacity was through improvements in USDA's organizational structure, elimination of obsolete data series, and updating of other key series such as the Census of Agriculture and fertilizer information.**

Mr. Hjort feels that the objectivity of USDA's international and national food and agriculture information systems is threatened and its efficiency and effectiveness hampered by the current organizational structure of USDA agencies.<sup>109</sup> The responsibility for the international food information system is shared by two officials in the Office of the Secretary; and the system is operated by two completely separate agencies; one also having action program responsibilities that make it difficult to maintain objectivity.

The responsibility for reporting on the U.S. food situation and outlook rests with ERS and the Outlook and Situation Board, but the chairmanships of national commodity supply-demand estimates committees are held by staff members in the agency that administers farm programs, the Agricultural Stabilization and Conservation Service.

In the interests of improved objectivity, effectiveness, and efficiency, the responsibility for both the international and the national food information systems should be assigned to one official, who would have the sole mission of providing economic intelligence on U.S. and international food supplies and prices. The staffs that gather data, analyze it, and provide economic intelligence would be

responsible to this official rather than to agencies having as their primary mission the expansion of farm exports or the maintenance of farm income. Reorganization was viewed by most as a necessary condition to achieving the maximum effectiveness of the national and international food systems operated by the Department of Agriculture.

Mr. Hjort discussed alternative means of accomplishing the necessary reorganization.<sup>110</sup> One method would be simply to transfer the Foreign Commodity Analysis Unit from FAS to ERS and make it another division of that agency. Another would be to combine the Foreign Commodity Analysis Unit from FAS with the Foreign Demand and Competition Division from ERS into a new agency, one with the sole mission of providing economic intelligence on world agriculture.<sup>111</sup> The third alternative would be to combine the foreign commodity analysts from FAS, the U.S. commodity analysts from ERS, and the foreign and national analysts from ERS into a single economic intelligence agency with responsibility for assessing and disseminating information of world and U.S. agriculture.

The potential for meeting objectivity criteria would be enhanced under any one of the reorganization alternatives. Overall efficiency and effectiveness would be lowest under the first alternative, higher under the second, and highest under the third. However, it is felt that even the first alternative would represent an improvement over the present organization simply because it would become possible for the first time for a single agency to plan and carry out a coordinated program of analysis. Efficiency and effectiveness would be higher under the second alternative because the system's operation would be directed by more senior professionals. The third alternative promises the highest efficiency and effectiveness, as it provides the opportunity to eliminate the duplication associated with the operation of two systems. It is not necessary to have one group of commodity analysts for the world and another for the United States. U.S.

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analysts cannot perform effectively unless they take the world situation and outlook into account; world analysts cannot perform effectively unless they take the U.S. situation and outlook into account. Efficiency and effectiveness would obviously be improved by combining the knowledge of these analysts.<sup>112</sup>

Among the improvements suggested by Mr. Hosea Harkness<sup>113</sup> and endorsed by several witnesses<sup>114</sup> was the creation of a World Crop Reporting Board in the U.S. Department of Agriculture<sup>115</sup> with responsibility for reviewing all national and international information on a timely basis and issuing reports that would be recognized as authoritative throughout the Government and the food industry. Harkness felt that regular monthly reports by such a Board—with official supplements when new developments warrant, including analysis of the current data—would be a substantial improvement over the current frequent release of unanalyzed data. Mr. Harkness recommended:

...that a World Crop Reporting Board be set up within the USDA that would review all sources of country production information (attache reports, foreign released statistics, weather-yield analysis, check data, etc.) from all departments of government on a timely basis. This Board would set a forecast or estimate that would be acknowledged within the Government (USDA, State, etc.) as the best number. Thus, we would eliminate duplicate numbers floating within Government. This would eventually lead to more credibility for the private user.<sup>116</sup>

Mr. Hume and Dr. West were asked to comment on this suggestion. Mr. Hume responded that in his view “this would inevitably slow up the providing of . . . information.”<sup>117</sup>

Dr. West indicated that this kind of thing was done on an informal basis.<sup>118</sup> The principal objection or concern to the establishment of such a Board designed to develop a number to eliminate duplicate numbers was the delay

that might be incurred from getting clearance for “the number.”

. Seth and Cochrane felt that while this seemed to be a reasonable proposal, “we believe improving the present (Outlook and Situation) Board’s operation and strengthening ERS and SRS would accomplish the same result and should be tried first.”<sup>119</sup>

Regardless of action taken regarding a World Crop Reporting Board, the necessity for deeper capability for analysis of the factors influencing world agriculture seemed to be generally agreed upon by everyone. Additional analysts may be employed, but doing so and using them inefficiently would not be a cost-effective solution to the problem. Under a reorganization it may be necessary to increase the number of analysts and field staff of the new or augmented agency. However, while the need for developing, verifying, and using more sophisticated analytic techniques seems evident, this need not imply increased numbers of people. Instead, the task is to make more effective use of the analysts and positions now available,

Variation in national data keep the reliability, timeliness, and adequacy of USDA’s world system below potential. There are two alternatives to prevent this: provide additional technical and financial assistance to help improve national agricultural information systems with respect to these attributes, or strengthen the analytic component of USDA’s world system so that more reliable and timely national estimates can be generated within the system. Both approaches may be pursued, recognizing that the former will take longer to accomplish than the latter. In the near term, the only alternative is to improve the analytic capability of USDA’s world system.<sup>120</sup>

Errors in estimates by the Interagency Commodity Estimates Committees also were singled out for correction. It is necessary to take program operations into account when developing supply-demand estimates, but the

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accountability for the estimates should rest with the agency organizationally responsible for them, Mr. Hjort felt that the chairmanship of these committees should be assigned to the agency with responsibility for operating the agricultural information system and that the members should be drawn from the agencies with responsibilities for programs that have an impact on supplies or demand.<sup>121</sup>

The creation of an economic intelligence agency, and combining commodity analysts from FAS and ERS into one unit, provide the opportunity for improving reliability of U.S. supply-demand estimates, but this major flaw in USDA's national agricultural information system will continue to impair reliability unless the chairmanship of the ICECs are taken from ASCS.<sup>122</sup>

Seth and Cochrane noted a potential conflict of interest (real or apparent) in the present arrangement of the ICECs being chaired by an official of the Agricultural Stabilization and Conservation Service.

They agreed with Mr. Hjort:

...that the chairmanship of the ICECs should be removed from ASCS. Further, responsibility for foreign trade estimates should be removed from FAS and representation of that agency on the supply-demand estimates committees should be removed.<sup>123</sup>

### **The Problems of Obsolescence**

Many of the data series now being maintained by SRS were started 40 or 50 years ago.<sup>124</sup> They were designed to provide information about food and agriculture at that time. To the extent that the food and agriculture industry has changed since then, these older data series are based on obsolete concepts, definitions, and measurements. Maintaining obsolete data systems is wasteful. Analyzing obsolete data leads to inappropriate conclusions. One good start in improving the national food information system would

be removal of outdated information prior to the collection of additional data for analysis.

This issue has gained increasing attention on the part of analysts in recent years, but it is a difficult one with which to deal. Failure to bring the series up to date, on the part of administrative officials charged with their collection and publication, is closely related to interests expressed by data users in the continuity of a series,

The Food Advisory Committee report<sup>125</sup> indicated that more rapid progress would probably be made if the Secretary of Agriculture were to establish an agricultural statistical review committee charged with the responsibility of making recommendations to the Congress and appropriate executive agencies for modernizing, coordinating, and standardizing the older food and fiber data series.

One example of obsolescence is found in the issue of whether farm statistics should be integrated.<sup>126</sup> Two sets of developments have necessitated changes in methods of collecting farm statistics. They are technological changes in farming and simultaneous progress in statistical technology,

Quality checks on the Censuses of Agriculture for 1964 and 1969 indicated that data were 8 and 17.6 percent incomplete, respectively. Typically, years rather than months elapsed between the time of collection of the data and the reports published. In short, agricultural census data no longer meet users' needs with respect to completeness and timeliness,

Methods for probability sampling to yield greater accuracy of estimates have been in use for current crop and livestock estimates for several years. They are now being expanded to gather economic data of this type previously made available by the Census of Agriculture after serious delays. The stage is set for the avoidance of considerable unnecessary duplication of effort through the integration of

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the Census of Agriculture activities and the probability sampling methods of the SRS.

The Food Advisory Committee report urged a study of the desirability and feasibility of integrating the staff and activities of the Census of Agriculture (Bureau of the Census, U.S. Department of Commerce) into the Statistical Reporting Service (Department of Agriculture).<sup>127</sup>

The hearing record generated discussions on both sides of the issue. A paper prepared by Dr. Harry Trelogan suggests that the "integration of the present systems offers opportunities for alleviating these problems with no more expenditure for data collection than are now projected."<sup>128</sup> The statement submitted by the Bureau of the Census, however, makes the point that consolidation and integration "would not result in . . . gains in quality, timeliness, and reduction in costs to the Government. . ."<sup>129</sup> In addition, the census Bureau believes:

It is exceedingly important that an independent agency, such as the Bureau of the Census, continue collecting benchmark data and that these data be obtained from a complete Census of Agriculture enterprises.<sup>130</sup>

Support for the integration and use of sampling procedures has been voiced by the National Association of State Departments of Agriculture in a resolution passed at its 1975 annual convention.<sup>131</sup> Professor Tweeten's testimony supported their position:

We can also obtain more information about the structure of U.S. agriculture by moving resources now used in the agricultural census to the Statistical Reporting Service (SRS) as proposed. . . The agricultural census currently is processed much too slowly and is all too reluctantly made available in detail to analysts for policy research. Because SRS data are more reliable than those of the agricultural census (which is no longer a census but a mailed sample survey),

much can be gained by moving census resources to SRS to obtain economies of size, timeliness, reliability and increased responsiveness to data needs.<sup>132</sup>

The USDA position on this issue was detailed by Dr. Paarlberg. He commented on the Food Advisory Committee report discussion on the timeliness and reliability of data as it relates to the Bureau of the Census, saying:

The question of needed changes in the agricultural census, including possible transfer of the operation to SRS, is a complex issue without an immediately clear answer. What is clear is that the agricultural census program needs to be modernized to use current data gathering techniques, to more nearly meet the data needs in today's more specialized agriculture and to develop ways to produce the results in a more timely fashion. It is also clear that much closer coordination between Census and SRS needs to take place, and if the activities remain in two separate Federal departments, there should be greater provision for efficiencies of planning and operation.<sup>133</sup>

Dr. Paarlberg felt that the census should be replaced by sample surveys and that much of the census data would be better obtained annually over 5-year periods with emphasis once each 5 years on generating county estimates.

We consider the agricultural census enormously important, and we frankly feel that it has not been given the importance that it deserves in the Bureau of Census, and there has been much delay in coming out with the data. . . We think that it could be improved and could be made more timely, and the questionnaires could be made more brief if they were targeted at the particular groups that must respond. We think it would be possible to update the techniques and use a probability sampling technique.<sup>134</sup>

Dr. Paarlberg exhibited bureaucratic restraint, saying:

We are not ambitious to take over that service. If the census could be given greater importance, and brought out more quickly, we would be very happy to see it stay where it is. But if it is not being afforded the importance it deserves, then frankly we would look with favor on seeing that it was afforded that importance.<sup>135</sup>

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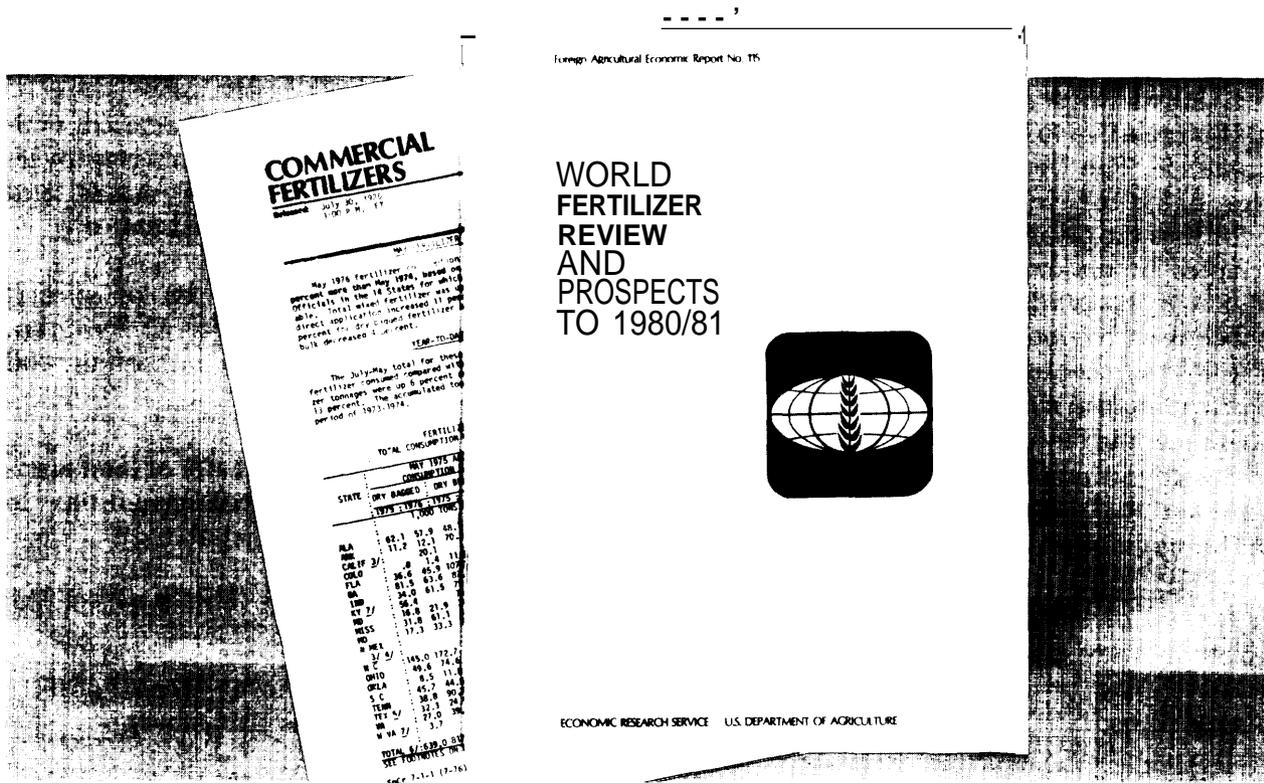
The collection of fertilizer information and its analysis and dissemination are shared by 10 governmental agencies and at least two industry-financed trade associations, The Bureau of the Census issues monthly reports on the production of inorganic fertilizer materials; the Bureau of Mines issues reports on potash, phosphate rock, and sulfur production; and the U.S. Tariff Commission issues reports on production of organic materials, especially urea. The SRS collects fertilizer utilization information from State regulatory agencies; and finally, the Bureau of Labor Statistics collects and publishes monthly fertilizer prices,

Users of these data are unhappy with this excessive fragmentation of fertilizer information, the poor quality of the data provided by some agencies, incompleteness in inventory data, and failure to issue the many reports on a coordinated time schedule. Although it may

not be feasible to consolidate the collection of information on fertilizer materials, the quality of some of the data could be improved substantially, and their release could be better coordinated,

Regarding the OTA discussion of a more fully coordinated fertilizer information system, Dr. Paarlberg noted that USDA participates in an Interagency Fertilizer Task Force established by the President's Economic Policy Board, He felt that this has been a useful activity and a forum for discussing problems and information on fertilizer. Dr. Paarlberg said that USDA looks to the Statistical Policy Division in the Office of Management and Budget as having the authority to bring about closer coordination in information that is scattered across several agencies of the Government.<sup>136</sup> (Figure 10 shows some of the reports on fertilizer information distributed by USDA).

Figure 10.—Fertilizer reports distributed by USDA-ERS



### Options to Make the USDA Information System More Accurate and Timely

Congress has a range of options for making the U.S. food and agriculture information systems more timely and accurate. It may rely on the executive branch to make the improvements indicated by the above analysis. Many of the improvements indicated as needed could be achieved by the executive branch without any changes in legislation. Even in these cases, however, Congress, if it wishes, could speed the adoption of improvements by communications from committee chairmen and ranking minority members requesting that action be taken to achieve those improvements which could be made without additional legislation. The scheduling of oversight hearings and issuance of directives as a part of the

appropriations process are other means of stimulating executive improvements.

Changes in existing legislation will be needed to achieve an integration of the Census of Agriculture and the sampling procedures of SRS. Changes in existing legislation also may be required to achieve significant improvement in the U.S. fertilizer information system,

Many of the improvements suggested could be achieved without additional governmental expenditures. The reorganization of FAS and ERS, creating a world economic intelligence unit, and the consolidation of the Census of Agriculture with SRS could be achieved without significant additional costs. The expected benefits, as indicated by OTA's study participants, should lead to substantial opportunities to improve the U.S. food information facilities,

## 11. INTEGRATING NUTRITION INFORMATION<sup>137</sup>

Throughout the world, food disappearance data are utilized as an indirect measure of the nutritional adequacy of food consumption. In the United States there is a plethora of information relative to food availability and disappearance. The Department of Agriculture, on the basis of food disappearance data, publishes the percentage of total nutrients contributed by major food groups and quantities of nutrients available per capita per day. It publishes a National Food Situation four times a year that contains many statistical tables portraying food supplies available, food disappearance, and food prices. **However, no agency of the Government collects and publishes relevant national data on the nutritional status of major population groups in the United States.**

A total of **903** bills dealing with food and nutrition were introduced into the 93rd Congress.<sup>138</sup> The principal nutrition issues appeared to be:

- Poverty as the principal correlation between hunger and nutritional deficiencies;
- Nutritional deficiencies associated with distorted food behavior, including overconsumption, found at all social and economic levels in the United States;
- Food and nutritional needs of special groups, such as pregnant women, preschool children, ethnic minorities, and the aged;
- The effort of a major transfer of food preparation and service responsibilities to the commercial sector; and
- The quality and safety of the food supply.

### Difficulties of Obtaining Meaningful Nutrition Status Information

In 1969, a panel at the White House Conference on Food, Nutrition, and Health agreed

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on the need to strive for two basic objectives in nutrition policy:

- . The establishment of a monitoring "system to evaluate the effectiveness of Federal food distribution and other programs to improve nutritional status; and
- . The establishment of a nutritional surveillance program to identify potential problems before large groups are adversely affected and as a basis for designing applied nutritional programs to correct nutritional deficiencies, especially among the poor.

Meaningful food consumption and nutrition surveillance information is far more difficult and far more costly to obtain than comparable information on food production. This arises primarily because of the difficulty of measuring nutrition deficiencies and related food consumption. Part of the high cost results from the fact that existing technologies require clinical analysis as a part of a comprehensive evaluation of an individual's nutritional status. Changing technologies might make less difficult the obtaining of useful information on the nutritional status on a more timely basis.

Nutritional scientists also are not fully agreed on the significance and reliability of specific tests for nutritional deficiencies. Further, information on nutritional status involves consideration of nutrition-related public health issues, where in many instances cause-and-effect relationships have not been fully established. It is because of these and other obstacles that little progress has been made in establishing a monitoring and surveillance program as recommended by the 1969 White House Conference,

### **Nutrition and Food Consumption Surveys**

The Federal Government does, however, carry on two activities that provide nutrition information based on consumption rather than

food disappearance. One is the Health and Nutrition Examination Surveys, which have been conducted for several years by the National Center for Health Statistics, HEW. Another is the nationwide Household Food Consumption Surveys, which were started in 1935 and have been continued at approximately 10-year intervals. The last one occurred in 1965, and another is in the planning stage, to be carried out in 1977. These surveys have been conducted by the Food Economics Institute of the Agricultural Research Service and its predecessor.

Users of the information provided by the Health and Nutritional Examination Surveys are critical of the small samples used, the failure to choose samples on a probability basis, and the excessive time lapse between gathering the data and publishing the results. Users of previous Household Food Consumption Surveys report that the design of these surveys was deficient. It proved impossible to relate the household food consumption information to important social and economic characteristics of the populations sampled.

Statisticians and automatic data-processing specialists are helping the USDA consumer and food economics staff to develop plans which will utilize the latest developments in sampling theory, automatic data-processing, and information transmission in the 1977 Household Food Consumption Survey. A closer integration of the health and nutrition surveys conducted by HEW and the Household Food Consumption Surveys conducted by USDA appears feasible and highly desirable.

Dr. West took exception to the OTA report's stating that the food and agricultural information system was basically an impersonal, production-oriented system. He said:

Although we don't integrate nutrition information into our analysis, we have made a couple of other improvements in the past 3 years that we think are consumer-oriented. The first was to increase greatly the detail of our information on price spreads and components of marketing

costs. This is an effort to explain more fully the reasons for changes in food prices, who gets what from the consumer's food dollar, and to identify areas of research for improving the efficiency of the system.

A second effort to communicate to consumers is our recent introduction of a monthly TV news service on current agricultural information. We have been successful in getting these outlook oriented features used on prime-time evening news shows in most major television markets.<sup>139</sup>

Dr. West also mentioned startup efforts to better monitor food purchases:

...a continuous survey of consumer food purchases, so we can improve our forecasting and analytical capability with respect to food prices through better measures of price and income elasticities and demand shifters.<sup>140</sup>

Mr. Sjerven noted that a recent editorial in the Milling & Baking News called attention to the fact that:

Consumption analyses recently issued by the Economic Research Service of the U.S. Department of Agriculture fill a void in data about flour and baked food usage that rank publication of the information as an important turning point in breadstuffs knowledge. . .The study provides facts about past and current flour consumption trends of a type and of a value never before available. . .<sup>141</sup>

...The innovative efforts involved. . .go right to the point of these hearings into the timeliness and accuracy of current information on agriculture. This study recognizes the limited usefulness of the Household Food Consumption Survey. . .which is published only once every 10 years. Our excitement over this study also reflects the importance to domestic users of grain and to the growers of the data provided by the various branches of the Department of Agriculture.<sup>142</sup>

Mr. Sjerven suggested "that the measurement of nutritional well-being ought to be assigned to someone."<sup>143</sup>

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## Options for Integrating Nutrition Information

The concern of Congress regarding the cost-effectiveness of the Federal food assistance programs could be satisfied by appropriate program evaluation studies. Congress, in its annual appropriations for the several food assistance programs, could authorize that a small part of the appropriations be used for evaluation studies and mandate that they be undertaken. In addition, it could set general guidelines for such studies.

Although the Office of Management and Budget has the responsibility for reviewing and integrating Federal surveys, it does not appear to have expended much effort on the coordination of the HEW Health and Nutrition Examination Surveys and the USDA Household Food Consumption Surveys, Oversight hearings on the design and compatibility of these two ongoing surveys, if conducted by an appropriate congressional committee, should be effective in increasing by a significant amount the nutritional information developed in the analysis of the data from these two now largely unrelated surveys.

As advancing technology is applied in making nutritional tests and analyzing the resulting data, it should be possible to develop less costly nutritional surveillance techniques than have been available in the recent past. This process could be speeded up substantially by funding limited experimental programs in nutritional surveillance over a period of years, thereby hastening the time when it will be feasible to launch a national nutritional surveillance program as recommended by the 1969 White House Conference on Food, Nutrition, and Health.

If Congress allocated as little as 0.1 percent of the annual cost of the Federal food assistance programs to program evaluation studies, it would be spending \$600,000 for such purposes. Clearly, Congress can require that adequate program evaluation studies be under-

taken without appreciably increasing total Federal food assistance program costs.

It is highly probable that expenditures of \$100,000 to \$300,000 annually on improved integration of ongoing surveys and experimental nutritional surveillance programs would result in a significant improvement in nutrition information over a 5- to 10-year period.

The Food Advisory Committee report recognized that the nutrition component of their

food information system report was not adequately covered. A supplementary statement prepared by Dr. Robert Nesheim, chairman of OTA's nutrition panel, details specific followup to be taken by the committee. His complete statement is found in the hearing record (pp. 341-344); however, this summary stresses the importance of nutrition in a food information system by appending key portions of Dr. Nesheim's statement to this summary and analysis, (See appendix IV.)

### III. USING ADVANCED TECHNOLOGIES

OTA's Food Advisory Committee report expressed approval of various U.S. Government agency activities and plans for exploring the potential of advanced technologies to make agricultural information systems more effective. The committee report concluded:

We believe it is urgent that the experiments and analyses utilizing new technologies for obtaining and analyzing data go forward on an expanding scale as preliminary results, including cost effectiveness analysis, justify. These newer technologies offer great promise for the years ahead.<sup>144</sup>

The committee report also noted the potential that advanced technologies have to improve agricultural information systems in developing countries. The report suggested that Congress:

... direct AID (the Agency for International Development) to increase its technical assistance for improvement of agricultural information systems, including the introduction of advanced information technology, in developing countries now most deficient in their agricultural statistical information.<sup>145</sup>

OTA's hearings pursued these FAC comments. Papers were commissioned, and a panel of experts representing the private sec-

tor and four executive agencies—National Aeronautics and Space Administration (NASA), U.S. Department of the Interior/Geological Survey, U.S. Department of Commerce/National Oceanic and Atmospheric Administration (NOAA), and the U.S. Department of Agriculture, which have been cooperating for several years—examined issues relevant to these matters.<sup>146</sup>

Three satellite systems—LANDSAT, METSAT, and DATASAT—have some utility in the agricultural area, but our principal interest is with LANDSAT.<sup>147</sup>

LANDSAT is the NASA project which is attempting to determine the usefulness of satellite-acquired remote-sensing data. NASA's Mr. Charles Matthews discussed the advantages of sensors:

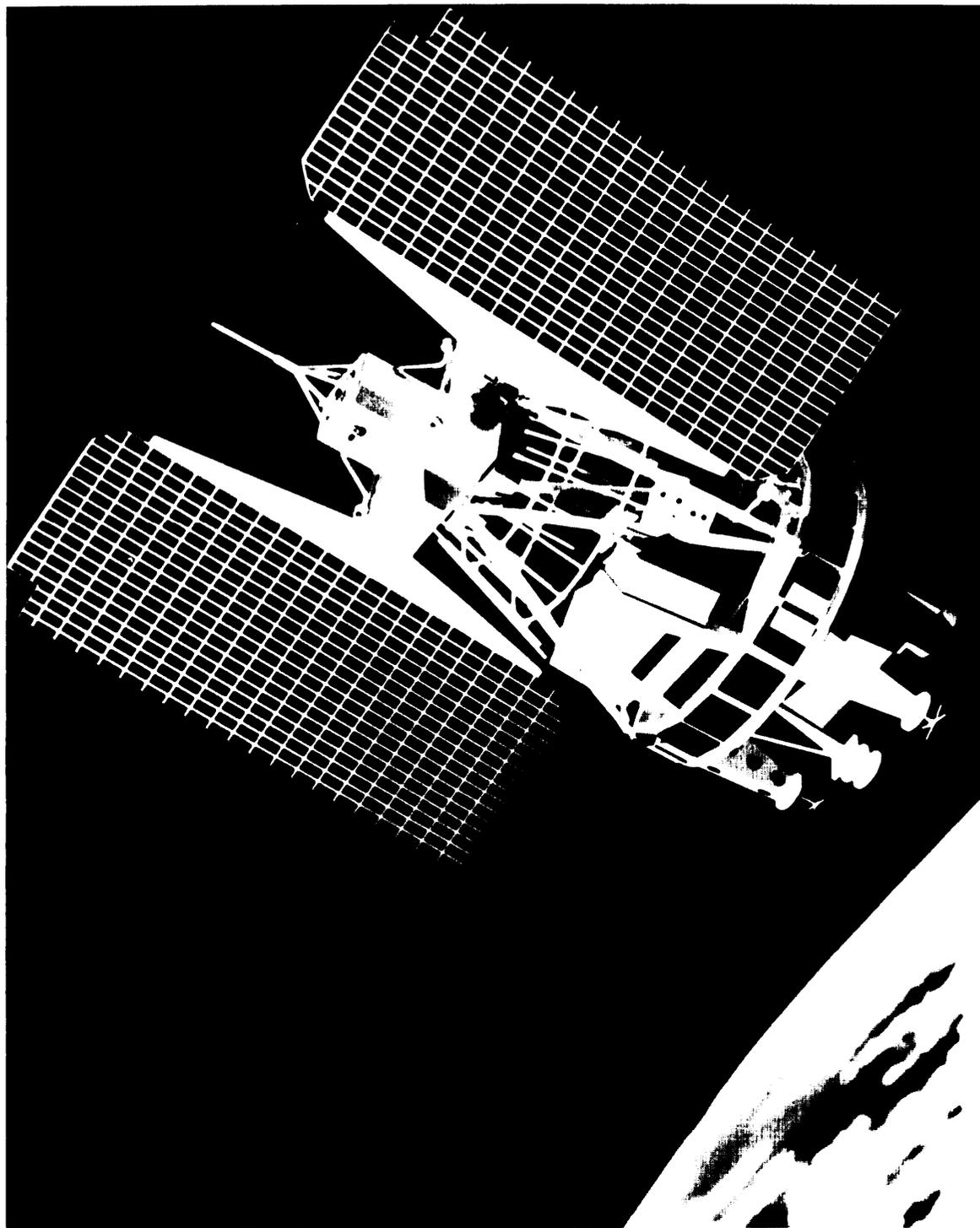
These satellites utilize advanced sensors which gather data in the most effective regions of the spectrum (the visible infrared and eventually, microwave wavelengths), not just the visual wavelengths to which cameras are essentially limited. Another advantage of these sensors is that their data can be produced in digital form, permitting rapid processing and analysis by computer. This is essential both for handling the large volumes of data acquired and also to get the most information out of the data.<sup>148</sup>

LANDSAT-1 was launched in 1972; LANDSAT-2 in 1975; and LANDSAT-C will be

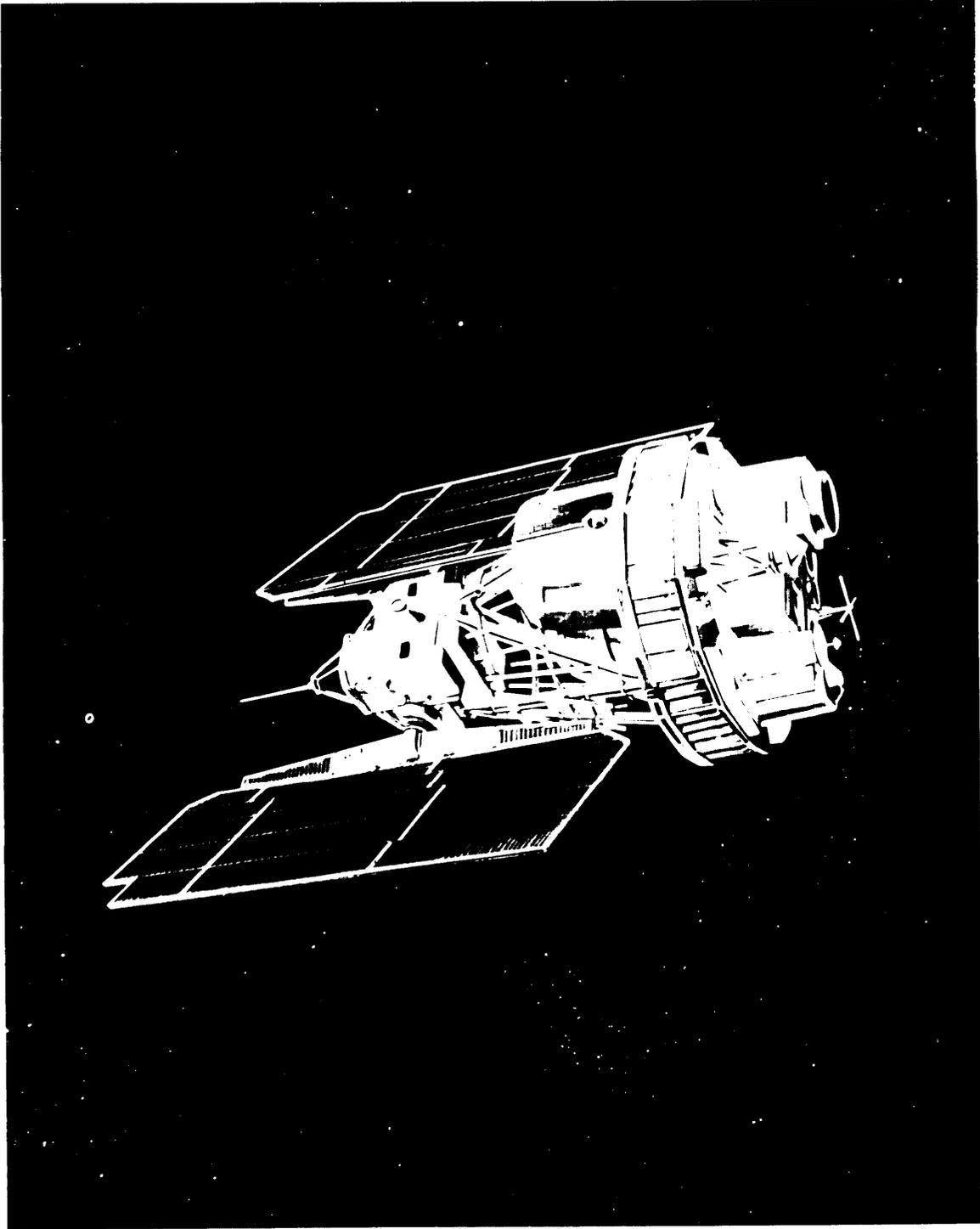
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**Figure 11.**—Artist's concept of the Earth Resources Technology Satellite-A (ERTS-1— now LANDSAT-1).  
First U.S. satellite devoted exclusively to the study of the earth's natural resources. *NASA photo*



**Figure 12.—Artist's concept of LANDSAT-2. LANDSAT-2 was launched on January 22, 1975, into a near-perfect circular polar orbit at a distance of 568 miles. The Multispectral Scanner System that LANDSAT-2 carries provide images of the earth in four spectral bands. NASA photo**



launched in 1977. These LANDSAT satellites are designed to be operative until 1980. LANDSAT data are expected to have a wide range of uses, and thus have received the attention of numerous U.S. executive agencies, including the Environmental Protection Agency, Department of Transportation, and Corps of Engineers, in addition to those to be discussed in this summary. Also in the private sector, the multinational grain exporters have shown considerable interest in LANDSAT, as well as international organizations, such as the Food and Agriculture Organization of the United Nations, World Meteorological Organization, and the International Wheat Council, “

Remote sensing technology shows progress toward providing information for:<sup>149</sup>

- water availability: demand (irrigation) and supply (snow cover);
- weather modification;
- irrigated land inventories;
- impacts of changing land use on agriculture;
- rangeland management;
- flood mapping;
- indications of climatic change;
- exploration for phosphates for fertilizer production;
- energy resources;
- demography;
- soil classification;
- crop inventories;
- plant figure estimates; and
- acreage devoted to agriculture, both in the United States and within other nations.

The advantages to be gained from the use of remote sensing seem to be legion. Mr. Matthews and Dr. Howard Hill (USDA) both noted the benefits of remote-sensing information,

Dr. Hill:

Quicker and better information on world crops could: 1) help the United States and other coun-

tries to better manage agricultural production and to minimize fluctuation in price and trade volumes; 2) provide early warnings of crop shortages due to adverse weather; 3) provide timely indications of crop diseases and insect infestations which could affect world food supplies; and 4) provide production and supply information to international organizations such as the Food and Agriculture Organization for use in carrying out their responsibilities.<sup>150</sup>

Mr. Matthews:

...more accurate and timely knowledge of current and projected world crop production. . .is required in planning and affects crop production and distribution. Exports to other countries, possibly involving millions of tons of grain, could be more effectively planned with less disruption to domestic markets and with better general economic effectiveness if world crop production could be readily estimated more in advance and on a continuing basis. Planting, marketing aid, and transportation decisions in producing countries are all based on crop inventory information, which is often available only after harvest and is frequently of uncertain accuracy in many countries. . . .A crop inventory system utilizing remote-sensing technology and the global meteorological system appears to offer great potential for upgrading existing information-gathering capabilities and for contributing to a more long-range solution of the food supply problem. , .<sup>151</sup>

He pointed out that advanced technologies, combined with current crop estimating methods and historical production data, help reduce the annual uncertainties affecting the management and marketing of major crops. Faster, earlier, and more accurate forecasts should assist in rational planning for the more effective use of supplies and should improve emergency food distribution both in the United States and abroad.<sup>152</sup>

While noting the advantages, Mr. Matthews was quick to point out that remote sensing was not expected to be a substitute for present traditional sources of information:

The accuracy of the satellite techniques. , are in most cases dependent on good supporting surface measurements (ground truth). That is, the satellite information generally cannot stand

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alone without good point source data. The advantage of the satellite is not in replacing the in situ supporting measurements but in generalizing these measurements to areas so vast (country or regional scale or larger) that no other known technique can provide the integrating information.<sup>153</sup>

In mid-1973 the Secretary of Agriculture, as part of the Department's continuing efforts to apply advances in technology to improving available food and agriculture information, created a Remote Sensing User Requirements Task Force with representatives from most departmental agencies. Eight of these agencies employ remote-sensing data in their programs. This task force has completed its cataloging of the Department's remote-sensing information requirements. Over 2,000 items of information useful to the Department's programs were identified as being potentially collectible by remote-sensing techniques. A task force implementation team—made up of USDA specialists, representatives from NASA, the Department of the Interior, and universities—has analyzed the requirements of the different programs in terms of priority of needs and available technology. Next, the cost-effectiveness of applications will be studied; and finally, a proposal for an integrated research, development, and implementation program will be submitted to the Secretary of Agriculture in fiscal year 1978.

Responding to the question of the use of remote sensing, Assistant Secretary Bell gave a personal view:

I think that in 4 to 5 years from now, the remote sensing will be very beneficial to us for crop forecasting, not only in the Soviet Union but in other places.<sup>154</sup>

He reviewed the present U.S. use of satellites to photograph Soviet crops:

We are using the satellite to give us information on the Soviet crop situation. At this stage,

the usefulness is quite limited, . . . The Soviet Union becomes much more hazardous in terms of trying to estimate than our own country, because of where it is geographically located. It is so much further north, the season is much shorter, and it is subject to change very quickly.<sup>155</sup>

The Large Area Crop Inventory Experiment (LACIE) is the best example of USDA's effort to exploit advanced technology and improve its agricultural information system. LACIE is the first attempt to use and measure the cost/benefit of such use in the agricultural area. This experiment pulls together several new and emerging technologies into one comprehensive system.

LACIE uses data from LANDSAT - 1 and -2 and from meteorological satellites and existing worldwide meteorological ground data systems in an experiment aimed at improving global crop production estimates by USDA's Foreign Agricultural Service. Figures 13, 14, 15, and 16 are various types of satellite photographs utilized in information gathering,

Mr. Hume indicated that the LACIE system could inform us of the spread of crop disease and insect infestation which could affect world food supplies; it could flash an early alert of crop shortfalls due to adverse weather and provide improved production estimates to international organizations.<sup>156</sup>

Dr. Hill explained the LACIE program:<sup>157</sup>

LACIE will be carried out in three phases. Phase 1, carried out in 1975, tested acreage estimating capabilities in selected wheat-producing areas of the United States. Wheat yield models were developed during this phase. Phases 2 and 3 will test LACIE capabilities to estimate wheat area, yield, and production in the United States and other wheat-producing regions. Phase 2 began in October 1975 and Phase 3 begins October 1976. Monthly crop forecasts will be prepared during the growing season. Associated research and development and tests of new techniques for crop identification measurement and yield estimation will be conducted throughout the experiment. . . , It is important to stress that LACIE

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NOTE: Footnotes appear at end of chapter,

Figure 13.—NASA/NOAA satellite photograph shows cloud cover over the U.S. and Mexico. NOAA photo



Figure 14. False color map of the 48 contiguous states. The United States is assembled from satellite images produced by NASA by the US Department of Defense. The map was produced from 595 black and white images used by ERTS at an altitude of 560 miles. NASA photo.



Figure 15.—A black and white copy of a color photograph taken by ERTS-1 of the area between Boston, Massachusetts and Norfolk, Virginia. The original color photograph contained 3 colors: bright red—depicting healthy crops, trees, and vegetation; industrial areas show up green or dark gray; clear water as black; suburban areas in light pink; and barren lands as light gray. NASA *photo*



Figure 16.—Infrared channel image showing most of Europe  
from NOAA 4 Satellite, May 8, 1976,



is an experiment, and recommendations for future program use will be based on the outcome of evaluations that are made as the experiment proceeds, . . . Although LACIE now is limited to wheat, it is expected that programs and techniques developed during the experiment can be applied to the estimation of other agricultural crops and land use. If successful and if found to be cost-effective, a crop forecasting system utilizing the earlier mentioned technologies would provide better and more timely crop estimates as inputs to the Department's international crop information collection and reporting system,

LACIE is a large and technically complex undertaking, involving close cooperation between two Departments (Agriculture and Commerce), one independent Agency (NASA), and several agencies within each of the Departments. The present experimental approach should, in time, be replaced by a user system capable of applying current technology and the advanced technology now planned for the 1980's. Thus LACIE is providing an environment both for testing technology—including future technology relevant to crop identification and yield forecasting—and for determining how best to utilize modern analytic capabilities in carrying out an information function.<sup>158</sup>

Dr. Hill also discussed advanced technology, including the use of satellites with respect to the Foreign Agricultural Service, the Statistical Reporting Service, and the Economic Research Service,:

#### Foreign Agricultural Service

The backbone of the Foreign Agricultural Service information system is its Agricultural Attache Reporting System, which relies on attach& stationed in 63 posts around the world reporting on 82 countries,

It is necessary to aggregate, process, and summarize to a great extent the high volume of detailed information concerning foreign production, imports, exports, consumption, and stocks to get a meaningful picture of existing world stocks of food and feed grains and the potential demand for U.S. agricultural products. The Foreign Agricultural Service utilizes a computer system for storage and retrieval of this informa-

tion as well as for statistical analysis and simple modeling to support its Foreign Commodity operation.

The Foreign Agricultural Service plans to make future use of advanced technology where it is both cost effective and funded. Plans include making FAS's computerized information systems more readily accessible to economists and commodity analysts through interactive computer terminals in commodity divisions. This will allow FAS economists to have more current information when it is needed and facilitate statistical analysis and econometric modeling,

FAS also hopes to be able to employ advanced techniques associated with intercontinental message switching and data transmission to improve attache information collection and reporting. The actual use of these technologies, however, will depend upon the outcome of a future cost benefit analysis and the availability of funds for such a project.

#### Statistical Reporting Service

Since the launch of LANDSAT-1 (ERTS 1) in 1972, the Statistical Reporting Service has conducted a continuing program to investigate the potential use of this imagery as a tool for collecting agricultural information. The primary thrust of the work to date has been in the area of crop identification and the development of methods to estimate crop acreages from LANDSAT imagery. Key components of this system under study are: (1) design and development of a flexible automated computerized data handling system for data conversion, calibration, interpretation, pattern recognition and statistical analysis; (2) development of a multistage sampling design that will utilize LANDSAT data, ground observations and related data in the estimation process; (3) analyzing data acquired considering accuracy, data acquisition cost, coverage, and availability for optimizing number and size of ground sample segments; (4) evaluation of alternative land use and crop classification systems using LANDSAT data for improving current SRS sampling frames; and (5) comparisons of crop identification and classification results from high altitude aircraft photography and LANDSAT to determine potential improvements in classification that could occur with better resolution satellite imagery,

Research results show that LANDSAT classification accuracy for crops is closely related to field size, field shape, and diversity of crops

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NOTE: Footnotes appear at end of chapter.

produced, Accuracy ranges from about 90 percent for Southwest Kansas with 4 crops down to 40 percent for central Idaho with 12 crops. Classification accuracy was improved, ranging to about 80 percent for 15 crops in Idaho, when higher resolution aerial photography was used. However, operational problems related to handling large volumes of data in such a system must be resolved before it can be tested for a large area.

Computer software has been developed that can match and retrieve LANDSAT data and corresponding ground truth sample data and estimates. This system allows LANDSAT information to be correlated with ground truth data obtained from routine field surveys.

The correlation (R) of LANDSAT data and SRS ground truth data for identical areas ranges from 0,5 up to 0,8. We believe that the LANDSAT data can be used to improve existing acreage estimates. Further study will be conducted to test this theory for other areas of the country and to develop cost estimates for the potential improvements using LANDSAT and other survey procedures.

LANDSAT data will be processed on the IL-LIAC IV Computer (a parallel processing system using 64 computers linked together and a separate computer serving as the Central Processing Unit). This computer can process over 7 million pixels (data points) in about 12 minutes. A digitizer that generates a system of coordinates is used to extract sample segment data from LANDSAT frames (tapes) for correcting classification errors, using ground truth acquired by personal enumeration of sample segments.

Problems that must be resolved before this technology can be put into any operation system include: (1) earlier availability of LANDSAT tapes, (2) improvements in the ability to extend crop signatures between LANDSAT frames, and (3) refinements in specified crop signatures that will improve classification and measurement accuracy.

The use of photography for making orchard tree and fruit counts also is being researched. A computer model uses digitized information from aerial and ground photographs. Results show that fruit trees as well as mature oranges, apples,

and peaches can be successfully counted from data obtained from photographs. The tree counts can be used in sample surveys to estimate tree populations while the automated fruit counting system can be used in a multistage sampling design to more precisely estimate the number of fruits per tree.

### Economic Research Service

The Economic Research Service provides economic information on the agricultural sector to public and private decisionmakers. The task has become more difficult as U.S. agriculture moves away from controls and comes more directly under the influence of domestic and foreign economic conditions. ERS has recognized the need to apply advanced techniques to problems of data management and it recently centralized its automatic data processing services into one unit, consisting of a data storage system linked to a generalized analytical package for estimating relations, making variable transformations, plotting data, and conducting statistical analyses. This technology will aid analysts by reducing the time required to conduct an analysis while increasing the amount of data which can be analyzed. Quality and timeliness of the analyses will be improved and other agricultural analysts will be able to retrieve data from the system more quickly. Ultimately, this will benefit the decisionmaker through improved information on which to base decisions.<sup>159</sup>

### Tentative Conclusions About LACIE

In reviewing and analyzing the LACIE program, Mr. Matthews concluded that:

Preliminary indications, based upon our initial assessments of the first year's performance, are that the LACIE acreage estimation techniques are generally adequate, and that with incorporation of certain technical changes, desired accuracy goals can be achieved.<sup>160</sup>

Others agreed that the first year's results have been favorable. Dr. White said: "In our opinion LACIE has tremendous potential for providing prompt, objective worldwide information on critical crops."<sup>161</sup>

However, there are impediments to fuller use of remote-sensing data. Agencies with

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NOTE: Footnotes appear at end of chapter.

operational responsibilities expressed caution in becoming dependent on LANDSAT data. Since, LACIE is essentially dependent upon LANDSAT, three deficiencies are relevant to future use of remote sensing in an agricultural information system:

1. LACIE is experimental, There is no assurance of continuity beyond about 1980 or even earlier if a spacecraft or launch vehicle fails.
2. Data are not available soon enough to be used in making time-critical decisions,
3. Standard photographic products contain less than the complete data content of the original digital data, thus precluding their use in some unique applications,

Dr. John DeNoyer of the Geological Survey (Department of the Interior) summed up these findings this way:

The greatest bottlenecks in terms of operational uses are questions of continuity of follow-on satellites similar to LANDSAT, quality of data provided to users, timeliness or currency of data when it reaches the user, and transfer of technology to users.<sup>162</sup>

The last two reasons are technical. The solutions are available and NASA and the Earth Resources Observation Systems (EROS) data center are augmenting their data-processing and distribution systems to make the necessary improvements. Dr. DeNoyer said that to assure continuity "would require a commitment by the United States and appropriate funding levels to support an operational program."<sup>163</sup> In the panel's view, failure to make such a commitment would keep the United States from continuing its leadership in global earth resources satellite activities.

The principal and overriding issues that emerge from a synthesis of the prepared papers, the testimony of individuals at the

hearings, and the answers to questions that were submitted after the hearing is whether remote-sensing technology **can be applied on an operational basis within a food system; and whether the LACIE program, although not yet complete, has provided adequate information to justify U.S. Government financial commitment to assure expert user agencies of its continuous availability.**

Table 2 details the USDA budget commitment to LACIE and other related USDA remote-sensing activities. The low level of funds committed emphasizes the distinction between experimental and operational uses. Dr. Hill stressed this:

If a decision is made to make LACIE operational, the requirement of a system with a capability to provide routine repetitive international crop forecasts would require a continuing flow of earth resources and meteorological data which are available to the user within a short time after acquisition, are repeated at frequent intervals throughout the growing season and are suitable for computer processing and analysis. Of course, a decision to implement a crop forecasting system at the end of LACIE also is contingent on a determination that information generated is sufficiently accurate, timely, and cost-effective to warrant an investment in such a program.<sup>164</sup>

The most positive conclusions were reached by the only nongovernment expert on the panel, Dr. Arch Park of Earth Resources Satellite Corporation, who said:

Current earth-observing satellites have demonstrated that with the proper technical, scientific, and institutional support, they can be employed in an operational system designed to provide a continuous overview of agricultural production and agricultural land use on a global basis with the inherent capability to forecast production in advance of harvest.<sup>165</sup>

Dr Park noted that some of the present LANDSAT deficiencies had to do with spatial, spectral, and temporal resolution, format, and throughput,<sup>166</sup> and he added that lack of an approved operational program has had a bad impact on agricultural investigations.<sup>167</sup>

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NOTE: Footnotes appear at end of chapter,

Table 2.—United States Department of Agriculture\* —Remote Sensing  
(Dollars in thousands)

Agency	Program level		
	FY1975 (Actual)	FY1976 (Estimate)	FY1977 (Budget request)
Large Area Crop Inventory Experiment (LACIE)			
Foreign Agricultural Service . . . . .	—	\$2,000	\$2,850
Agricultural Stabilization and Conservation Service . . . . .	\$950	—	—
Economic Research Service . . . . .	—	—	—
Statistical Reporting Service . . . . .	—	—	—
Agricultural Research Service . . . . .	—	—	—
Soil Conservation Service . . . . .	—	—	—
Total LACIE . . . . .	950	2,000	2,850
Other Remote Sensing			
Animal and Plant Health Inspection Service . . . . .	50	22	51
Agricultural Research Service . . . . .	380	349	508
Agricultural Stabilization and Conservation Service . . . . .	2,722	2,610	2,646
Cooperative State Research Service . . . .	143	160	177
Economic Research Service . . . . .	30	14	35
Forest Service . . . . .	1,590	1,770	1,925
Soil Conservation Service . . . . .	120	152	174
Statistical Reporting Service . . . . .	215	796	799
Total, Other Remote Sensing . . . .	5,250	5,873	6,315
Total USDA Remote Sensing . . . .	\$6,200	\$7,873	\$9,165

\*Detailed statement of Dr. Don Paarlberg, Director of Agricultural Economics, U.S. Department of Agriculture. Prepared for Committee on Aeronautical and Space Sciences, United States Senate, February 5, 1976.

He concluded that time from acquisition of the data to delivery of that data (now about 3 weeks):

...is perhaps the most serious deficiency in the present LANDSAT program, and denies to the serious investigator the ability to conduct an experiment in anything like realtime. It is in every case an after-the-fact analysis of the data. This

has had a serious impact on the experimental program in NASA, and has resulted in a lack of serious agricultural investigations. , .<sup>168</sup>

### Consensus and Conclusion

Two major sources of information are utilized in food information systems operated by national governments, international organizations, and private firms. They are satellite data and traditional collateral data.

NOTE: Footnotes appear at end of chapter.

New technologies are becoming available to support the traditional manner in which information is collected, analyzed, and disseminated. As Mr. Matthews noted in his testimony:

...traditional systems were designed to cope with traditional problems, which the international food crisis is not. To be effective, contributions for new systems will be required.<sup>169</sup>

New systems that can address major requirements for: (1) worldwide standardized data collection relating primarily to food supply but also to food demand; (2) rapid data processing; and (3) accurate data analysis were described:

These (new) techniques involve the use of remote-sensing satellites to provide large area, worldwide, repetitive coverage as well as weather conditions affecting agricultural yield. These satellites utilize advanced sensors which gather data in the most effective regions of the spectrum, . . .

(These) data . . . can be produced in digital form permitting rapid processing and analysis by the computer. This is essential both for handling the large volumes of data acquired and also to get the most information out of the computer.<sup>170</sup>

In sum, Mr. Matthews concluded that a "marriage of the satellite, sensor, and computer, and in conjunction with traditional techniques, (makes) a worldwide food information system. . . possible, "'<sup>171</sup> (Emphasis supplied)

Many capabilities of remote sensing have been demonstrated. Others are in the research stage. Still more areas of application have not been started. The entire potential for using remote-sensing technology cannot be adequately measured at this time. However, the consensus of the panel is that the demonstrated capabilities do represent a major contribution toward achieving many information needs. More emphasis needs to be placed on

physical models to turn data into useful information and still more attention needs to be placed on using this information for real management decisions,

A recent (January 30, 1976) General Accounting Office (GAO) study of NASA's Land Satellite Project supports a major theme found in OTA's analysis:

None of the Federal agencies involved in the LANDSAT project has developed a long-range comprehensive plan which includes user requirements to assist in deciding if and when LANDSAT should become an operational system.

Related to this is the question of the Federal Government's role in supporting satellite-based remote-sensing technology.<sup>172</sup>

The GAO study reported that the cost-benefit studies performed separately by NASA and the Department of the Interior showed divergent results because of different assumptions used.<sup>173</sup>

The GAO report recommended that:

NASA take the initiative to lead the other participating agencies in developing a plan which includes requirements, milestones, and dates for evaluating progress being made toward the goal of deciding if and when there should be an operational earth resources satellite system, . . . Such a plan must postulate a Federal Government policy role in satellite-based remote-sensing technology. . . (addressing) 1) the assignments of roles and responsibilities to the involved agencies, 2) interrelationships among oceanographic, meteorological, and earth resources satellite systems, 3) alternative organizational arrangements for operational systems reflecting differing degrees of Government, private sector, and international participation, and 4) estimated resource and funds requirements to be filled by the Federal Government.<sup>174</sup>

Dr. Park, understandably the most outspoken witness on the panel, concluded that:

...such a system is feasible, that both the requisite hardware and software exist, and that the

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NOTE: Footnotes appear at end of chapter.

creation of such an operational system would provide the most appropriate base for the orderly development of foreseeable technological improvement.<sup>175</sup>

He feels that the experimental phase of the program was finished when NASA demonstrated that LANDSAT-1 worked successfully in orbit. Thus, Dr. Park believes that the only important function which should be changed in terms of the existing program is a commitment by the user agencies to provide an analytical operational capability that is presently missing in some agencies of the Government. In addition, Dr. Park strongly urged "that a centralized data processing and analysis facility be created for the staff that will operate it."<sup>176</sup>

### **Options for Accelerating the Use of Advanced Technology**

The use of remote-sensing data clearly holds great promise for increasing the timeliness, coverage, and analysis of food and agricultural information. Most agencies make use of advanced technologies to obtain more information and/or conduct more sophisticated analyses of available data.

The use of advanced technology is presently constrained by the lack of a follow through commitment to make remote sensing an opera-

tional program. This is imbedded in budget. Congress, to a substantial extent, speeds or slows the adoption of advanced technology by its appropriations for this phase of an agency's program. As noted above, it has authorized an experimental remote-sensing program involving NASA and the Departments of the Interior, Agriculture, and Commerce until 1980. Governmental agencies are finding these remote-sensing data highly useful but are reluctant to become dependent on a source of information which may not continue after 1980. **An early decision to authorize a continuing LANDSAT program would speed the adoption and broaden the use of remote-sensing data.**

The LANDSAT program appears to be even more valuable in making international information available to the United States on a timely basis than in increasing the information available on domestic food production. Congress may wish to take the leadership in exploring the possibilities of increasing international cooperation in LANDSAT programs.

The great promise of improved coverage and timeliness in a food information system based on the collection and analysis of remote-sensing data can be realized only at a substantial increase in total information costs. At this stage it would appear to be on the order of several hundred million dollars annually.

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NOTE: Footnotes appear at end of chapter.

## FOOTNOTES

<sup>1</sup>Noted by Assistant Secretary of Agriculture Bell as "the most effective international body in the gathering and analyzing and dissemination of (wheat) information." Hearings, p. 42.

The principal groups worth noting are. Organization for Economic Cooperation and Development (OECD); International Cotton Advisory Committee; World Meteorological Organization (WMO); International Monetary Fund (IMF); International Bank for Reconstruction and Development (World Bank).

<sup>3</sup>In addition to the Department of Agriculture, other executive agencies are involved in food information systems.

The Bureau of the Census in the Department of Commerce is a major producer of time series data. Its major report in this area is the Census of Agriculture. A comprehensive document entitled "Food Industries Data Sources" has been prepared by the Department of Commerce (March 1975) outlining the data published by the Federal Government and selected private groups.

The Department of Labor's Bureau of Labor Statistics conducts monthly surveys of consumer and wholesale prices, which include many food items.

The National Center for Health Statistics of the Department of Health, Education, and Welfare conducts the Health and Nutrition Examination Survey (HANES), which involves taking a 24-hour dietary history and checking the health of participants. The survey is conducted from mobile laboratories moved from city to city.

The Federal Trade Commission collects considerable data on the food industry through special surveys, used as a basis for regulating competition and unfair trade practices.

Others—such as the Department of State, the National Science Foundation, and the National Academy of Sciences—issue reports dealing with food and agriculture matters from time to time.

<sup>4</sup>Hearings, p. 52. Assistant Secretary of Agriculture Richard Bell was questioned as to how the Department of Agriculture became aware of impending Soviet grain purchases in 1975, Senator Humphrey asked, "How did Secretary Butz learn of the Soviet's grain-buying plans in July 1975?" Secretary Bell responded:

Our first information . . . regarding the Soviet purchase intentions in fact came to us through the export firms.

The export firms for the past year have been almost in constant contact with Soviet buyers; and they go in and out of Moscow almost weekly, and there is something there generally every day.

We have asked them to keep us posted on the Soviet attitudes and information. They have done a good job of doing that. They have generally given us a report on every trip in and on every trip out and in June 1975 they began to tell us that they felt the Soviets were showing an interest and were probably going to buy.

Assistant Secretary Bell went on to say that when it appeared that the grain companies were about to negotiate agreements, they kept the Department of Agriculture "informed of the quantities they were talking about; each firm told us the quantities they were working on; we kept that information generally to ourselves about what each company was doing. . ."

<sup>5</sup>Hearings, p. 88.

<sup>6</sup>*ibid.*

<sup>7</sup>See pp. 49-52, 99, and 103 of this report for detailed summaries of all suggestions made to OTA in the course of the study. These suggestions helped frame options for congressional action.

<sup>8</sup>Detailed descriptions of these key agencies can be found in the hearing testimony as follows: Regarding FAS, pp. 104-107, 120-123; Regarding ERS, pp. 107-120, 123-130; Analysis of FAS and ERS, pp. 81-97.

<sup>9</sup>"Scope and Methods of the Statistical Reporting Service," USDA, Miscellaneous Publication No. 1308, July 1975, provides valuable insights into this USDA agency.

<sup>10</sup>Hearings, pp. 90, 92, and 121.

<sup>11</sup>Hearings, pp. 120-123.

<sup>12</sup>Hearings, p. 120.

<sup>13</sup>Hearings, p. 88.

<sup>14</sup>*ibid.*

<sup>15</sup>Hearings, p. 91.

<sup>16</sup>Hearings, p. 170.

<sup>17</sup>Hearings, p. 89.

<sup>113A</sup> report to the Congress entitled "The Agricultural Attache Role Overseas: What He Does and How He Can Be More Effective for the United States," prepared by the Comptroller General of the United States, April 11, 1975. provides more detailed resource material than the OTA study or hearing record.

<sup>19</sup>The Central Intelligence Agency feels that major communications barriers with USDA have been overcome since 1973. Institutional barriers still remain—namely, economic and food intelligence information reaches only the top-level USDA decisionmakers. This information is held rather tightly. The information that passes to the working-level analyst is well filtered. Not all senior analysts in ERS are cleared to receive it. Likewise, what flows to Congress undergoes more sanitation via USDA.

Two lines of inquiry were not pursued by OTA: (1) the accuracy of CIA information and its frequency, quality, and flow within USDA; and (2) how Congress might obtain access to CIA intelligence data on a regular basis.

<sup>20</sup>Hearings, pp. 45, 114, and 125.

<sup>21</sup>Hearings, p. 230. A paper prepared at OTA's request by Mr. E.A. Jaenke, President of E.A. Jaenke & Associates, Inc., enumerated the major agencies, departments, and government bodies that have some significant input in the total food equation. These decisionmakers number 26 and are listed as appendix 111 along with an executive office organization chart. See also, Hearings, pp. 173-178.

<sup>22</sup>Detailed statistics and numbers on circulation can be found in Hearings, p. 120.

<sup>23</sup>Hearings, pp. 92, 124-125.

<sup>24</sup>Hearings, p. 124.

<sup>25</sup>Hearings, p. 124. Refers to the Office of Technology Assessment Food Advisory Committee Report, p. 40.

<sup>26</sup>Hearings, p. 92.

<sup>27</sup>*Ibid.*

<sup>28</sup>Agricultural Research Service, Agricultural Marketing Service, Hearings, pp. 16 and 18.

<sup>29</sup>The OTA study found more consistent praise for SRS than for any other element in USDA's information network. (Hearings, p. 94.) Another notice of high praise is found in a comment by Dr. Hosea Harkness, who, commenting on some of the USDA organizations playing key roles, felt that the SRS "is the most sophisticated agricultural data collection service in the world. Reports are released with a timeliness that exists nowhere else. Quality of the forecasts and estimates are unsurpassed." (Hearings, p. 133.)

hearings, p. 167.

<sup>31</sup>Hearings, p. 41.

hearings, p. 41.

<sup>33</sup>"The Soviet Grain Shortage: A Case of Rising Expectation," Current History, June 1975, p. 246.

<sup>34</sup>Hearings, p. 75.

<sup>36</sup>Hearings, p. 76.

<sup>37</sup>Hearings, p. 6.

<sup>37</sup>Hearings, p. 144.

<sup>38</sup>Hearings, p. 43.

<sup>39</sup>Hearings, pp. 43-44.

<sup>40</sup>A copy of the treaty appears in Hearings, pp. 61-70. Assistant Secretary Bell noted that the United States has similar cooperative agreements with Eastern Europe Communist countries to fill knowledge gaps. These include Poland and Romania; with East Germany a serious gap remains. (Hearings, pp. 46-47.)

<sup>41</sup>Hearings, p. 56. Refer to treaty document pp. 65-66 for a list of categories.

<sup>42</sup>Hearings, p. 56.

<sup>43</sup>Hearings, p. 56. A later witness, Professor Luther Tweeten, said: "The Soviet Union itself seems to lack adequate data on commodity production and utilization. In part this stems from failure of its statistical reporting system, which can be improved. But in part the inadequate data stems from changes in production late in the crop season including failure to harvest grain in the fields because of inclement weather. (Hearings, p. 222.)

<sup>44</sup>Hearings, p. 38.

<sup>45</sup>Hearings, p. 56.

<sup>46</sup>Hearings, p. 38.

<sup>47</sup>Hearings, p. 339.

<sup>48</sup>*Ibid.* Seth and Cochrane urged the "U.S. Government to press for full cooperation in the furnishing of information on production, use, and stockpiling of food commodities, especially grain. Investment by the United States in improving the fundamental data base both home and abroad for projecting commodity requirements would pay a high return in terms of reducing surprise, uncertainty, and speculative price gyrations." (Hearings, p. 197.)

<sup>49</sup>Hearings, p. 44.

<sup>50</sup>Hearings, p. 57

<sup>51</sup>Hearings, p. 57

<sup>52</sup>Hearings, p. 269.

<sup>53</sup>*Ibid.*

<sup>54</sup>Hearings, p. 269.

hearings, p. 57.

<sup>56</sup>Hearings, p. 9.

<sup>57</sup>Hearings, p. 122. See also earlier discussion on agricultural attachés in this summary, pp. 7-10.

<sup>58</sup>Hearings, p. 123.

hearings, p. 124.

<sup>60</sup>Hearings, p. 124.

<sup>61</sup>Hearings, p. 124.

<sup>62</sup> Hearings, pp. 124-125.

<sup>63</sup> Hearings, pp. 125-126.

<sup>64</sup> Hearings, p. 126.

<sup>65</sup> Hearings, p. 127.

<sup>66</sup>*Ibid.*

<sup>67</sup>Hearings, p. 133.

<sup>68</sup>Hearings, p. 130.

<sup>69</sup>Hearings, p. 137.

<sup>70</sup>Hearings, p. 138.

<sup>71</sup>Hearings, p. 138-139.

<sup>72</sup>*Ibid.*

<sup>73</sup>Hearings, p. 144.

<sup>74</sup>Hearings, p. 139.

<sup>75</sup>Hearings, p. 140.

<sup>76</sup> Hearings, p. 147.

<sup>77</sup> Hearings, p. 148-150; 159, 160.

<sup>78</sup>Hearings, p. 154.

<sup>79</sup> Marketing margin: the difference between what the farmer gets for his raw product and what the consumer pays at retail for the finished product.

<sup>80</sup>Hearings, p. 148.

<sup>61</sup> Hearings, pp. 149-150.

<sup>62</sup> Hearings, pp. 151-153.

<sup>83</sup> Hearings, p. 150.

<sup>84</sup>Deficiencies were noted by all OTA participants and were acknowledged by USDA. Mr. Howard Hjort's testimony and analysis provided useful categories upon which to base this summary. (Hearings, pp. 92-95.)

<sup>65</sup> Noted by FAC report, pp. 25-26; by Assistant Secretary Bell, pp. 37 and 42; by Dr. Hathaway, p. 70; Mr. Jaenke, pp. 170 and 186; Dr. Cochrane and Mr. Seth, p. 197. (All page numbers refer to Hearings.)

<sup>66</sup>Noted by FAC report, pp. 19-22; Dr. Hathaway, p. 75; Mr. Sjerven, p. 137; Mr. Johnson, pp. 147-148; Mr. Hamilton, p. 156; Mr. Jaenke, p. 186. (All page numbers refer to hearings.)

<sup>87</sup>Noted by FAC report, pp. 14, 22-24; Dr. Hathaway, pp. 78-79; Mr. Hume, p. 123; Dr. West, pp. 124-125; Mr. Hamilton, p. 154; Mr. Jaenke, p. 186. (All page numbers refer to Hearings, )

<sup>86</sup> Noted by FAC report, pp. 23-24; Mr. Harkness, p. 134; Mr. Sjerven, p. 138; Mr. Keefe, pp. 143-144; Mr. Hamilton, Hearings, p. 155; Mr. Jaenke, p. 186. (All page numbers refer to hearings. )

<sup>69</sup> Hearings, p. 76.

<sup>90</sup>Hearings, p. 26.

<sup>91</sup>Hearings, p. 197.

<sup>92</sup>Hearings, p. 118.

<sup>93</sup> Hearings, p. 156. For FAC discussion on broiler prices, see Hearings, pp. 19-20.

<sup>94</sup>Hearings, pp. 126-127.

- 95Hearings, p. 118.  
 96Hearings, pp. 19-20.  
 97Hearings, p. 102.  
 98Hearings, p. 93.  
 99Hearings, p. 123.  
 100Hearings, pp. 124-125.  
 101Hearings, p. 146.  
 102*Ibid.*  
 103Hearings, p. 93.  
 104Hearings, pp. 201-202.  
 105Hearings, p. 95.  
 106Hearings, p. 95.  
 107Hearings, pp. 143-144.  
 108Hearings, pp. 93-95.  
 109Hearings, pp. 93-94.  
 110Hearings, p. 94.  
 111Such a measure was supported by Seth and Cochrane (Hearings, pp. 201-202). See also their comments pp. 192-193.  
 112Hearings, p. 94.  
 113Hearings, p. 134.  
 114Frazier, Hearings, p. 149; and Hjort, Hearings, p. 85.  
 115USDA opposes such a Board. See testimony by Hume, Hearings, p. 112.  
 116Hearings, p. 134.  
 117Hearings, p. 112.  
 118Hearings, p. 113.  
 119Hearings, p. 202. See also p. 193.  
 120Hearings, p. 95.  
 121Hearings, p. 95.  
 122Hjort, Hearings, p. 95.  
 123Hearings, p. 202.  
 124Food Advisory Committee report, Hearings, p. 19.  
 125Hearings, p. 20.  
 126Detailed discussion, pro and con, of this topic is found in Hearings, pp. 356-392.  
 127Hearings, p. 21.  
 128Hearings, p. 356.  
 129Hearings, p. 373.  
 130*Ibid.*  
 131Hearings, pp. 387-389.  
 132Hearings, p. 222.  
 133Hearings, p. 118.  
 134Hearings, pp. 102-103. See also p. 119.  
 135Hearings, p. 103.  
 136Hearings, p. 119.  
 137The material for this section was developed by OTA staff for use in the Food Advisory Committee report. See Hearings, pp. 29-33.  
 138Derived from staff bill analysis found on pp. 106-107 of this summary and analysis.  
 139Hearings, p. 126.  
 140Hearings, pp. 126-127.  
 141Milling & Baking News, October 7, 1975, as cited in Hearings, p. 137.  
 142Hearings, p. 137.  
 143Hearings, p. 138.  
 144Hearings, p. 24.  
 145Hearings, p. 26.  
 146Much of this discussion was laced with the technical aspects of remote sensing. This summary and analysis has attempted to distill the policy issues from the presentations and discussions of witnesses. The interested reader may refer to the Hearings, pp. 243-336, to review these technical matters.  
 147METSAT and DATASAT were intended to acquire operational data to meet the needs of the organizational entities responsible for their design and employment.  
 METSATS (see Hearings, pp. 318-320) are the NOAA-3 and -4 satellites of the Department of Defense.  
 DATASATs (see Hearings, pp. 320-322) are the COMSAT/INTELSAT Communications Satellites and the DOMSAT series.  
 However, both systems may have utility for an agricultural information system — i. e., METSATS, weather and precipitation data; and DATASATs, a telemetry channel for data transmission.  
 148Hearings, p. 249.  
 149Hearings, pp. 249, 277, 314-315.  
 150Hearings, p. 299.  
 151Hearings, p. 253.  
 152*Ibid.*  
 153Hearings, p. 255.  
 154Hearings, p. 40.  
 155Hearings, p. 45.  
 156Hearings, p. 123.  
 157The reader may obtain technical background from Mr. Matthews' statement concerning LACIE in Hearings, pp. 250-253, and from Dr. Park's statement in Hearings, pp. 312-318.  
 158Hearings, pp. 298-299.  
 159Hearings, pp. 299-301.  
 160Hearings, p. 253.  
 161Hearings, p. 273.  
 162Hearings, p. 293.  
 163Hearings, p. 293.  
 164Hearings, p. 299.  
 165Hearings, p. 311.  
 166Hearings, pp. 316-317.  
 167Hearings, p. 317.  
 168Hearings, p. 316.  
 169Hearings, p. 249.  
 170*Ibid.*  
 171*Ibid.*  
 172Land Satellite Project, National Aeronautics and Space Administration. Study by the staff of the U.S. General Accounting Office, January 30, 1976, Publication No. PSAD-76-74. (GAO report), pp. 1-2.  
 173GAO report, pp. 2, 18, 31.  
 174GAO report, p. 3.  
 175Hearings, p. 335.  
 176Hearings, p. 327.