USING FARM PROGRAMS TO PROMOTE WATER MANAGEMENT GOALS

Innovative Arrangement Using U.S. Department of Agriculture Programs to Promote Water Resource Management in California

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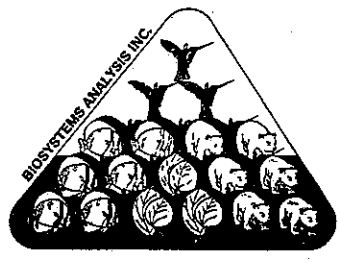

USING FARM PROGRAMS TO PROMOTE WATER MANAGEMENT GOALS

Innovative Arrangements Using U.S. Department of Agriculture Programs to Promote Urban Water Resource Management Goals in California

DRAFT FOR REVIEW ONLY

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LIST OF ACRONYMS

0-50/92 . . . . . 0/92 (grains) or 50/92 (cotton) Provisions of Commodities Programs
ACP . . . . . Agricultural Conservation Program
AF . . . . . Acre Foot, about 325,800 gallons
ARP . . . . . Acreage Reduction Percentage
ASCS . . . . . Agricultural Stabilization and Conservation Service of the USDA
CARCD . . . . . California Association of Resource Conservation Districts
CCC . . . . . Commodity Credit Corporation of the USDA
CCRG . . . . . County Conservation Review Group
CEQA . . . . . California Environmenntal Quality Act
COC . . . . . County Agricultural Stabilization and Conservation Committee
CRP . . . . . Conservation Reserve Program
CVP . . . . . Central Valley Project
DASCO . . . . . Deputy Administrator, State and County Operations, ASCS
DEMO . . . . . Water Quality Demonstration Project
DWR . . . . . California Department of Water Resources
EBI . . . . . Environmental Benefits Index, used to evaluate CRP bids at the national level
ELS . . . . . Extra-long staple, or Pima cotton
EPA . . . . . U.S. Environmental Protection Agency
ERS . . . . . Economic Research Service of the USDA
FACT . . . . . Food Agriculture Conservation and Trade Act of 1990 (PL 101-624)
FSA . . . . . Food Security Act
HUA . . . . . Hydrologic Unit Area
LTA . . . . . Long-Term Agreement
RCD . . . . . Resource Conservation District
SCRG . . . . . State Conservation Review Group
SCS . . . . . Soil Conservation Service of the USDA
STC . . . . . State Technical Committee
SWP . . . . . State Water Project
SWRCB . . . . . State Water Resources Control Board
USDA . . . . . U.S. Department of Agriculture
USBR . . . . . U.S. Bureau of Reclamation
WQIP . . . . . Water Quality Incentive Projects, short for Agricultural Water Quality Protection Program
WQSP . . . . . Water Quality Special Project
WRP . . . . . Wetland Reserve Program

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We appreciate the guidance and review given to this project by Lyle Hoag, executive director of California Urban Water Agencies. Without his interest and initiative this effort would not have progressed from vague concepts to this completed overview.

I. EXECUTIVE SUMMARY

The U.S. Department of Agriculture's (USDA) farm programs affect urban water agencies (agencies) in California through their effects on irrigated agriculture. Commodity programs subsidize farming and affect irrigation practices and acreage on over two million acres of irrigable California cropland, and other farm programs affect irrigation management practices on other irrigated cropland around the state.

The recent drought increased awareness of the need for mechanisms to facilitate water transfers and improve water management in the state. The Central Valley Project Improvement Act and the state's Bay/Delta standards, as recently modified in the Draft Water Right Decision 1630 will also require water to meet flow standards.

USDA programs provide one potential mechanism to maintain reliability of water supplies and water quality at a minimum economic and social cost. The Food, Agriculture, Conservation and Trade Act of 1990 (P.L. 101-624, FACT) continues over 50 years of federal support and intervention in agriculture, but federal farm policy is changing and becoming more complex to accommodate new and changing concerns. The commodity programs are relying more on voluntary mechanisms to reduce commodity supplies, and recent initiatives for water quality and retirement of agricultural land could be used for water management. California Urban Water Agencies has funded this study to determine how urban water agencies can work with farm programs to attain water supply and water quality goals.

Many federal farm programs and policies could be important to California water resource management. We have analyzed many programs, but not all in detail. Commodity provisions in FACT allow targeted option payments and paid land diversion, but these provisions are unlikely to be used anytime soon. We also reviewed emergency drought programs and found they have been rarely used in California. The new Wetland Reserve Program has been funded as a pilot project to restore wetlands. This program will enroll and restore about 6,000 acres, mostly rice land in the Sacramento River basin, to wetlands. Since wetlands can assimilate pollutants, the program could have significant intentional or incidental water quality impacts. Also, the Environmental Easement Program, although not currently funded, could become a major vehicle for retirement of irrigated land. The fate of all of these programs deserves monitoring. Programs and provisions not analyzed in detail are discussed in Appendix C.

Five farm programs or program provisions were analyzed in detail. These are:

- 0-92 and 50-92 provisions of commodities programs

  These provisions allow participating commodity (grains, cotton, rice) farmers to receive deficiency payments on 92 percent of their maximum payment acreage, even if as little as 0 percent (grains) or 50 percent (rice and cotton) of the permitted acreage is planted. In addition, FACT authorizes the 50 percent

planting minimum for rice and cotton to be lowered in the case of prevented planting due to drought. During the recent drought, 0-50/92 provisions were used to obtain deficiency payments on hundreds of thousands of acres of idled irrigated land in California.

The availability of the 0-50/92 provisions lowers the financial impact of drought, as well as the farmers' opportunity cost of leasing water to agencies. At a minimum, agencies working to transfer water from commodity farmers should recognize these payments in formulating offer prices.

- Flex acreage provisions

  1990 legislation allows commodity farmers to change crop mix on up to 25 percent of their commodity acreage base, without penalty to cropping history and base acreage. Since 1990, this provision has significantly changed cropping practices on California commodity base acreage. In 1991, over 100,000 acres in the state were planted to a crop other than the original commodity.

  Agencies could work with flex acreage provisions by encouraging farmers to plant dryland crops on formerly irrigated acreage, to change to irrigated crops that use less water, or to change to crops that will improve water quality.

- Conservation Reserve Program (CRP)

  The FACT continues this program from the 1985 Food Security Act. Land is idled by 10 to 15 year leases. The CRP has idled about 36 million acres nationwide and 188,000 acres in California, but little of the idled land was ever irrigated.

  While the FACT contains language requiring the CRP to address water quality problems, this has not been a major emphasis of the program. Also, it appears that the process of evaluating CRP bids could be biased against irrigated land. It can be argued that some irrigated land not being accepted should be enrolled in the CRP. California may be able to argue for an evaluation process that would enroll more irrigated land.

- Agricultural Conservation Program (ACP)

  The Agricultural Conservation Program (ACP), which is not part of the 1990 FACT or previous farm bills, funds irrigation system improvements that have resulted in saving hundreds of thousands of acre feet (AF) in reduced water

application annually in California. ACP funding is available statewide and additional funds are targeted to Hydrologic Unit Areas (HUA).

This program is especially noteworthy for indirectly involving many other California interests and institutions through education, cost-sharing and other forms of participation. Participants have included the California Department of Water Resources (DWR) and local water supply agencies.

The major issue with this program is the amount of water that may be transferred from irrigation water conservation. Reducing water application at the farm level can adversely impact water users who depend on return flows or seepage, and accommodations may have to be made for these users in the transfer process. Irrigation water management can be part of a regional strategy or management plan which, overall, results in transferable water.

- Water Quality Incentives Projects

  The WQIP, authorized in the FACT, funds irrigation management in designated watersheds. The WQIP is important because funding more than doubled between 1992 and 1993. Also, the success of the WQIP in a region may affect future CRP enrollment.

Following our discussion of the five programs, we developed and analyzed four strategies. Each strategy presents a way for urban water agencies to work with farm programs to enhance their water resource management.

The four strategies are:

Strategy 1. Develop and Apply Expertise in Farm Programs

Using this strategy would improve internal understanding and monitoring of farm programs as part of a more complete understanding of irrigation economics. Information could be used to develop better water transfer offers and to increase the role of agencies in regional water management.

Strategy 2. Work Directly with Farmers

In this approach, agencies would work with farmers and irrigation districts to increase farmer participation in voluntary programs that increase water supply or improve water quality. This could be done either as an addition to strategy 1, or by using other agricultural experts who understand the programs and, perhaps, know the target farmers.

Strategy 3. Promote Special Area Designations

Agencies could work with local groups and the Soil Conservation Service (SCS) to obtain special area designations for California watersheds. Designation of a water quality problem area as a Water Quality Special Project (WQSP) or a Water Quality Demonstration Project (DEMO) can result in federal funding and/or increase the ranking of land in competition for USDA funds. California does not have a wellhead protection program or any conservation priority areas. Both designations would increase the ranking of designated lands for CRP land retirement.

More Hydrologic Unit Areas (HUA) could be formed. HUAs are designated in watersheds where agricultural non-point pollution contributes to a failure to meet state water quality goals. HUAs increase the ranking of cropland for CRP enrollment and increase the allocation of funds for other conservation efforts. WQIP funds are disbursed to regions on the basis of applications from state USDA offices, so agencies could work with local agencies and state offices to obtain WQIP funding.

Strategy 4. Affect USDA Administration and Funding

Under this strategy, agencies would work with farmers and other agricultural interests to increase funding, change administration, or change the farm program laws in ways favorable to California water resource management. This approach would not require money for water transfers or cost-sharing, but it has less chance of being successful.

The best strategy for any single agency will depend on the unique characteristics of demand, local water resources, and agriculture. The relative merits of each strategy are:

	STRATEGY 1	STRATEGY 2	STRATEGY 3	STRATEGY 4
	Develop Expertise	Work with Farmers	Designate Special Areas	Affect Programs
ECONOMIC				
COSTS	-	-	+	+
BENEFITS	+	+	-	-
TECHNICAL				
HYDROLOGY	N	+	-	-
LEGAL	+	+	-	-
SOCIAL	N	N	+	-
CHANCE OF SUCCESS	+	N	N	-

+ = relatively favorable - = relatively unfavorable N = neutral

Strategies 1 and 2 may be more expensive than the other two because they may require water transfer and irrigation improvement costs. On the other hand, the water yield could be higher. Both strategies could work well within existing institutions, and both would have social merits

such as increasing understanding and communications; however, strategy 2 could be interpreted as intrusive. Since these strategies avoid political channels and work largely within existing institutions, the chance of success is higher. Strategy 2 may create the image of "using" agricultural programs for other purposes.

Strategies 3 and 4 have relatively low costs and water yield benefits and require more work with outside agencies and interests such as congress, resource conservation districts, irrigation districts, the SCS, the Agricultural Stabilization and Conservation Service, and county technical committees. Since land retirement and irrigation water conservation are part of this strategy, the technical and legal feasibility of transferring water savings is important. Arguably, strategies 3 and 4 are riskier because of the large number of alliances required and the all-or-nothing nature of politics. Strategy 3 avoids some of this risk by working within existing law to promote designations authorized precisely to consider the impacts of agriculture on third parties.

Overall, we feel that all of the strategies have great potential for helping to improve water resource management in California. Some of the potential is because of opportunities unrecognized or underutilized in the past, while some potential is due to changing politics at the state and federal level. Existing farm programs designed to idle or retire irrigated land, improve irrigation efficiency, and reduce non-point agricultural pollution have not been applied to their full potential in California because of time limitations on the farm and personnel limitations in local, state, and federal agencies. In addition, urban water managers often fail to recognize the central importance of the USDA and other agricultural institutions in water resource management. Our strategies provide opportunities for urban water agencies to work with established agricultural institutions and policies. This approach should increase cooperation between agricultural and urban water users.

Agricultural policy, and the programs and strategies discussed here, will continue to change with changing priorities and politics. The new Clinton administration has developed a new farm plan which would implement some user fees, payment limits and reduced subsidies to attain spending reductions, but these and any other new ideas must first pass the test of Congress. Events in Washington should be monitored to determine how these changes will affect California.

II. BACKGROUND

A. INTRODUCTION AND PURPOSE

Agricultural irrigation accounts for roughly 80 percent of applied or net water use in California (DWR 1987), so variations in irrigation water use from year to year can have large effects on water quality and supplies remaining for other users. Diversion, application, and consumptive use of irrigation water change with the amount of acreage irrigated and the mix of crops grown. These farming practices are affected by farmer experience and capabilities, relative crop prices, water and other input supplies, marketing and production constraints, and incentives and requirements of federal farm programs and policies.

Changes in irrigation water use at the farm level affect regional hydrology through changes in ground and surface water use, groundwater recharge, and irrigation return flows. In turn, downstream flows, water quality and water supplies remaining for other uses are affected. Changes in irrigated acreage or crop mix can affect water quality directly by leaching salts and other minerals, and by non-point pollution from use of pesticides and other farm chemicals. Water quality can be indirectly affected through dilution or repulsion of other pollutants.

Urban water agencies could benefit if farm programs were modified to consider more fully the impacts of irrigation on water supply and quality. Irrigation water conservation has been a goal of the agricultural conservation program for many years. Farm program legislation has changed substantially in the last decade, and the water quality impacts of farming practices are now considered in several program provisions.

California Urban Water Agencies (CUWA) has funded this study of federal farm programs in California to determine if and how urban water agencies might increase water supplies or improve water quality by affecting the administration of farm programs or participating in farm programs.

The first objective of the study is to determine if and how agencies can affect farmer participation in farm programs. Farm programs increasingly rely on voluntary mechanisms for commodity supply controls and selection of crops. These voluntary mechanisms present opportunities for agencies to work with farmers to also promote water supply and quality goals.

The second objective of the study is to determine if and how agencies can influence the administration of farm programs in California to improve water quality or supplies. Primarily, the study analyzes programs in which the U.S. Department of Agriculture (USDA) has discretion in program administration, and through which water use could be substantially affected. Discretion may occur when:

- explicit discretion is provided by legislation
- programs are targeted to vaguely defined conditions
- implementation is limited by funding and the allocation of funds among regions is discretionary.

Even if agencies can affect farm programs or farmer participation, there are still several issues involving how to most effectively bring about improvements in water supply and quality. Specifically, institutional structures such as alliances and markets are needed to effectively implement water transfers and promote water quality improvements. These additional needs result in more specific strategies for action.

B. SCOPE AND OVERVIEW

In the course of our study, we did not consider changes in the administration of farm programs that would leave California farmers worse off than they would be under current conditions. Instead, we analyzed programs that provide voluntary mechanisms for farmers to reduce water use or improve water quality. Farmers would benefit from the changes we suggest because the change in administration of voluntary programs would increase the number and quality of farm program options available, the amount of USDA spending in California, or because they will be able to participate in expanded water transfer programs or other voluntary programs funded by agencies.

Many federal agricultural policies and programs affect agricultural economics and irrigation water use in California. The Food, Agriculture, Conservation and Trade Act of 1990 (FACT, PL 101-624) extends price support provisions for dairy, wool, oilseeds, sugar and honey; federal marketing order programs for fruits and nuts, quality standards, agricultural trade promotion, agricultural credit, crop insurance and disaster assistance, rural development, the Food Stamp Program, and research and education programs.

However, commodity and conservation programs affect irrigation water use and water quality most directly. Commodity programs include provisions that require the farmer to idle acreage to receive program benefits, or allow the farmer to idle more land while still receiving benefits. Conservation programs also idle land or attempt to affect water resources directly. Therefore, our study focused on the commodity and conservation programs. In addition, the Agricultural Conservation Program (ACP) is considered even though it is not part of the FACT.

Among commodities, cotton and rice are especially important irrigated crops in California because of their acreage and water use and because they are among the most highly subsidized commodities. Furthermore, participation of eligible farmers and acreage is higher than for other grains. For this reason, we emphasize cotton and rice crops and associated programs.

Section III provides the information on commodity programs needed to understand the sections that follow. Then, data on participation in the programs since the 1990 FACT are displayed and discussed. These data are augmented by more detailed data and discussion provided in Appendix B.

Commodities programs included in the study scope but not analyzed in detail are discussed in Appendix C. Some programs or provisions were not carried forward for analysis because they are believed to have a low probability of being funded or implemented in the next few years. However, the new Democratic administration in Washington may support funding and

implementation of FACT provisions. Therefore, all of the provisions discussed here, and potential new legislation before 1995, are worth monitoring.

Next, we discuss the commodities programs with the most potential for improving water quality and supply. Programs or provisions were carried forward for more analysis if, in California during 1993-1995:

- the program will substantially affect water use at the farm level, and;
- the program will or could affect substantial amounts of irrigated acreage, and;
- water use can be affected through administrative discretion or voluntary participation by farmers.

For each program we evaluate the economic and other incentives affecting participation, the amount of water potentially involved, and other factors unique to that program.

In Section V, we consider the conservation provisions of the FACT and other conservation responsibilities of the USDA and provide an introduction to conservation programs. The conservation provisions included in the study scope but not analyzed in detail are discussed in Appendix C. Conservation provisions believed to have the most potential are evaluated in detail in Section VI.

Finally, we discuss how the important commodity and conservation programs can be used to promote water resource goals by providing a mix of programs, alliances with other interests, and recommended courses of actions. Each alternative strategy for action is evaluated in terms of its potential costs, returns and risks.

III. INTRODUCTION TO COMMODITY PROGRAMS

This section describes commodity programs, highlights important terms, and gives a summary of pertinent trends in commodity programs and related farm policy. We then summarize the 1990 to 1992 data on commodity program participation in California.

As demonstrated by recent legislation, a new farm bill typically becomes law about every five years; the Agriculture and Food Act of 1981 (PL 97-98) the Food Security Act of 1985 (PL 99-198) and the Food, Agriculture, Conservation and Trade (FACT) Act of 1990. Each farm bill typically consists of amendments to the previous farm bill that reflect the changing priorities and intervening events of the previous five years.

A. STRUCTURE AND TERMINOLOGY

Only farmers with a history of production of program commodities can participate in commodity programs. (The term "farmer" may include landowners, tenants, individuals, corporations or other entities with an interest in a farming operation.) Program commodities are feed grains (sorghum, corn, oats, barley), wheat, rice, and upland and extra long staple (pima) cotton. Crop acreage **base** defines how many acres of a farmer's land is eligible for program benefits and also subject to program requirements. Acreage base is determined by acreage planted and **considered planted** to a program crop within the prior 3 to 5 years. For the purpose of determining crop acreage base, acreage considered planted includes acreage prevented from being planted by natural disaster, reduced acres, 0-50/92 acres, flexed acres, and zero-certification acreage (Langley 1992). These terms are defined below.

If an eligible farmer decides to participate, he can then obtain a **nonrecourse loan** from the government based on a **loan rate** per unit crop and his historical production. If, after harvest, crop price is below the loan rate, the farmer can default on the loan and keep the loan principal, and the government must take title to the crop. That is, "the government has no recourse but to take repayment of the crop itself in repayment of the loan. . . ." The loan rate can be adjusted in consideration of "grade, type, quality, location and other factors" (USDA ASCS 1990a).

Since many farmers turn their crops over to the government when market price falls below the loan rate, and the government then holds this commodity off the market, the loan rate acts as a price floor or **support price** in the market. Prices observed on commodity markets are also affected by **Commodity Credit Corporation** (CCC) open market purchases and sales, and nonparticipating farmers worldwide can also benefit from these price support operations.

Participating farmers must reduce their acreage base planted to the program commodity by an annual **acreage reduction percentage** (ARP). The amount of acreage not planted is equal to the farmer's base, times the ARP. The percentage reduction for each program crop is determined each year according to stocks and/or use of the crop, and some legislated minimums

and maximums. For example, rice and cotton have legislated maximum ARPs of 35 and 25 percent, respectively.

Participating farmers typically cannot plant any crops on reduced acres. Rather, the idled land must be put into an approved **conserving use** that protects the land from weeds and water and wind erosion. In arid areas such as California, most conserving use is non-irrigated fallow, although some idled acres may be planted to a cover crop such as clover to reduce wind erosion (Caldwell, J. pers. comm. 1992).

While nonrecourse loans support prices, **deficiency payments** provide direct income support to participating farmers. Deficiency payments are a check from United States taxpayers to the farmer and are based on the difference "between a **target price**, and the market price or the loan rate, whichever difference is less" (USDA ERS 1989). This **payment rate** is multiplied times a **program yield** (units of crop per acre), times the farmer's maximum payment acreage, if the farmer grows the commodity on all of his maximum payment acreage, to determine his total deficiency payment. Under the FACT, target prices are fixed until 1995.

A farmer can receive two payments for double-cropped commodities. "Total crop acreage bases on the farm may exceed cropland by the amount of the 5-year average of double-cropped program crops" (Langley 1992). However, the amount of acreage planted to both double-crops may be limited by the amount of conserving use required on reduced acres for both crops.

Total payments are subject to a **payment limit** per person. The payment limit per farmer under the 1990 FACT is $50,000 for deficiency plus paid diversion payments, and $75,000 for marketing loan gains plus loan deficiency plus Findley payments. (If loan rates are reduced, Findley payments are additional deficiency payments to compensate farmers for the loss.)

The FACT contains so-called **triple-base** provisions. In addition to the regular crop base, **permitted acreage** is the maximum amount of land a participant is permitted to plant to the commodity and is equal to the acreage base less reduced acreage. **Maximum payment acreage** is permitted acreage less 15 percent of acreage base.

The additional 15 percent difference between permitted and maximum payment acreage was required under the 1990 Budget Reconciliation Act to reduce farm program expenses (USDA ERS 1990). The **normal flex acreage** may be planted to most other crops, but not fruits and vegetables, without any loss of crop acreage base eligible for benefits in future years. The farmer cannot receive deficiency payments on normal flex acres, regardless of what is grown.

In addition, 10 percent more of base, called **optional flex acres**, can now be planted to the other crops without loss of base eligible in future years. Deficiency payments are lost only if a crop other than the program commodity is grown. The so-called "flex" provisions are taken up in detail in Section IV.B.

The 0/92 and 50/92 provisions (**0-50/92**) were first authorized under the 1985 Act. If an ARP is in effect, these provisions allow a farmer to receive deficiency payments based on 92 percent

of his maximum payment acreage as long as he plants between 0 (grains) or 50 (rice and cotton) and 92 percent of his permitted acreage. The 0-50/92 provisions are taken up in detail in Section IV.A.

In addition, the USDA can implement several provisions to idle more acreage if needed to reduce commodity supplies. These are the **targeted option payment** and **paid land diversion.** These provisions are discussed in Appendix B.

Under **zero-certification**, a farmer can plant his entire base to another crop and maintain base protection for future years. Fruit and vegetable plantings cannot be increased above normal and zero-certification cannot be used to build base of another program crop.

B. HISTORY AND IMPORTANT TRENDS IN FARM POLICY

Federal farm programs have existed in some form since the 1930s. The original purposes were, "preserving the family farm and supporting prices and farm income". . ."to conserve natural resources" and to "ensure the orderly distribution" of commodities (Langley and Baumes 1989). In later legislation, additional emphasis was given to food assistance to low-income persons, especially through the food stamp program, and "to ensure consumers an abundance of food and fiber at reasonable prices."

The problems created by past farm bills affected how commodity programs are currently structured. Non-recourse loans, because they increase prices, have frequently made U.S. commodities uncompetitive in world markets, so nonrecourse loan rates have been lowered and additional programs implemented to increase exports while maintaining farm income.

The 1981 bill followed a period of inflation, high prices, and strong demand. It was felt that production incentives and protection from inflationary costs of production were important, and program prices (loan rates and target prices) were tied to inflation. In the 1980s, however, the expected inflation did not materialize. A strong dollar, declining exports and excessive stocks of commodities led to lower loan rates and trade-enhancing provisions to increase exports in the 1985 Food Security Act. As loan rates were reduced to encourage exports, the share of income provided by deficiency payments increased. Between 1981 and 1990, loan rates for rice and cotton declined 19 and 4 percent, respectively, while target prices increased 0 and 3 percent (Green 1990).

Under the FACT, if world market prices are below the loan rate, mandatory **marketing loan** provisions make commodities more competitive by allowing farmers to repay their loans at a price less than the loan rate. The government takes an immediate loss on the exchange. **Generic certificates** help reduce government storage, and **export enhancement** provisions target subsidies to markets lost to unfair competition.

The FACT also continued a trend toward more emphasis on environmental concerns. The conservation provisions are taken up in detail in Section V, but it is also important to note here that an increasing share of commodity supply control occurs through the Conservation Reserve

Program (CRP). Through the eleventh CRP sign-up in 1991, the CRP had idled 4.06, 10.62 and 1.37 million acres of corn, wheat and cotton base, respectively (USDA, Agricultural Stabilization and Conservation Service [ASCS], Conservation and Environmental Protection Division 1992).

Commodity program farmers must also demonstrate **conservation compliance** on farmed acreage to be eligible for program benefits. The farmer may have to adopt appropriate farming practices and avoid new farming of highly erodible land or wetlands.

Another important trend is the use of voluntary as opposed to mandatory acreage reduction to achieve commodity supply reduction goals. These voluntary provisions include the 0-50/92 and flex acreage provisions discussed below. Nationally, 13 million acres of commodity base were idled with 0-50/92 provisions, and flex acreage resulted in 5 million acres shifted from program commodities to other crops in 1991. Along with the CRP, these voluntary provisions have recently resulted in lower acreage reduction requirements.

Deficit reduction was an important concern in 1990, affecting farm programs through the 1990 Omnibus Reconciliation Act, enacted to reduce outlays as required by deficit reduction agreements. Continued reduction of farm income support and other funding may affect the viability of programs and farmer participation rates. Farm program subsidies, particularly those targeted to export markets, may be reduced if the current round of talks in the General Agreement on Tarriffs and Trade (GATT) results in new plans to reduce domestic protection of agriculture.

C. THE COMMODITY PROGRAMS IN CALIFORNIA SINCE 1990

State-level data on 1990 and 1991 crop acreage base, complying acreage, and flexed and idled acreage were obtained from the USDA (Office of Public Affairs 1991, 1992a), and preliminary data were obtained for 1992 (USDA, OPA 1992b). These acreage figures were analyzed to determine to what extent California cropland participates in the commodity programs, and how the FACT may have affected farming and irrigation water use since 1990.

More detailed summaries of these data and other relevant state and county data are provided in Appendix B. An overall summary of important data is provided in Table 1 below.

Over all crops, about 60 percent of 4.16 million acres of potential crop base (Appendix B), or 2.5 million acres, complied with program requirements and participated in the programs in 1990. In 1990, about 243,000 acres were idled by mandatory acreage reduction provisions, and 301,000 acres with 0-50/92 status were idled. In 1991, 185,000 and 650,000 acres were idled with the ARP and 0-50/92 provisions, respectively, over all crops. In 1992, preliminary data indicated that about 143,000 and 409,000 acres were idled with mandatory and 0-50/92 provisions, both down from the previous year.

Secondary estimates of irrigation consumptive use, in combination with Table 1, demonstrate the importance of these provisions. The 1991 Emergency Drought Water Bank yielded from 1

to 2 acre-feet (AF) per acre for irrigated grains, 2 to 2.5 AF for corn and sorghum, and 3.5 AF for rice (Howitt, Moore and Smith 1992). Cotton in the San Joaquin Valley has been estimated to consume 2.6 AF per acre (CDWR, Office of Water Conservation 1988). Therefore, for just rice and cotton, acreage idled with mandatory and voluntary provisions in 1991 reduced consumptive use by 1.14 million acre feet. Of course, much of this acreage would have been idled by the drought regardless of the programs. The major significance of these provisions is that they substantially reduced the economic costs of the drought to farmers.

No acreage of any crop was flexed in 1990, because the law did not yet include this option. If a farmer did plant another crop on base acreage, that acreage did not participate in the program. The use of flex acreage increased from 0 acres to 119,000 acres in 1991 to a projected 204,000 acres in 1992.

Table 1. Summary of participation of California crop acreage in commodity programs 1990 to 1992[1].

	1990	1991	PRELIMINARY 1992
UPLAND COTTON			
Participating Base	1,009,517	902,995	1,068,476
Acreage Reduction	97,526	40,843	6,786
Idled with 50/92	25,666	155,106	60,867
Flexed to Other Crop	0	46,678	49,753
Planted	744,611	622,533	824,910
RICE			
Participating Base	583,503	585,390	576,477
Acreage Reduction	103,072	28,921	0
Idled with 50/92	47,673	153,539	81,980
Flexed to Other Crop	0	22,286	68,974
Planted	399,622	356,982	416,956
ALL OTHERS[2]			
Participating Base[3]	882,795	992,185	947,201
Acreage Reduction	42,565	115,615	46,236
Idled with 0/92	227,484	341,607	266,103
Flexed to Other Crop	0	50,064	84,833
Planted	453,723	357,222	464,891

[1]Includes double-cropped acreage, i.e., an acre double-cropped to program commodities counts as 2 acres.
[2]Wheat, corn, barley, oats and sorghum. Extra-long staple (ELS) cotton (< 1000 acres) not reported
[3]1990 base included 571,460 acres of wheat, 126,984 acres of corn, and 174,168 acres of barley. Sorghum and oats make up a small fraction of California's commodity base acreage.

Source: USDA, OPA (1991, 1992a, 1992b)

Appendix B provides other data which confirm that practically all rice and cotton acreage in the State is irrigated. For wheat and corn, most planted base acreage in California was irrigated (84 and 96 percent, respectively) in 1991. About half of barley planted base and 32 percent of oats planted base was irrigated.

County-level estimates in Appendix B and Sections IV.A. and IV.B. show that cotton and rice acreage is concentrated in a few counties. Of all commodities, wheat base acreage is most dispersed around the state. There are important differences between counties in participation rates and use of commodity program provisions.

Appendix B also shows deficiency payment data for participating crops. In 1991, average California cotton and rice deficiency payments were $108 and $259 per payment acre, respectively. For all program commodities, deficiency payments exceeded $200 million. This subsidy does not include CCC losses on the non-recourse loan program, storage and handling costs incurred by the CCC, marketing loan or export enhancement costs, or costs to consumers.

IV. COMMODITY PROVISIONS CONSIDERED

A. 0-92 and 50-92 PROVISIONS

1. 0-92 and 50-92 Background

The Food, Agriculture, Conservation and Trade Act (FACT) continues this voluntary acreage reduction provision from the 1985 Act. If an acreage reduction percentage (ARP) is in effect, the provision allows a farmer to receive deficiency payments based on 92 percent of his maximum payment acreage as long as he plants between 0 (grains) or 50 (rice and cotton) and 92 percent of his permitted acreage. The provisions also allow the farmer to protect his future program payments by maintaining his crop acreage base and farm program payment yield histories.

For the purpose of allowing use of 0-92 or 50-92 (0-50/92) provisions, an ARP of zero is different from having no ARP. An ARP can be 0 percent, allowing 0-50/92 provisions to be used even if there is actually no acreage reduction. This 0-percent ARP was used for rice in 1992.

Under the 1990 FACT, for rice and cotton, the 50 percent planting requirement can be waived with a prevented planted credit due to drought. Prior to 1990, drought was not allowed as a reason for planting less than 50 percent of eligible acreage for 50-92 purposes. The change has been liberally applied in California in recent years so that the 50 percent planting requirement was reduced by the percentage of water shortage imposed. For example, if an irrigation district reduced farm water deliveries by 10 percent, then the 50 percent planting requirement was reduced to 40 percent.

Land enrolled in 0-50/92 must be planted to an approved nonprogram crop or conserving use. Approved nonprogram crops can include sesame, castor beans, triticale, mung beans, and several other experimental and industrial crops. For grains, but not rice or cotton, farmers may also grow minor oilseeds on 0-92 acreage. Minor oilseeds include sunflowers, rapeseed, canola, safflower, flaxseed and mustard seed.

The Secretary can limit acreage entered in 0-92 programs if adverse effects to local agricultural economies could result, except that these acreage restrictions cannot be imposed in a county eligible for disaster emergency loans (USDA ASCS 1990a).

2. 0-92 and 50-92 History

The 0-50/92 provisions have provided substantial drought assistance to California farmers during the recent drought. In 1991, land idled with the 0-50/92 program reached 650,000 acres, of which 300,000 acres were rice and cotton base. Rice and cotton farmers enrolled 26 and 11 percent of their base, respectively.

The "prevented planted" provision has also been very important. In 1991, about 27 percent of rice and 41 percent of cotton 50-92 acreage idled was enrolled under this provision (Appendix B). Table 2 shows important differences between counties in how the 50/92 provisions were used in 1991.

Table 2. Percentage of participating base idled with ARP and 0-50/92 provisions, and percentage planted, 1991.

	PERCENTAGE ARP	PERCENTAGE PLANTED	50/92 PERCENTAGE PREVENTED	50/92 TOTAL PERCENTAGE BASE IDLED
RICE				
California	4.9%	60.8%	6.9%	26.8%
Colusa	5.0%	59.8%	2.7%	22.3%
Butte	4.9%	59.2%	3.5%	25.6%
Sutter	4.9%	64.5%	6.8%	24.3%
Glenn	5.0%	63.6%	3.4%	20.7%
Yolo	5.0%	40.1%	37.0%	75.2%[1]
Yuba	5.0%	84.2%	0.0%	3.8%
Placer	5.0%	62.7%	6.7%	25.5%
Other	4.9%	50.9%	16.3%	41.1%
COTTON				
California	4.5%	68.3%	7.5%	18.2%
Fresno	4.2%	65.3%	8.5%	21.2%
Kern	4.6%	60.9%	13.8%	30.0%
Kings	4.3%	70.9%	8.0%	19.3%
Tulare	4.9%	77.4%	0.1%	2.6%
Merced	4.9%	78.9%	2.8%	8.6%
Madera	4.4%	94.1%	0.0%	1.0%
Riverside	4.9%	58.4%	0.0%	6.5%
Imperial	4.9%	48.7%	0.3%	5.4%

[1]Potential errors in this data causing some percentages to add to greater than 1 have not been resolved.

Source: USDA ASCS 1992b

These data show that 50/92 was used extensively in some counties (Yolo, Kern) but very little in others (Yuba, Madera). Extensive use of 50/92 suggests that the program had good economics, or that the region had poor water supplies.

3. 0-92 and 50-92 Evaluation

a. Payments and incentives

Payments to farmers under the 0-50/92 provisions are calculated as maximum payment acreage times .92, times the farmers' program yield, times the deficiency payment rate per unit crop. Maximum payment acreage is participating crop base, less the ARP, and less normal flex acreage, which is 15 percent of base.

In comparison to a situation with no 0-50/92, the voluntary 0-50/92 provisions provide incentive to transfer water. This is because deficiency payments are made on a per-acre basis. Without 0-50/92, a farmer would lose all his deficiency payments for land idled to transfer water. With 0-50/92, and since there is an 8 percent idling (fallowing) requirement, this loss is reduced, but not eliminated.

For example, if a farmer has 100 acres of cotton base, and a 10 percent ARP is in effect, he can receive deficiency payments for 69 acres [(100-10-15) times .92] so long as he plants between 45 (90 times .5) and 82.8 (90 times .92) acres. If deficiency payments are $108 per payment acre, the farmer planting 45 acres would receive $4860 without 50-92, and $7452 with 50-92.

In general, the decision to participate in the 0-50/92 provisions should depend on target and market prices, production costs, crop yield, payment limitations and alternative uses for scarce farm resources. A farmer already participating in the program can receive deficiency payments based on his maximum payment acreage, and crop revenues are obtained from whatever crop is grown on permitted acreage. If he participates in 0-50/92, he forgoes, at a minimum, deficiency payments on 8 percent of his maximum payment acreage plus other net revenues on at least 8 percent of his permitted acreage that is idled.

First, if a farmer takes a net loss on farming before considering deficiency payments, enrollment in 0-50/92 may be profitable because this net loss is avoided. This situation could occur if market prices or nonrecourse loan rates are low, if expected crop yields are low, or if production costs are high. However, the operating loss avoided must exceed the 8 percent loss in deficiency payments also incurred by participating in 0-50/92. In this situation, the farmer would be likely to grow the least amount of crop allowed by the 0-50/92 provisions.

Second, benefits to enrollment in 0-50/92 may involve limited resources available for farming. For example, if water supplies are limited by drought, the farmer might expect that it is more profitable to idle land. Rather than to try to grow the crop on all of his permitted acres, this farmer takes 0-50/92 payments and concentrates the limited water over fewer acres. This type of incentive probably accounts for most of the irrigated acreage enrolled in 0-50/92 in California since 1990.

Finally, if the farmer is deciding on whether or not to participate in the commodity program at all, many other factors come into play. In general, farm program benefits must exceed revenues

lost from acreage reduction and other program compliance requirements. The availability of 0-50-92 payments may be one of many benefits and costs considered.

b. Potential water yield

Table 1, along with crop water consumptive use estimates, can be used to determine potential additional water savings from 0-50/92 provisions. 1991 conditions are assumed since the large amount of acreage already enrolled limited additional acreage, resulting in conservative estimates, and since urban agencies would be likely to desire more water during drought.

For just cotton and rice, and ignoring the prevented planted provisions, 296,391 and 139,156 more acres of cotton and rice could have been enrolled in the 50-92 provision in 1991. Idling this land would have saved about 1.25 million AF of consumptive use. Since the prevented planted provision was used in 1991, this estimate is conservative. However, payment limitations and other factors may limit the financial incentives for participation at these much higher levels.

c. Other factors

From 1990 through 1992, sign-up for commodities programs occurred between January 16 and April 26 (USDA ASCS 1992a). In those three years, sign-ups began on January 16, March 4 and February 10, but all ended between April 13 and April 26. As recently as 1988, sign-ups ended by March 11. This schedule should meet the needs of water agencies, who usually have some idea of their annual water supplies and their need to supplement them by March or April.

According to Howitt, Moore and Smith (1992) and other sources, farmers in 1991 were able to participate in the emergency drought water bank and obtain payments from both the bank and the 0-50/92 provisions. This provides some precedent and indicates the feasibility of transferring water from 0-50/92 idled acreage.

Other provisions attached to 0-50/92 payments should be recognized in agricultural to municipal water transfers. In particular, the provisions imply that transferring part of a farm's water supply may be much more economical and feasible than transferring all of the supply.

B. CROPPING FLEXIBILITY PROVISIONS

1. Cropping Flexibility Background

Farmers may plant up to 25 percent of each program crop acreage base on their farm to other, specified commodities while protecting their acreage base in subsequent years. This "flex" acreage is divided into normal (15 percent) and optional (10 percent). The normal flex was included to help farmers compensate for a 15 percent reduction in deficiency payments required under the Omnibus Budget Reconciliation Act of 1990 (USDA Economic Research Service 1991). The farmer's payment acreage is reduced by 15 percent of base regardless of the crop planted on normal flex acreage. If the farmer uses the flex option to grow a different crop, his

deficiency payments are reduced accordingly, but he still receives base acreage protection for future years.

The specific crops allowed on flex acreage are all program crops, minor oilseeds, industrial or experimental crops, crops for haying, green manure or grazing, and extra-long staple (ELS) cotton, if the farmer does not participate in the ELS cotton program. Crops not allowed include almost all fruits and vegetables for consumption, seed or ornamental purposes; dry edible beans, and peas and lentils. Peas and lentils were allowed on up to 20 percent of wheat or feed grain base in 1992, but not as part of flex acreage (Langley 1992). The USDA can prohibit any crop from flex acres, and is required to prohibit soybeans from optional flex acres if prices are expected to be poor.

2. Cropping Flexibility History

Table 1 showed that, since 1990, California farmers have taken increasing advantage of flex provisions to change crop mix. The use of flex acreage increased from 5 percent of complying base in 1991 to a projected 8 percent in 1992.

Table 3 shows the percentage of rice and cotton base acreage flexed by county in 1991. There are important differences between counties. For rice, some soils are not well suited for other crops and this may limit flex opportunities in some counties. Cotton farmers used the flex provisions more than rice farmers. Statewide, 3.8 and 5.2 percent of rice and cotton base, respectively, were flexed in 1991.

Table 3. 1991 rice and cotton flex acreage, percentage of base.

	RICE			COTTON	
	PERCENTAGE OPTION FLEX	PERCENTAGE NORMAL FLEX		PERCENTAGE OPTION FLEX	PERCENTAGE NORMAL FLEX
California	0.4%	3.5%	California	0.9%	4.3%
Colusa	0.3%	3.3%	Fresno	1.3%	6.0%
Butte	0.0%	2.2%	Kern	0.6%	3.5%
Sutter	0.4%	3.5%	Kings	1.0%	4.6%
Glenn	0.2%	3.3%	Tulare	0.6%	3.2%
Yolo	1.4%	7.8%	Merced	0.3%	1.0%
Yuba	0.0%	0.5%	Madera	0.0%	1.5%
Placer	0.4%	1.1%	Riverside	1.2%	2.9%
Other	1.5%	7.1%	Imperial	3.9%	8.6%

Source: USDA, ASCS, 1992b.

3. Cropping Flexibility Evaluation

a. Program payments and incentives

The economics of use of flex acreage depends on the expected economics of the alternative crops a farmer can grow on flex acres. Economics depends largely on costs of production, crop yields, and prices in the open market. Program provisions for program crops that can be grown of flex acres are important. For example, market prices are frequently close to non-recourse loan rates.

Deficiency payments cannot be collected for alternative crops, but farmers are eligible to receive non-recourse loans on program commodities (but not ELS cotton) planted on flex acres, as long as these commodities do not exceed 25 percent of base. For optional flex acres, deficiency payments on the original commodity are lost. This is a substantial deterrent, especially for cotton and rice farmers. Even though cotton and rice farmers made little use of optional flex in 1991 (Table 3), almost 20 percent of total flexed acreage was optional (Appendix B).

Use of flex acres may also be affected by the agronomic values of crop rotation and a desire to experiment. Commodity farmers were bound by program requirements for many years, so flexibility provides new opportunities to improve soils and test management ideas with alternative crops. Crop mix can also be constrained by available farm machinery and irrigation systems.

b. Potential water yield

Potential water savings result from a shift to a relatively water-conserving crop. In addition, a shift to alternative crops may have important water quality considerations. McCormick and Algozin (1989) found that planting flexibility would probably encourage less intensive cropping and benefit groundwater quality in the south central valley of California.

For water transfers, a major technical consideration is water savings from change in crop mix. The difference between crops indicates yields that might be obtained from flex provisions.

Potential additional water savings during the 1991 drought can be estimated. From Table 1, only 5.1 and 3.8 percent of upland cotton and rice base was flexed, respectively. Therefore, 19.9 and 21.2 percent more of cotton and rice base, for a total of 25 percent, could have been flexed to grains, saving 1.1 (2.6-1.5) and 2 (3.5-1.5) AF per acre, respectively. The total potential additional savings in consumptive use would have been about 445,870 AF. Economic factors, especially the loss of deficiency payments on optional flex, would limit the economic feasibility of this change.

c. Other factors

The USDA solicits comments on crops that may not be planted on flexible acres (Fed Reg 57[181] 9/19/92). Given the authorized reasons why certain crops may be prohibited, it seems unlikely that water supply or quality considerations could be considered in this process.

V. INTRODUCTION TO CONSERVATION PROGRAMS

A. OVERVIEW

The 1985 Food Security Act reflected the increased importance of environmental concerns in farm policy. The conservation reserve program (CRP), conservation compliance, sodbuster and swampbuster provisions were first authorized in 1985. Under the Food, Agriculture and Trade Act (FACT), the entire conservation title was reorganized into an umbrella program, the Agricultural Resources Conservation Program, organized as follows:

- Environmental Conservation Acreage Reserve Program
  - Conservation Reserve Program
  - Wetlands Reserve Program
- Agricultural Water Quality Protection Program
- Environmental Easement Program

In many respects, the FACT conservation provisions build on conservation policies that began decades ago. The Agricultural Conservation Program (ACP) is the oldest surviving conservation program. It differs from every other program discussed in that it is not part of FACT or prior farm bills.

In Section V.B, we describe state and local agencies critical to conservation programs, and, in Section V.C, we discuss programs that designate specific geographic areas. These programs often make land eligible for conservation program funding or increase the ranking of land in competition for USDA funds.

In Appendix C, the new Wetlands Reserve Program and Environmental Easement Program are summarized but not evaluated in detail. In Section VI, the CRP, the Water Quality Incentives Projects (WQIP) and the ACP are discussed and evaluated in detail.

B. FEDERAL, STATE AND LOCAL ORGANIZATION

Understanding the roles and interactions of local, state and federal organizations is essential to understanding agricultural conservation policy. Local groups have important roles in the administration of commodities programs in terms of enforcement, adjustments for local conditions and distribution of payments, but commodities programs are essentially administered from the top down. Local and state groups are more important for conservation programs where local conditions and initiatives determine the level of funding received by individuals for conservation efforts.

Local implementation of conservation programs usually involves at least five institutions: the resource conservation district (RCD), the local Soil Conservation Service (SCS) field office,

cooperative extension, the county Agricultural Stabilization and Conservation Service (ASCS) office, and the county ASC committee (COC).

RCDs typically consist of farmers, but any landowner or person who has a stake in the district is eligible. Boards are normally appointed by the county supervisors. Sometimes, RCD boards include some or all of the same individuals who serve on irrigation district boards. RCDs provide guidance, implementation, coordination, local priorities, and education regarding conservation programs and practices.

The RCD evaluates local irrigation practices, reviews conservation plans, and approves Long Term Agreements (LTAs). RCDs provide recommendations to SCS, ASCS and cooperative extension. RCDs make recommendations to the ASCS county committee on appropriate cost-shares and approved practices and review all proposals for cost sharing in the district.

RCDs can also receive money through the federal Clean Water Act. RCDs have applied for and received this Environmental Protection Agency (EPA) money directly, but most EPA money is channeled through state regional water quality control boards.

The Cooperative Extension Service provides demonstration, education, coordination and research services through the land grant university system. The ASCS administers programs and federal funds, publishes application procedures, and accepts applications.

The SCS provides technical assistance. The FACT states that "The Congress declares that an additional purpose of the Soil Conservation Service and the Extension Service is to aid in protecting and improving the quality of water." (U.S. Congress 1990). The SCS helps select practices approved for funding, determines the feasibility of cost-share proposals, and helps with farm conservation plans. The SCS also publishes application procedures and accepts applications (USDA SCS et al. 1992). Farmers may take their conservation plans directly to the ASCS, but they normally take them to the SCS first to ensure their technical feasibility.

The County ASC committee (COC) is elected by local farmers/ranchers in accordance with Section 8b of the Soil and Conservation Domestic Allotment Act. For the CRP, the COC accepts requests, determines if acreage offered is cropland, commits funds, acquires easements, and makes payments. For the ACP, they review projects with the SCS and review and prioritize applications for cost-sharing. They issue final approval for ACP and Special Projects and determine the ACP maximum cost-share percentage.

In addition to these players, several other groups provide additional technical support and review. The state technical committee (STC) was established by FACT "to assist the Secretary in the technical considerations relating to implementation of the conservation provisions under this title." The STC includes representatives of federal and state departments and agencies, including "the State water resources agency."

The County Conservation Review Group (CCRG) consists of the county ASC committee, the county extension agent, and representatives of the SCS, the Forest Service, the Farmer's Home

Administration, and the local RCD. The State Conservation Review Group (SCRG) is similarly constructed, consisting of the STC, the State Director of Extension, the State Conservationist of the SCS, and other representatives.

Agencies who want to learn more about conservation programs in their local region should contact the local SCS office and local RCDs. The SCS publishes the "SCS California Directory" (1991a) which lists state and local SCS field offices and personnel. The California Association of Resource Conservation Districts publishes "California's Resource Conservation Districts" (1992) which provides meeting times, directors and employees for all RCDs in the state.

C. SPECIAL AREA DESIGNATIONS

The President's Water Quality Initiative, which began during the Bush administration, called for voluntary cooperation to improve water quality. As part of the initiative, the USDA began several new programs designed to accelerate implementation of better water quality practices.

Three programs target funds to areas with water quality problems and serve as the basis for eligibility for some USDA conservation program funding. The programs are hydrologic unit areas (HUAs), Water Quality Special Projects (WQSP), and Water Quality Demonstration Projects (DEMOs). In addition, the EPA's wellhead protection areas identified under the Safe Drinking Water Act affect CRP enrollment and have affected the funding of Water Quality Incentives Projects (WQIP). The CRP and WQIP have their own special area designations discussed under those programs.

1. Hydrologic Unit Areas

Section 319 of the 1987 Water Quality Amendments to the Federal Water Pollution Control Act (Clean Water Act, 33 U.S.C. 1329) requires states to prepare assessment reports, priorities and management plans for dealing with nonpoint source pollution. The states identify problem areas in plans submitted under Section 319. Then, "the goal of the HUAs is to provide technical, financial, and educational assistance to implement a program within a HUA to solve an agricultural non-point source water quality problem identified in the State's Water Quality Assessment Report" (USDA ASCS 1992j).

Local farmers and farm groups are encouraged to form HUAs within problem areas to avoid regulation and voluntarily address their water quality problems using best management practices. Typically, the SCS works with the Extension Service, RCDs, and irrigation districts to form a HUA. The proposed HUA then competes against applications from all over the country.

Three HUAs have been established in California. In 1990, only the Fresno HUA (Westside San Joaquin Valley) was established; in 1991, West Stanislaus and Morro Bay were added (NMCSP 1991).

In West Stanislaus, for example, the SWRCB concluded that "100 miles of the San Joaquin River are impaired by pesticides and fertilizers carried by drainage water . . ." (Osterli 1991).

The HUA is a five-year cooperative project involving the SCS, the ASCS, cooperative extension, the Central Valley Regional Water Quality Control Board, and the West Stanislaus Resource Conservation District. Best management practices include structural, agronomic and managerial practices such as irrigation scheduling and management, and soil water monitoring.

The HUA designation results in more ACP funding, more money for education, 4-H programs and other extension, more monies for activities at local resource conservation districts, and more SCS staffing. The Fresno, West Stanislaus and Morro Bay HUAs received 1991 national HUA funding of $200,000, $150,000 and $100,000, respectively, administered under the ACP (USDA ASCS 1991j). In 1992, HUA lands were eligible to receive WQIP funding. Lands within HUAs are eligible for CRP enrollment.

2. Water Quality Special Projects

Funding is currently available for WQSPs. Currently, one of these is funded in Sonoma and Marin counties, at about $300,000 annually (USDA ASCS 1992j). The project is attempting to deal with water quality problems caused by dairy manure. In 1992, WQSPs were eligible to receive WQIP funding.

3. Water Quality Demonstration Projects

The 1990 FACT provides that the USDA can contract with farmers to develop demonstration or model farms to demonstrate the practical application of farming practices that reduce the potential for contamination or degradation of surface or groundwater. The goal of a Water Quality Demonstration Project (DEMO) is "to accelerate the transfer and adoption of new and innovative technologies that are economically feasible, environmentally sound, and socially acceptable in protecting and/or improving water quality, with emphasis on agricultural chemicals" (USDA ASCS 1992j).

Currently, there is one DEMO project in California in seven rice counties, funded at a level of about $200,000 annually under the ACP. The purpose of the DEMO is to keep rice herbicides "out of the State water system." In 1992, DEMOs were also eligible to receive WQIP funding.

4. Wellhead Protection Program

The Safe Drinking Water Act of 1985 (42 U.S.C. 300h-7) requires that states develop wellhead protection programs to prevent groundwater contamination. The states implement the programs with some federal assistance (Crutchfield 1989).

California does not have an approved wellhead protection program (USDA SCS 1991b), even though some local communities have their own programs. Apparently, the SWRCB, being the responsible state agency, has not pursued this program. This may be because of the emphasis on local groundwater management, and a lack of time and resources to develop a program. In California, the Department of Health Services has responsibilities for drinking water quality, but they also have time limitations exacerbated by new EPA monitoring requirements. Ironically,

current EPA policy releases utilities from some water quality monitoring requirements if they develop a wellhead protection program. Fresno gets its entire water supply from an aquifer that may qualify for this program.

CRP guidelines provide eligibility to lands within a designated wellhead protection area, but only if the state has an approved wellhead protection program. Land within these areas bid below local prevailing rental rates (which pass the stage 2 evaluation) are automatically accepted into the CRP (USDA ASCS 1992c).

VI. CONSERVATION PROVISIONS AND PROGRAMS CONSIDERED

A. CONSERVATION RESERVE PROGRAM (CRP)

1. CRP Background

The 1985 Food Security Act (FSA) authorized the USDA to retire highly erodible cropland by paying participants an annual rent for 10 to 15 years and half the establishment cost of cover crops. The CRP is similar to the Soil Bank Programs of the 1950s and 1960s. The program has enrolled about 36.6 million acres nationwide with a goal of 40 to 45 million acres by 1995.

Most land enrolled under the program is in the Mountain, Northern Plains, and Southern Plains regions. In the Northern Plains, 60 percent of the region's available land was enrolled in 1989 (Young and Osborn 1989). Between 1986 and 1992, only 188,800 acres in California were enrolled (USDA ERS RTD 1992).

The CRP under FACT could be important as a means to affect irrigation water use and quality in California because the FACT includes new language authorizing CRP cropland retirement for water quality purposes. Also, CRP legislation allows for targeting of specific areas and allows the USDA substantial discretion in ranking bids received for enrollment.

2. Eligible Lands

The FACT permits the USDA to include highly erodible land and other lands in the CRP during 1991-1995. For our purposes, two categories of other land are of particular interest:

1) Cropland that contributes to water quality degradation for which the water quality protection program proves ineffective, and

2) "Non-irrigated or irrigated cropland which produce, as determined by the Deputy Administrator, saline seeps, or which are functionally related to such saline seeps, or where a rising water table contributes to increased levels of salinity at or near the ground surface" (NARA 1991).

Under 1992 guidelines issued to state offices (USDA ASCS 1992c) eligible cropland contributing to a water quality problem may be offered if it meets one of the following criteria:

- located in states with designated "319" areas (water quality problem areas)
- located in public wellhead areas identified by EPA
- causing saline seeps or in seep area or land where the water tables contribute to increased levels of salinity at or near the ground surface

In addition to highly erodible land and land eligible because of water quality problems, other categories of land may be enrolled that could have water quality or water supply benefits. Filter strips adjacent and parallel to streams, and capable of reducing sedimentation or pollution, and land with scour erosion caused by out-of-bank flows can be enrolled. Enrollment of land in these categories could play a role in local or regional water quality management.

Any cropland enrolled in the CRP must have been planted to an agricultural commodity in 2 of the 5 years from 1986 to 1990. Generally, "an 'agricultural commodity' is defined to be an annually tilled crop" (NARA 1991). The law also limits the maximum percentage of land in a county that can be enrolled, unless the CCC finds that the local economy will not be adversely affected.

The applicant must develop a conservation plan for enrolled land. This plan must include specific appropriate conservation practices, and the CRP pays one-half of the establishment cost of cover crops. Approved practices for cropland contributing to salinity include establishment of permanent salt-tolerant vegetation.

3. The Bidding Process

Farmers submit bids for dollar amounts they are willing to accept to enroll their cropland. Under the 1985 FSA, the USDA determined the maximum acceptable rental rate, or bid caps, for groups of counties having comparable production and erosion characteristics. Bid caps were affected by average cash rental rates, estimated program costs, and eligible program acreage. Eligible land with a bid less than the maximum rate was enrolled (Schaible 1989). As discussed below, this procedure changed substantially in 1990.

Under current procedures, applicants go through a three-phase screening process. First, both the person and the land are screened for eligibility by the COC. The COC recommends bids for approval or disapproval (USDA ASCS 1992c). In the second phase, "bids with acceptable COC codes are analyzed by the National Office to ensure that the rental rates bid do not exceed the local prevailing rental rates for an acre of comparable land. There is no adjustment for irrigated versus dryland values in the bid screen process (Osborn 1992).

In the third phase, if a useful life easement or wellhead bid was provided, the bid is accepted. Other bids are evaluated based on an Environmental Benefits Index (EBI) per dollar bid. Under the 1990 FACT "the Secretary has discretionary authority, provided in section 1434 . . . to give priority to bids based on environmental benefit and by region to the extent that water quality, wildlife conditions, or abatement of erosion may be accomplished" (NARA 1991).

The EBI was developed over a two to three month period immediately after the passage of FACT. To develop the EBI, the ERS coordinated efforts of the USDA agencies ASCS, SCS, and the U.S. Forest Service as well as the Fish and Wildlife Service and EPA (Osborn 1992).

"The bids selected will be those where the greatest environmental benefits are generated for the federal dollars expended. Such factors may include, but are not limited to:

(1) Surface water quality;
(2) ground water quality;
(3) soil productivity;
(4) conservation compliance considerations;
(5) tree planting;
(6) 319 area designations; and
(7) conservation priority area designation for selection" (NARA 1991).

To reduce strategic maneuvering by farmers, the exact details of the EBI are not public, but the index includes these seven factors. The USDA has reserved the right to change the EBI if needed. "Different factors . . . may be established from time to time for priority purposes to accomplish the goals of the program." An applicant can appeal the basic data used to evaluate his bid, but the USDA has ruled that the EBI process itself is not appealable.

4. Conservation Priority Areas

"Conservation priority areas . . . . may be designated where watersheds exhibit actual and significant adverse effects on water quality or wildlife habitats related to agricultural production activities." Original conservation priority areas were designated for the Chesapeake Bay, Great Lakes and Long Island Sound. New priority areas are established "upon application by the appropriate State agency" (U.S. Congress 1990).

Applications for designation of other areas for future signups are submitted by State water quality agencies to the USDA through the STC. According to the Final Rule (NARA 1991) "State water quality agencies may submit an application for designation of other areas to the Deputy Administrator through the state ASC committee."

The states were given the opportunity to nominate conservation priority areas for the twelfth sign-up period, and new areas were established in 16 states (Osborn 1992), but not in California. The SCS chose not to nominate a conservation priority area under this provision (Bullard 1992). Several areas in California were considered including existing HUAs, DEMOs and estuary projects. Areas for which applications had been submitted in the past were evaluated. One area (Montezuma Hills) was considered in some detail, but the eligible area turned out to be small, so an application was not submitted.

5. Conservation Reserve Program History

As of the end of the twelfth signup period in 1992, 188,000 acres were enrolled in California. Only 1,722 total acres were enrolled in California in the twelfth signup period. Some other data from past and the most recent (1992) signups are provided below.

Table 4. Conservation Reserve Program history.

	NO. BIDS	ACRES BID	BIDS APPROVED	PERCENTAGE BIDS APPROVED	ACRES APPROVED	PERCENTAGE ACRES APPROVED	AVERAGE RENTAL
Twelfth CRP Signup, June 15-26, 1992							
CA	52	18,359	17	33%	1,722	9.38%	$48.94
US	37,119	2,595,175	19,504	53%	1,099,976	42.39%	$63.09
CA/US	0.14%	0.71%	0.09%	62.22%	0.16%	22.13%	77.57%

	NUMBER BIDS	NUMBER CONTRACTS	PERCENTAGE APPROVED	ACRES CONTRACTED	AVERAGE RENTAL
First through Eleventh signup					
CA	760	510	67%	187,000	$48.55
US	498,100	356,700	72%	35,396,000	$49.29
CA/US	0.15%	0.14%	93.71%	0.53%	98.50%

Sources: USDA, OPA, 1992c

Only a small fraction of the California acreage enrolled, primarily in Siskiyou County, has been irrigated. Other irrigated acreage in HUAs has been bid and found eligible, but land has not been enrolled at the national level. Apparently, the EBI per dollar bid has not been high enough for the USDA to enroll this irrigated land. California has submitted 0.15 percent of U.S. bids and only 0.5 percent of CRP lands are in California.

Data on enrollment by county are provided in Table 5 below. CRP enrollment in California is also concentrated in San Luis Obispo county. This land is primarily highly-erodible, dryland grains acreage.

Average rental rates by state for the most recent CRP sign up period are provided in Table 6 below. Average rental rates have been much higher in some states than others. These differences could be because some of these states include conservation priority areas, wellhead protection programs, and other factors which make the bids more acceptable. The differences may also reflect regional land values and economic returns to farming (Osborn 1992).

Table 5. Major counties participating in conservation reserve program.

COUNTY	ACREAGE ENROLLED
San Luis Obispo	105,334
Yolo	20,643
Monterey	18,141
Siskiyou	16,830
Kern	6,927
Tulare	4,848
Glenn	4,533
Subtotal	177,256
Total California	190,523

Source: Preliminary Report: Status Report by County 9/29/92

Table 6. Acres accepted and some average rental rates, twelfth signup period.

STATES	ACRES	RENTAL, $/ACRE
California	1,722	$48.94
Illinois	82,624	$87.76
Iowa	127,150	$98.18
Maryland	1,366	$76.50
Missouri	109,398	$69.79
Ohio	55,984	$81.27
Montana	48,153	$27.67

Source: USDA ERS RTD 1992

6. Conservation Reserve Program Evaluation

a. Payments and incentives

Enrollment in the CRP in California has been limited by relatively high returns to agriculture and other farm programs in comparison to acceptable CRP bids, as well as a lack of priority for enrollment in the state in the form of wellhead designation, conservation priority area or HUA.

The low average rental rate in California effectively excludes irrigated land from the program. The low average bids accepted for California land in the past has certainly discouraged many farmers of irrigated land from submitting bids, and many farmers are probably unaware that the

explicit bid cap was terminated in 1990. No bids from the West Stanislaus and Morro Bay HUAs have been submitted. Apparently, farming is too profitable to justify any bid that might be accepted.

b. Potential water yield

The CRP has many potential applications for improving water supplies and quality in California. The program is directed at soil erosion and water quality, but land retirement incidentally stops the consumptive use of irrigation water, except that some water may be required to establish cover crops. No specific estimate of potential water yield was made for this study.

c. Other factors

The signup of new lands is limited by annual appropriations. The U.S. House cut funding for additional CRP sign-ups from agricultural appropriations in mid-August 1992 (Daines 1992). It is believed that the CRP has a fair chance of receiving appropriations for new enrollment for 1994 and 1995 since the FACT requires that 1 million acres be reserved for enrollment in each of calendar years 1994 and 1995. This land reservation is specifically targeted to commodity farmers having problems meeting their conservation compliance requirements.

The program also could be continued under a new 1995 farm bill. Currently, it is expected that enrolled land will leave the CRP in the next decade as leases expire.

One goal of the FACT was to use the WQIP for land which caused water quality problems. If the WQIP failed, then the CRP would be used to retire the land. Therefore, the progress of the WQIP in addressing local water quality problems in Colusa, Fresno and Stanislaus counties could be monitored. If the WQIP is ineffective, a case could be made for land retirement using CRP.

Many states have "piggyback" programs that provide additional local cost-sharing for use with CRP programs, and other states have their own programs similar to the national CRP. Gadsby (1992) reports that seven states, six in the midwest, have programs similar to the national CRP, and 13 more states have programs with some similarity to the national CRP. For example, the Missouri CRP has made a 25 percent cost-share available for farmers to meet their conservation plans under the national CRP. Since ASCS pays 50 percent, the farmer is left with a 25 percent share. In Minnesota, the "Reinvest in Minnesota" and "Permanent Wetland" programs emphasize conservation of wetlands and prairies. Several other state have programs to enhance wildlife resources on national CRP lands.

CRP signup periods have varied in duration and frequency as noted below. For 1987 through 1989, two signups were held annually.

Annual CRP payments are limited to $50,000 per individual per year. This could limit enrollment of cropland from large farms.

Table 7. Conservation Reserve Program sign up periods, 1987-1989, 1992.

SIGNUP PERIOD	DATES	YEAR
4	Feb 9-27	1987
5	Jul 20-31	1987
6	Feb 1-19	1988
7	Jul 18-Aug 31	1988
8	Feb 6-24	1989
9	Jul 17-Aug 4	1989
12	June 15-26	1992

In comparison to the commodity programs, the CRP has an advantage in that it can be legally applied to any annual crop. However, the CRP has little application for high-valued annual crops, and no application for perennials.

B. WATER QUALITY INCENTIVE PROJECTS

1. Water Quality Incentive Projects Background

The Food Security Act of 1985 was amended to include the Agricultural Water Quality Protection Program. From the 1990 FACT, "The policy of Congress of that water quality protection, including source reduction of agricultural pollutants, henceforth shall be an important goal of the programs and policies of the Department of Agriculture." (U.S. Congress 1990)

"The Secretary must establish an Agricultural Water Quality Protection Program as a voluntary incentive program with the goal of enrolling 10 million acres during calendar years 1991-95. USDA will enter into 3- to 5-year agreements with farm owners and operators to develop and implement plans to protect water quality . . ." (USDA ERS 1991). The implemented program is more commonly referred to as the Water Quality Incentives Projects, or WQIPs.

2. Eligible Lands

Eligible lands include ". . . (5) areas recommended by state lead agencies for environmental protection as designated by a governor of a state; (6) in consultation with the secretary, other areas recommended by the Administrator of the Environmental Protection Agency or the Secretary of the Interior; (7) lands not located within the designated or approved areas but, if permitted to continue to operate . . . would defeat the purpose of the program as determined by the Secretary; or (8) areas contributing to identified water quality problems in areas designated by the Secretary" (U.S. Congress 1990).

In addition, ". . . the Secretary shall give priority to lands on which agricultural production has been determined to contribute to, or creates, the potential for failure to meet applicable water

quality standards or the goals and requirements of federal or state laws governing surface and ground water quality, in consultation with state officials . . ."

For 1992, USDA ASCS (1992d) stated that "those members of the State Conservation Review Group (SCRG) who are involved with oversight of the ACP water quality projects will recommend the WQIP area or areas. . . . WQIP will be implemented in an existing Water Quality Demonstration Project (DEMO), Hydrologic Unit Area (HUA), or 1991 ACP Water Quality Special Project (WQSP)." The SCRG could "target WQIP to a subwatershed within the larger DEMO, HUA or 1991 WQSP."

States received allocations of funds "based on the number of DEMOs, HUAs and 1991 Water Quality Special Projects within each state. Funds will be allocated to each state office based on the number of projects times about $50,000. In 1992, California had 3 HUAs and one DEMO. In 1992, farmers in eight counties submitted 28 applications involving 6,307 acres under WQIP. Contracts for approved practices on 2,340 acres paid out $85,000 (Denley 1992).

For 1993, the USDA asked the states to submit applications for areas to be eligible for WQIP funds to the national level. The WQIP was no longer targeted to DEMOs, HUAs and 1991 Water Quality Special Projects, but the states could resubmit areas previously designated under these programs.

1993 applications were coordinated by the conservation specialist (Larry Plumb) in the state ASCS office (Denley 1992). Three new projects in Colusa, Fresno and Stanislaus counties were approved, and each obtained close to their request in WQIP funds. The funds provided by this appropriation are provided in Table 8 below.

Table 8. Approved fiscal year 1993 WQIPs in California.

PROJECT NAME	FUNDING	ACRES	FUNDING PER ACRE[1]
Colusa	$52,000	50,000	$1.04
Westside Fresno	$199,000	50,000	$3.98
Western Stanislaus	$199,000	42,000	$4.74
Weighted Average			$3.17
U.S.	$15,000,000	4,815,759	$3.11
CA/US	3.0%	2.9%	

[1]Calculated as an average

Source: USDA ASCS 1992e

3. Approved Practices

To participate, a farmer must develop and implement a water quality protection plan with the technical help of the SCS. The plan must include "specific agricultural production practices that will be implemented, improved and maintained . . . in order to carry out and achieve the water quality goals and objectives of the producer" (U.S. Congress 1990). To prioritize applications, the SCRG "should give general guidance criteria that local officials can take into consideration when prioritizing applications" (USDA ASCS 1992d).

The program funds irrigation water management related to irrigation-induced water quality problems. In general, no payments are made for installing structures. Structures with a life greater than 10 years can be funded under the ACP, discussed below. WQIP has been used to fund devices with a short useful life such as sprinklers or water measurement and irrigation timing devices that are not eligible for ACP funds. For irrigation scheduling problems, the SCS frequently works with the Irrigation Training and Research Center, Agricultural Engineering Department, California Polytechnic State University in San Luis Obispo.

Recent approved practices (USDA ASCS 1992d) were:

Irrigation water management: Determining and controlling the rate, amount and timing of irrigation water in a planned and efficient manner.

Regulating water in a drainage system: Controlling the removal of surface or subsurface runoff, primarily through the operations of structures.

Toxic salt reduction: Reducing or redistributing the harmful concentration of salt in the soil.

4. Payments and Incentives

PL 101-624 states, "In determining the amount of incentive payment to be made . . . the Secretary shall consider, among other things, the amount necessary on a per acre basis to encourage producers to participate, additional costs incurred by the producer, and the production values foregone, if any, in implementing the practices." Cost share payments must not exceed 50 percent of the cost of the eligible practice, and incentive payments are limited to $3,500 per year in conjunction with any ACP payments.

The STC "shall establish incentive rates at or below the established rates" in consideration of factors mentioned in the previous paragraph. For 1992, maximum payment rates for the three practices listed above were $10 an acre.

Farmers have about 2 years to sign up to receive the new WQIP funds in each respective county. Since 3-year LTAs will be used, this money will fund improved management for up to 5 years.

5. Water Quality Incentive Projects Evaluation

The WQIP would apply primarily to water quality benefits. Because of the relatively small amount of funding the cost-sharing limitation, the WQIP would probably be used as part of a larger package of services associated with a water management program. Because designation of areas is now initiated at the state level, working with appropriate agencies to develop more areas may be productive.

a. Potential water yield

Although some water yield from improved irrigation practices may be obtained, none has been estimated.

b. Other factors

Since the program has a goal of enrolling 10 million acres and 4.8 million have been enrolled so far, the program has been about half funded in relation to its 1995 goal under FACT. "The 1992 Appropriations Act provided $6.75 million under ACP to be used for water quality payments and practices . . ." (USDA ASCS 1992d). In fiscal 1993, national funding for the WQIP increased to $15 million. The program has broad-based support and will probably continue to be funded at fiscal year 1993 levels.

In 1992, the first signup period was to be initiated "no later than February 3" for two weeks, with a later optional signup period held after June 15 "of a duration not to exceed 4 weeks" (USDA ASCS 1992d).

The WQIP and ACP, discussed below, have an advantage in that they can be applied to irrigation systems for any crop. The economics of irrigation water management on high-valued and perennial crops is very different from that of low-valued commodities. For high-valued crops, incentives for management are likely to be more related to crop yield, quality, and the potential for interactions with other agronomic problems such as field operations and plant disease.

C. AGRICULTURAL CONSERVATION PROGRAM

1. Agricultural Conservation Program Background

The ACP was first authorized in the Soil Conservation and Domestic Allotment Act of 1936 as amended. The objectives of this program are to "assure the continued supply of food" and "to provide for environmental conservation or enhancement" (NARA 1992b). The recipient must participate in the operation of a farm or ranch. Irrigation or municipal water districts are not eligible to receive ACP funds.

Approved conservation practices "Conserve or safely dispose of water" or "Prevent or abate agricultural related pollution of water, land and air." The counties select from a menu of

practices approved at the state level. Special practices can be approved at the county level; for example, surge irrigation is approved in the Fresno HUA.

A program is developed in each county by the COC, in consultation with the CCRG. "At least one public meeting per year shall be held for this purpose." This process identifies problems and develops conservation practices designed to treat them. The practices are prioritized. The county program must be approved by the state ASC committee. Each year, when the COC has determined the extent to which federal funds will be made available, notices of approval are issued showing the units of approved practices for which cost-sharing will be available.

The COC also works with farmers to encourage use of the ACP. The farmer must file a request for funds for an approved practice and a plan with the COC at the county ASCS office. Generally, local SCS offices determine if the plan is technically feasible. Plans having high costs or unusual features can be evaluated at the state level.

Regular practice Irrigation Water Conservation (WC4) can fund structures having a minimum 10-year life. Buried mainlines, laterals, and other "permanently installed systems" are eligible if they do not have an emitter or sprinkler. Lining of irrigation ditches, land leveling, tailwater recovery systems, gated pipe, backflow devices, and flow measuring devices are generally eligible. Sprinklers or buried drip tubing, and any system bringing additional land under irrigation, converting a sprinkler system to gravity, or restoring a system are not eligible.

Examples of practices approved for West Stanislaus County included pipelines, return systems, some land leveling, and other water saving measures. In the rice DEMO, three improvements allow rice growers to work with mandated tailwater holding periods are authorized.

2. Payments and Incentives

Funds are "distributed among the states in accordance with conservation needs as determined by the Secretary." The funds are distributed through state to county committees which approve final payments. The state conservationist determines how to allocate monies among counties. Money may be reallocated to counties with more need. Funding priorities within a state are discretionary and closely related to current perceptions of importance. HUAs obtain special funding allocations in addition to regular ACP shares.

The ACP is most frequently used for annual or "regular" programs. For these programs, cost-sharing under regular agreements must not exceed 75 percent of the average cost of carrying out the practice, as determined by the county committee, but the DASCO can specifically authorize a higher level to provide adequate incentive for the conservation practice. The federal cost share is also related to "the public benefits resulting from the conservation or pollution abatement practice" (USDA ASCS 1991). Cost-sharing of up to 80 percent may be available for low-income farmers.

Cost-sharing under annual agreements is also limited to $3,500 per person per year unless the person participates in "pooling agreements." The $3,500 cap is a disincentive to some farmers, especially large-scale farmers whose time and resources are relatively valuable.

With Long-term Agreements (LTAs), a long-range plan is required to treat the resource to a level which allows sustainable farming. With an LTA, a farmer can obtain a maximum of $35,000 (10 x $3,500) in advance. Cost-sharing must not be in excess of 75 percent nor less than 50 percent of the average cost.

ACP pooling agreements encourage farmers to work together on a common problem. The maximum annual cost share per farm increases from $3,500 to $10,000, to a maximum of $50,000 per pool. Pooling arrangements are often used for joint problems such as bank erosion and tail water return systems, and can be used to get funding in a relationship with local irrigation districts.

Nationwide, ACP funding has recently been in the range of $160 to $190 million annually (Denley 1992). Table 9 below provides data on ACP expenditures and participation in California in recent years.

Table 9. Summary of Agricultural Conservation Program in California 1987-1990, by practice.

	NUMBER OF FARMS WITH CONTRACTS				FEDERAL PAYMENTS TO FARMERS	TRANSFERRED TO SCS[3]
	REGULAR	LONG-TERM[1]	POOLS	TOTAL[2]		
1987	1,169	64	61	1,232	$3,339,450	$235,100
1988	1,593	93	115	1,684	$5,022,001	$233,750
1989	1,605	170	94	1,768	$5,702,108	$222,750
1990	1,486	152	94	1,634	$5,363,209	$223,700
1991	1,396	122	91	1,515	$4,701,714	$248,300
U.S. 1991	128,044	9,417	2,593	136,899	$180,820,195	$8,684,459
CA/US 1991	1.1%	1.3%	3.5%	1.1%	2.6%	2.9%

[1]Long term agreements
[2]Regular and LTAs include pools. LTAs and Regular do not add to total since some farms have both arrangements.
[3]Additional money transferred to SCS for technical assistance with ACP.

Since 1988, California has received $4.7 to $5.7 million dollars annually for the ACP. The ASCS also transfers $225,000 to $250,000 to the SCS annually for technical assistance. Irrigation water conservation practices are by far the largest single practice funded in California. Some data are provided in Table 10.

Table 10. Irrigation water conservation practice (WC-4) in California.

YEAR	FARMS	ACRES SERVED	PAYMENTS TO FARMERS	PERCENT OF GROSS[1]	DOLLARS PER ACRE
1987	840	78,059	$2,396,609	71.8%	$30.70
1988	1,267	100,527	$3,882,523	77.3%	$38.62
1989	1,259	97,048	$4,134,761	72.5%	$42.61
1990	1,191	93,416	$4,034,130	75.2%	$43.18
1991	1,105	87,366	$3,630,707	77.2%	$41.56

[1]From Table 9

Over 70 percent of ACP funding in California has been for irrigation water conservation practices, with average annual investments of $31 to $43 an acre.

3. Participation with Outside Interests

There are numerous cases of outside interests working with the ACP to further their water resource goals. These programs generally provide financial and technical assistance which can be used in support of ACP funding applications, and/or they work with local institutions which have been developed or assisted with USDA funding in the past.

The Westlands Irrigation District has funded a program to evaluate water management plans, paying up to $8 an acre to help develop the plans. ACP funding could be considered once the plans were prepared.

Eight mobile irrigation laboratories have been funded by DWR with local money from cities and counties. The labs conduct on-farm irrigation evaluations, and recommendations can lead to requests for ACP funding. DWR funds 50 percent of the cost for the first year, 40 percent for the second year and 30 percent for the third year, paid by a charge of $600 per evaluation. Statewide, about 26 agencies assist with cost sharing. Funding is directed through a local resource conservation district. Most labs conduct over 100 irrigation evaluations per year, even though local climate may limit the growing and irrigation season.

The California Association of Resource Conservation Districts (CARCD) is actively searching for funds to assist with irrigation water conservation programs (Spieze 1992). Public outreach is needed to obtain irrigation conservation improvements on farms that have not responded to past efforts. CARCD is working with DWR, the SCS, RCDs and U.C. Cooperative Extension to solicit the U.S. Bureau of Reclamation for financial assistance in the Central Valley, and they may ask the EPA for similar assistance in the future.

A pilot program to install gypsum blocks for soil moisture measurement has been funded by two outside groups. The program was originally funded in Yolo county by a New York based

environmental group. More recently, the program has been funded with a grant from the California Energy Commission through the CARCD. The project was expanded to a maximum of 85 farmers in 12 counties. Currently, only 6 or 7 farmers in California are part of the project.

The gypsum block program requires that farmers take soil moisture readings throughout the irrigation season. With time constraints in mid-summer, some farmers abandoned the program and others had to be contacted to get readings. While interest in the program has been high, the time required to monitor soil moisture is a problem for farmers, even though the additional information is very beneficial in irrigation management.

In the Morro Bay HUA, Morro Bay has been degraded by siltation from the 49,000 acres of crop and rangeland in the watershed. Streambank restoration, improved livestock management, and erosion control practices on cropland have been funded by the WQIP, the ACP and the Coastal Conservancy. The SCS provides technical assistance. The Coastal Conservancy has funded studies and an enhancement plan and provided $400,000 to the local RCD for erosion control projects. The Conservancy also contributed to the purchase of 130 acres of bottomland adjacent to the Bay, and will fund a wetland restoration effort.

In the Sacramento rice DEMO project area, mandatory holding periods for rice field drainage water were developed by the regional water quality control board and the EPA. The DEMO project tests drainage control systems and shows growers how to use them. When a farmer obtains ACP cost-sharing for approved practices, ICI Americas, the herbicide manufacturer, provides additional cost-sharing of 15 percent up to $1,800 a year. Since the ACP can fund 75 percent up to $3,500 a year, a farmer can get up to 90 percent funding or $5,300 a year from both sources. Other contributors to improvements in the region include another chemical company and the California Fish and Game and Cooperative Extension (Huff 1992).

In the Malibu area, the SCS is developing technical information to assist farmers to reduce non-point pollution into a lagoon. The problem also involves tertiarily treated effluent from a municipal agency. In another project, the Metropolitan Water District of Southern California is buying conserved water from the Imperial Irrigation District. The transfer involves, among other things, land-leveling and tailwater pumpback programs. Some irrigation improvements in Imperial Irrigation District have been funded with ACP money.

4. Evaluation

a. Potential water yield

For a subset of total ACP-funded water conservation practices, the ASCS estimates applied water savings and costs under the program. These data are provided in Table 11.

These ACP funded improvements have resulted in new water savings at a rate of 43,000 to 65,000 AF annually. Since improvements last at least 10 years, funding is continuous, and only that share of WC4 primarily for water conservation is counted (Table 11). The ACP has probably reduced irrigation water application by at least 500,000 AF annually. These savings,

when amortized over the expected life of the investment, have cost $19 to $23 per acre-foot including the $5 to $7 federal cost-share.

Table 11. Water conservation savings on WC-4 with the primary purpose of water conservation.

YEAR	ACRES SERVED	COST SHARING (million)	EFFICIENCY[1]		APPLIED AF/AC		TOTAL COST AF		AF SAVED TOTAL
			BEFORE	AFTER	BEFORE	SAVED	ANNUAL SAVED	SAVED U.S. SHARE	
1987	63,429	$2.265	57%	67%	4.94	0.7	43,186	$5.35	$14.42
1988	78,663	$3.613	55%	67%	4.71	0.7	56,760	$6.49	$19.84
1989	90,428	$4.005	55%	68%	4.73	0.7	55,242	$7.39	$22.81
1990	89,393	$3.922	56%	69%	4.83	0.8	64,839	$6.16	$18.99
1991	76,162	$3.468	57%	70%	4.60	0.8	53,249	$6.64	$19.89

[1]Irrigation system applied efficiency

Source: USDA ASCS 1992f and prior years

One important concern is the extent to which water conserved with ACP practices can be transferred. "Conservation" frequently does not reduce consumptive use or other water losses, but, rather, reduces irrigation runoff or seepage which formerly became water supply for other water users. In this case, conservation may merely change the time or place of water availability. Irrigation water "conservation" may even result in increased consumption as applied water savings are used to irrigate other land.

The potential value of irrigation water conservation measures to municipal agencies must be evaluated on a case-by-case basis. Other potential benefits include:

- Improvements in downstream water quality.
- Reduced groundwater pollution.
- Change in the time or place of water availability, including instream uses.
- Farm level benefits, such as improved yields, which might be exchanged for "wet" water.

In these cases, the water "savings" may not be transferable, but conservation can play a role as part of a larger transfer process. For example, irrigation conservation could be used to mitigate impacts to other local water users.

b. Other factors

ACP funds are authorized annually by Congress. The program has had very stable funding over the years, and this is expected to continue.

One concern is that "practices . . . that result in significant economic benefits to the farmer or rancher are not eligible for ACP cost-sharing" (USDA ASCS 1991). The goal of the program is to encourage improvements that the farmer "would not or could not be expected to undertake without financial and technical assistance", and to obtain "community-wide benefits." In consideration of these goals, ACP funding perhaps could not be used by farmers to obtain water only for profitable water transfers.

Of course, ACP practices can result in transferable water. Additional water yield, over existing levels, might be limited by declining returns to increased investment, and by cost-sharing limitations which keep large farmers and some irrigation improvements out of the program.

VII. ALTERNATIVE STRATEGIES

The commodities programs are responsible for idling much of California's irrigated acreage each year. For participating commodity farms, mandatory acreage reductions and inflexible crop requirements are being replaced by voluntary land retirement programs and individual decisions on planting and crop mix. This change, especially through the 0-50/92 and flex provisions, has allowed California commodity farmers to withstand drought and transfer water at much less cost than would have been the case without the provisions. Also, water quality problems associated with agriculture are receiving increased attention in the form of new programs and increased funding. These changes have created an important opportunity to improve water resource management, but many legal and hydrologic uncertainties remain.

Each action strategy which the urban water agencies should consider includes farm programs, a plan of action, commitment of money, personnel and resources, and interactions with institutions and individuals. The strategies differ in intent, approach, cooperation required with other interests and their probable effectiveness.

All of the strategies include some combination of the five provisions or programs analyzed in Sections IV and VI, but federal, state, and local programs would not be ruled out. In fact, this research showed that the interest and assistance of other agencies could be important to the success of a strategy. The content and approach of each case may need to be adjusted to obtain the best result.

The strategy selected in any particular case will depend upon the specific water resource goals sought. Each strategy differs in its potential to meet a range of goals. Differences occur in the applicability of each strategy to types of water transfers such as lease, sale, or dry-year lease option, and in its ability to promote water quality improvements. In addition, the merits of each strategy depend on the nature of agriculture in the target region. For example, some regions have little or no commodity acreage, so 0-50/92 and flex provisions would not apply.

Because of these factors, there can be no best or final strategy, but a description of important considerations provides a guideline for more detailed decision-making. Each agency must decide the best approach, based on specific needs and regional circumstances.

A. FACTORS TO CONSIDER IN EVALUATING STRATEGIES

This section outlines the factors a municipal water agency should consider when determining the proper mix of strategies in an overall water management plan. Four types of factors are differentiated: economic, technical, legal and social. Economic factors refer to all projected or estimated dollar impacts to the agency. Technical factors refer largely to hydrology and the operations of facilities required to effect a transfer. "Legal" refers to mandatory constraints on operations of facilities, water transfer law, and farm program laws, while "social" refers to other

concerns involving public perceptions and attitudes that might affect the success of a strategy or other related activities of the agency.

The risk and uncertainty of each factor should be considered, as well as the expected value or result. Risk refers to possible outcomes with a known or approximated distribution, such as hydrology. For example, the expected frequency of drought can be estimated with some confidence. Uncertainty refers to possible outcomes for which no useful probabilities can be developed, perhaps because there is no precedent. For example, the percentage of farmers who will sign up for a new water transfer program is uncertain. Below, some important factors to consider in evaluating strategies are discussed.

1. Potential Direct Costs of the Strategies

Direct costs include all of the tangible expenses of developing and maintaining a strategy, as well as the payments to farmers required for their cooperation. Each strategy would require an up-front commitment of money, time and personnel to develop the strategy, and additional expenses would then be required to implement the strategy. Two of the strategies require payments to farmers and two require time and travel for meetings to obtain information and develop alliances and approaches to promote the strategies.

2. Type of Water Transfer Desired

The goals of each agency will determine which types of water transfer plans are appropriate. Some agencies want more water to augment supplies during drought. Some agencies can tolerate uncertainty in these intermittent supplies, but others want to know with more certainty the amount of water and the situations under which it will be available.

Annual leases can be used to contract for water supplies in dry years, but water supply reliability is increased only to the extent that the availability of water through annual leases is a certainty. With a dry-year lease option, the agency purchases the right to obtain water in future dry years whenever specified conditions such as snowpack or storage are met. Since water is obtained only in drier years, the lease-option is similar to a purchase of priority of an appropriative right. The lease option increases the reliability of municipal water supplies, but usually represents a more long-term commitment than the simple annual lease. Finally, outright purchase of a water right would provide more water supply for most years, as determined by the priority of the right, but water supply reliability may not improve at all if the purchased right is no more reliable than the agencies' existing rights.

The farm programs discussed differ in the length of time water could physically be made available and in their fit with types of water transfers. Since the commodities programs are annual, the 0-50/92 and flex provisions fit well with an annual lease program; however, these provisions can change every five years, so they would not be highly reliable for a lease-option transfer.

The conservation programs save water over a longer period, but typically only for 10 to 15 years. Since water is made available in years when it may not be needed, the ability to store or exchange yield in dry years may be important. Potential water yield is a major issue for the Agricultural Conservation Program (ACP) and Water Quality Incentive Projects (WQIP) because consumptive use is rarely changed by irrigation practices. Consequently, such programs may work better as part of a regional water management plan rather than as an explicit method to obtain water yield for water transfers.

3. Potential Yield of the Strategy

An agency should evaluate hydrologic and legal feasibility to estimate the potential water yield of a water transfer program. Hydrologic feasibility is the potential to actually move water to the planned time and place, or to exchange water to satisfy buyer, seller and any intermediaries. Hydrologic feasibility can also include conveyance losses. Feasibility involves an expected quantity as well as a risk. Legal feasibility is linked to hydrologic feasibility because it may be illegal to transfer water that cannot be made physically available. Legal feasibility also requires that other water users are not injured. A transfer may require water rights be protected in transit or in storage, and additional legal issues ensure compliance with environmental laws.

The extent to which water made available by USDA programs will be transferable is unclear. If water from mandatory acreage reduction could be marketed annually, a related water transfer program could result in a large and immediate "source" of water for municipalities. However, in one view, this water would have been available to other water users, so its transfer results in injury. Since the transfer would not result in "new" water, it could be protested. The 1991 water bank regulations did not allow transfer of water from land idled by USDA acreage reduction requirements (Howitt, Moore and Smith 1992).

On the other hand, 0-50/92 and flexibility provisions are voluntary, so efforts to transfer water from land enrolled under these provisions would have a better claim for water not otherwise used. The yield of the transfer, at its source, will generally be estimated as change in consumptive use plus unrecoverable seepage.

Agencies may also need to work with the farmer to satisfy the law. Following is a summary of water transfer law based on Hill (1992); these statements represent one set of views at one point in time:

Riparian

> Not transferable, but water can be made physically available to a downstream use if owner does not exercise right. Protection and diversion may raise legal issues.

Appropriative

> Pre-1914. Not subject to a water rights permit, not subject to SWRCB approval. Transferable so long as there is no adverse effect on any other legal water user

or the environment. The other water user must complain and file suit to stop the transfer.

Post-1914.

- If conducted within same purpose, place of use and point of diversion, (example, within SWP or CVP) no SWRCB approval is needed.

- Otherwise, subject to SWRCB approval.
  - Long term (more than one year)
    If not through Delta, then process in Water Code 1735-1737. Long-term transfers are difficult to get approved.
    If through the Delta, then the SWRCB will probably not approve any which divert additional amounts of water from the Delta until an environmental evaluation of cumulative impacts has been completed.
  - Temporary (annual)
    Temporary urgency transfer subject to CEQA
    Temporary transfer contains an exemption from CEQA

Riparian water rights are attached to the land and, therefore, cannot be formally transferred. However, if the owner does not exercise the right (actually irrigate), then the water is physically made available, at least at the point of original diversion. The 1991 water bank bought water from riparian water rights owners. When farmers reduced their riparian diversions in the Delta, the SWP was able to reduce releases from Lake Oroville to maintain Delta water quality. Such a strategy could also be applied to appropriative rights.

Under the new CVP Improvement Act, review of transfers from within the CVP to outside parties will be required from the USBR. The proposed transfer must be denied if fish and wildlife water deliveries are impaired by delivery capacities, if water quality is reduced, if there are significant adverse impacts on groundwater, or if there is unreasonable impact on district or water-user water supply, operations or financial conditions. Local irrigation district review will be allowed if the transfer is over 20 percent of its CVP supply. CVP contractors have right of first refusal and additional costs will be placed on water transferred out of the CVP (P.L. 102-575, Title XXXIV). In any case, farmers within an irrigation district may have to obtain permission from the district or other responsible entities to transfer water. New legislation may seek to clarify the role of local districts in water transfers.

Agencies may find advantages to the transfer of pre-1914 appropriative rights. Transferring water from a local irrigation district or other local source may be more feasible from a legal and technical perspective. Currently, annual transfers are much more feasible than long-term transfers or sale of water rights. Any of these factors could change with new water transfer legislation.

The source of water savings under each program may affect the ability to transfer water. Under 0-50/92, water savings are generally derived from idling land. Under the flex provision, water savings could result from conversion to a less water intensive or dryland crop. For example, cotton or corn farmers could be encouraged to plant dryland wheat. Water savings from ACP and WQIP approved practices are difficult to calculate and vary from place to place.

4. Benefits: Potential Cost Savings in Comparison to No Strategy

An agency should estimate the potential benefit of a new water transfer strategy as the cost of alternative water supplies avoided because of the strategy. Similarly, the benefits of a program to improve water quality are frequently the costs of obtaining those same improvements by some other means. An attempt should be made to determine the water supply which would actually be reduced if the transfer program were enacted; potential benefits can be gaged accordingly.

Emergency drought water banks or groundwater are examples of the alternative cost of acquiring additional water. For some utilities, more secure, permanent water supplies may be required. For still others, more conservation would be required if water was unavailable from the contemplated strategy. In any case, water consumers eventually pay for costs and benefits, so comparisons should include all costs to water users. If the quality or quantity of deliveries at the tap changes, then consumer values may be an important part of benefit.

If the cost of the water strategy per unit water, divided by its probability of success is less than the cost of alternative supplies, then the contemplated strategy would be a good investment. If the probability of success cannot be estimated (i.e., the plan is uncertain as opposed to risky), then a more subjective evaluation is required.

5. Feasibility and Costs of Alliances Required

The number and nature of alliances required is different for each strategy. Costs rise as more individuals and groups become involved in a strategy, but so does the likelihood of success. For example, it costs more to develop the alliance needed to change the administration of farm programs, but a coordinated and united alliance has a better chance of achieving change.

6. Potential Risks

Any untried strategy has risks. A strategy can fail to reach its goals, or if the outcome is all-or-nothing, there is a significant chance that no change will occur. Each strategy carries the risk of favorable or unfavorable incidental outcomes. A strategy may be perceived as being damaging or even offensive to some interests, who may seek compensation or try to restrict future efforts. For example, water districts or third party interests may try to block transfers, or agricultural interests or environmentalists may oppose the use of program provisions to free up water. These actions could affect future water management activities. On the other hand, new alliances could have unforeseen benefits.

B. DESCRIPTION AND EVALUATION OF FOUR STRATEGIES

This section presents four strategies and their risks, costs, and returns. The four strategies and their relationship to each of the four important USDA programs are shown in Table 12 below.

Table 12. Relationship of strategies to programs.

	PROGRAMS			
STRATEGIES	**0-50/92**	**FLEX**	**WQIP and ACP**	**CRP**
1. Develop and Apply Expertise	X	X	1	
2. Work With Farmers	X	X	X	
3. Promote Special Area Designations			X	X
4. Affect USDA Administration and Funding			X	X

[1]In most regions, a minor role.

To improve water transfer offers and regional water management, strategy 1 would increase agency understanding and monitoring of farm programs. Strategy 1 has little application to the WQIP and ACP since monitoring WQIP and ACP participation would probably not affect agency offers for water transfers. The WQIP and ACP could be important where there is little commodity acreage, where water quality is important, or where irrigation water management is an important concern of the municipal agency. In strategy 2, agencies would try to directly increase farmer participation in existing and widely used voluntary programs. More effort would be directed at the WQIP and ACP.

Strategies 1 and 2 currently have little application to the CRP. Before any agency could work with farmers to enroll more land in the CRP, policy must be changed so more irrigated land can be enrolled. Strategies 1 and 2 could only be applied to the CRP after strategies 3 and 4 had been successfully applied.

Strategies 3 and 4 have no significant application to the commodities provisions. No special area designations affect the administration or funding of commodities programs. One possible exception is that agencies could work with farmers to establish commodity base acreage which would then be eligible for commodities program benefits. A farmer who could not currently obtain 0-50/92 payments for idling irrigated land could become eligible, and the contribution of deficiency payments might improve the economics of idling land.

Realistically, agencies have little chance of affecting the administration or funding of commodities programs, with the possible exception of the administration of the prevented-planted provision of 50/92 programs caused by drought.

1. Strategy 1: Develop and Apply Expertise

***Develop and apply* expertise in farm programs to improve water transfer offers, negotiating positions, and regional water management.**

With a better understanding of farm program options and economics, agencies could formulate better water transfer offers. Offers could be improved by determining the lowest price that will secure the desired amount of water, and by including terms and conditions that will make offers more acceptable.

Agencies could maintain in-house experts or retain other expertise to gather information about USDA programs. These experts would maintain, update and analyze detailed farm budgets, as well as monitor crop prices and annual farm program requirements and options. Factors that should be studied include:

1) Farm Program and Market Variables

- Target prices and non-recourse loan rates
- National crop prices and market conditions
- Acreage reduction requirements
- 50/92 prevented-planted allowance
- Approved ACP practices

2) Farm Production Variables (actual and potential)

- Location and amount of irrigated acreage
- Water supplies
- Water application and consumptive use
- Commodity base acreage
- Crop mix and use of flex and 0-50/92 provisions
- Crop yields
- Production costs
- Forward contracts and other constraints
- Water marketing plans
- Local crop prices

3) Irrigation Efficiency (actual and potential)

- District and farm conveyance system and losses
- Irrigation system and application efficiency
- Appropriate irrigation technologies
  - Soils
  - Expected irrigation efficiency
  - Capital costs
  - Operating and maintenance costs

Federal cost-sharing available
Expected transferable water
Improvements in crop yield or quality
Other management considerations

4) Non-point Pollution and Irrigation-induced Erosion

Baseline conditions
Appropriate technology
Federal cost-sharing available
Potential improvement

Agencies could first monitor conditions set externally to their local region, such as farm program provisions and external market conditions. Next, they could develop detailed information on local farming practices and economics. Information from items I and II could be used to analyze farm programs and water transfer options that would apply specifically to the agencies' location. If agencies were interested in promoting irrigation water conservation or improved water quality, then the data outlined in III or IV would also be developed. Detailed crop and farm budgets could be developed to estimate farm net returns under a variety of farm management, farm program, and water transfer scenarios, and this information would assist in formulating better water transfer and management offers.

This strategy could also be used to predict the impacts of farm programs on water supply and quality. Timely forecasts of crop mix and irrigation water use could complement hydrologic forecasts and improve the planning seasonal water use. This management application would be most useful for agencies strongly affected by regional agriculture or having important irrigation water delivery accounts.

This strategy would require interaction with existing agricultural research institutions such as the land grant universities and the Extension Service. In addition, it would be beneficial to develop relationships with local and state ASCS and SCS offices to obtain and evaluate up-to-date information on farm programs. Any services, procedures and contacts currently required for water transfers, such as legal assistance and work with water districts, the SWP or the CVP, would still be required.

This strategy is the least intrusive of the four. Agencies would try to get the best information available concerning irrigation, and interactions would consist largely of requests for information. To avoid being perceived as nosey, agencies could conduct a public information campaign and all information could be made available to the general public.

Since most of the potential water yield would be from annual commodity programs, this strategy would be best suited to an annual water lease program. Each year, agencies would compare potential yields and costs to the availability and costs of alternative water supplies and decide

on a water marketing program. This strategy could also be applied to work with the ACP and WQIP, where water savings would be more long-term and difficult to calculate and transfer.

2. Strategy 2: Work With Farmers

***Work with farmers* to transfer water or promote other water resource goals by assisting them with information, paperwork, cost-sharing and more explicit financial incentives.**

This strategy could be an extension of Strategy 1 in that agencies would not only increase their ability to monitor and interpret the farm programs but also bring this information to farmers and help them make the arrangements required to participate in the programs and transfer water. In Strategy 1, agencies merely seek to collect information and understand programs to formulate better offers. In strategy 2, agencies take a more active role in explicitly working with the programs.

Alternatively, strategy 2 need not build on strategy 1 if outside agricultural experts are used. Agencies could work through agricultural and water transfer experts who already understand farm programs and water transfer procedures. Commodity brokers, farm management experts, water transfer consultants, and attorneys experienced with transfer procedures could all provide these services.

This strategy would provide a package of services related to USDA programs and irrigation water management that would be mutually beneficial to the farmer and agencies. Agencies or their representatives would provide information and paperwork services to help farmers compare options, satisfy USDA requirements, determine how much water could be transferred, and satisfy water district and other legal requirements.

Agencies could participate directly with the program provisions in several ways:

1) Provide incentives for farmers to make more use of the flex or 0-50/92 provisions, ACP and WQIP, and then market the water savings.

Using this strategy, agencies' water transfer efforts would target farmers who are able to increase their participation in the flex, 0-50/92, ACP or WQIP programs. The objective would be to idle land that would not otherwise be idled, plant water-conserving crops on flex acreage, or increase conservation; the farmer's compliance could then be obtained to transfer the water saved.

This strategy should result in a good claim for transferable water because land is fallowed and consumptive use is reduced. The claim is strong because fallowing would not have occurred otherwise.

2) Provide incentives to market water to farmers who have already participated in the flex or 0-50/92 provisions, ACP and WQIP.

In many cases, irrigation water may become available because of a farmer's decision to use flex or 0-50/92 provisions, but the farmer has no additional financial incentive to participate in an annual water transfer. A water leasing program could specifically target these individuals. The program would have to offer a high enough price to compensate the farmer for the loss of alternative opportunities to use the water and for his time and trouble. Since these transfers do not increase water supplies, this approach may have less of a claim for transferable water.

Both cases [1) or 2)] would require more interaction with local interests than strategy 1. Agencies, or their representatives, would work with the ASCS, SCS and irrigation districts, and the increased local presence could mean more time spent dealing with local economic and hydrologic concerns.

Because program participation is annual and program provisions can change every 5 years, short-term water leases would be the best application for this strategy. It is likely, however, that flex and 0-50/92 provisions will be continued in future farm program legislation, and lease-option arrangements could include contingencies for a change in the law.

a. The special role of conservation programs

Urban water agencies can become involved with USDA conservation programs, as many other "outside" groups presently do (Section VI). This process, however, is complicated by technical and legal issues. The best place for irrigation water conservation may be in a water transfer package that ensures all local water users are no worse off than they would be without the transfer.

Incentives to conserve water are affected by irrigation efficiency and uniformity, crop mix, the price and availability of water, potential increases in crop yields or crop quality, and district incentives and programs. Farmers are usually more willing to adopt conservation measures when they have time to consider the options. Where water is inexpensive, water price provides little incentive to conserve.

The major factors reducing participation in the WQIP and ACP are:

1) A lack of information on planning strategies for irrigation system conversion and the overall impacts of improved irrigation water management on crop yield and quality and farm management problems and economics.

2) A lack of time, especially during the growing season, to deal with irrigation water management problems and paperwork.

3) Cost-sharing limitations imposed by the programs. This is particularly a problem for large-scale farmers.

To overcome the first problem, agencies could subsidize the technical expertise needed to implement improved water management. Agencies could work with programs promoted by the

California Association of Resource Conservation Districts and others to improve irrigation water management. The mobile labs program is a good model for technical assistance. Agencies also could work with individual growers to plan irrigation improvements and transfer water savings and provide support for the paperwork and planning needed to apply for ACP and WQIP funds.

To overcome the second problem, agencies could subsidize irrigation management and information services during the growing period when farmers are busy. Irrigation system improvements that also save management time in summer are valuable to many farmers.

The maximum cost-sharing provisions of ACP and WQIP, especially the $3500 combined maximum, currently deter many farmers from using the programs. For a large farm, cost-sharing limitations are especially restrictive, and additional cost-sharing over the $3500 maximum may be needed to induce additional conservation. Agencies could supply additional cost-sharing for approved irrigation and conservation practices and work with the state to develop a "piggyback" program.

Since the per-acre payments provided by WQIP ($10) are a small part of total per acre costs or revenues, WQIP payments frequently do not provide much incentive to improve irrigation. Additional small incentive payments, combined with technical assistance, could motivate more farmers to participate in the WQIP.

Irrigation improvements should be phased in to take advantage of available cost-sharing and minimize disruptions to farming practices. Phased improvements allow for more orderly conversion and maximize the dollar contribution from the ACP. Planning for phased improvements could entice more farmers to participate.

When determining how on-farm irrigation water conservation fits into an overall water supply strategy, agencies should be sensitive to the local structure for implementing conservation programs, such as local resource conservation districts, county ASC committee, the soil conservation service, and irrigation districts. These groups know which farmers are in most need of improvements and which farmers might participate in programs with additional incentives.

If current CRP administrative procedure could be changed (Strategy 4), then agencies may be able to work with farmers to enroll more irrigated land. Agencies could give farmers additional financial incentives to participate in the CRP. Incentives could take the form of additional annual rental, perhaps equal to the difference between what bid will be accepted and the farmer's required lease rate. For example, if a farmer requires $100 per acre per year to enroll his land, and the CRP will pay $45 an acre, then the agency could pay the additional $55 an acre.

Urban water agencies could work with farmers by informing them of CRP provisions and helping them develop bids for their land. Agencies could share the cost of additional water conservation or could work with farmers to market water not needed because of enrollment. Water marketing would be complicated by specific restrictions on long-term water transfers; for example, water cannot presently be transferred through the delta from CRP-enrolled land.

3. Strategy 3: Promote Special Area Designations

Work with local resource conservation districts, state agencies, USDA state offices (SCS and ASCS), and other interests to *promote and establish special area designations.*

As discussed in Section VIII, special area designations are used primarily for water quality purposes. Designation increases funding, makes land eligible for programs, and increases the ranking of land in competition with other regions. Time and personnel limitations in local and state agencies and institutional impediments have limited special area designations in California. Possible designations, cross-referenced to conservation programs affected, are provided in Table 13 below.

Table 13. Conservation programs in relation to special area designations.

SPECIAL AREA DESIGNATION	CONSERVATION RESERVE PROGRAM	AGRICULTURAL CONSERVATION PROGRAM	WATER QUALITY INCENTIVES PROGRAM
Hydrologic Unit Area	1	2	3
Designated Wellhead	1		
Water Quality Demonstration Project		4	3
Water Quality Special Projects		2	3
WQIP Designated Areas	5		6
Conservation Priority Area	1		

1. Increases ranking of land.
2. Directly results in more funding.
3. Designations affected WQIP funding in 1991.
4. Results in a larger cost share.
5. Success of WQIPs may affect eligibility for future CRP enrollment.
6. Makes land eligible.

This third strategy requires alliances with state and local ASCS and SCS offices, as well as local resource conservation and irrigation districts. Other important contacts include regional water quality control boards, state and federal Environmental Protection Agencies, universities, and other urban water agencies. Alliances with environmental groups and farm advocates would also be useful to obtain a strong base of support. The SWP and CVP could have important roles, and the involvement of DWR would be helpful.

The most promising special designations are development of a wellhead protection program and subsequent designation of wellheads and development of more HUAs. Both of these designations are likely to succeed and should save significant amounts of water. The main advantages of this strategy would be relatively low cost and public acceptance. Costs would be low because no outlays for incentives or transfers would be needed. Public acceptance should

be favorable because all of the designations increase the availability of federal funds and it is unlikely any interests would be harmed.

Disadvantages include limited geographic scope, the chance of failure, and potential low water yields if the other strategies are not included. This approach could best be applied to regional water quality problems for which most of the designations were developed.

4. Strategy 4: Affect USDA Administration and Funding

Change USDA administration and funding patterns **by working with local groups, state USDA officials, and other interested groups.**

California has many water quality problems, and federal law directs resources to correct these problems. California may have already missed some opportunities to obtain more funding for the state, and municipalities could work within established administrative or legislative channels to increase the likelihood and size of future subsidies. In addition, the USDA has substantial discretion in its administration of conservation programs; agencies could work with agriculture and irrigation water suppliers to obtain more favorable consideration in future land retirement and conservation programs.

Table 14 shows the allocation of USDA conservation program funds to California in comparison to the role of California in U.S. agriculture and the economy. For the ACP and WQIP, California receives 1 to 3 percent of the total U.S. support. For the CRP, California obtains less than 0.5 percent of U.S. support, and an even lower percentage of California bids have been approved.

At the same time, California has more than 3 percent of U.S. farms and land in farms, about 8 percent of value of agricultural production and agricultural real estate, and 10 percent of gross farm income. The state recently accounted for about 12 percent of the U.S. population and had a population density 2.6 times the national average.

These figures show that California has conservation problems that should receive priority over other states. Even a cursory look at California's water resource problems reveal substantial needs. For example, California has over 1 million acres of irrigated land with irrigation-induced soil erosion (Bullard 1992). The state is now home to several anadromous and estuarine species proposed or listed as endangered, a specific criteria in the 1990 FACT. There are state-level plans to retire lands overlying saline groundwater, and water quality standards are not being meet in many places. The currently proposed Bay/Delta Interim Water Rights Decision (D-1630), the new Central Valley Project Improvement Act, and other factors will reduce water supplies to irrigated land, increasing the need for irrigation water conservation. It is clear that California should take a more active position in USDA conservation programs.

Table 14. Major indicators of California's participation in conservation programs, and indicators of California's share of U.S. agriculture and population.

California Participation in Program	California Percent of of U.S.	California Value
1993 WQIP		
Percentage Funding (dollars)	3.00	$250,000
Percentage Land (acres)	2.95	142,000
1991 ACP		
Percentage Farms (farms participating)	1.11	1,515
Percentage Funds (dollars)	2.60	$4,701,714
CRP		
Signups 1-11		
Number of contracts	0.14	510
Land contracted (acres)	0.53	190,000
Signup 12		
Number of bids approved	0.09	17
Land contracted (acres)	0.16	1,722
1988 Federal Ag Payments (thousand dollars)	2.31	$335,000
California Importance		
Agriculture		
1989 Number of Farms	3.87	84,000
1989 Land in Farms (thousand acres)	3.13	31,000
1989 Value Real Estate (mil. dollars)	7.78	$46,181
1988 Gross Farm Income (mil. dollars)	9.99	$17,742
Socio-economic		
1986 Gross State Product (mil. dollars)	12.74	$533,816
1988 Population (thousand persons)	11.52	28,314
1988 Population density (persons/area)	260.72	

Source: Tables 4,8,9, and USDC BOC 1990.

The future administration and funding of conservation programs could be influenced by informed and strategic influencing of farm program administration, legislation and appropriations. If municipal water agencies developed expertise in farm policy, they could work to bring about positive change. Legislation and discretionary administration of USDA programs could be monitored, and agencies could work with the agricultural community to promote changes to their mutual benefit. Changes could include increased funding for conservation programs and ranking of land for enrollment in the CRP.

Agencies could get more California land enrolled in the CRP by encouraging the USDA to accept more bids from irrigated land in California, or by increasing the designation of special areas as outlined above. Following are steps that could be taken to encourage the USDA to enroll more California land:

Obtain, evaluate and critique the Environmental Benefits Index (EBI). The EBI is used to evaluate CRP bids in Washington. While the authorizing language was general, the EBI itself is very specific. Under the EBI, irrigated land bids have not been accepted even though the "environmental benefits" per dollar of idling irrigated lands may be higher than other lands accepted into the program. Since the USDA has found that the EBI is not debatable, this approach would result in conflict with the USDA.

Determine how to modify stage II of the CRP process to differentiate between irrigated and dryland values. If differentials between dryland and irrigated land are not considered in "local prevailing rental rates for an acre of comparable land," then much irrigated land in counties with dryland could be disqualified. This practice may be in conflict with the intention of FACT, which is merely to ensure that bids fairly consider local conditions.

Develop and publicize information showing the severity of sediment loads from irrigation return flows. As mentioned, 1 million acres of California's irrigated land has induced erosion. Not only does this reduce the productivity of the land, but erosion contributes to water quality problems in many areas. By emphasizing the severity of this problem, California may succeed in getting the environmental benefits of the CRP in California revisited.

This strategy can be applied to other conservation programs by working to change administration policies and law. Either approach could negatively impact other California interests or agriculture outside of California. Examples include:

- work with agricultural interests to increase the *$3500 limit* on ACP and WQIP funds.

There could be resistance to this approach because it would require changing the existing law and increasing federal expenditures.

- work to obtain *more ACP funds* for California.

This approach would require increasing federal expenditures or reallocating funds from other states, which may not be politically feasible.

- work to obtain funding for the *environmental easement program.*

By working with environmental groups interested in solving California's water problems, agencies could influence the administration of the program in a way favorable to California. The impact on local agricultural economies, however, could be an issue. Despite a high chance of failure, the potential benefits of this approach to California water agencies are great. The

APPENDIX A.

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APPENDIX A.

REFERENCES CITED

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APPENDIX B.

DATA AND ANALYSIS OF DATA ON COMMODITY PROGRAMS IN CALIFORNIA, 1990 TO 1992

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DATA AND ANALYSIS OF DATA ON COMMODITY PROGRAMS IN CALIFORNIA, 1990 TO 1992

This appendix presents detailed summaries of the data discussed in Section III of the report.

Potential Base

The potential crop base in 1990 was about 4.16 million acres (Table B.1). Potential base includes acreage on the books with a history in the crop that may qualify for the program, even if there has been no attempt to enroll recently. Potential base included 1.5 million acres of upland cotton and 0.6 million acres of rice. Potential crop base declined for every commodity from 1990 to 1991 (Table B.2) and again from 1991 to 1992 (Table B.3). The decline in potential base over the 1990 to 1992 period was notably less for cotton and rice (5%) than for other grains (12%).

Participating Cropland

Participation of potential base increased from 60 percent in 1990 (Table B.1) to 62 percent in 1991 (Table B.2) to 68 percent in 1992 (Table B.3). Participating acreage increased by about 100,000 acres from 1990 to 1992. Participation rates were higher for cotton (67% of potential base in 1990) and rice (93%) producers than any other commodity.

Participation of cotton base acreage fell by 107,000 acres from 1990 to 1991 (from 67% to 61% of potential base) but rebounded by 165,000 acres in 1992 to 75 percent of potential base. Participation of rice acreage was relatively stable from 1990 to 1992 (93% to 95% of potential base), resulting in a small overall decline in complying acreage.

Acreage Idled with Commodity Program Provisions

Over all commodities, at least 22 percent of the 2.48 million acres of participating base was idled with program provisions in 1990. Of the mandatory ARP, about 83 percent (201,000 acres) was cotton and rice base. The 1990 ARPs were 12.5 percent for cotton and 22.5 percent for rice that year, as compared to only 5 percent for wheat and oats and 10 percent for other grains.

In 1991, the sharp 116 percent increase in 0-50/92 acreage reflected poor water supplies that year. Producers were able to use the 0-50/92 provisions to maintain some of their deficiency payments for acreage idled by the drought.

In 1991, ARPs for rice and cotton were reduced to 5 percent, resulting in a decline in ARP acreage for these two crops from the 201,000 acres the previous year to only about 70,000 acres. However, use of the 0-50/92 provisions increased by 235,000 acres for the two crops;

about 100 percent for rice and 400 percent for cotton.

In 1992, a 10 percent ARP was required for participating cotton and 0 percent for rice acreage; cotton ARP acreage doubled and rice fell to zero from the previous year. Preliminary acreage idled with 0-50/92 provisions was substantially less than in 1991.

Acreage Flexed to Other Crops

Preliminary data for 1992 showing that 1992 flex acreage was planted to soybeans is not correct and was probably based on national averages. Regardless, the new crop mix flexibility has resulted in a net loss of program commodity acreage in California.

Amount of Commodity Acreage Irrigated

The ASCS estimates the amount of irrigated and dryland planted in the farm programs (USDA ASCS 1992g). We obtained these data and analyzed them at the state level. For all practical purposes, 100 percent of the participating rice, cotton and sorghum planted acreage was irrigated. In 1991, 96 percent of corn, 84 percent of wheat, 53 percent of oats, and 32 percent of barley was irrigated.

Deficiency Payments and Payment Rates

Payment rates are important to understanding incentives to irrigate or transfer water from land enrolled in farm programs. Statewide average payment rates can be estimated using data on average program yields and average deficiency payment rates. Estimated payments per acre, and total deficiency payments are provided in Table B.4.

County-Level Participation

County level participation data can help target the best areas in which to work with commodities programs. Table B.5 shows participating grain base acreage in the top six counties in the State.

Of all program commodities, participating wheat base acreage is most evenly distributed around the state. The top six counties account for less than 50 percent of base acreage. Other counties having more than 20,000 acres of wheat base enrolled in 1991 were Glenn, Kings, Madera, San Joaquin, Fresno, Sacramento and San Luis Obispo.

Table B.6 summarizes participating rice and cotton information, including land idled. Rice and cotton base acreages are much more concentrated than the base acreage for grains. The top six rice counties contained 91 percent of participating rice base in California, and the top cotton counties contained 96 percent of cotton base.

The source for this data includes more detail than the source for Table 1 (Section III) in two areas. First, the 50/92 acreage data include a breakdown for acreage enrolled under the "prevented planted" provision. Secondly, flex acreage is disaggregated by normal and optional

flex. This information is analyzed in more detail in Section IV of the report. Some of the data lack credibility. For example; idled, planted and flexed rice acreage in Yolo County exceeds the participating base; therefore, these data should be used as indicators only.

Table B.1. 1990 commodities programs in California. Acreage complying (participating), idled, flexed, and planted.

	ACRES	PERCENTAGE (% COMPLYING)	FLEXED ACREAGE	ACRES
WHEAT				
Potential Base	1,055,498			
Complying Base[1]	571,460	54%	Program	0
			Soybean	0
Idled			Oilseed	0
ARP ACR	17,594	(3%)	Other	0
0-50/92	123,011	(22%)		
Total Idled	140,605	(25%)	TOTAL	0
Flexed	0	(0%)	Net[2]	0
Planted	327,870	(57%)		
Unaccounted[3]	102,985	(18%)		
UPLAND COTTON				
Potential Base	1,517,546			
Complying Base[1]	1,009,517	67%	Program	0
			Soybean	0
Idled			Oilseed	0
ARP ACR	97,526	10%	Other	0
0-50/92	25,666	3%		
Total Idled	123,192	12%	TOTAL	0
Flexed	0	0%	Net[2]	0
Planted	744,611	74%		
Unaccounted	141,715	14%		
RICE				
Potential Base	624,534			
Complying Base[1]	583,503	93%	Program	0
			Soybean	0
Idled			Oilseed	0
ARP ACR	103,072	18%	Other	0
0-50/92	47,673	8%		
Total Idled	150,745	26%	TOTAL	0
Flexed	0	0%	Net[2]	0
Planted	399,622	68%		
Unaccounted	33,136	6%		

Table A.1. 1990 commodities programs in California. Acreage complying (participating), idled, flexed, and planted (cont.).

	ACRES	PERCENTAGE (% COMPLYING)	FLEXED ACRERAGE	ACRES
BARLEY/OATS				
Potential Base	536,683			
Complying Base[1]	176,072	33%	Program	0
			Soybean	0
Idled			Oilseed	0
ARP ACR	15,035	9%	Other	0
0-50/92	76,978	44%		
Total Idled	92,013	52%	TOTAL	0
Flexed	0	0%	Net[2]	0
Planted	53,356	30%		
Unaccounted[3]	30,703	17%		
CORN/SORGHUM				
Potential Base	424,996			
Complying Base[1]	135,264	32%	Program	0
			Soybean	0
Idled			Oilseed	0
ARP ACR	9,936	7%	Other	0
0-50/92	27,496	20%		
Total Idled	37,432	28%	TOTAL	0
Flexed	0	0%	Net[2]	0
Planted	72,498	54%		
Unaccounted	25,334	19%		
TOTAL				
Potential Base	4,159,257			
Complying Base[1]	2,475,815	60%	Program	0
			Soybean	0
Idled			Oilseed	0
ARP ACR	243,163	10%	Other	0
0-50/92	300,823	12%		
Total Idled	543,986	22%	TOTAL	0
Flexed	0	0%	Net[2]	0
Planted	1,597,956	65%		
Unaccounted[3]	333,873	13%		

[1]May include double-cropped acreage
[2]Net reduction in acreage due to flex provisions
[3]Complying base less idled less flexed less planted. Includes 0/92 acreage planted to minor oilseeds.

Table B.2. 1991 Commodities Programs in California. Acreage Complying (Participating), Idled, Flexed and Planted.

	ACRES	PERCENTAGE (% COMPLYING)	FLEXED ACREAGE	ACRES
WHEAT				
Potential Base	1,007,977			
Complying Base[1]	598,982	59%	Program	10,883
			Soybean	0
Idled			Oilseed	811
ARP ACR	87,517	15%	Other	18,893
0-50/92	178,252	30%		
Total Idled	265,769	44%	TOTAL	30,587
Flexed	30,587	5%	Net[2]	25,921
Planted	232,364	39%		
Unaccounted[3]	70,262	12%		
UPLAND COTTON				
Potential Base	1,483,374			
Complying Base[1]	902,995	61%	Program	20,700
			Soybean	0
Idled			Oilseed	9
ARP ACR	40,843	5%	Other	25,969
0-50/92	155,106	17%		
Total Idled	195,949	22%	TOTAL	46,669
Flexed	46,678	5%	Net[2]	38,994
Planted	622,533	69%		
Unaccounted	37,835	4%		
RICE				
Potential Base	619,214			
Complying Base[1]	585,390	95%	Program	6,085
			Soybean	0
Idled			Oilseed	2,754
ARP ACR	28,921	5%	Other	13,447
0-50/92	153,539	26%		
Total Idled	182,460	31%	TOTAL	22,286
Flexed	22,286	4%	Net[2]	21,682
Planted 356,982	61%			
Unaccounted	23,662	4%		

Table A.2. 1991 Commodities Programs in California. Acreage Complying (Participating), Idled, Flexed and Planted (cont.).

	ACRES	PERCENTAGE (% COMPLYING)	FLEXED ACRERAGE	ACRES
BARLEY/OATS				
Potential Base	494,867			
Complying Base[1]	231,516	47%	Program	4,778
			Soybea	9
Idled			Oilseed	2
ARP ACR	16,056	7%	Other	2,766
0-50/92	105,468	46%		
Total Idled	121,524	52%	TOTAL	7,555
Flexed	7,555	3%	Net[2]	6,319
Planted	65,399	28%		
Unaccounted[3]	37,038	16%		
CORN/SORGHUM				
Potential Base	388,148			
Complying Base[1]	161,687	42%	Program	4,871
			Soybean	0
Idled			Oilseed	328
ARP ACR	12,042	7%	Other	6,723
0-50/92	57,887	36%		
Total Idled	69,929	43%	TOTAL	11,922
Flexed	11,922	7%	Net[2]	9,574
Planted	59,459	37%		
Unaccounted	20,377	13%		
TOTAL				
Potential Base	3,993,580			
Complying Base[1]	2,480,570	62%	Program	47,317
			Soybean	9
Idled			Oilseed	3,904
ARP ACR	185,379	7%	Other	67,798
0-50/92	650,252	26%		
Total Idled	835,631	34%	TOTAL	119,028
Flexed	119,028	5%	Net[2]	102,490
Planted	1,336,737	54%		
Unaccounted[3]	189,174	8%		

[1]May include double-cropped acreage
[2]Net reduction in acreage due to flex provisions
[3]Complying base less idled less flexed less planted. Includes 0/92 acreage planted to minor oilseeds.

Table B.3. Preliminary 1992 commodities programs in California. Acreage complying (participating), idled, flexed, and planted.

	ACRES	PERCENTAGE (% COMPLYING)	FLEXED ACREAGE	ACRES
WHEAT				
Potential Base	957,673			
Complying Base[1]	565,722	59%	Program	12,819
			Soybean[4]	25,218
Idled			Oilseed	10,210
ARP ACR	27,953	5%	Other	5,797
0-50/92	148,998	26%		
Total Idled	176,951	31%	TOTAL	54,044
Flexed	54,044	10%	Net[2]	47,429
Planted	288,929	51%		
0-50/92 Minor Oil	24,499	4%		
Unaccounted	21,299	4%		
UPLAND COTTON				
Potential Base	1,428,855			
Complying Base[1]	1,068,476	75%	Program	9,345
			Soybean[4]	33,298
Idled			Oilseed	5,051
ARP ACR	96,786	9%	Other	2,059
0-50/92	60,867	6%		
Total Idled	157,653	15%	TOTAL	49,753
Flexed	49,753	5%	Net[2]	36,070
Planted	824,910	77%		
0-50/92 Minor Oil	0	0%		
Unaccounted	36,160	3%		
RICE				
Potential Base	612,449			
Complying Base[1]	576,477	94%	Program	5,114
			Soybean[4]	34,595
Idled			Oilseed	10,846
ARP ACR	0	0%	Other	18,419
0-50/92	81,980	14%		
Total Idled	81,980	14%	TOTAL	68,974
Flexed	68,974	12%	Net[2]	68,526
Planted	416,956	72%		
0-50/92 Minor Oil	0	0%		
Unaccounted	8,567	1%		

Table A.3. Preliminary 1992 commodities programs in California. Acreage complying (participating), idled, flexed, and planted (cont.).

	ACRES	PERCENTAGE (% COMPLYING)	FLEXED ACRERAGE	ACRES
BARLEY/OATS				
Potential Base	460,403			
Complying Base[1]	215,302	47%	Program	4,418
			Soybean[4]	6,302
Idled			Oilseed	2,419
ARP ACR	10,024	5%	Other	836
0-50/92	87,197	40%		
Total Idled	97,221	45%	TOTAL	13,975
Flexed	13,975	6%	Net[2]	12,399
Planted	81,957	38%		
0-50/92 Minor Oil	6,497	3%		
Unaccounted	15,652	7%		
CORN/SORGHUM				
Potential Base	360,526			
Complying Base[1]	166,177	46%	Program	4,712
			Soybean[4]	7,158
Idled			Oilseed	4,098
ARP ACR	8,259	5%	Other	846
0-50/92	29,908	18%		
Total Idled	38,167	23%	TOTAL	16,814
Flexed	16,814	10%	Net[2]	11,634
Planted	94,005	57%		
0-50/92 Minor Oil	17,799	11%		
Unaccounted	(608)	-0%		
TOTAL				
Potential Base	3,819,906			
Complying Base[1]	2,592,154	68%	Program	36,408
			Soybean[4]	106,571
Idled			Oilseed	32,624
ARP ACR	143,022	6%	Other	27,957
0-50/92	408,950	16%		
Total Idled	551,972	21%	TOTAL	203,560
Flexed	203,560	8%	Net[2]	176,058
Planted	1,706,757	66%		
0-50/92 Minor Oil	48,795	2%		
Unaccounted[3]	129,865	5%		

[1]May include double-cropped acreage
[2]Net reduction in acreage due to flex provisions
[3]Complying base less idled less flexed less planted. Includes 0/92 acreage planted to minor oilseeds.
[4]This projection is probably meaningless as an indicator of crop mix.

Table B.4. Average and total deficiency payment rates, California, 1991.

CROP[1]	AVERAGE PROGRAM YIELD	1991 PAY RATE[2]	PAYMENT PER ACRE[3]	1991 DEFICIENTY PAYMENTS (millions)	AVERAGE PER FARM[4]
Wheat (bu)	68.9	$1.47	$101.28	$33.09	$9,047
Upland Cotton (lb)	1,069.0	0.101	107.97	65.54	24,239
Rice (lb)	6,875.5	0.0376	258.52	91.85	28,341
Barley (bu)	50.4	0.62	31.25	4.31	3,187
Corn (bu)	126.3	0.58	73.25	5.69	3,928
Sorghum (bu)	74.1	0.56	41.50	0.20	573
Oats (bu)		0.35		0.15	590
TOTAL				$200.83	

[1]A bushel of wheat is 60 lbs, corn and sorghum 56 lbs, barley 48 lbs, and oats 32 lbs.
[2]Deficiency payment rate per unit of program yield. Under a winter wheat option, producers received $1.40 per bushel.
[3]Payment per acre eligible to receive payment; typically, enrolled less 15 percent less acreage reduction (equals maximum payment acreage, MPA). If producer participates in 0-50/92 program, payments are received on 92 percent of MPA. All deficiency payments are subject to payment limitations.
[4]Per farm receiving some deficiency payment.

Source: Langley (1992), USDA OPA 1992a, and USDA ASCS 1992h

Table B.5. Participating base grain acreage in 1991. Top counties in California[1].

WHEAT		CORN		BARLEY	
California	599,271	California	151,163	California	215,600
Yolo	82,103	Yolo	26,738	San Luis Obispo	38,594
Colusa	47,444	Sacramento	23,430	Monterey	31,729
Solano	41,342	Tulare	15,836	Fresno	20,048
Tulare	40,057	Solano	15,026	Kings	16,854
Imperial	36,758	San Joaquin	14,088	Riverside	14,994
Kern	34,287	Merced	11,281	Tulare	14,842
Sum	281,991	Sum	106,399	Sum	137,061
Six Counties	47.1%	Six Counties	70.4%	Six Counties	63.6%

[1]State total data differ from those provided by USDA OPA 1991. Differences in California base, idled and planted acres are within 3 percent for every crop except that 0-50/92 idled acreage for cotton is 7 percent different (155,106 v. 166,023). Inconsistent data for some counties suggest some data may be in error.

Source: USDA ASCS 1992i.

Table B.6. County-level data on 1991 rice and cotton participation in commodities programs.

	PARTICIPATING BASE	ACREAGE IN ARP	IDLED BY 0-50/92			FLEXED TO OTHER CROPS		
			TOTAL PLANTED	PREVENTED PLANTED	TOTAL IDLED	PLANTED OPTION	PLANTED NORMAL	TOTAL FLEXED
RICE, ACREAGE								
California	579,282	28,615	352,439	39,831	155,151	2,179	20,033	22,212
Colusa	147,237	7,346	88,121	4,021	32,813	373	4,898	5,271
Butte	108,370	5,276	64,190	3,805	27,691	0	2,388	2,388
Sutter	99,238	4,836	63,979	6,770	24,162	398	3,513	3,911
Glenn	91,639	4,580	58,314	3,086	18,954	209	3,031	3,240
Yolo	40,240	2,012	16,140	14,877	30,242	576	3,153	3,729
Yuba	37,659	1,866	31,705	0	1,421	0	206	206
Placer	17,417	871	10,919	1,168	4,450	64	187	251
Other	37,482	1,828	19,071	6,104	15,418	559	2,657	3,216
COTTON, ACREAGE								
California	911,209	40,854	622,428	68,199	166,023	8,487	39,009	47,496
Fresno	303,025	12,697	197,752	25,631	64,220	4,030	18,131	22,161
Kern	221,547	10,203	134,877	30,600	66,548	1,227	7,809	9,036
Kings	127,111	5,465	90,171	10,207	24,474	1,331	5,797	7,128
Tulare	121,331	5,939	93,866	128	3,195	757	3,876	4,633
Merced	56,212	2,748	44,357	1,575	4,824	174	584	758
Madera	42,825	1,865	40,289	0	417	21	638	659
Riverside	21,140	1,046	12,343	0	1,369	250	621	871
Imperial	18,017	891	8,772	58	976	697	1,552	2,249

Source: USDA ASCS 1991i

APPENDIX C.

COMMODITY AND CONSERVATION PROGRAMS NOT ANALYZED

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This appendix briefly describes two commodity program provisions and three conservation programs which were investigated but not analyzed in detail.

Targeted Option Payments

From USDA, ERS (1991) "the Secretary may offer targeted option payments to producers who increase (or decrease) their ARP in return for an increase (or decrease) in their target price. . . . For each voluntary 1-percent increase (decrease) in the ARP rate above (below) the announced level, a producer may receive an increase (decrease) in target price between 0.5-1 percent."

This program was not analyzed in detail because 1) it appears unlikely that the USDA could target the program to a particular region, such as California, and 2) it appears unlikely that targeted option payments will be used by the USDA anytime before the next farm bill in 1995. Targeted option payments are unlikely to be used because other supply control programs and the CRP have reduced and will continue to reduce acreage and supplies enough to make this program unnecessary. Targeted option payments can be expensive to the government, and are likely to be used only if ARPs are close to their legal maximum.

If ever used, potential strategies would be similar to those proposed for the 0-50/92 because targeted option payments are a voluntary mechanism to idle acreage on an annual basis.

Paid Land Diversion

From USDA, ERS (1991) "The Secretary (of Agriculture) may also implement a paid land diversion whether or not an ARP is in effect," if the program will assist in adjusting the total national acreage to desirable goals. Payments may be set through bids submitted by farmers or through any other means that the Secretary deems appropriate. Diverted land must be limited so the local economy is not adversely affected."

This program was not analyzed in detail for the same reasons as provided above for targeted option payments.

Drought Financial Assistance Programs

Drought financial assistance programs could be important in reducing farm hardship due to drought. Drought programs could be part of a complete drought water transfer program, but none are analyzed in detail in our report because each would have only a small impact on water use in comparison to other programs analyzed.

The Emergency Feed Assistance Program allows that livestock producers can buy CCC or other grain at one-half the market price (DWR 1991) if feed loss of 40 percent or more is expected. This program is not directly important to water use because it is targeted to livestock.

The Emergency Conservation Program allows for federal cost sharing for emergency water conservation measures during droughts. "Subject to the availability of funds, the county committee with the concurrence of the State committee and approval of the Deputy Administrator, State and County Operations (DASCO) may implement the program to carry out emergency water conservation and water enhancement measures during periods of severe drought" (NARA 1992b).

Cost-sharing may not be offered to solve conservation problems that existed prior to the disaster. Cost-sharing per person is limited to $200,000 per disaster, but county committees (without DASCO) can approve payments not to exceed $10,000 per person per disaster. Cost share payments are further limited by the county committee to amounts not to exceed 64 percent of the first $62,500, 40 percent of the second $62,500, and 20 percent of the remaining eligible reimbursable costs. Pooling agreements are also used.

The program is administered by State and county ASC committees (COC). The county committee is authorized to implement the program for all disasters except drought. For drought, the decision to implement drought practices must be made by the DASCO in Washington (USDA ASCS 1991).

The Emergency Conservation Program was not analyzed in detail because it has not been used much for drought assistance in California. Its most notable application has been for repairs required after earthquakes.

Soil and Water Loans, administered by the FHA, are given to help farmers develop and conserve their water resources. Well drilling and improvements to or purchase of irrigation systems can qualify for funding. Up to $200,000 can be loaned, but only to farmers unable to get loans elsewhere. The program gave 12 loans totalling $362,980 in the October 1991 through September 1992 year, and $285,000 in the previous year, primarily for water resource development (Deiss 1992). This loan program was not carried forward because of the small amount of subsidy involved.

Environmental Easement Program

Title XII of the Food Security Act of 1985 was amended by FACT to include the Environmental Easement Program. This program would "acquire easements . . . on land placed in the conservation reserve . . . land under the Water Bank Act, or other cropland that (A) contains riparian corridors, (B) is an area of critical habitat for wildlife, especially threatened or endangered species; or (C) contains other environmentally sensitive areas . . . that would prevent a producer from complying with other Federal, State or local environmental goals." The

easements would be "permanent easements or easements for the maximum term permitted under applicable State law" (U.S. Congress 1990).

The program has not been funded. The Center for Resource Economics (1992) reports that the USDA has not requested any funds for the program, and the program may never be implemented. If funded, the program could be applied extensively in California to retire marginal irrigated land that contributes to water quality problems. Therefore, the program deserves close monitoring at the national level.

Also, agencies may be able to influence the implementation of the program in terms of funding and environmental and regional priorities. The past and pending listing of several fish species under the Endangered Species Act and other water quality problems could be used to argue for a strong role for this program in California.

Discussion of the CRP below shows how an opportunity to influence the administration and funding of a similar program has not been fully exploited. Perhaps, a more active role in the early stages of the Environmental Easement Program could result in accelerated progress toward solving some of California's water resource problems.

Wetland Reserve Program

The FACT authorized the Wetland Reserve Program (WRP) to restore and protect wetlands. The USDA is authorized to enroll 1 million acres by 1995, but enrollment is limited by annual appropriations. Wetlands converted to crops before 1986, farmed wetlands, functionally-related lands and riparian corridors linking such lands are eligible (USDA ASCS 1991).

Perpetual easements must receive priority in evaluating which bids to accept, and participants must agree to permanently retire their existing crop base. A wetland restoration plan is required and 75 percent cost-sharing may be obtained.

In June of 1992, a pilot program to enroll 50,000 acres was offered in nine states including California. California farmers submitted bids to enroll 85,000 acres at a price of $1,000 to $3,000 per acre for the permanent easements. It currently appears that 6,000 acres will be enrolled given the available funding.

Most enrolled acreage will be located in rice growing areas. Although consumptive use may not be substantially reduced, the new wetlands could provide incidental water quality benefits by reducing the application of pesticides and water drainage from rice fields. The WRP could have more direct benefits if wetlands can be used more directly to treat municipal source water, non-point urban runoff, non-point agricultural runoff, or treated effluent. These uses would have to be contained in the approved plan for the WRP wetlands.

Observers gave different opinions on the potential for this program to be funded in the next three years. Interested agencies should monitor appropriations in Congress.