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1. ミニッツ

MINUTES OF MEETING
BETWEEN THE JAPANESE MID-TERM EVALUATION TEAM AND THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF THE REPUBLIC OF CHILE ON JAPANESE TECHNICAL COOPERATION FOR THE PROJECT ON CONSERVATION OF THE ENVIRONMENT AND RURAL DEVELOPMENT WITH FARMERS' PARTICIPATION FOR THE MEDITERRANEAN DRYLAND ZONE OF CHILE

The Japanese Mid-term Evaluation Team (hereinafter referred to as "the Japanese Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Ms. Harumi KITABAYASHI, visited the Republic of Chile from October 29 to November 14, 2002 for the purpose of mid-term evaluation of the Project Type Technical Cooperation for the Project on Conservation of the Environment and Rural Development with Farmers' Participation for the Mediterranean Dryland Zone of Chile (hereinafter referred to as "the Project") as well as discussing the major issues related to the implementation of the Project.

For this purpose, the Japanese Team and the Chilean authorities concerned formed the Joint Evaluation Team (hereinafter referred to as "the Team"). The Team evaluated performance and achievements of the Project through field visits, interviews, and had a series of discussions in respect of desirable measures to be taken by both Governments for the successful implementation of the Project.

As a result of the discussion, the Team agreed to recommend to their respective Governments the matters referred to in the evaluation report attached.

On the recommendation of the mid-term evaluation report, the Japanese Team and the Chilean authorities concerned agreed with the items of the attached document.

Santiago, November 14, 2002

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Executive Director
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Attached Documents

The Joint mid-term evaluation team consisting of 12 members from Chile and Japan concluded the result of its mid-term evaluation as follows.

1. Overall Progress of the Project
   Although some difficulties were experienced at the early stage of the implementation, the Project made a steady progress according to the implementation plan. The agricultural development plans for micro-scale watershed should be formulated by the end of the Project. The concept and contents of the agricultural development plan should be clarified and it is recommended that Chilean and Japanese experts begin the discussions as soon as possible. The tentative outline of such plans should be presented at the next Joint Coordinating Committee of the Project.

2. Definition of Participatory Approach in the Project
   Although the principal objects of the Project activities are improvement and development of technologies, importance of farmers' participation in the process of improvement and development was confirmed. In other words, the technologies improved and developed by the Project reflect the needs of farmers, and financial support by the Chilean government is available for the introduction of such technologies in the farmers' fields.

3. Situation of Cost-sharing
   The Project activities were implemented by cost-sharing by both governments. Although the disbursement is behind the schedule, the Chilean government has allocated the necessary budget to the Project. The Japanese team requested that measures should be taken to keep the agricultural machines in San Jose in adequate conditions.

4. Revision of Project Design Matrix
   In order to express in a better way the development of the Project, some modifications were made in the Project Design Matrix (PDM) of the Project based on the mutual agreement. The objectively verifiable indicators and outputs were changed with that purpose. A revision of the Plan of Operation (PO) including activities to be carried out in coming two years were also proposed by the project and agreed upon by the Team.

Attached Document

THE MID-TERM EVALUATION REPORT FOR THE PROJECT ON CONSERVATION OF THE ENVIRONMENT AND RURAL DEVELOPMENT WITH FARMERS' PARTICIPATION FOR THE MEDITERRANEAN DRYLAND ZONE OF CHILE

Concepción, November 13, 2002

北林春美

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Regional Secretariat of Agriculture

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ABBREVIATIONS

AGCI	International Cooperation Agency of Chile (Agencia de Cooperación Internacional de Chile)
CNR	National Commission of Irrigation (Comisión Nacional de Riego)
CONAF	National Forestry Corporation (Corporación Nacional Forestal)
INDAP	Institute for Agricultural and Livestock Farming Development (Instituto de Desarrollo Agropecuario)
INIA	Institute for Agricultural and Livestock Investigations (Instituto de Investigaciones Agropecuarias)
MINAGRI	Ministry of Agriculture (Ministerio de Agricultura)
ODEPA	Studies and Agrarian Policies Bureau (Oficina de Estudios y Políticas Agrarias)
SAG	Agricultural and Livestock Farming Service (Servicio Agrícola y Ganadero)
SEREMI	Regional Secretariat of Agriculture (Secretaría Regional Ministrial de Agricultura)

1. Evaluation of the Project

1-1 Objectives of Evaluation

1) To review the degree of achievement of Input, Output, Project Purpose, in comparison with the Original Plan described in the Project Documents, such as the Record of Discussions (R/D), Project Design Matrix (PDM) and Plan of Operation (PO).
2) To evaluate the Project in terms of the five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact and Sustainability).
3) To review and revise the PDM and PO based on the present condition of the Project, if necessary.
4) To identify problems on any aspects of the Project implementation and propose necessary solutions.

1-2 Methodology of Evaluation

The evaluation study was conducted by the Joint Evaluation Team composed of the Japanese Mid-term Evaluation Team and the nominated Chilean officials who had not been directly involved in the Project.

1) The PDM2 for evaluation was formulated for logical evaluation of the Project, revising the PDM1 which had been agreed upon during the Consultation of the Project in December, 2000.
2) The degree of achievement of the Project Plan was assessed.
3) Analysis was made for the Five Evaluation criteria described below.

a) Relevance

Relevance refers to the validity of the Project purpose and the overall goal in connection with the agricultural policy of the Republic of Chile as well as the needs of beneficiaries.

b) Effectiveness

Effectiveness refers to the extent to which the expected benefits of the Project have been achieved as planned, and examines if the benefit was brought about as a result of the Project (not of external factors).

c) Efficiency

Efficiency refers to the productivity of the implementation process, examining if the input of the Project was efficiently convert into the output.

d) Impact

Impact refers to direct and indirect, positive and negative impacts caused by implementing the Project, including the extent to which the overall goal has been attained.

e) Sustainability

Sustainability refers to the extent to which the Project can be further developed by the recipient country, and the benefits generated by the Project can be sustained under the recipient country's policies, technology, systems, and financial state.

1-3 Members of the Team

1) The Japanese Team

Name	Assignment	Position
Harumi KITABAYASHI	Leader	Director, Agricultural Technical Cooperation Division, Agricultural Development Department, JICA
Shigeyo TANAKA	Rural Development	Senior Technical Officer, Technical Cooperation Division, International Affairs Department, General Food Policy Bureau, Ministry of Agriculture, Forestry and Fisheries
Noriko FURUTANI	PCM Evaluation	Program Officer Global Link Management Inc.
Ichiro ADACHI	Planning Management	Staff, Agricultural Technical Cooperation Division, Agricultural Development Department, JICA

2) The Chilean Team

Name	Assignment	Position
Alvaro PINOCHET	Leader	Profesional de Apoyo de la SEREMI Agricultura, VIII Región
Maria Eugenia MORAGA	Evaluation Planning	Jefa de Departamento de Politica y Planificacion, AGCI
Cecilia ROJAS	Evaluation Planning	Encargada de Cooperación Internacional, ODEPA, MINAGRI
Christian NAVARRETE	Irrigation / Water Resources	Coordinador de Departamento de Fomento al Riego, CNR
Mitzi JELDRES	Soil Management /Rural development	Jefa de Area-Quirihue, INDAP VIII Región
Juan JIMENEZ	Soil Management /Rural development	Jefe de Departamento de Servicio, INDAP, VIII Región
\lejandra ENGLER	Farming System /Rural development	Investigadora, INIA Quilamapu, VIII Región
Juan Paulo RAMIREZ	Farming System /Rural development	Investigador, INIA Quilamapu, VIII Región

2. Outline of the Project

2-1 Background of the Project

Poverty is especially concentrated in the inland dry region extending from Region V to Region VIII in Central Chile, with many farmers living in the area being engaged in small-scale rain-fed agriculture. Agricultural productivity in the region is underdeveloped because of deterioration of natural resources in agro-ecological systems.

MINAGRI has been working to increase research and extension of technology for restoration of degraded land and improvement of farming conditions for small- and medium-scale

farmers (hereinafter referred to as "farmers"), preparation of incentive and credit systems to farmers for land improvement, covering of bare land with pasture, and construction of facilities for land preservation.

INIA has conducted research and extension of technology for a sustainable agro-ecological system. However MINAGRI recognized that it was necessary to improve and disseminate technologies more effectively, as well as to promote cooperation among the organizations concerned. The Project was proposed by the Government of the Republic of Chile for the purpose of improvement and dissemination of these more effective technologies.

In response to the above-mentioned proposal, JICA dispatched a Preliminary Study Team and Short-term Study Team to confirm assistance needs and to discuss details of the Project. The Implementation Study Team signed the Record of Discussions on the Project on November 4, 1999. The Project started in March 2000 for a five-year period that will end in February 2005. The consultation Team was dispatched in November 2000 to formulate PDM1 and PO. The project activities have been conducted based on PDM and PO during the first half of the Project.

2-2 Objective of the Project

The project purpose is "Integrated soil and water conservation technology for sustainable agriculture development will be verified at small scale watershed in Ninhue County, Region VIII". And the Project has three outputs as follows.

1) Elaborating the appropriate agricultural development plan at small-scale watershed level.
2) Improving techniques for soil / water conservation.
3) Verifying the practical integrated technology for soil/water conservation.

Additionally, to achieve the project purpose, the farmers' participation is assumed to be indispensable. In the Project, "the farmers' participation" is defined as contents of the following.

1) The farmers participate in the Project from the planning stage.
   The new technology verified in the Project should meet the needs of farmers for that purpose. In the Project, a base line survey was conducted and farmers' needs were understood. And the workshop and the training courses have been held several times, and the result of these activities have been fed back and reflected in the contents of the research.
2) The farmers can use technologies that will be developed and improved by the Project.
   The technologies developed by the Project should be based on the farmers' needs and could be adopted to the farmers.

To achieve the overall goal, more farmers in the Mediterranean Dry-land Zone of Chile should apply to these technologies by using the incentive and credit system available in Chile such as PRODESAL.

The framework of the Project is shown in the PDM 2(See ANNEX 1).

3. Modification of the Project Scope (Modification of PDM1, PO)

3-1 The objectively verifiable indicator

As a result of discussion among the members of evaluation team together with Japanese experts and Chilean counter personnel from the Project, the PDM1 has been modified. The revised PDM1 is attached as PDM2 on the Annex 1.

The objectively verifiable indicators of Outputs in the PDM1 were found to be difficult to show the extent of farmers' participation and need to be more concrete. In order to see the extent of the Outputs achievement, objectively verifiable indicators should to be those shown in the PDM2. The detailed reasons for the new indicators will be clarified under the explanation on achievement level of each indicator.

The mid-term evaluation team used new indicators as much as possible to see the achievement degree of Outputs of the Project.

3-2 Important Assumptions

Most of the poor farmers cannot introduce new technology for soil / water conservation for sustainable agriculture without some sort of supports such as credit / incentive due to their limited resources. Therefore, "The credit / incentive to introduce the technology improved / developed by the Project for soil / water conservation is accessible to poor farmers according to Chilean government policy" is added as Important Assumption towards the Project Purpose achievement.

3-3 Outputs

Output 1 of the PDM1 includes the term "Rural Development". This concept includes not only agricultural sector but also other sectors such as health, education etc. This term "Rural Development" has been changed into "Agricultural Development" in the PDM2. The term is made to be in accordance with the original intension of the Project.

3-4 Project activities

Under Activity 1-4, the term "Land use planning" has been changed into "Agricultural development planning" according to the actual activities. "Land use planning" is included in "Agricultural Development". Some activities have been revised in consideration with the actual situation as the latest PO shows (Annex 2).

4. Result of the evaluation

Observing the progress of the Project, it is of great importance to thoroughly evaluate the Project from the viewpoint of present and future implications. For that purpose, the efficiency, the effectiveness, the impact, the relevance and the sustainability of the Project, were assessed jointly

by both sides through an evaluation survey. The findings of the survey are as follows.

4-1 Efficiency

4-1-1 Quantity, quality and timing of inputs

1) Japanese Inputs

Dispatch of Experts

A total of six (6) long-term experts and a total of fourteen (14) short-term experts have been dispatched as planned. The list of the experts is attached in ANNEX3.

Training of Chilean Personnel in Japan

A total of nineteen (19) counterparts have visited Japan to participate in technical training. The list of trained personnel is attached in ANNEX4.

Provision of Equipment, machinery and materials

Major equipment, machinery and materials were provided to carry out the project activities effectively as shown in ANNEX5.

Supplementary funds to cover local cost

The Japanese side bore a part of the Project local cost to implement the Project more effectively. The supplementary fund made by the Japanese side is shown in ANNEX6.

2) Chilean Inputs

Assignment of Counterparts

Chilean counterparts have been assigned to the Project. The list of assigned counterparts is attached in ANNEX7.

Allocation of budget

The Chilean side represented by MINAGRI bore operational cost as shown in ANNEX 6. In addition, the following organizations have made significant contributions to support the Project; ①Regional Government, ②Ninhue County.

Provision of Buildings and Facilities

The Chilean side provides the main facilities that are essential for the Project. But the provision of the definitive working space for the Japanese experts were delayed. The storage house for agricultural equipment has not been built in San Jose.

4-1-2 Linkage between inputs and outputs

1) Japanese Inputs

Most of the Japanese inputs are converted into outputs, but there are some problems as follows.

i) Assignment of the long-term expert in the field of soil management

One long term expert in the field of Soil Management has been dispatched with a delay of about one year. However, by the effort of the Counterpart and dispatched short term expert, the progress of the activity in this field is on time.

ii) Timing and term of the short-term experts

In some cases of the short-term experts, the timing and the term of dispatch is not implemented as planned. To convert the inputs into outputs more effectively, it is important to dispatch the short-term experts based on the Project plan considering the seasonal issue.

iii) Problem of communication

Communication problem has been existing, although the Project has not been affected because of effort done by Japanese and Chilean counterparts for smooth implementation.

iv) The Chilean counterparts mentioned that the Japanese coordinator made a remarkable contribution to smooth implementation of the Project.

2) Chilean Inputs

Most of the Chilean inputs are converted into outputs. But buildings of offices for some Japanese experts were late.

The Japanese Team requested that INIA built a storage house for agricultural equipment in San Jose as soon as possible.

According to the Chilean counterparts, the professional evaluation system has not been able to make a fare evaluation of them.

4-2 Effectiveness

4-2-1 Project purpose level

PROJECT PURPOSE:

Integrated soil and water conservation technology for sustainable agriculture development will be verified at small-scale watershed in Ninhue County, Region VIII.

OBJECTIVELY VERIFIABLE INDICATORS:

1. At least 30 farm households in San Jose use the technology of soil conservation which have been improved/developed by CADEPA.

2. At least 2 farms at 5 micro-scale watersheds* in San Jose use the technology of small-scale irrigation.

It is expected at the time of mid-term evaluation that the Project Purpose will be achieved by the end of the Project. The reasons for this estimation are firstly, all of the 3 outputs are progressing steadily and secondly the important assumptions to achieve the project purpose remains as described on PDM.

At the time of mid-term evaluation, the indicator 1 cannot be strictly figured out due to the current data processing system. However, the rough number of farmers who already began to use even a simple soil conservation technique is more than 30. The technology includes the abandonment of Fallow (Barbecho), introduction of Non-plowing cultivation, Rotation cultivation,

*Note: micro-scale watersheds; Geographical space among the peaks of a group of hills that makes the water flow into one basin.

Nitrogen accumulating cultivation of legume, etc. Most of the farmers are introducing mixture of some techniques making them suitable to their own land situation in terms of slope level, areas, water resource, financial limit, etc. as a soil conservation technology.

As for indicator 2, one micro-scale watershed currently uses the technology of small-scale irrigation. And some individual farm households introduced such technology as drip-irrigation and shallow well. For example, INDAP provided financial and technical supports to eight farmers in San Jose through PRODESAL project in order for farmers to construct the drip-irrigation facilities.

The important assumption to achieve the project purpose is "The credit / incentive to introduce the technology improved / developed by the Project for soil / water conservation is accessible to poor farmers according to Chilean government policy." The related agencies which are responsible for provision of the support for farmers to promote the technology improved/developed by the Project is crucial to achieve the project purpose. The coordination has been in progress by overcoming the difficulties at the beginning among members. Its current functional networking begun to produce some fruits such as user-friendly supports for small-scale farmers.

Therefore, integrated soil and water conservation technology for sustainable agriculture development will be verified at small-scale watershed in Ninhue County, Region VIII by the end of the Project.

4-2-2 Output level

OUTPUTS:

OUTPUT 1. Elaborating the appropriate agricultural development plan at micro-scale watershed level.

OBJECTIVELY VERIFIABLE INDICATORS:

Indicator 1-1. By the end of the project, the agricultural development plan is created in at least 2 model micro-scale watersheds.

Indicator 1-2. By the end of year 2003, the percentage of farmers who participated in the planning process of agricultural development plan is more than 60%.

***The percentage of participation is based on the number of farmers who performed all of the following three actions at least once;**

① Participating in CADEPA training course

② Visiting the demonstration field (PECA) for learning purposes

③ Applying to the government's support program for CADEPA related techniques

Elaborating the appropriate agricultural development plan at micro-scale watershed level is on progress.

Indicator 1-1. By the end of the project, the agricultural development plan is created in at least 2 model micro-scale watersheds.

Although there has not been created the agricultural development plan in any model micro-scale watershed, the process to create such a plan has begun. All the necessary studies were conducted. As a result, the basic data to create the agricultural plan have been collected. Through these activities, the technical transfer on the various and highly specialized studies was conducted. Based on the study method learned, some necessary data are collected continuously. Moreover, the level of feed back from farmers into research by INIA researchers is increasing, not only the frequency of dialogues with small-scale farmers has been increased but also the its quality of it has been upgraded as shown by the farmers' trust in the researchers and techniques of the Project.

Indicator 1-2. By the end of year 2003, the percentage of farmers who participated in the farm planning process of agricultural development plan is more than 60%.

***The percentage of participation is based on the number of farmers who performed all of the following three actions at least once;**

① Participating in CADEPA training courses

② Visiting PECA for learning purposes

③ Applying to the government's support program for CADEPA related techniques

By the time of mid-term evaluation, the exact percentage of farmers who performed the following three actions at least once ; ① CADEPA training course, ② Visiting PECA for learning purposes, ③ Applying to the government's support program for CADEPA related techniques was not shown due to the lack of confirmation data. However, there are some convincing figures to show the output 1 will be achieved by the end of the year 2003. In the year 2001, for example, 743 persons visited PECA for learning purpose. Although all of them are not farmers, more than 500 were small/micro-scale farmers in the Mediterranean dry land zone. Those who participated in the CADEPA training courses until October 2002 were 281. (Source: "Transferencia de Tecnologias de Riego y Proteccion de Recursos Naturales en la Comuna de Ninhue y Portezuelo, VIII Region") The number of applicants for INDAP programs was approximately 80 in year 2001, although not all of them received the support.

Besides, the understanding level by those farmers who participated in some of the above mentioned activities is considerably high in terms of practice. One of the trained farmers extended the wheat cultivation area by herself applying the techniques recommended by the Project. Such an independent attitude to take further action shows their strong interests in the Project. They expressed their willingness to expand their activities on soil / water conservation for sustainable agriculture.

It was reported that it took quite some time at the beginning before establishing the good relationship between the Project and farmers. Now that the Project is known to almost all farmers in San Jose, farmers themselves are verifying those techniques

improved/developed by the Project.

Finally, it should be mentioned that spread effect is appearing because farmers in verification process such as described above are willing to tell their experiences to their neighbors / friends and quite a few farmers visited PECA in organized tour by INIA researchers even from outside of the region.

Almost all the researchers are positive with the importance of farmers' participation which has been making effect on the research process although some topics do not have direct relation to the research process in nature. However, spread effect of participatory research will be accelerated in the near future.

OUTPUT 2. Improving techniques for soil / water conservation.

OBJECTIVELY VERIFIABLE INDICATORS:

Indicator 2-1. By the end of the project, the number of improved/developed techniques for soil and water conservation is at least 3.

Improving techniques for soil / water conservation is progressing steadily. It could be estimated by watching the following facts related to the indicators that some, at least 3, techniques for soil / water conservation will be improved / developed by the end of the Project.

The number of the techniques of, which the process of improvement / development has been completed is none at the time of mid-term evaluation. However, the considerable numbers of techniques which meet the project aim are on the process.

For example, animal traction seeder applicable to a small area was developed by CADEPA based on the accumulation of the past studies' knowledge and now on the process of verification towards improvement in practicality and cost-saving. Already a farmer actually introduced this animal traction seeder for production activities. Moreover, the followings were pointed out, during workshop with all the INIA's researchers and Japanese experts involved in the Project on November 4, as a part of the techniques to be possibly counted at the end of the Project to see the achievement level of output 2.

① Water utilization management, ② Water obtaining system, ③ Water accumulation system, ④Drip-irrigation and enlargement of such irrigated areas, ⑤Development of method to study deep ground water by geophysical exploration, ⑥Introduction of new crops and mix management with native crops, ⑦ Livestock-farming system, ⑧Soil fertility management by utilizing the various legume, ⑨Drip-irrigated greenhouse with variety of vegetable cultivation, ⑩Anti-erosion drainage system, ⑪Lupine utilization for soil fertility, ⑫Soil fertility protecting by utilizing straw as soil cover, etc.

OUTPUT 3. Verifying the practical integrated technology for soil / water conservation.

OBJECYIVELY VERIFIABLE INDICATORS:

Indicator 3-1.By the end of the project, environmentally friendly and appropriate technology for soil / water conservation is verified at the model farm and is presented in a manual on 4 topics.
Indicator 3-2. By the end of the project, at least 5 bulletins for farmers are created.

Verifying the practical integrated technology for soil / water conservation is currently on the process. Achievement level of output 3 is confirmed by watching the present situation of the indicators as shown below.

Indicator 3-1.By the end of the project, environmentally friendly and appropriate technology for soil / water conservation is verified at the model farm and is presented in a manual on 4 topics.

The INIA researchers involved in the Project recognize the content of the 4 topics of the technical manual on the soil / water conservation, which are ①Study, planning, evaluation, ②Irrigation / water resources, ③Soil management, ④Farming / cultivation. And they are aware of their responsible topics in creating manual as a result of their verification activities. The manual in the Project is a product of verification of integrated technology improved / developed by the Project. The practical integrated technology is a combination of techniques to apply to each real farm in micro-scale watershed. Currently multi-field researches towards soil /water conservation for sustainable agriculture are on the progress. In other words, the various combinations of practical techniques are on the verification process towards the integration and consequently completion of the manual.

Indicator 3-2. By the end of the project, at least 5 bulletins for farmers are created.

Although no bulletin for farmers has been completed yet, one of the five bulletins is prepared to the extent of 90% at present. Those would be practical and user-friendly for farmers' understanding since those are based on the experiences and knowledge obtained through the dialogue on the field between INIA researchers and farmers as well as other related agencies. INIA researchers involved in the Project are confident enough to complete such bulletins of 5 by the end of the Project.

4-3 Impact

4-3-1 Technical aspects

The studies on improvement/development techniques for small- and micro-scale farm have been started. In particular, those to protect the slope hills from erosion. The on-going development process of the small animal traction seeder could be pointed out as a good example to show how the actual necessity of farmers in the target area has been reflected into the development

process of technology, because this specific machine was not originally planned to develop. Rather, the idea came from real necessity and dialogue with farmers.

4-3-2 Socio-cultural aspects

An unexpected negative impact occurred is dissatisfaction among some farmers. During the busy seeding season, many of the farmers in San Jose would like to use the farming machines such as non-plowing seeder. However, the limited number of machines requires the farmers to use them in order. Some need to wait patiently until his/her turn. In consequence, those who could not take advantage of the seeder before the others came to complain since their eagerness to practice the non-plowing farming was quite significant.

Success in application of new technology started to take influence on the farmers' consciousness of "organization". They began to recognize the importance of organizing action although they do not currently have farmers' organization.

Another unexpected positive impact is that environmental care for their land among farmers in San Jose has been created. The school children who are crucial for future as next generation are becoming highly conscious about water /soil conservation for sustainable agriculture towards their life improvement. This increasing interest among the youth lead to the fact that quite a few number of the graduates from the local school came to hope studying further at the agricultural school. The local school has been actively involved in the Project related activities. And it was observed that these kinds of educational activities considerably influenced not only the children but also their parents who are farmers in the region.

4-3-3 Institutional and management aspects

Members of INIA have been experiencing the new working style influenced by the Project. In INIA the researchers were not used to work in a team. However, they started working closely regardless of the departments, toward the same goal. Verifying some techniques on the same field in PECA is a good example of the above mentioned situation. Also feedback from farmers through dialogue into research process has been newly developed by the implementation of the Project.

4-3-4 Economic and Financial aspects

Now that coordination of the related agencies is functioning well, farmers can more easily access to the financial support compared to the past. In the previous system, farmers had to contact several authorities to receive the support. Also the range of techniques qualified for support has been widen in order for the Project related technology to be introduced. It is reported that information exchange made the members' capability in terms of budget allocation because of increment in members' knowledge on the Project. These changes have been happening because of the implementation of the Project.

4-3-5 Environmental aspects

In the village site visit and interviews revealed that people in San Jose believes that because of the Project, roads in San Jose do no longer get damage by eroded soil although those had been covered by the mud (eroded soil) when it rained in the past.

4-4 Relevance

After the commencement of the Project, the current administration appeared in Chile under which the new agricultural policy has been made. "Una Politica de Estado para la Agricultura Chilena Periodo 2000-2010" shows the three objectives of the policy which are ①To strengthen its international competitiveness of Chilean agricultural products, ②To improve the economic situation of the small-scale producers, ③To develop the sustainable agriculture with environmental consideration. From the technical point of view, the Project related technology appears to be effective to improve the deteriorated situation of erosion in dryland zone in Chile. Moreover, the Regional Strategy for Development also puts the priority on dryland zone under which Ninhue is nominated as one of the areas to be improved. INIA, counterpart organization, puts emphasis on the environmentally friendly agriculture for sustainable development.

As for needs of the target group, farmers themselves in the target area as well as the Chilean counterpart personnel together with Japanese expert express accurately their needs which are consistent with both project purpose and overall goal. Moreover, the results of the Project are expected to be applied to other small-scale watershed areas in mediterraniean dryland zone in Chile. Therefore, the Project purpose and overall goal is relevant at the time of mid-term evaluation.

4-5 Sustainability

Sustainability of the Project in general appears to be existing from the following reasons;

4-5-1 Technical aspects

The technology which the Project tries to develop and introduce seems to be technically appropriate to the agriculture of dry land zone especially for small-scale farmers in terms of labor saving and high productivity because it includes the consideration for micro and slope area as well as cost implication to poor farm households. However, to ensure the sustainability, continuing efforts to consider the cost for the new technology will be necessary still more after the awareness promotion to the farmers on the new technology.

And the assignment of responsible personnel to the key position is crucial to the sustainability. At present project counterparts are assigned properly in terms of qualification and motivation.

4-5-2 Institutional and management aspects

INIA has been taking initiative to coordinate the related agencies to work closely for the purpose of farmers' benefit and the achievement of the project purpose. Close coordination among related agencies seems to be crucial to achieve the overall goal to be attained after the Project.

Because of this functional networking, all the agencies began to modify the manner of service so that it is more convenient for the farmers provided by these related agencies. As a consequence, INIA has enhanced its capability of the project management to achieve not only project purpose but also overall goal.

The related agencies to support small-scale farmers are well organized by the Project initiative. The coordinating meeting is held once a month. Since its establishment, not only 19 meetings in a conference room have been realized but also communication and activities have been accumulated among members. The merit of being well organized are pointed out by themselves such as follows; ①To utilize the other organizations' strength to supplement own organization's limitation for farmers' benefit by knowing other organizations' objectives and activities, ②Each organization can learn the needs of farmers through other organization that have closer contact with farmers as well as farmers' representative who attends the meeting as an observer.

4-5-3 Economic and financial aspects

Project activities are going well under the adequate budget borne by INIA and JICA at present. To keep these activities, implementation organization's cost bearing is quite essential. Therefore, continuing endeavor for budget disbursement is needed.

4-5-4 Socio-cultural aspects

The strong interest in the Project by farmers shows the farmers' eagerness for improving their living conditions through whatever measures that trustworthy as well as possible. Interview to farmers at project site for this mid-term evaluation found the fact that some farmers are willing to work extra hours to make an investment introducing the Project related technology, as they believe it would generate bigger income with which they can improve their living standard.

5. Conclusion

Though several difficulties were experienced at the beginning, the Project has made a significant progress in development of technologies for sustainable agriculture in the Mediterranean dry land zone in the past two years and eight months, producing numbers of potentially effective techniques in soil control, irrigation, and farming system.

Numbers of farmers in San Jose in Ninhue County have understood the concept of sustainable agriculture and soil conservation, and they are participating in the situation analysis, planning and verification of the Project activities. Some farming techniques have already been used by them in their fields.

Several new scientific methods were introduced to collect data and information of high quality, which could be utilized as the basis for the sustainable agricultural development plan. The experiments being conducted in the demonstration field (PECA) in San Jose is producing relevant

data and information for improvement and verification of technologies in soil control, irrigation, cropping and farming system that could be effective under the real situation of nature and society in Ninhue county.

Regarding coordination and cooperation among authorities and organizations, establishment of the task force committee under SEREMI enabled relevant organizations to promote the activities of the Project, by means of exchange of information. And the related organizations made adjustments of their programs so that they could accommodate the needs of farmers. Such coordination by the task force committee and functional cooperation by the committee's members played an important role in facilitating introduction of improved technologies by the farmers.

Considering the above mentioned situation of the Project, the joint evaluation team concludes that the Project will continue to accelerate the activities to improve and verify usefulness of sustainable agricultural technologies and it will accomplish its final objectives such as manuals of integrated technologies that are proved to be effective and adoptable in the Mediterranean dry land zone, as well as the agricultural development plan for micro-scale watersheds (MMCs) by the end of the Project period.

6 Recommendations

The following recommendations were made for ensuring achievement of the Project purpose in the Ninhue county and expansion of the benefits brought by the Project to the other regions.

1) Clarification of the concept and contents of the agricultural development plan

It was confirmed in the discussions that at least two agricultural development plans for small-scale watersheds will be formulated by the end of the Project, which incorporates the scientific data collected and analyzed by the Project and the technologies verified in the demonstration field (PECA). It is expected that this agricultural development plan will be utilized as the model development plan adoptable in the other Mediterranean dry-land zone in Chile. Activities aiming at verification of improved technologies are to be continued to obtain scientific and social evidences of superiority and adequacy. At present, however, the detailed contents of the plan has not been clarified and mutually agreed upon by the Chilean and Japanese experts. It is necessary that INIA and Japanese experts' team start discussions on the content of the plan as soon as possible and present a tentative outline of such plans at the next Joint Coordinating Committee of the Project.

2) Strengthening of the system of coordination and cooperation in the task force committee

The role of task force committee, which consists of SEREMI, INIA, INDAP, SAG, CONAF, CNR, Municipal Office and farmers' neighborhood group, is essential to facilitate introduction of

technologies improved by INIA not only in Ninhue but also in the other agricultural communities. It is desirable that such system of mutual coordination and cooperation would be established as a permanent (not temporary) mechanism for agricultural development in Mediterranean dry-land zones.

ANNEX 1

PROJECT DESIGN MATRIX2 (PDM2) : Revised Version

Project Title: Project on conservation of the environment and rural development with farmers' participation for the Mediterranean dryland zone of Chile

Project Period : 1 March 2000 ~ 28 February 2005

Target Area : Sector San Jose, Ninhue county

Target Group : Farmers in San Jose

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	Means of Verification	IMPORTANT ASSUMPTIONS
OVERALL GOAL Sustainable agriculture and poverty alleviation will be promoted through a soil and water conservation program at small-scale watershed areas in an inland dry region.	- Useful programs of agricultural development will be made out in 9 counties in inland region through the soil and water conservation.	- Agricultural development progaram of county	1 Economic conditions are stable 2 Problems of lot possession do not block applicaton of the program
PROJECT PURPOSE Integrated soil and water conservation technology for sustainable agriculture development will be verified at small-scale watershed in Ninhue County, Region VIII.	1 At least 30 farm households in San Jose use the technology of soil conservation which have been improved/devloped by CADEPA. 2 At least 2 farms at 5 micro-scale watersheds of sector San Jose use the technology of small-scale irrigation.	1 Project record 2 Project record	1 Agricultural policies of the Ministry of Agriculture do not change. 2 Natural condition does not change suddenly.
OUTPUTS 1 Elaborating the appropriate agricultural development plan at small-scale watershed level. 2 Improving techniques for soil / water conservation. 3 Verifying the practical integrated technology for soil / water conservation.	1-1 By the end of the project, the agricultural development plan is created in at least 2 model micro-scale watersheds. *See the note 1 below. 1-2 By the end of year 2003, the percentage* of farmers who participated in the farm planning process of agricultural development plan is more than 60%. *See the note 2 below. 2-1 By the end of the project, the number of improved/developed techniques for soil and water conservation is at least 3. 3-1 By the end of the project, environmentaly friendly and appropriate technology for soil / water conservation is verified at the model farm and is presented in an manual on 4 topics. 3-2 By the end of the project, at leasl 5 bulletins for farmers are created.	1-1 Agricultural Development Plan 1-2 Project record (Monitoring Record) 2-1 Technical report (Project record) 2-2 Project record 3-1 Manual, technical report (Project record) 3-2 Project record	The credit/incentive to introduce the technology improved/developed by CADEPA for soil / water conservation is accessible to poor farmers according to Chilean government policy.
ACTIVITIES 1 Resources assesment and agricultural development planning of small-scale watershed area 1-1 Water resource assessment 1-2 Social and economic study 1-3 Soil erosion status survey 1-4 Agricultural development planning 2 Improvement of soil / water conservation technologies 2-1 Improvement of small-scale by water saving irrigation technology. 2-2 Improvement of water resources development technology (surface run off, underground water) 2-3 Improvement of soil management and conservation technology 3 Verification of Integrated technology 3-1 Verification and field demonstration of conservative soil / water and effective technology for utilization 3-2 Preparation of manuals for soil and water conservation	**INPUTS** **Japanese Side** 1 Dispatch of experts 1-1 Dispatch of long-term experts 1) Chief Advisor 2) Coordinator 3) Irrigation / water resources 4) Soil management 5) Farming / cultivation 1-2 Short-term experts Groundwater survey, Geophysical exploration Small-scale irrigation (water-saving, drip) Soil physics, Soil chemistry, GIS Cultivation Farm management Development economy Economic project evaluation Participatory survey and planning method Other necessary experts 2 Provision of machinery, Equipment and Materials 3 C/P training in Japan	**Chilean Side** 1 Assignment of C/P (for each long-term expert, and suitable number of C/P for each short-term expert) 2 Assignment of responsible person (Project director, Project manager) 3 Assignment of administrative person 4 Budget allocation (including expences for demo farm operation) 5 Project office, facilities (for 5 experts), land for verification and demonstration	The following organizations make an agreement of cooperation on each charge. (AGCI, ODEPA, SEREMI, INIA,INDAP, CNR, SAG, CONAF, Ninhue county office) **PRE-CONDITIONS**

* Note1: Micro-scale watershed : There might be slight defference on the border of the area depending on the situation of farmers' participation.

*Note 2:The percentage of participation is based on the number of farmers who performed all of the following three actions at least once ; ① Participating in CADEPA training courses, ② Visiting PECA for learning purposes, ③ Applying to the government's support program for CADEPA related techniques

Annex 2. Plan of Operation (PO)

Activities	Expected Results	Schedule					Responsible Organization	Inputs			Remarks
		1	2	3	4	5		Human resources	Equipments and materials	Expenses	
I. Baseline study	To clarify the farming systems of the producers, cultivation technology, land use situation and condition of the water resources.							Counterpart 8 pers. Offices 2 pers.			
1. Study on farmers and farming systems 1) Socio-economic study on Rural Area 2) Study on the condition of agricultural production technology	* Socio-economic problems and the technological level of the farmers in the county of Ninhue. * To clarify the real situation of the socio-economic status and the agricultural exploitation status in the county of Ninhue. * The crops, the technological capacity of those cultivations and the opinions of those farmers at small watersheds is clarified. * To confirm the study results	----					INIA, JICA county of Ninhue	Planning of the economic development and farming systems Participatory method (short term) Counterparts	Vehicles, statistical data, personal computer for analysis	Expenses on study and analysis	Preparation of basic list of farmers
2. Basic study on soil 1) Study on the damage situation of soil erosion 2) Study on the technology situation of soil control and soil conservation	* To find the problems on soil erosion, control of soil and technology level about soil conservation		—				INIA, JICA, county of Ninhue	soil management (long term) Counterparts	Analyzers of soil, vehicles, statistical data, personal computer for analysis	Expenses on study and analysis	
3. Basic study on water resources 1) Study on existing use of water resources 2) Study on the existing technology, the situation of small scale irrigation	* To find the problems on the use of water resources and to clarify the technological level of irrigation in the county Ninhue	----					INIA, JICA, county of Ninhue	Irrigation and resources of water (long term) Counterparts	Vehicles, statistical data, personal computer for analysis	Expenses on study and analysis	

Activities	Expected Results	Schedule 1	2	3	4	5	Responsible Organization	Inputs: Human resources	Inputs: Equipments and materials	Inputs: Expenses	Remarks
II. Evaluation on the natural resources and planning of agricultural development at small watersheds	Based on the evaluation of the soil and water resources, the agricultural development plans for the microscale watershed will be elaborated.										
1. Evaluation on water resources 1) Elaboration of a topographical map 2) Meteorological study 3) Study on Water superficial-rivers and torrents 4) Studies on groundwater Geophysical study Study on groundwater Sondage study Calculation of hydrological balance	* Map of the drainage system, study of the flow of affluence. * Study of springs, geophysical exploration, sondage study, observation of the groundwater level, analysis of the balance hydrological. * It clears up the quantity of resource of the superficial water and groundwater						INIA, JICA county of Ninhue	Irrigation and water resource (long term), GIS (short term) Study of groundwater (short) Geophysical exploration (short term) Counterparts	Equipments of meteorological observation, Equipments of surveying, analyzers of quality of the water, Equipment of geophysics exploration Vehicles, statistical data, Personal computer for analysis.	Analysis of air photograph, elaboration of the topographical map of 1:5000, hydrological and geologic study study of springs, sondage study, tests of pumping.	Analysis of aerial photograph, elaboration of the topographical map, hydrological and geologic study, sondage study, etc. will be hired consultants local. GIS (counterpart training) Surveying apparatus (counterparts training) Geophysical exploration (counterpart training)
2. Socio-economic study at small watershed 1) Study on the social and geographical conditions. 2) Study on the economic situation and management of the farmers 3) Study on the technical capacity of cultivation 4) Classification of data of existing cultivations.	* To clarify the real situation of the socio-economics and farming conditions at the sector of San Jose. * The crops, the technological capacity of cultivation, farmers' opinions at the sector of San Jose will be clarified. * Confirmation of the data and results of the investigations						INIA, JICA, county of Ninhue	Farming and cultivation(long term) Farm management Development economics Participatory planning method (short term) Counterparts.	Vehicles, Statistical data, Personal computer for analysis.		
3. Study of the soil erosion 1) Study on the damages situation of soil erosion 2) Tests and analysis on soil erosion at plots Preparation of test plots Preparation of study of torrent Analyses	* To clarify the degree of soil erosion at the sector of San Jose.						INIA, JICA, county of Ninhue	Soil management (long term) Soil physics(short term) Counterparts	Equipments of test survey, equipments of measurement of soil erosion	Installation of plot, channel collector for the mensuration of torrents, installation of the settling basin	3 types of plot and 2 gradients (20%, 10%) Type 1: natural pasture Type 2: traditional tillage Type 3: no tillage Mensuration of the cultivation effects in contour farming, etc.
4. Agricultural development plan 1) Formulation of use plan of water resources 2) Preparation of map of election of good places for water resources 3) Preparation of soil map (soil improvement, fertilization) 4) Preparation of model on farming system 5) Preparation of crops calendar 6) Land use plan 7) Afforestation plan for soil conservation 8) Program for economic evaluation of different production alternatives. 9) Promotion in organizing of groups for cooperative use of machinery	* Calculation of quantity (necessary-insufficient) * Good places of flowing water and groundwater at Ninhue County will be elected and made usually use of the plan in the future. * Agricultural development plan adaptable to the situation at this area will be prepared. * Soil map and crops calendar will be utilized for the elevation of farming technology. * Tree - planting will contribute to the water/soil conservation * To increase the farmers provided the capacity to operate agricultural machines * To form the groups for cooperative use of no-tillage sowing machines pulled by animal * Effective use of resources will contribute the alleviation of poverty.						INIA, JICA, CONAF, County of Ninhue	Irrigation and water resources, Soil management Farming and cultivation (long term), (short term) Groundwater, geophysical exploration, soil analysis, agricultural machinery, etc. Counterparts.	Equipments of geophysics exploration, Equipments of soil analyzers, agricultural machinery, etc.	Expenses of study and analysis	(counterpart training) land use plan, groundwater geophysical exploration, agricultural machinery, etc.

Activities	Expected Results	Schedule					Responsible Organization	Inputs			Note
		1	2	3	4	5		Human resources	Equipments and materials	Expenses	
III. Improvement of the technology of soil and water conservation.											
1. Improvement of the irrigation technology of small scale 1) Technology for drip-irrigation	It improves the irrigation technology of small scale, the technology of development of water resources and the technology of control of soil conservation.						INIA, JICA county of Ninhue	Farming and cultivation (long term) Irrigation and water resources (long term) Drip-irrigation (short term) Counterparts	Soil testing equipments		
2. Improvement of development water resources (flowing water and groundwater) 1) Pond of small scale 2) Irrigation with groundwater 3) Test of demonstration of water resources development	* Technology of economic design of ponds. * Elaboration of the use plan of underground waters of layers shallow and underground waters of cracks. * Elaboration of the integral plan of supply from pond. * Use of underground waters and design of watering facilities. * The use technology with solar energy will be proved.						INIA, INDAP, JICA, CNR, county of Ninhue	Irrigation and water resources (long term) Technology of pond construction (short term) Counterparts	Pump for pumping test, analyzers of engineering geotechnical Vehicles, Statistical data, Personal Computer for analysis	Geological survey In-situ test, Execution of the construction of pond	The land is required for the pond
3. Improvement of the technology of control and soil conservation 1) Cultivation technology without plowing 2) Fertilization technology appropriate for the cultivation 3) Technology to improve the soil for fruits and leguminous 4) Composting technology with crop residuals	* It develops and improves the appropriate technology for soil control and conservation in the sector of San Jose.						INIA, INDAP, JICA, county of Ninhue	Water resources, Soil management Farming and cultivation (long term) Soil physics(short term) Soil chemistry(short term) Counterparts	Agricultural machines, machines and material of soil analysis. Vehicles, Statistical data, Personal computer for analysis	Expenses of study and analysis.	Soil conservation (counterpart training) Agricultural machines (counterpart training) Chemical analysis of soil (counterpart training) Sustainable agriculture (counterpart training)

Activities	Expected Results	Schedule 1	2	3	4	5	Responsible Organization	Inputs: Human resources	Inputs: Equipments and materials	Inputs: Expenses	Remarks
IV. Verification of the integral technology and elaboration of manuals	The manuals are elaborated by means of the demonstration of the use technology integral and they consolidate the methods of appropriate rural development at level of small watershed.										
I. Verification and fields demonstration of the conservative soil/water and effective technology for utilization 1) Irrigation technology of fruit-bearing 2) Demonstration of the use of water of pond and underground water 3)Technology of irrigation of vegetables, etc. 4) Cultivating technology without plowing 5)Fertilization technology appropriate for the cultivations 6) Technology to improve the soil for fruits and leguminous 7) Composting technology with crop residuals 8) Selection of new cultivations and new cultivation technologies 9) Technology of crop rotation system by cultivation without plowing 10) Technology for high quality production 11) Technology of sustainable agriculture	They make sure the resources of water of the small watershed and it is promoted the use in the cultivations of fruits and vegetables. It consolidates the technology of the use of underground water of cracks and waters underground of shallow layers. It consolidates the fertilized technology and improvement of the appropriate soil for those cultivations and the use of the resources of organic substances, etc. New cultivations are introduced. * The quality of vegetables, grapes and wines are improved.						INIA, SEREMI, INDAP, CNR, SAG, CONAF, JICA, County of Ninhue	Irrigation and water resources (long term) Farming and cultivation (long term) Soil management (long term) Soil physics (short term) Soil chemistry (short term) Counterparts	Agricultural machines, equipments and materials of soil analysis facilities of cultivation and plantation, equipments and materials of cultivation, Vehicles, Statistical data, personal computer for analysis.		Because of long time is required for the demonstration of the effects of fruit irrigation they are carried out the tests with taking of water of those torrents, etc. from the initial year.
2. Elaboration of related manual with the conservation of soil and water 1) Study, planning, evaluation 2) Irrigation / water resources 3) Soil management 4) Agricultural systems and cultivation	* Technology demonstration through manuals * Conferences, training courses and seminars using the equipment and media system, and the technology developed will extend toward other regions.						INIA, SEREMI, INDAP, JICA, County of Ninhue	All Japanese experts and the counterparts	Equipments and media system	Expenses for binding of manuals and elaboration of teaching machine expenses related with the celebration of conferences. Expenses for studies	

ANNEX 3

Assignment of Japanese Experts

Long-term Experts

Area of speciality	Name	Period of Dispatch
Chief Advisor	Nobuyoshi SAKAMOTO	2000/03/25-2002/05/31
Chief Advisor	Yukio SHINOMI	2002/06/10-2004/06/09
Project Coodinator	Shinichi KONDO	2000/03/01-2003/02/28
Irrigation and Water Resourses	Koki OTA	2000/03/01-2003/02/28
Soil Management	Shigehiko YOSHIKAWA	2001/05/21-2003/05/20
Farming and Cultivation	Tadashi MANABE	2000/05/20-2003/02/28

Short-term Experts

Area of speciality	Name	Period of Dispatch
Agricultural Economics	Shoichi ISHIOKA	2000/08/05-2000/09/02
Participatory Survey Method	Shiro MUKAI	2000/08/05-2000/10/04
Soil Management	Shigehiko YOSHIKAWA	2000/09/20-2000/11/19
Grondwater Survey	Masayuki IMAIZUMI	2000/12/05-2000/12/25
Geophysical Exploration	Hiroomi NAKAZATO	2000/12/05-2000/12/25
Soil Physics	Azuma TAKAGI	2000/12/07-2000/12/25
Economy for the Development	Shunsuke AKAMATU	2001/05/21-2001/06/23
Geographic Information System	Ryota NAGASAWA	2001/07/23-2001/08/19
Soil Chemistry	Koichi HONDA	2001/09/03-2001/10/02
Small-scale Irrigation	Michio NARUOKA	2001/10/01-2001/10/29
Technology of Small-scale Reservior	Tutomu KOBAYASHI	2002/01/20-2002/02/17
Soil Conservation	Takao FUJIMOTO	2002/06/17-2002/07/15
Agrarian Study for Sociology	Izumi CHIBA	2002/08/02-2002/08/27
Water Conservation	Yukio OKUDA	2002/09/09-2002/10/07

ANNEX 4

Acceptance of Chilean Counterpart for Training in Japan

Training area	Name	Period of Training or Study
Planning and Management	Hernán ACUÑA	2001/06/16 - 2001/07/01
Assesment of Agricultural Environment	Claudio PEREZ	2001/01/15 - 2001/02/16
Water resources management/irrigation	Haraldo WAGEMANN	2000/10/01 - 2000/11/25
Water conservation/hidrology resources	Hamil URIBE	2000/10/01 - 2000/11/25
Irrigation (Water saving irrigation, drip irrigation)	Angélica BORQUEZ	2001/08/17 - 2001/09/23
Water resources (Plant/cost estimation)	Norberto ORTIZ	2001/08/17 - 2001/09/23
Water harvest	Claudio ALIAGA	2002/10/01 - 2002/20/29
Soil Chemistry	Nicasio RODRIGUEZ	2001/06/30 - 2001/07/25
Agricultural machineries	Jorge RIQUELME	Before the beginning of CADEPA
GIS	Marcelino CLARET	2001/11/03 - 2001/12/09
Soil conservations	Ciro BELMAR	2002/10/01 - 2002/10/25
Agriculture Economics	Carlos RUIZ	2000/07/03 - 2000/08/02
Pasture/Farming	Fernando FERNANDEZ	2002/02/24 - 2002/03/23
Agriculture Economics	Roberto VELASCO	2002/02/24 - 2002/03/23
Sustainable agricultural	Gustavo MORALES	2003/03 (Plan)
Peasent organization	Patricio LEIGHTON	2002/08/25 - 2002/09/13
Planification for Participation	Claudia VARGAS	2003/03 (Plan)
Rural agriculture development with the peasents participation	Patricia ZAMBRANO	Before the beginning of CADEPA
	Nelba GAETE	2002/06/20 - 2002/07/30

ANNEX 5

List of Provided Machinery and Equipment

General Machinery and Equipment (Less than 500.000 pesos per unit)

Year	Register N°	Name (maker, Form)	Price ($)	Quan	Instalation	Utility	State	Note
2000	6.03.08 - 27100	Rotary mower	478,800	1	INIA Quilamapu	A	Excellent	
2000	6.08.04 - 27101	Clinometer	97,527	1	GIS	A	Excellent	
2000	6.01.05 - 27102	Printer HP 840	110,000	1	General administration	A	Excellent	
2000	6.01.05 - 27103	GPS Garmin	381,807	1	GIS	A	Excellent	
2000	6.08.04 - 27104	Rain recorder HOBO	214,354	1	Irrigation/water resources	A	Excellent	
2000	6.08.04 - 27105	Double prism	94,778	1	Irrigation/water resources	A	Excellent	
2000	6.08.04 - 27106	Digital anemometer	390,929	1	Irrigation/water resources	A	Excellent	
2000	6.01.06 - 27107	Mapping software surfer	374,312	1	GIS	A	Excellent	
2000	6.07.00 - 27108	Chainsaw Husqvarna	261,000	1	INIA Quilamapu	A	Excellent	
2000	6.01.05 - 27109	GPS MAP 410	857,388	2	GIS	A	Excellent	
2000	6.08.04 - 27110	Set TV Sony	483,890	1	General administration	A	Excellent	
2000	6.08.04 - 27111	Video camera Sony	460,960	1	General administration	A	Excellent	
2000	6.08.04 - 27112	Videotape Sony	97,900	1	General administration	A	Excellent	
2001	6.03.08 - 27113	Electrical generator	931,360	2	Irrigation/water resources	A	Excellent	
2001	6.08.04 - 27114	Altimeter	159,182	1	GIS	A	Excellent	
2001	6.08.04 - 27115	Sugar refracto meter 0-32%	202,075	1	Faming/Cultivation (Cauquenes)	A	Excellent	
2001	6.08.04 - 27116	Sugar refracto meter 28-62%	177,018	1	Faming/Cultivation (Cauquenes)	A	Excellent	
2001	6.03.07 - 27117	Pump	400,492	1	Irrigation/water resources	A	Excellent	
2001	6.03.07 - 27118	Pump	255,389	1	Irrigation/water resources	A	Excellent	
2001	6.08.04 - 27119	Binocular	52,781	1	GIS	A	Excellent	

Year	Register N°	Name (maker, Form)	Price ($)	Quan	Instalation	Utility	State	Note
2001	6.08.04 - 27120	Curvimeter concurve eight	123,750	1	Irrigation/water resources	A	Excellent	
2001	6.08.04 - 27121	Digital camera	470,248	1	General administration	A	Excellent	
2001	6.08.04 - 27122	Soil hardness tester	382,634	1	Soil management	A	Excellent	
2001	6.08.04 - 27123	Wooden frame square sieve	297,000	2	Irrigation/water resources	A	Excellent	
2001	6.08.04 - 27124	Tray S33-18 custom W500xl	301,950	10	Irrigation/water resources	A	Excellent	
2001	6.08.04 - 27125	Tray S33-18 custom W670xl	148,500	2	Irrigation/water resources	A	Excellent	
2001	6.08.04 - 27126	Concrete pan c122a	493,018	2	Irrigation/water resources	A	Excellent	
2001	6.08.04 - 27127	Soil thermometer	34,456	1	Soil management	A	Excellent	
2001	6.08.04 - 27128	Clinometer	114,637	1	GIS	A	Excellent	
2001	6.08.04 - 27129	Pole	197,060	20	Irrigation/water resources	A	Excellent	
2001	6.01.05 - 27130	Scanner HP 4400	140,351	1	General administration	A	Excellent	
2001	6.01.05 - 27131	CD Rom recorder	259,600	2	General administration, GIS	A	Excellent	
2001	6.01.05 - 27132	CD Rom recorder	156,400	2	General administration	A	Excellent	
2001	6.01.05 - 27133	Webcam USB	85,000	1	General administration	A	Excellent	
2001	6.01.05 - 27134	Hard Disk 60 Gb	106,500	1	GIS	A	Excellent	
2001	10.05.00 - 27135	Standard soil color charts	116,820	1	Soil management	A	Excellent	
2001	6.08.04 - 27136	PH meter Horiba	363,714	1	Irrigation/water resources	A	Excellent	
2001	6.08.04 - 27137	Video tape Sony	103,900	1	Munic. Ninhue	A	Excellent	
		Total	**10,377,480**					

General Machinery and Equipment (more than 500.000 and less than 9.000.000 pesos per unit)

Year	Register N°	Name (maker, Form)	Price ($)	Quan	Instalation	Utility	State	Note
2000	6.03.08 - 27138	Trailer	944,000	1	Faming/cultivation	A	Excellent	
2000	6.01.05 - 27139	Plotter HP	5,737,578	1	GIS	A	Excellent	
2000	6.01.05 - 27140	Desktop Computer	2,319,200	4	General administration	A	Excellent	
2000	6.01.05 - 27141	Note-type computer	3,150,000	3	General administration	A	Excellent	
2000	6.01.05 - 27142	Printer Laserjet 4500	1,654,203	1	General administration	A	Excellent	
2000	6.08.04 - 27143	Soil moisture meter	672,419	1	Soil management	A	Excellent	
2000	6.01.06 - 27144	Autocad Map 2000	2,917,581	1	GIS	A	Excellent	
2000	6.03.08 - 27145	Electrical generator	511,200	1	Irrigation/water resources	A	Excellent	
2000	6.01.06 - 27146	Sotware imagine virtual	5,531,064	1	GIS	A	Excellent	
2000	6.08.04 - 27147	PH meter	697,540	1	Irrigation/water resources	A	Excellent	
2000	6.08.04 - 27148	Notebook computer Compaq	1,045,000	1	General administration	A	Excellent	
2000	6.08.04 - 27149	Starflow system	1,604,800	1	Irrigation/water resources	A	Excellent	
2000	6.08.04 - 27150	Soil moisture meter	7,570,050	1	Soil management	A	Excellent	
2000	6.08.04 - 27151	Water level meter DIK 602A-A1	1,429,950	1	Irrigation/water resources	A	Excellent	
2000	6.08.04 - 27152	Water level meter DIK 601A-A1	936,230	1	Irrigation/water resources	A	Excellent	
2000	6.08.04 - 27153	Groundwater level meter DIK 602A-C1	4,289,950	1	Irrigation/water resources	A	Excellent	
2000	6.08.04 - 27154	Groundwater level meter DIK 602A-B1	2,859,900	1	Irrigation/water resources	A	Excellent	
2000	6.08.04 - 27155	Groundwater level meter DIK 601A-B1	1,872,460	1	Irrigation/water resources	A	Excellent	
2000	6.08.04 - 27156	Groundwater level meter DIK 601A-A1	1,872,460	1	Irrigation/water resources	A	Excellent	
2000	6.08.04 - 27157	Total station main unit set	6,682,600	1	GIS	A	Excellent	

Year	Register N°	Name (maker, Form)	Price ($)	Quan	Instalation	Utility	State	Note
2001	6.08.04 - 27158	Portable color meter	889,130	1	Faming/cultivation (Cauquenes)	A	Excellent	
2001	6.03.06 - 27159	Fertilizer aplicator	1,177,640	1	Soil management	A	Excellent	
2001	6.03.08 - 27160	Rake	758,200	1	Faming/culivation	A	Excellent	
2001	6.08.04 - 27161	Distance meter	537,030	1	GIS	A	Excellent	
2001	6.03.02 - 27162	Stationary thresher	3,250,000	1	Faming/cultivation	A	Excellent	
2001	6.03.02 - 27163	Laboratory thresher	1,250,000	1	Faming/cultivation	A	Excellent	
2001	6.08.04 - 27164	Shaker and accesories	1,851,833	1	Faming/cultivation	A	Excellent	
2001	6.01.05 - 27165	Computer K7 Athlon	1,949,722	1	GIS	A	Excellent	
2001	6.01.05 - 27166	Notebook computer Compaq	2,311,622	1	General administration	A	Excellent	
2001	6.03.08 - 27167	Chopper	3,386,600	1	Soil management	A	Excellent	
2001	6.03.06 - 27168	Sprayer	1,855,803		Faming/cultivation	A	Excellent	
2001	6.08.01 - 27169	Binocular microscope	3,829,259	1	GIS	A	Excellent	
2001	6.08.01 - 27170	Stereomicroscope	2,657,585	1	Faming/cultivation	A	Excellent	
2001	6.08.02 - 27171	Analytic balance PRECISA	1,229,311	1	Faming/cultivation	A	Excellent	
2001	6.01.05 - 27172	GPS Garmin	872,492	2	GIS	A	Excellent	
2001	6.01.05 - 27173	Printer 990 HP	500,000	2	General administration	A	Excellent	
2001	6.01.05 - 27174	ZIP USB 250MB	518,000	4	General administration	A	Excellent	
2001	6.01.05 - 27175	Hard Disk personal storage 40 Gb	510,400	2	General administration, GIS	A	Excellent	
2001	6.08.04 - 27176	Chromatography columns	821,140	3	Faming/cultivation (Cauquenes)	A	Excellent	
2001	6.08.04 - 27177	TV set Sony	559,900	1	Munic. Ninhue	A	Excellent	
2001	6.08.01 - 27178	Microphotographic equipment binocular	2,942,787	1	Faming/cultivation	A	Excellent	
2001	6.08.04 - 27179	Steel camera and swet	1,368,670	1	General administration	A	Excellent	

Year	Register N°	Name (maker, Form)	Price ($)	Quan	Instalation	Utility	State	Note
2001	6.08.04 - 27180	Conductivity meter twin cond.	747,447	1	Irrigation/water resources	A	Excellent	
2001	6.08.04 - 27181	Ph meter twin	1,456,284	1	Irrigation/water resources	A	Excellent	
2001	6.08.04 - 27182	Stainless sampling tube 100ml	1,140,480	72	Soil management	A	Excellent	
2001	6.08.04 - 27183	Stainless sampling tube 50ml	1,345,401	9	Soil management	A	Excellent	
2001	6.08.04 - 27184	Falling head permeameter	2,098,792	2	Soil management	A	Excellent	
2001	6.08.04 - 27185	Three phase meter	2,727,440	1	Soil management	A	Excellent	
2001	6.08.04 - 27186	Soil column method kit for pf	1,588,944	1	Soil management	A	Excellent	
2001	6.08.04 - 27187	Cylindrical intakerate meter	1,613,694	1	Irrigation/water resources	A	Excellent	
2001	6.08.04 - 27188	Groundwater level recorder 603A C1	2,391,831	1	Irrigation/water resources	A	Excellent	
2001	6.08.04 - 27189	Groundwater level recorder 601A A1	1,617,602	1	Irrigation/water resources	A	Excellent	
2001	6.08.04 - 27190	Standard compaction set set SG10	1,747,343	1	Irrigation/water resources	A	Excellent	
2001	6.08.04 - 27191	Variable head permibiality	4,925,230	5	Irrigation/water resources	A	Excellent	
2001	6.08.04 - 27192	Compressor S18-t-2b	1,410,745	1	Irrigation/water resources	A	Excellent	
2001	6.03.07 - 27193	Vacuum pump	1,108,796	1	Irrigation/water resources	A	Excellent	
2001	6.03.08 - 27194	Power tiller K120 x RK125	4,884,641	1	Faming/cultivation	A	Excellent	
2001	6.08.04 - 27195	Soil penetrometer SR-2	2,051,025	1	Soil management	A	Excellent	
2001	6.03.08 - 27196	Vibro subsoiler S 226	2,804,164	1	Faming/cultivation	A	Excellent	
2001	6.08.04 - 27197	Half step log sprayer	1,098,805	1	Faming/cultivation	A	Excellent	
2001	6.03.08 - 27198	Trailer TG 140B-VG	3,213,528	1	Faming/cultivation	A	Excellent	
2001	7.02.01 - 27199	Vehicle single cabin	6,625,125	1	Faming/cultivation	A	Excellent	
2001	7.02.01 - 27200	Vehicle double cabin	7,499,900	1	Soil management	A	Excellent	
2001	6.01.05 - 27201	Copy machine	7,005,223	1	General administration	A	Excellent	

Year	Register N°	Name (maker, Form)	Price ($)	Quan	Instalation	Utility	State	Note
2001	6.08.04 - 27202	Spectrofoto meter	5,780,289	1	Faming/cultivation (Cauquenes)	A	Excellent	
2001	6.08.06 - 27203	Freeze dryer system	5,680,817	1	Faming/cultivation	A	Excellent	
2001	6.08.04 - 27204	Portable leaf meter	7,151,158	1	Faming/cultivation (Cauquenes)	A	Excellent	
2001	6.08.04 - 27205	Grounwater level recorder DIK 603A	8,007,090	1	Irrigation/water resources	A	Excellent	
		Total	**177,047,103**					

General Machinery and Equipment (more than 9.000.000 pesos per unit)

Year	Register N°	Name (maker, Form)	Price ($)	Quan	Instalation	Utility	State	Note
2000	6.08.04 - 27206	Earth resistivity meter	46,441,500	1	Irrigation/water resources	A	Excellent	
2000	6.08.04 - 27207	Electromagnetic wave analyzer	40,705,800	1	Irrigation/water resources	A	Excellent	
2000	6.08.04 - 27208	Portable Gama-Ray analyzer	36,041,060	1	Irrigation/water resources	A	Excellent	
2000	6.03.03 - 27209	Seeder JUBER	18,254,600	1	Soil management	A	Excellent	
2001	7.02.04 - 27210	Vehicle Wagon 4WD	12,785,440	1	Irrigation/water resources	A	Excellent	
2001	6.03.01 - 27211	Tractor New Holland TL 90	14,939,893	1	Faming/cultivation	A	Excellent	
2001	6.08.04 - 27212	Chromatography	15,083,835	1	faming/cultivation (cauquenes)	A	Excellent	
2001	6.08.04 - 27213	Spray Booth	24,261,213	1	Faming/cultivation	A	Excellent	
2001	6.08.04 - 27214	Biodigester	15,398,500	1	Faming/cultivation	A	Excellent	
2001	6.03.02 - 27215	Combine	43,027,400	1	Faming/cultivation	A	Excellent	
2001	6.03.08 - 27216	Trencher	14,168,579	1	Irrigation/water resources	A	Excellent	
2001	6.08.04 - 27217	Soil moisture meter	20,636,472	1	Soil management	A	Excellent	
2001	6.08.04 - 27218	Chromatography accesories	20,085,000	1	faming/cultivation (cauquenes)	A	Excellent	
2001	6.08.04 - 27219	Elemental analyzer MAX CNS	35,483,500	1	Soil management	A	Excellent	
		Total	**357,312,792**					

ANNEX 6

Local Cost

(Thousand of Japanese Yen)

Items	2000 year		2001 year		2002 year		Total	
	Japan	Chile	Japan	Chile	Japan	Chile	**Japan**	**Chile**
1 General Local Expenditure	5.000	10.205	5.000	14.062	3.750	31.304	**13.750**	**55.570**
2 Baseline Study	1.898	91	0	0	0	0	**1.898**	**91**
3 Verification Farm (PECA)	1.978	1.318	0	1.685	0	2.028	**1.978**	**5.031**
4 Soil Map	0	0	984	335	986	425	**1.970**	**760**
5 Water Resources Map	0	0	870	410	1.378	865	**2.248**	**1.275**
6 Census List of Farmers	0	0	1.068	258	0	0	**1.068**	**258**
7 Text	0	0	646	605	0	0	**646**	**605**
8 Crops Calender	0	0	0	0	654	262	**654**	**262**
Total	**8.876**	**11.614**	**8.568**	**17.355**	**6.768**	**34.883**	**24.212**	**63.852**

Note: In addition to the cost above mentioned, there are incentives of CNR, FOSIS, CONAF, INDAP, Municipalidad Ninhue and FNDR.

ANNEX 7

Assignment of Counterparts

Area	Name of Counterpart	Possition
Management	Hernán ACUÑA Pommiez	Head Regional Center of Research INIA Quilamapu
Management	Claudio PÉREZ Castillo	Administrator CADEPA Project
Irrigation/water resources	Hamil URIBE Cifuentes	Reseacher of Hydric Resources
	Octavio LAGOS Roa	Reseacher of Hydric Resources
	Harald WAGEMANN Maldonado	Reseacher of Irrigation
	Fernando SOTO Huenún	Technician of Hydric Resources and Irrigation
Soil management	Nicasio RODRIGUEZ Sánchez	Reseacher of Soil Fertility
	Jorge RIQUELME Sanhueza	Reseacher of Soil Conservation
	Isaac MALDONADO Ibarra	Reseacher of Meteorology and Soil Erosion
	Marcelino CLARET Merino	Researcher of GIS and Remote Sensing
	Claudio ALIAGA Donoso	Technician of Soil Conservation
	Ciro BELMAR Navarro	Technician of Soil Fertility
Farming/cultivation	Carlos RUIZ Sánchez	Researcher of Crops and Agr. Economics
	Gustavo MORALES Schulz	Researcher of Agricultural Economics
	Fernando FERNANDEZ Elgueta	Researcher of Pastures of Drylands
	Roberto VELASCO Hansen	Researcher of Agricultural Economics
	Mario MELLADO Zambrano	Researcher of Wheat Science
	Juan SOTOMAYOR Soler	Researcher of Vineyards and Wine
	Juan TAY Urbina	Researcher of Grain Legumes
	María Inés GONZALEZ Aristegui	Researcher of Horticulture
	José PEDREROS Ledesma	Researcher of Weed Science
	Arturo LAVIN Acevedo	Researcher of Fruit Trees
	Andrés FRANCE Iglesia	Researcher of Phytopathology
	Magdalena CRUZ Aguayo	Researcher of Phytopathology
	Guisella REYES Troncoso	Technician of Weed Science
Administration	Verónica VALDES Barbieri	Secretary CADEPA Project
	Ramón PALMA Moncada	Assistant and Driver CADEPA Project

ANNEX 8

Progress of Project Activities (Yearly plans)

Plans of activities by detailed plan of operations								Advances of activities		Results	Attain-ment %	Final Objects to be attained
Division	Topic	Sub topic	1	2	3	4	5	The state of the advance of the activity	Remaining issues			
1 Baseline study	1. Study of farmers. (Study of farming systems).	1) Socio-economic rural study	–					1) Baseline study 2) Socio-economic study 3) Diagnosis of the situation of some farmers of the sector San José of County of Ninhue (2000) (Short term expert). 4) Study community and method of planning (2000) (Short term expert). 5) Sociological study of the rural community (2002)(Short term expert) 6) Study on Demands for the programs of INDAP by the farmers' of the sector San José, County of Ninhue, Provincial of Ñuble, VIII Region (2001) 7) Basic list of inhabitants of the sector San José (2001) 8) Socioeconomic study of the county Ninhue; Summary of antecedents (2001) By means of these 8 studies it became possible to understand the conditions, the problems and the ideas of the farmers of the sector. Information: Apart from the reports mentioned 1) - 8) 9) Current situation of the object area (Plan of participatory conservation of the rural environment rural CADEPA, 2001) 10) Baseline of sector San José, County of Ninhue, VIII Region, Chile (2001) 11) Transfer of irrigation technology and protection of natural resources in the county of Ninhue and Portezuelo, VIII Region First stage N°1 (2001) 12) Same as the previous one No.2	None	1) The current situation of farmers in the interior unirrigated land including San José's sector was understood. 2) Can be used for the evaluations and planning of the project. 3) It is utilized in organizations that have relationship with the Project	100	/ Clarify current situation of the agricultural productions, the farmers' socioeconomic reality and characteristic of the sector. / Clarify the problems and the plan of improvement for the demonstration and establishment of general technique for the development of sustainable agriculture for the interior unirrigated land

								13) Same as the previous one No.3				
		2) Study of the conditions of the technology of agricultural production		–				1) By means of surveys, study by means of interviews and sampling of wheat yield, the current situation of the main agricultural product was clarified Information: Apart from the reports mentioned 1) ~ 13) 14) Current situation of wheat yield in the Sector San José of the county Ninhue, 2002. (Information of the expert of long term)	none	1) They have cleared up some of the important points, like the cause of the dropped productivity of the cultivations with fallows, etc	100	
	2. Soil Basic Study	1) Study of the condition of damages of soil erosion		–				1) To know the recognition of soil degradation by the farmers in San Jose, and their demands through the questionnaire survey. 2) Study of the situation of the soil erosion and the mechanism of the development of the soil erosion Information: 1) Same as I.1.1. 2) Reports by the short term experts of soil physics and soil management Study of complement 2002 (Study of the ground for the elaboration of a soil map)	Observation of the development of the soil erosion and damages will be continued.	/ 84% of the farmers have recognized the damages by soil erosion, and to improve the soil, they suggested plantation, ditch for drainage, cultivation in contours and phosphorus fertilizer application, etc. / There are three different types of soils in San Jose, which makes it difficult to know the future of the erosion / The contents of available nitrogen and phosphate are small in the soils in San Jose. / The crops are damaged not only by arid soil but also by excess humidity in the soil during sowing	100	/ The damages by soil erosion and the technologies of the farmers against soil degradation will be clear up.
		2) Study of condition of the technology of soil control and soil		–				1) To know the recognition of and the demands for soil control and soil conservation of the farmers in San Jose, through the questionnaire survey. 2) Study of the soil fertility of the	Observation of the farmers' technology of soil management		100	

		conservation						wheat fields cultivated in the traditional ways "Barbecho" in San Jose 3) Investigation of conservational effect for soil humidity by the ditch using tensiometers Information: 1) Same as I.1.1. 2) Reports by the short term experts of soil management	will be continued	period. / The ditch of infiltration installed for the reforestation did not obtain beneficial results in PECA / The farmers' technologies against damages from soil erosion are not fully understood.		
	3. Basic study of water resource	1) Study of existing use of water resources	–					/ Studies of water resources development method and existing use of water resources Report : 1) Baseline study in Ninhue county, Aug. 2000	/Activities were completed in 2000.	/It was understood that water resources are tight in the dry season at sector San Jose. /It was understood that surface water in rivers and torrents generally go dry in the dry season at sector San Jose. /It was proved that water resources for irrigation are mainly obtained from shallow wells, and farmers do not have enough funds to drill a deep well. /Farmers can use little water because of cost of electricity for pumping /It was understood that the total irrigated area is only 10ha in Ninhue county, and generally the drip-irrigation system is used for orchard and vegetables	100	/Problems of the use of water resources and technological level of irrigation at small watersheds are cleared up.
		2) Study of irrigation technology state in small scale	–					/Study of existing small scale irrigation Report : 1) Baseline study in Ninhue county, Aug. 2000	/Activities were completed in 2000.		100	

Plans of activities by detailed project operations								Advances of activities of project		Evaluation of the current result	Attain-ability%	Final attainable Object
Division	Topic	Sub topic	1	2	3	4	5	The state of the advance of the activity	Topic to continue			
2. .Evaluation of the natural resources and land use plan at small watersheds	1. Evaluation of water resources	1) Elaboration of a topographical map	–					/ Elaboration of a topographical 1/5,000 map of sector San Jose Report : 1) The topographical 1/5,000 map of sector San Jose, JICA, March 2001	/Activities were completed in 2000.	/ The topographical map is used as basic map of the project in many activities. / Probable annual and the rainy season precipitations were used to estimate the possible water kept in reservoirs. / The surface run-off percentage of the rainy season precipitations was used to estimate the water kept in reservoir / The deep well with 28m depth was drilled in the mountain stream near the demonstration field based on the results of geophysical exploration, and groundwater is used for orchard and vegetables irrigation. / Studies of geophysical exploration for groundwater are leading in South America. / It was proved that the drill point of deep well can be selected by geophysical exploration. / It was proved that the method of tank model is useful to analyze the hydrological balance in semi-arid regions.	100	/ Development of method to estimate the quantity of resource of the surface runoff water and groundwater. / Development of method to study deep groundwater by geophysical exploration / Improvement of method to select the drill point of wells / Formulation of use plan of water from sources that are made up with shallow well, reservoir and deep well. / Development of method to use surface runoff water and groundwater in sector San Jose.
		2) Meteorological study	–	–	–	–	–	/ Collection and analysis of meteorological data in counties near the sector San Jose / Meteorological study at the demonstration field Report : 1) Characteristics of precipitations in counties near the sector San Jose, report of long term expert. May 2002 2) Report of Chile National Irrigation Committee, No.3, April 2002 3) Report of CADEPA Joint Coordinating Committee, June 2002	/ Continuation of meteorological study at the demonstration field. /Estimation of probable precipitations in sector San Jose and counties near the sector San Jose.		50	
		3) Surface runoff water-studies of rivers and mountain stream	–	–	–	–	–	/ Measurements of surface runoff water in three basins of sector San Jose / Calculations of surface runoff percentage and peak flow. Report : 1) Irrigation and Water resources, Report of CADEPA Joint Coordinating Committee, Oct. 2001 2) Report of Chile National Irrigation Committee, No1, Nov. 2001 3) Report of Chile National Irrigation Committee, Dec.2001	/ Improvement of preciseness of surface runoff percentage. / Calculation of peak runoff percentage. / Proof of relation between basin management and surface runoff percentage. / Studies of		50	

								4) Report of Chile National Irrigation Committe, April 2002	surface runoff water will be continued, and data will be used for design discharge.			
		4) Studies of groundwater (1) Geophysical study	–	–	–	–	–	/ Geophysical study (electrical magnetic wave and electrical prospecting method) at three points in sector San Jose Report : 1) Technical report for water resources (geophysical study), JICA, March 2001 2) Application of methodology to explore the crack water in inland dry areas in CHILE, No.III World Water Forum, Oct. 2001 3)Report of Chile National Irrigation Committee, No.3, Dec.2002 4) Report of CADEPA Incorporation Committee, June 2002	/ Improvement of method to select the drill point of deep well.		50	
		(2) Study of groundwater	–	–	–	–	–	/ Studies of groundwater by γ-Ray method at three points in sector San Jose / Observation of twenty (20) shallow well's water level in sector San Jose / Pumping test (coefficient of infiltration) at sixty (60) shallow wells in sector San Jose. Report : 1) Technical report for water resources (geophysical study), JICA, March 2001 2) Report of Chile National Irrigation Committee, Nov.2001 3) Report of Chile National Irrigation Committee, No.2, Dec.2001	/ Improvement of method to select the drill point of deep wells. / Estimation of the quantity of resource of the shallow groundwater / Improvement of method to select the drill point of shallow well.		50	

							4) Report of Chile National Irrigation Committee, No.3, April 2002 5) Report of CADEPA Incorporation Committee, June 2002				
		(3) Study of test pitting		–			/ The deep well with 28m depth was drilled in the mountain stream near the demonstration field based on the result of geophysical exploration, and groundwater is used for orchard and vegetables irrigation.	/ Study of test pitting at the promising point of deep groundwater.		80	
		(4) Calculation of hydrological balance			–	–	–	/ The water balance was roughly calculated by one stage tank model with data on precipitations, surface runoff water, evaporations and soil moistures. Report : 1) Report of Chile National Irrigation Committee, No.3, April 2002	/ Accumulation of hydrologic data / Improvement of water balance analysis model		30	
	2. Study socioeconomic (small watershed)	1) Study of the social and geographical conditions.	–					/ The same as the section I.1.1) " Socio-economic Study of the rural community Information: The same as the section I.	none	/ The situation of the rural society in San Jose, the management of farming household, the level of cultivation techniques have been clarified by baseline study..	100	
		2) Study of the economic situation and management of the farmers	–		–		–	/ The same as the section I.1.1) " Socio-economic Study of the rural community Information: The same thing that of the section I	/ Conduct supplementary studies if necessary. / In the last yearof the project, study to evaluate the results of the project will be carried out		80	
		3) Study of the	–					/ The same as section I.1.1) "	None		100	

		technical capacity of cultivations						Socio economic Study of the rural community Information: The same as the section I				
		4) Classification of data of existing cultivations.	–		–		–	/ To continue collecting, analyzing and arranging such materials as the reports published in INIA, technical documents in Chile and foreign countries / In addition to the point I.1.2) data obtained from the tests in the demonstration field (PECA) are collected, arranged and utilized. Information: The same as the section I	/ Use for elaboration of manuals, by adding and rearranging data if necessity arises.		50	
	3. Study of the soil erosion	1) Study of the condition of damages of soil erosion		–				/ The quantity of eroded soil in San Jose was estimated with the USLE formula by the geographic information system (GIS) Information: 1) A report by Japanese expert on GIS 2) A report by Japanese expert on soil physic 3) A report by Japanese expert on soil management	/ This study will be continued to improve the precision until 2005	/ The amount of soil loss in sector San Jose was predicted with the USLE formula by the GIS (the parameters of soil type and cultivation were tentative). / The plots test clarified quantitatively how the introduced cultivation system (non-tillage system) is effective for decrease of soil loss compared with traditional one. / It will be difficult to install more test plots at different type of soils.	30	/ To clear up the damages of soil erosion in the small watershed
		2) Test and analysis of soil erosion at plot -Preparation of test plots -Preparation of study of torrent -Analyses	–	–	–	–	–	/ The 18 plots of drainage (3 types of treatments; non-tillage, natural pasture and traditional tillage, 2 types of slopes; 10% and 20%, triplicate) were installed to study soil erosion / A study about gully development is going on, in which the following methodology was considered To choose one gully. To make a topographic map / Characterizations of the soil physic properties have been done. / For improving the methodology, increase of the number of gullies	/ To continue accumulating the data of soil loss and analyze them / Topographic map are not enough to get a good data about gully development, / For improvement, photography		30	

								under study from one to five was decided. At the same time, a water movement will be studied the next year. / The measurement of gully development using strings stretched tightly was continued in PECA / The quantities of eroded soil and run off water from the plots have been measured continually.	from plane will be used, and at the same time the hose method will be used			
	4. Land use plan	1) Formulation of use plan of water resources			–	–		/ The proposal guide that includes method to obtain irrigation water, characteristic feature of reservoir and possibility of construction with labor from farmers was formulated. / It was proved that drip -irrigation is useful because it is possible to be constructed by farmers under the situation of tight water resources. / Practicable irrigation areas for grape, olive and pistachio were roughly calculated from the maximum volume of surface runoff water and groundwater that farmers can use in the basin of San Jose river.	/ Presently practicable volume of shallow well and surface runoff water will be calculated, and use plan of water resources will be formulated corresponding to crops calendar, which the sector of farming and cultivation will formulate.	/ According to the study of existing use of water resources for irrigation water, it was proved that water of shallow well as main sources, supplemented by water harvesting of mountain stream and runoff water from field are useful. / It was proved that use of deep well and reservoir in mountain stream, compound water resources are necessary to obtain irrigation water. / The methods to estimate the quantity of shallow groundwater and surface runoff water in the sub-sector will be developed, and it will give useful information to obtain irrigation water.	30	/ To lay a land use plan for the small watershed, consisting of use of water resources, farming patterns, soil conservation practice, forestation, etc.
		2) Preparation of map of election of good places for water resources		–	–	–	–	/ The map of selection of good places for water resources in sector San Jose and Santa Rosa were prepared. Report : 1) The map of selection of good places for water resources in sector San Jose and Santa Rosa, JICA, March 2002. 2) Report of Chile National Irrigation Committee, No.3, and April 2002.	/ Preparation of map of election of good places for water resources in sector Chequen and San Juan.		40	

								3) Report of Chile National Irrigation Committee, No4, July 2002 4) Report of Chile National Irrigation Committee, No5, Oct. 2002. 5) Report of CADEPA Joint Coordinating Committee, June 2002.				
		3) Preparation of map (soil improvement, fertilization)		–	–	–	–	/ Soil characteristics descriptions in the farmers' fields / Area of the project is about 34,000 ha (2001;10,000ha, 2002;10,000ha) / One point description of a soil sampling represents 100 ha. Soil characteristics (soil nutrient, soil physical properties, soil topography, and vegetation) were measured. ./ A soil map of the area will be made for characteristics such as fertility management, fertilizers recommendations for all the crops of the area and soil conservation practices Information: 1) The soil map for soil improvement and fertilization-2001, JICA, March 2002. 2) The characteristics of soils in northern part of Ninhue, JICA expert report, October 2002	/ To be continued / The soil map for soil improvement and fertilization will be prepared all over Ninhue in 2005	/ A soil map will be utilized to show to the Ninhue farmers the sustainable agricultural practices together with a crop calendar / A plan of soil improvement adapted to the zone conditions, and the model of agriculture production were set up	40	
		4) Preparation of the manual of farming pattern			–	–	–	/ By the result of the section I.1.1) "Socioeconomic study of the rural community", the conditions and situations were understood of the family, land ownership, nature, soils, subsistence farming system for the shortage of profitable agricultural products at local level;	/ To elaborate a model of farming system that attempts to change the subsistence style toward a style in which they can obtain	/ proposal is ready.	10	

									good crop and good products.			
		5) Preparation of crops Calendar		–	–	–	–	/ The proposals are under study in groups with the counterparts. / Calendar of CADEPA 2002 was elaborated which presents the main agricultural operations to carry out every month	/ To elaborate and to use manual on the main agricultural products. / Revision of the monthly operations for the calendar of CADEPA 2003	/ The calendar CADEPA 2002 was elaborated and distributed to all the organizations that have relationship with the project, with positive responses.	10	
		6) A forestation for soil conservation		–	–	–	–	/ The 7 kinds of trees including pine trees were planted in PECA by the method of CONAF, but most of the pine trees did not take root. / The effect of the ditch for infiltration was measured with tensiometer. / Plantation of pine trees and eucalyptuses was carried out in 22ha of farmers' fields in San Jose (27 farmers), but some of them did not take root information 1) The effect for infiltration of water of the ditch measured with tensiometer, expert report, 2002	/ To study the cause of death of the planted pine trees and new plantation in PECA / To give advice about the reforestation technology to farmers	/ Recommendation to receive the financial help from CONAF for reforestation in farmers' fields / To study the cause of death of the planted pine trees / To study what kinds of trees or grasses are useful for erosion control	25	
		7) Support for organization of group for cooperative use of machinery		–	–	–	–	/ 12 farmers (two of them were women) participated in the advanced training course of machinery and received a license of tractor operator. They also participated in the sowings of the sector with machine of traction animal. / More than ten times of field day were arranged about zero farming	/ To conduct courses of harvesting machinery. / Support for the organization of the groups of cooperative use of the machines	/ The farmers' interest in the agricultural machineries is being increased by means of the advanced training courses.	30	

								anc ...e agricultural machinery, and more than 700 farmers participated.				

Plans of activities by detailed plan of operations								Advances of activities		Results	Attainment %	Final Object to be attained
Division	Topic	Sub topic	1	2	3	4	5	The state of the advance of the activity	Remaining issues			
3. Improvement of the technology of soil and water conservation	1. Improvement of irrigation technology at small scale	1) Technology for drip-irrigation			–	–	–	/ Characteristics of existing water resources of irrigation, pump, water distribution tank, irrigation system and irrigation field were studied in sector San Jose and near counties Report : 1) Technical report for irrigation technology at small scale, JICA, Nov. 2001. 2) Information of expert for irrigation of small scale, CADEPA Joint Coordinating Committee, June 2002	/ Proof of optimum irrigation quantity to grow fruit and to bear fruit in early stage	/ From the view point of economizing construction cost, possibility of farmer construction and easy maintenance, drip-irrigation systems with shallow well, simple pump, water conveyance pipe, water supply tower, filter, water distribution pipe, water conveyance tube, outside emitter and hand operation control were satisfactory.	30	/ Development of technology to construct a small scale drip-irrigation and reservoir with low cost and easy maintenance. / Development of technology of water harvest. / Development of technology of groundwater irrigation with low cost and easy maintenance.
	2. Improvement of development water resources (Surface runoff water and groundwater)	1) Pond of small scale			–	–		/ Studies of existing use of reservoirs in sector San Jose and near counties. / Australia type tank was set up in the demonstration field, and the plan of reservoir was made up. Report : 1) Technical report on construction the reservoir, JICA, March 2002. 2) Information of expert for construction reservoir of small scale, CADEPA Joint Coordinating Committee, June 2002	/ Method of water harvest to bring together field runoff water. / Method of mountain stream diversion works. / Proof of function of percolation ditch (Zanja) to conserve water resources fast. / Studies of runoff sand quantity in mountain stream, and	/ It was proved that surface runoff water in the rainy season is promising for water resources of reservoir in sector San Jose.	50	

									estimation of sediment in reservoir.			
		2) Irrigation with groundwater			–	–		/ Wells with 28m and 10m depth were drilled in the mountain stream near the demonstration field and in it respectively, and groundwater is used for orchard and vegetables irrigation.	/ Studies for endurance of irrigation facilities.		50	
		3) Test of demonstration of water resources development	–	–	–	–	–	/ Verifying studies to acquire irrigation water from shallow well, deep well and Australia type tank are carried out in the demonstration field.	/ Continuation of activities.		50	
	2. Improvement of technology of control and soil conservation	1) Cultivation technology without plowing		–	–	–	–	/ The characteristics of the soils in non-tillage cropping were studied. / Elaboration of the proposal preparation of the appropriate farmland for non-tillage cropping. / The prerequisite condition of soil hardness for non-tillage drill seeding was proposed. / A comparative study between non-tillage cropping and minimum tillage cropping is carried out. / A performance test of non-tillage seeder with traction of cattle was done. Information: 1) A report of Japanese expert on soil management, 2000 2) A report of Japanese expert on soil chemistry 3) An information from Japanese expert "Suitable soil hardness for non-tillage seeding" 4) An information from Japanese	/ Study on adaptability of non-tillage drill seeder / Study of the annual change in the improvement of the soil fertility and soil conservativeness in non-tillage cropping / Study on the standard technology for non-tillage cropping system. / Study on the control of weeds in non-tillage	/ Increase of farmers in San Jose, who are interested in the non-tillage cropping (more than 30 farmers in 2002). / A study is necessary so that the farmers understand the capacity of reduction of the erosion by means of non-tillage cropping system. / A study on the sustainable production in leguminous crops in non-tillage cultivation is necessary.	25	/ Development of non-tillage cropping system and improvement of soil conservation technology

								expe..., "Performance of seeding by non-tillage drill seeder"	cropping			
		2) Fertilization technology appropriate for the cultivation		–	–	–	–	/ Soil fertility analysis of all nutrients availability in the soil in non-tillage cropping system / Validation of a contribution of legume residues on the soil surfaces for improving soil fertility Information: 1) An information from Japanese expert, "Where are the nitrogen applied? "	/ Study on the fertilization in non-tillage cropping system / Study of lupines as green manure and soil conditioner	/ After establishment of seeding method in non-tillage cropping system, the study to decrease fertilizer application is necessary like examinations of fertilizer application position and/or types of fertilizers	10	
		3) Technology to improve the soil by fruits and leguminous		–	–	–	–	/ To identify appropriate time of irrigation, tensiometer was installed to the orchard of grapes, olives and pistachios in the PECA / The effect of subsoiler to increase soil water drainage was examined.	/ Study on the biological improvement of soil structure by means of the green manure vegetation like leguminous pasture, radish	/ It is necessary to study the methods to make good compost in dry farmyard / A point of view is necessary on the use and application of organic materials to improve soils, not only produced in the farm but also produced in the rural communities, because almost of the crop residues produced in the farm are used for the animals.	10	
		4) Technology composted with cultivation residuals		–	–	–	–	/ Soil temperature is being measured in 1 cm and 5 cm of depth in PECA to know the properties of decomposition of compost in the soil. / Preparation for the measurement of the decomposition rate of the organic materials (wheat straw, etc.) in the rural communities.	/ To continue the study of the decomposition of the organic materials. / Analyses of compost quality for green house vegetables		20	

Plans of activities by detailed plan of operations								Advances of activities		Results	Attainment %	Final object go be attained
Division	Topic	Sub topic	1	2	3	4	5	The state of the advance of the activity	Remaining issues			
4.Demonstration of the integral technology and elaboration of manuals	1. Demonstration of the conservation of soil and water and effective technology	1) Irrigation technology of orchards	–	–	–	–	–	/ Cultivation of grape, olive and pistachio is carried out with irrigation in the demonstration field, and growth is favorable / Irrigation plans were drawn up of eights farmers plan to cultivate olives by PRODESAL project of INDAP. Report : 1) Report of Chile National Irrigation Committee, No.1, April 2002. 2) Report of Chile National Irrigation Committee, No.3, June 2002.	/ Demonstration of irrigation technology of orchards and elaboration of related manual.	/ Irrigation of orchards by using groundwater and reservoir was carried out. / INDAP approved financing for drip-irrigation systems for eight farmers in sector San Jose, who are constructing those systems by themselves.	50	/ Resources of water are secured and the use in the cultivations of fruits and vegetables is promoted, and related manuals will be elaborated. / The use of surface runoff water and underground water is consolidated, and related manuals will be elaborated.
		2) Demonstration of the use of water of pond and underground water			–	–	–	/ Australia type tank was set up in the demonstration field, and the plan of reservoir was made up. Report : 1) Technical report for construction the pond, JICA, March, 2002	/ Demonstration of technology to use a reservoir and groundwater and elaboration of related manual.		30	
		3) Technology of irrigation of vegetables, etc.		–	–	–	–	/ Basic irrigation data for vegetables in open field cultures were collected. / Drip-irrigation facilities were installed in green house in the demonstration field.	/ Demonstration of irrigation technology in green house in the demonstration field and elaboration of related manual.		25	/ Efficient integrated technologies for conversation of soils and water resources as non-tillage cropping system will be demonstrated....
		4) Cultivation technology		–	–	–	–	/ 22 farmers(18.6 ha.) in 2001, and 46 farmers(55.5 ha) in 2002 have	/ Annual study	/ Over 30 farmers	30	

		without plowing						seeded by non-tillage cropping / Short courses on technology for sustaining environment like non-tillage cropping system have been given to the students and farmers in San Jose.	of the validity of the rotation of wheat and legumina in non-tillage cropping system / Study of the management system of the agricultural machines for more efficient utilization, because many farmers are interested in non-tillage cropping	accepted non-tillage cropping system - new agricultural technology – in 2002 / As a main technology for sustainable agriculture, the non-tillage cropping system will be established and farmers will be trained by means of the course etc.		
		5) Fertilization technology appropriate for the cultivation		–	–	–	–	/ Soil fertility analysis of all nutrients availability in the soil in non-tillage cropping system	/ Validation of contribution of legume residues on the soil surfaces for improving soil fertility		5	/ Technologies demonstrated in the model regions will be introduced through manuals. / Conferences, training courses and seminaries will be conducted using the equipment and media system, and the technology developed will extend to other regions
		6) Technology to improve the soil by fruits and leguminous		–	–	–	–	/ Soil fertilization rates and nutrients in vineyards, olive, and pistachios in the PECA site using the fertirrigation method			10	
		7) Composted technology with residuals of cultivations			–	–	–		/ Study of organic materials utilization method in greenhouse on horticultural crops		0	

		8) Horticultural production with manure of domestic livestock			–	–	–	/ Experiment in the greenhouse in PECA	/ Study of manure composition in essential nutrients	. Horticultural production with manure of domestic livestock seems difficult, because most of domestic live stock is put out to grass and their manure is not available for use. / The complicated environmental climatic condition of the sector limits the varieties and types of agricultural product that can be cultivated. / No serious problem is presented in the growth of the plants of pistachios, olive trees and grapes	10	
		9) Selection of new crops and cultivating techniques of new crops		–	–	–	–	/ The jojoba plants that grow naturally in the mediterranean unirrigated land of the South America southeast, and also in the northeast of Mexico, the majorities of planted seedlings in the PECA dried off, with approximately 10% of survival, therefore, the test was canceled on this plant. / 4 varieties of pistachios (6 plants each); the 5 varieties (10 plants each) of olive trees and the 3 varieties (50 plants each) of grapes were planted and they are growing in an appropriate way. / A greenhouse has been built (120 m^2) and, they have been introduced and they are being carried out tests on new varieties and cultivations of vegetables.	/ The introduction of new crops will need to be carried out with a rigorous observation of the fundamental rules of selection of appropriate and adaptable crops to the land / An effort of long term is needed for the production of durable crops. / It should be studied to increase the types of profitable agricultural product (vegetables, flowers, peas, etc.) inside the sector.		50	
		10) Cultivating technology of low input and manpower		—	—	—	—	/ In the demonstration field, establishment of system of cultivation of leguminous, cereals, leguminous fodder, cereals like	/ It is sought to elaborate the manual for the evaluation of		20	

		saving labor						wheat, etc., through the system of zero farming was planned. This one comes practicing from the year 2001. / With the bad buds and negative development of the pea cultivated in the 2001 and the bad reproduction of the hualputra (2002), a part of the plan of use of the demonstration field was modified.	the sowing by means of the rotation system. / The only material that can be used in the field is the straw of the wheat. It is necessary to carry out a study to introduce new materials such as sawdust or others. / Technical development is expected for irrigation of fruit plant species.			
		11) Technology of stable production of high quality.		–	–	–	–	/ A greenhouse of 120 m^2 has been built and the development of technology development of high quality production of vegetables like tomato and others are going on. / Using the provided equipment (liquid chromatography of high pressure) it is planned to improve quality of grapes and wines and to create a new brand. .	/ Study the possibility to increase different varieties of agricultural products (vegetables, flowers, leguminous, etc.) that are profitable for the farmers of the area. / increase the precision and efficiency in handling materials. Also, to study the possibility	/ The introduction of the greenhouse in San José where profitable products don't exist, will be an improvement for the sector if the economic resources are obtained as well as irrigations, and access to a market to be able to make the sale.	20	

									of the assignment of the experts of short term.			
		12) Technology of sustainable agricultural production		–	–	–	–	/ Enrichment of the agricultural land is planned by means of the combination of a forestation, forages and small animals in the PECA where pine and other 7 varieties of trees were planted with the method recommended by CONAF. / The same as the section IV-1-10. / The practice of rotation of cultivations with wheat, hualputra and leguminous is carried out.	/ It is necessary to complement plantation since present bad growth of the plants. / When the plants have good growth it needs to be carried out combination of forest, cultivation and pasture for livestock. / The same as the section 4-1-10.		20	
	2. Elaboration of related manual with the conservation of soil and water	1) Study, Plan and evaluation		–	–	–	–	/ The reports from Japanese short term experts were translated into Spanish.	/ To consider the composition of the manual		15	
		2) Irrigation and water resources		–	–	–	–	/ The proposal of table of contents were made / Reports of short-term experts for water resources (groundwater survey and geophysical exploration), small scale irrigation technology and technology to construct a reservoir were translated into Spanish / The 2001 year map of selection of good places for water resources	/ To consider the composition of the manual		20	

							was prepared.				
		3) Soil control		–	–	–	–	/ Some reports about the activity of Japanese experts on soil management were translated into Spanish for the manual as follows. /Soil management / Soil physics /GIS /Soil chemistry /Soil management (long tem expert's activity) /Soil map in Ninhue (2001)	/ To consider the composition of the manual		20	
		4) Agricultural systems and cultivation		–	–	–	–	/ Preparation of table of contents	/ To consider the composition of the manual		15	