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TECHNICAL WORKSHOP ON NON-METALLIC SORBENTS
IN AGRICULTURE AND ENVIRONMENTAL ENGINEERING

Organized by UNIDO and the UNIDO-Czechoslovakia Joint
Programme, Non-metallic Industries, from 19 through
29 September in Pilsen, Czechoslovakia

FINAL REPORT

This report has been prepared by:

Board of Participants in the Technical Workshop

UNIDO-Czechoslovakia Joint Programme,
Non-metallic Industries, Pilsen

1/27

Pilsen, Czechoslovakia

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LIST OF ABBREVIATIONS

1. RICR&MMP Research Institute for Ceramics,
Refractories and Non-metallic Raw
Materials, Pilsen
2. INTIB Industrial and Technological
Information Bank
3. DSA Daily Subsistence Allowance

I. INTRODUCTION

The Technical Workshop on Non-metallic Sorbents in Agriculture and Environmental Engineering was organized by UNIDO Vienna and by the UNIDO-Czechoslovakia Joint Programme, Non-metallic Industries in Pilsen, Czechoslovakia, in co-operation with the Research Institute for Ceramics, Refractories and Non-metallic Raw Materials in Pilsen. This Workshop has been the 20th one organized during the 10 years of the Joint Programme history.

The objective of the workshop was to foster the exploitation of selected non-metallic sorbents in agriculture and for environmental protection in developing countries and to identify the areas of concern for transfer of technologies, technical co-operation and training through UNIDO and the UNIDO-Czechoslovakia Joint Programme, Non-metallic Industries, Pilsen.

The UNIDO-Czechoslovakia Joint Programme, Non-metallic Industries in Pilsen was established at the Research Institute for Ceramics, Refractories and Non-metallic Raw Materials, Pilsen and it has been backed by the companies associated under the Czechoslovak Ceramic Works. It commenced its activities in 1978. The Joint Programme has also been maintaining close contacts with companies producing lime, cement, bricks, glass and other products based on non-metallic minerals.

The Joint Programme provides assistance to developing countries in fostering twinning arrangements between the appropriate Czechoslovak organizations and similar ones in the developing countries in carrying out individual training programmes and in organizing workshops, in testing raw materials together with the related technological research and pilot investigations leading to the selection of appropriate industrial technology. Its staff provides technical assistance to the developing countries during technical assistance missions that regard all technological issues of the development of ceramics, advanced ceramics, building materials

and non-metallic minerals based industries. The Joint Programme also renders technical assistance to developing countries within its programme of energy conservation and management in the application of non-metallic minerals and rocks in agriculture and environmental engineering.

Transfer of technical and scientific information has taken up a very important place in the overall activity of the Joint Programme. The information and publications are distributed through a node of INTIB specialized in non-metallic minerals and energy conservation which is equipped for contacts with external databanks.

II. PARTICIPANTS

21 high-qualified governmental nominees from 12 developing countries took part in the Workshop. Their list is presented in Annex 1.

The Workshop was of great concern for many developing countries, the participants were invited to come under the arrangement of their respective Governments covering the round trip travel expenses and the Joint Programme covering their DSA from the training activities.

Due to the schedule of departure of participants and according to their individual requests those who were in Czechoslovakia after the terminating of the Workshop were provided individual training programmes.

III. LANGUAGE

The programme was conducted in English and the lectures and country reports were typed in English, too.

IV. ORGANIZATION OF THE WORKSHOP

Organization was ensured by the Organizing Committee:

Director of the Technical
Workshop

Programme Director

Mr. A. Lošický, General Director
of the Czechoslovak Ceramic Works,
Prague, guarant of the Joint Pro-
gramme, member of UNIDO-CSSR Joint
Committee for Co-operation
Mr. Z.A. Engelthaler, Chief Engi-
neer of the UNIDO-Czechoslovak
Joint Programme, Non-metallic In-
dustries, Pilsen and

Director of the Research Institute
for Ceramics, Refractories and
Non-metallic Raw Materials, Pilsen

UNIDO Vienna representatives

Mr. Gérard Sartre, Director of
Project Review and Appraisal Divi-
sion, UNIDO

Mr. N.G. Shering, Industrial De-
velopment Officer and Liaison Officer
of the UNIDO-Czechoslovakia Joint
Programme, Non-metallic Industries,
Pilsen

Technical Secretaries

Mr. J. Müller, Senior Expert of
the UNIDO-Czechoslovakia Joint
Programme, Non-metallic Indus-
tries, Pilsen

Ms. B. Engelthalová, Chief of
Administration of the UNIDO-Cze-
choslovakia Joint Programme,
Non-metallic Industries, Pilsen

Co-operators

Mr. S. Hora, Technical Director,
Research Institute for Ceramics,
Refractories and Non-metallic
Raw Materials, Pilsen

Mr. O. Kohnrovský, Director for
Economics and Development, Na-
tional Centre for Ceramics, Refractories
and Non-metallic Raw Materials,
Pilsen

General Rapporteurs

Mr. F. Pecháček, Expert, UNIDO-Czechoslovakia Joint Programme, Non-metallic Industries, Pilsen

Mr. M. Nový, Expert, UNIDO-Czechoslovakia Joint Programme, Non-metallic Industries, Pilsen

Administration,
Information and
Reporting

Mr. J. Zaloudek, Chief, INTIB node UNIDO-Czechoslovakia Joint Programme, Non-metallic Industries, Pilsen

Mr. P. Franče, Expert, UNIDO-Czechoslovakia Joint Programme, Non-metallic Industries, Pilsen

Ms. Ivana Vrzalová, Clerk INTIB node
Ms. A. Eršová, Clerk and
Ms. Z. Zoubková, Clerk, UNIDO-Czechoslovakia Joint Programme, Non-metallic Industries, Pilsen

Board of Participants

Chairman

Mr. Mohand Saïd Ould Ali (Algeria)

Members

Mr. Asnakew Woldeab (Ethiopia)
Mr. Kim Gi Su (Korea P.D.R.)
Mr. Soysa E.S.K. (Sri Lanka)
Mr. C. Fernando Forero (Colombia)

1. Programme of the Workshop

The Workshop concentrated on the integrated exploitation of non-metallic sorbents, especially for agriculture and environmental engineering. Seven lectures were presented by scientists, researchers and professionals from industries and technical universities that focused on various aspects related to the successful introduction of technologies based on non-metallic sorbents. The lectures were governed by considerations guiding to practical and economical applications. The information provided by lecturers was supported by case studies to demonstrate selected technologies and their advantages.

The programme of the workshop comprehended industrial study visits that enabled the participants to compare different ways of applications. The programme focused on sorbent processing, namely bentonite, soil reclamation and improvement and other agricultural uses. A considerable part of practical studies was devoted to the demonstration of cheap methods of different water pollution remedies through bentonite considering the conditions and financial possibilities of small units. The participants were also informed of relevant testing methods to research appropriate technologies of non-metallics integrated exploitation.

The lectures and industrial study visits were completed by round table discussions giving the participants opportunity to exchange their opinions and experience with lecturers, managers and technical staffs in the production plants and institutes visited as well as among themselves.

The programme of the workshop was enriched by the discussions the participants had with Mr. G.R. Latortue and Mr. N.G. Biering, who represented UNIDO. The participants had three round table discussions with Mr. G.R. Latortue who appreciated, on behalf of the UNIDO Headquarters, the UNIDO-Czechoslovakia Joint Programme, Non-metallic Industries, Pilsen, as the best one among all UNIDO Joint Programmes. This achievement and the value of the Joint Programme Pilsen results from the enthusiasm devoted to the work, high quality of output, which are realistic to particular developing countries, and from the interdisciplinary approach to the integrated exploitation of indigenous non-metallic materials and large and complex fields of activities. He also provided the participants with information on the procedures to establish co-operation and get technical assistance from UNIDO (Summary is presented in Annex 3).

The workshop was co-chaired by the Board of Participants who elected the representative of Algeria as their chairman. They collaborated with the Joint Programme staff to prepare the final report.

2. Discussions

The participants enriched their scope of knowledge during the discussions with the representatives who are mentioned in Annex 2.

3. Documentation and Aids

The following documentation and aids were handed over to each of the Technical Workshop participant and UNIDO representative

- Technical Workshop Schedule
- Complete set of seven lectures
- Bulletins and booklets and technical leaflets of the UNIDO-Czechoslovakia Joint Programme, Non-metallic Industries, Pilsen
- Publication on the Research Institute for Ceramics, Refractories and Non-metallic Raw Materials, Pilsen
- Multilingual vocabulary for ceramic industry and non-metallic raw materials
- English-Czech Practical Handbook
- Writing materials and handbook
- Protective helmet for in-plant training
- Cumulative list of Joint Programme publications
- Accident - description of water purification plants

Whenever requested participants were presented samples of products.

4. Lectures Delivered

1. Mr. A. Lošťák: Development of Bentonite Production in CSSR
2. Mr. Z.A. Engelthaler: Integrated Exploitation of Non-metallic Sorbents
3. Mr. J. Kačín: Non-metallic Sorbents in Environmental Engineering

4. Mr. J. Stoklasa: Ecological Planning
5. Mr. J. Petr: Agricultural Applications of Selected Industrial Minerals
6. Mr. J. Kuřvart: Prospecting and Evaluation of Bentonite Deposits
7. Mr. J. Müller: Economic Aspects Related to Agricultural and Environmental Applications of Industrial Minerals

5. List of Locations of In-plant Trainings

Interdisciplinary Approach for the Exploitation of Non-metallic Sorbents	UNIDO-Czechoslovakia Joint Programme, Non-metallic Industries, Pilsen
Application of Sorbents in Agriculture	State Farm Křimice
Practical in-plant training in bentonite dressing	North Bohemian Ceramic Works, Obrnice
Non-metallic in environmental protection and recultivation	Coal Mining Area, Most
Exploitation of non-metallic sorbents and bentonite application for waste water disposal	Research Institute for Ceramics, Refractories and Non-metallic Raw Materials, Pilsen and its division in Karlovy Vary
Application of bentonite to clean oily waste water	Waste Water Disposal Plant in Pizeň
Feldspar upgrading plant and recultivations	CALCFRIG Borovany
Preservation of Landscape and Biosphere	National Parks of South Bohemia
Application of bentonite to separate oil emulsion from water	Waste Water Disposal Plant Prague
Soil Evaluation and Classification	State Agricultural Testing Institute Pizeň

5. Presentation of Country Reports

Distinguished participants delivered country reports describing the actual and development situation in the field of geologic reserves, extraction and upgrading and application of locally available non-metallic sorbents in their countries. The country reports from Ethiopia, Hungary, Algeria, ^{Spain} and Colombia were of special interest as some of them were based on the Joint Programme Pilsen previous activities. All participants agreed that the Joint Programme Pilsen will edit the country reports as its official publications.

V. ADMINISTRATIVE ORGANIZATION OF THE PROGRAMME

1. Administrative work

Administrative staff was engaged in organizing and arranging lectures, plant visits in factories and in the Research Institute, accommodation arrangements, local transport, social events, providing of visas and air tickets booking, etc.

2. Secretariat and Audience Room

The Secretariat of the Workshop was established in the premises of the UNIDO-Czechoslovakia Joint Programme, the Audience Room in the URAI hotel in Pilseň.

VI. EVALUATION BY THE PARTICIPANTS

This workshop offered the opportunity for the participants of 12 countries to share their experience and to upgrade their knowledge as the technologies and know-how demonstrated during the workshop programme guide to the industrial development through the integrated exploitation of indigenous non-metallic minerals and rocks considering the agriculture and environmental protection.

The contribution of Czechoslovak industries in this Programme was very significant. The participants appreciated the high standard of research and technology in industries in Czechoslovakia. The participants were able to discuss in institutions visited the problems related to their home practice and concern. The participants recognized that the information gained during the visits, lectures and round table discussions will help in their further activities in their home countries.

Following visits to the Research Institute for Ceramics, Refractories and Non-metallic Raw Materials, Pilsen and factories of the Czechoslovak Ceramic Works the participants desired for further co-operation with the UNIDO-Czechoslovakia Joint Programme, Non-metallic Industries, Pilsen in the field of training, testing and evaluation of non-metallic sorbents for agricultural application, waste water treatment and environmental protection applications and assistance in establishing laboratories, research facilities and production units in their home countries.

The participants in the workshop presented some individual requests and recommendations related to the need of their respective countries.

The participants expressed their gratitude to UNIDO and the Joint Programme, Pilsen for arranging this workshop in Czechoslovakia where the authorities are very generous in sharing their knowledge and experience. The participants highly appreciated especially extended by the organizers to arrange for extra visits of plants according to their individual concern and requests.

They were thankful to Dr. A. Dobiš, General Director of the Czechoslovak Ceramic Works and Director of the Workshop, for his active part in the Programme and for his permission to visit the Ceramic Works.

They greatly appreciated the role of Mr. Z. H. Anguinaler, Director of the Research Institute for Ceramics, Refractories and Non-metallic Raw Materials and Chief De-

cutive of the UNIDO-Czechoslovakia Joint Programme, Non-metallic Industries, Pilsen, for well prepared programme and his personal involvement in various activities. They further appreciated his part in the round-table discussions.

The participants expressed their gratitude to Mrs. E. Engelthalerová, Chief of Administration, and Mr. J. Müller, Senior Expert and to the other staff members of the UNIDO-Czechoslovakia Joint Programme, Non-metallic Industries, Pilsen, who were always helpful and contributed to the success of the workshop.

VII. CONCLUSIONS AND RECOMMENDATIONS

1. Participants appreciated very much the round table discussions with Mr. G.R. Latortue and Mr. N.G. Biering. Special attention was paid to the mechanism of creation of new UNIDO projects which are being requested by the majority of the representatives of the participating countries such as Suriname, Algeria, Ethiopia, Iraq, Egypt, Cuba, P.D.R. of Korea.
2. Upgrading of Knowledge in Developing Countries in Industrial Mineral Sector

Non-metallic minerals and rocks play an important role among the industrialization plans and projects of developing countries. International co-operation and technical assistance to promote the development of industrial minerals sector is needed.

UNIDO and the UNIDO-Czechoslovakia Joint Programme, Non-metallic Industries, Pilsen, should:

- a) arrange regular workshops and seminars at regional and interregional level specialized on one mineral alternating with workshops devoted to broader technological problems annually. The participants recommended that those workshops should be also organized in developing countries (in the co-operation with the UNIDO

and the Joint Programme) in which facilities and capabilities for such arrangements are well established, such as Algeria.

Aide memoires of seminars are recommended to describe in detail the programme to facilitate the nomination procedure with reference to the topic of specific activities in geology research, mining extraction, mineral upgrading etc. In future this can be a base for specialized discussions in the seminars. It is considered desirable that these discussions concentrate on specific problems as presented by participating countries pending on time available.

- b) review the status of this industry in developing countries in view of its constraints related to:
- planning
 - technology
 - financing
 - manpower
 - environmental protection
 - role of research and development centres and non-governmental organization in the development of non-metallic minerals based industries.
- c) continue editing technical publications focused on particular minerals, particular plant profiles and other issues as requested by developing countries. These indigenous publications will be distributed through the INTIB node, Pilsen, which can also edit and distribute titles presented by the scientists, researchers and professionals from developing countries who may have concern. Some participants in the workshop presented the works for publishing through the INTIB node. On the other hand, they may requested Joint Programme publications in the amounts of 30 - 110 titles each.

The participants desire that the Joint Programme, Pilsen technical publications may be made available to the R + D organizations through UNDP offices in the

productive developing countries.

- d) continue cascading new audiovisual programmes focusing on particular problems related to the industrial minerals so that training process in their national centres could be upgraded. The participants found the presented audiovisual programmes interesting and useful and requested OXIBO and Joint Programme, Pilsen to provide copies for their national centres.

3. Integrated Exploitation of Non-metallic Sorbents

In promoting the appropriate exploitation of non-metallic minerals industries the requirements of the user industries, e. g. building materials industry, paper, glass, rubber, cosmetics, ceramics, refractories, foundry, should be carefully examined and governments should take necessary measures to ensure the proper utilization of locally available raw materials including the measures taken to lower the waste during mineral processing which will contribute considerably to economic results and environmental protection. In this respect it is recommended that inventory studies be conducted and industrial directories be prepared and made available to the users. An important part of the exploration process is the characterization of the raw materials. The participant recognized the work that the Joint Programme carried out in testing non-metallic raw materials for developing countries and welcomes any possibilities of extending this activity through a new OXIBO project.

Non-metallic minerals and rocks functioning as sorbents may successfully be applied in agriculture to enhance the yield of deficient soils and for wastewater disposal. To promote the application of those minerals in developing countries the following is recommended:

- establishment of an Association of Non-metallic Sorbents Experts under the Guidance of the Joint Programme, Pilsen
- establishment of a group of consultants to assist developing countries in this field
- organization of group training programmes
- publishing activities, dissemination of new technical information

4. UNIDO technical assistance and further co-operation with the Joint Programme, Pilsen

Evaluating the capability of the Joint Programme, Pilsen, representatives of participating countries expressed conclusions and requests for further co-operation. They recommended that their requirements should be respected by the Joint Programme, Pilsen and UNIDO Headquarters in further activities and planning.

Some of participants will investigate the opportunity for applying to UNIDO for the formulation of new UNIDO technical assistance projects related to the integrated industrial exploitation of non-metallic raw materials in their respective countries. To facilitate the project approval the project concept should be presented as in Annex 3.

5. All participants have requested UNIDO to develop a special fund to finance individual co-operation among the experts of developing countries. The experts have the opinion that the workshop was a very good opportunity for experts from developing countries to co-operate and discuss about their problems. They suggest that this co-operation may be updated when the experts have the opportunity for individual co-operation in the frame of the above Association of Non-metallic Sorbent Experts. This fund should create the facilities to finance the travel and living cost during their experts meetings to solve their problems.

LIST OF PARTICIPANTS

UNIDO Vienna Representatives:

Mr. Gérard R. Latortue, Director of Project Review and Appraisal Division

Mr. N. G. Biering, Industrial Development Officer and Liaison Officer of the UNIDO-Czechoslovakia Joint Programme, Non-metallic Industries, Pilsen

List of Participants

1. Mr. Mohand Saïd Ould Ali
Technical Director
Ministry of Industry, E.N.O.F.
Alger
Algeria

2. Mr. Mahadew Dewanand
Mining Engineer
Ceramic Development and Training Centre
Stefanootstraat No. 13
Zorg en Hoop
Paramaribo
Suriname

3. Mr. Sarath Kamalasinghe Soysa
Research Officer
Ceylon Ceramic Corporation
Piliyandala
Sri Lanka

4. Mr. Carlos Fernando Forero
Chemical Engineer
Consortio Technologico
Calle 16 No. 9-46
Bogotá Colombia

5. Mr. Stjepan Puskarić
Senior Engineer of Research and Development
INA - Petrokemija
Kutina, Jugoslavia
6. Mr. Dr. Zsigmond Varga
General Director
Agroinnova
5000 Szolnok, Ady-EV 6-8 , Hungary
7. Mr. Dr. László Lafferton
Director of Production
Agroinnova
5000 Szolnok Ady-EV 6-8 , Hungary
8. Mr. Zubek Lajos
Chief Adviser
Agroinnova
K - 5001 Szolnok Ady-EV 6-8 , Hungary
9. Mr. Kim Sung Jo
Deputy Director State Commission of
Science and Technology , Korea P.D.R
10. Mr. Li Hong Je
Engineer of plant
Construction material factory , Pyongyang, Korea P.D.R.
11. Mr. Kim Gi Su
Chief of Faculty Construction College
Dean of Pyongyang University Construction
Pyongyang, Korea P.D.R.
12. Kim Chung On
Engineer of plant
Pyongyang, Korea, P.D.R
13. Mr. Yahia Kahloune
Director of the Bentonite Plant
ENOF - 31 Rue Mohammed Hattab
Belfort - El Harrach
Algeria

14. Mr. Asnakew Woldeab
Head of Division of Soil and Water Management
Institute of Agricultural Research
P.O.Box 2003, AA, Ethiopia

15. Mr. Jorge Alberto Febles González
Agricultural Engineer
Soil Institute Carretera Antigua de Vento
km 8 1/2 Capdevila
Ciudad de la Habana
Cuba

16. Mr. Mohamed Lantour
Chief of Regional Soil Department
PB 130
7000 Bizerte
Tunisia

17. Mr. Raad Omar Salih
Scientific Researcher
Scientific Research Council
P.O.Box 2416
Baghdad, Iraq

18. Mr. Samir Abdel Aziz
Researcher
Soil and Water Research Institute
Agriculture Research Centre
Elgamaa Street
Giza
Arab Republic of Egypt

19. Mr. Mohamed Abdel Naim
Associate Professor
Soil and Water Research Institute
Agriculture Research Centre
Elgamaa Street
Giza
Arab Republic of Egypt

20. Mengesha Molla Miretu
Head of Community Forestry
Addis-Bah Forestry Development Project , P.O.B 2220
Addis Ababa, Ethiopia

21. Mr. František Karčoš
Director
Agrochemical Enterprise
Rožňava, CSSR

LIST OF REPRESENTATIVES DURING DISCUSSIONS

- UNIDO Vienna
- Mr. Gérard R. Latortue
Director of Project Review and Appraisal
Division
 - Mr. N.G. Biering, Industrial Development
Officer and Liaison Officer of the UNIDO-
Czechoslovakia Joint Programme, Non-metal-
lic Industries, Pilsen
- CSSR
- Mr. A. Lošťák, General Director of the
Czechoslovak Ceramic Works, Prague
 - Mr. Z.A. Engelthaler, Chief Executive of
the UNIDO-Czechoslovakia Joint Programme,
Non-metallic Industries, Pilsen and
Director of the Research Institute for
Ceramics, Refractories and Non-metallic
Raw Materials, Pilsen
 - Ms. E. Engelthalerová, Chief of Administra-
tion, UNIDO-Czechoslovakia Joint Programme,
Non-metallic Industries, Pilsen
 - Mr. M. Kužvart, Professor, Department of
Mineral Deposits, Faculty of Natural
Sciences, Charles University, Prague
 - Mr. J. Petr, Director, Agricultural State
Farm, Křimice
 - Mr. J. Dlouhý, Chief, Dept. of Dept. of
Horticulture, State Farm, Křimice
 - Mr. J. Fröhlich, Director of Bentonite
Plant, Northbohemian Ceramic Works, Most
 - Mr. M. Hladědek, Chief of Laboratory
Department, RICRMP, Division at Karlovy
Vary

- Mr. J. Smrž, Senior Research Officer
RICRRMP, Division at Karlovy Vary
- Mr. V. Šebek, Senior Research Officer,
RICRRMP, Division at Karlovy Vary
- Mr. J. Kačín, Chief of Research Department,
RICRRMP
- Mr. V. Procházka, Director, North
Bohemian Ceramic Works
- Mr. Viliam Toman, Deputy Director, Bentonite
Plant, Obrnice
- Mr. J. Slabý, Technologist, Bentonite
Plant, Obrnice
- Mr. J. Dolžal, Assistant to the General
Director
- Mr. Zdeněk Reska, Chief of the Production
and Technical Department, North Bohemian
Brewery, Most
- Mr. S. Mikyska, Director, Calofrig,
Borovany
- Mr. F. Bumba, Chief Technologist, Calofrig
Borovany
- Mr. J. Müller, Senior Expert, UNIDO-
Czechoslovakia Joint Programme, Non-
metallic Industries, Pilsen
- Mr. P. Franče, Expert, UNIDO-Czechoslovakia
Joint Programme, Non-metallic Industries,
Pilsen
- Mr. M. Nový, Expert, UNIDO-Czechoslovakia
Joint Programme, Non-metallic Industries,
Pilsen
- Mr. F. Pecháček, Expert, UNIDO-Czechoslo-
vakia Joint Programme, Non-metallic
Industries, Pilsen

- Mr. J. Zaloudek, Chief INTIB Node, UNIDO-Czechoslovakia Joint Programme, Non-metallic Industries, Pilsen

Project Development (Main Guidelines)

1. Justification and Background Informations

2. Objectives - Long term and development objectives
- Immediate objectives

3. Inputs

a. national input, i. e. from Government, or Privat
enterprise or from co-operatives

b. UNIDO input

b 1. International consultants, need expressed in W/m
(working months)

b 2. Training - domestic
- abroad

Content of training programme

- what field

- duration

- cost of training with breakdown per person and
per months

b 3. Equipment

testing equipment or pilot plant

b 4. Miscellaneous

4. Outputs

For each input what will be the output

5. Activities of the Project

to be defined according to objectives, inputs and the real
need. UN Authorities will select the best way and place
for each country. If very specific request, as an exemp-
tion, will be submitted, it must be explained and jusvi-
fied.

6. Budget

Costs of different inputs are evaluated and covered
by:

6.1 Governmental contribution

- in kind
- in US Dollars contribution shows good will and interest, cost sharing

6.2 UNIDO contribution in US Dollars

Project Development Administration

The project concept or proposal to be submitted through the Governmental contacting office,

original to UNDP

copies to UNIDO SIDFA (if established) and to UNIDO,

att. Mr. G. R. Latortue

Director

Project Review and Appraisal Division

UNIDO

P. O. Box 400

A - 1400 V i e n n a

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Telephone 2631, extension 3350