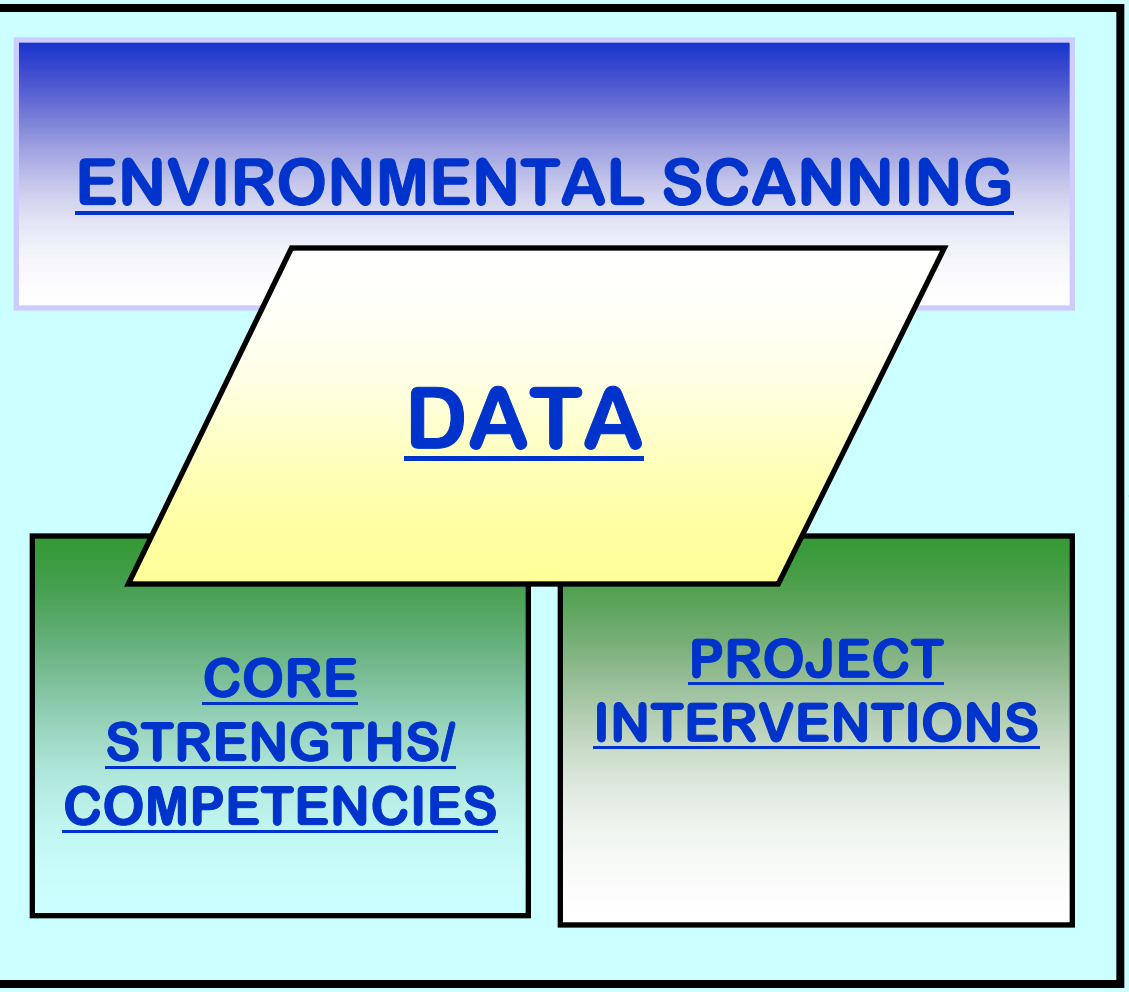
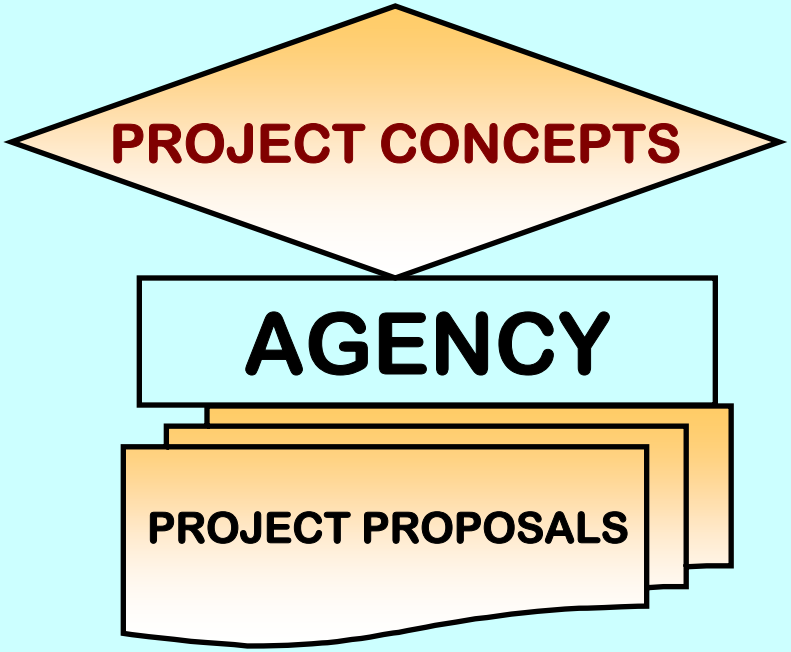
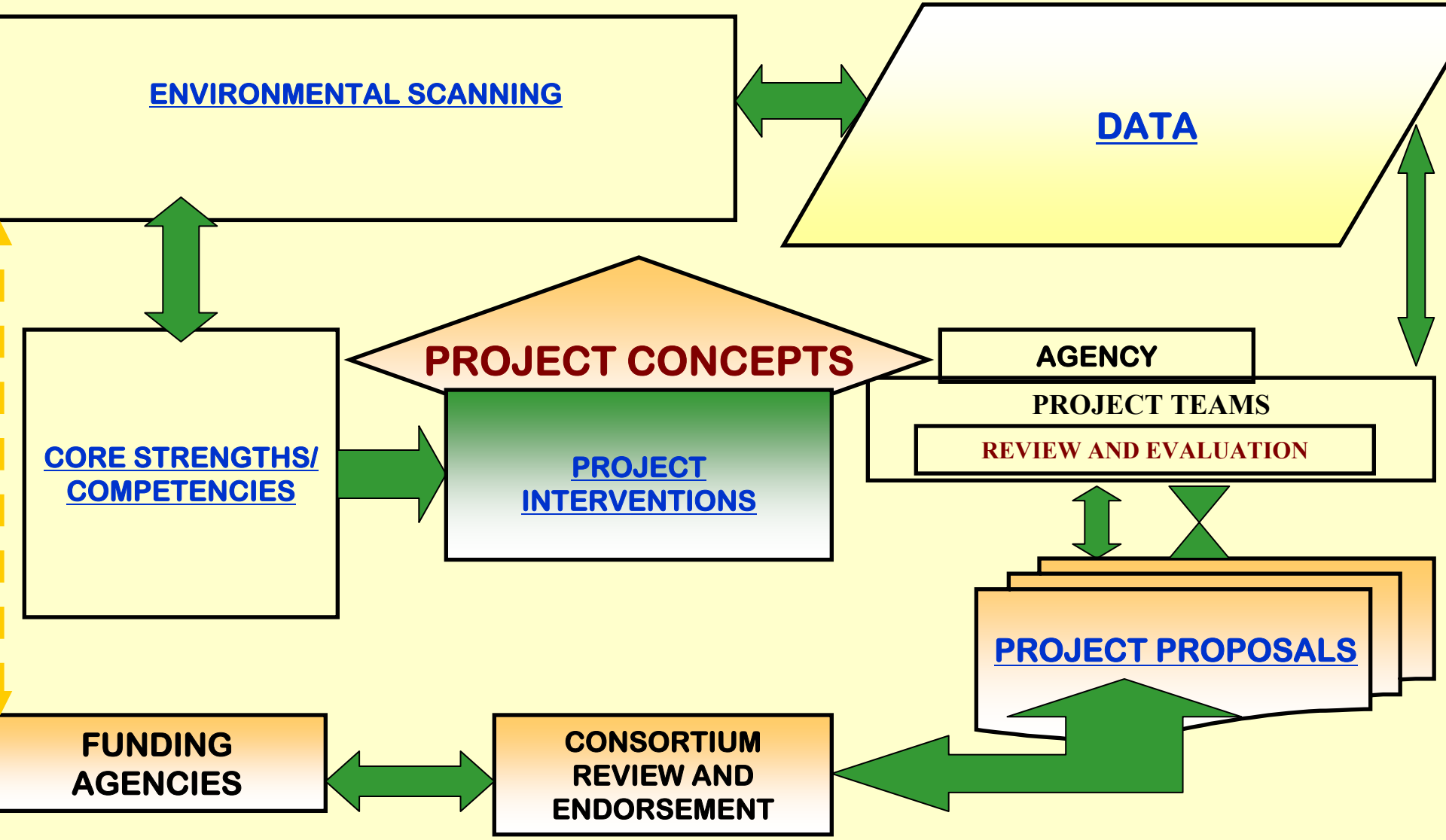




BASIC ELEMENTS NEEDED FOR PROJECT CONCEPTUALIZATION AND DEVELOPMENT

@RQD

POSSIBLE GUIDE ON PROJECT CONCEPTUALIZATION AND DEVELOPMENT



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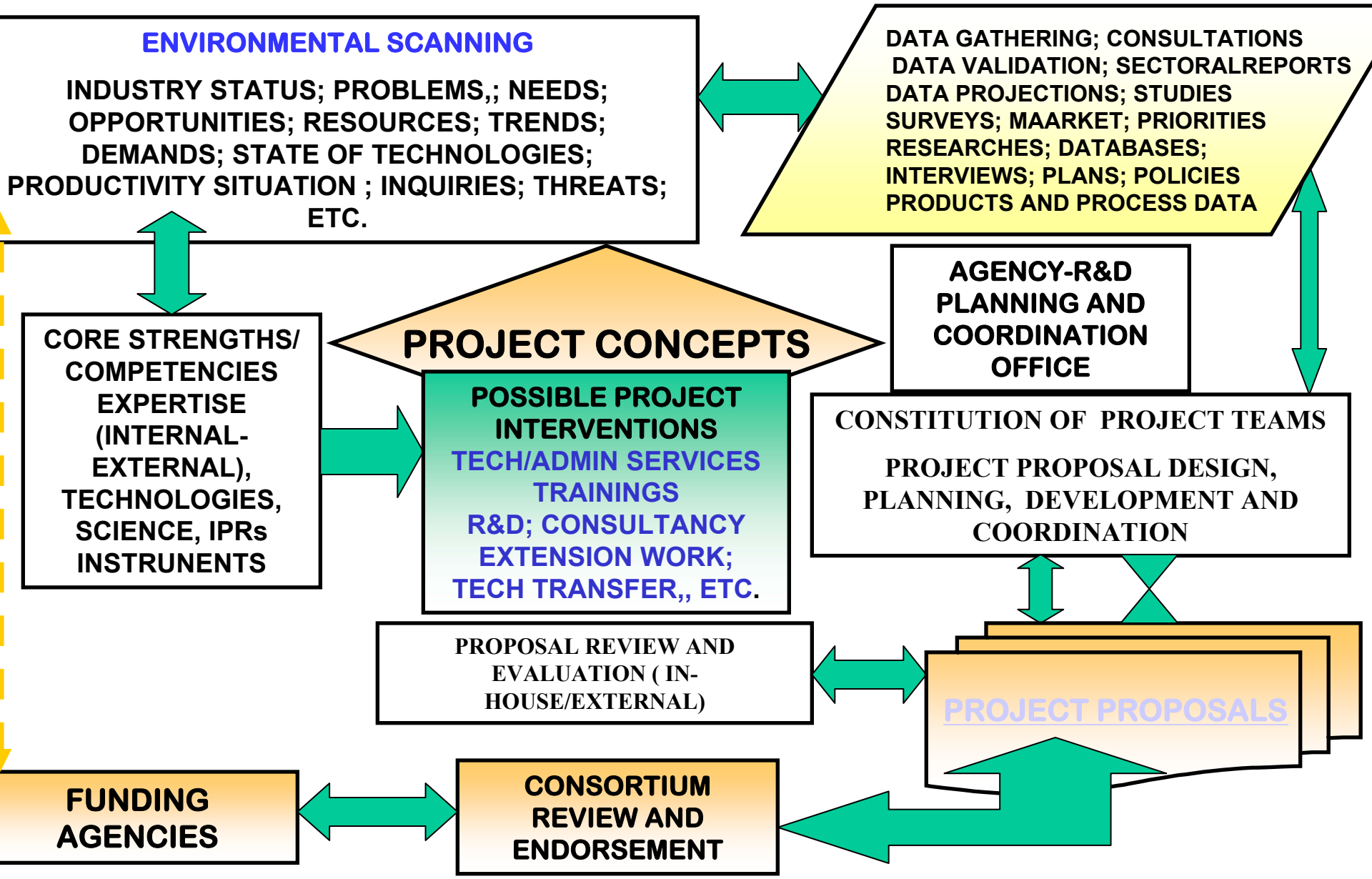


Thank you for your kind attention!

CAPSULE PROJECT PROPOSAL FOR FINANCIAL ASSISTANCE

ASSISTANCE CAPSULE PROJECT PROPOSAL FOR FINANCIAL

I .TITLE: BENEFICIATION OF PHILIPPINE FELDSPAR FOR THE CERAMIC AND GLASS INDUSTRY

II. STATUS OF THE FELDSPAR INDUSTRY

Feldspar is the general term designating a group of closely related minerals, especially abundant in igneous rocks and consisting essentially of aluminum silicates in chemical combination with varying proportions of one or more bases, one of which usually predominates and characterizes the particular type of mineral. Potash feldspar, soda feldspar, and lime feldspar are the most common varieties.

Feldspar is a useful constituent of glass, fired clay products, and enamels, that promotes fusion during firing and imparts strength, toughness and durability in the finished products.

In glass batches it brings alumina, together with the accompanying alkalies into the melt. The added alumina enhances the workability of the molten glass and improves the finished product by giving it better chemical stability and inhibiting any tendency towards devitrification. This increased workability facilitates the operation of automatic machines for shaping jars and bottles, materially reducing the spoilage ratio. Greater chemical stability broaden the usefulness of the containers.

Feldspar is used in ceramic mixtures mainly as a flux. In these mixtures it fuses at a temperature below the melting point of most other ingredient so that, besides entering with them into complex physical and chemical reactions, it also performs as vitreous binder to cement together the particles of the various crystalline substances present.

As for other uses, feldspar serves advantageously in mild abrasives and scouring soaps. In the purest grade it finds applications in the making of artificial teeth.

With the possible exception of clay, feldspar is the most essential ceramic material in the whiteware industry. Table 1 outlines the amount of feldspar used in common types of pottery bodies.

TABLE 1.Amount of feldspar used in common ceramic bodies

TYPE	AMOUNT (%)
Sanitary ware	25 - 35
Hotel China	15 – 35
Chemical Porcelain	15 – 30
Electrical Porcelain	30 – 50
Whiteware	15 - 30
Floor and Wall Tile	10 – 55

Feldspar for glass making usually is ground no finer than 20 mesh. It is added to the extent of 1.8% to 2.5% in the glass manufacture.But by the sheer' volume and diversity of glass products produced, it is estimated that more than half of the world's production of commercial feldspar is used in the manufacture of glass.

Resource Availability

All feldspar mines in the Philippines are open-pit or quarrying operations, which entails some landscape disruption and potential land-use conflicth.. Ironically, the country's deposits of high grade feldspar that require no treatment other than hand cobbling to bring it to usable grades are relatively very few, and are now virtually exhausted.

The decreasing availability of high grade feldspar coupled with the expanding utilization by the industry, stimulates a search for better methods of extracting commercial grade feldspar from low grade feldspar deposits, which the Philippines has almost unlimited quantities to boast of

As of December 31, 1981, Philippine feldspar* reserve stood at 30,038,237 metric tons with Ilocos Norte comprising 80% of the total reserves. The reserve by provinces are as follows:

Province	Metric Tons
Bulacan.....	500,000
Cebu	9,966
Ilocos Norte	 24,013,401
Iloilo	... 2,000
Lanao del Norte	13,000
Nueva Ecija	..3,265,670
Occidental Mindoro	..2,234,000

Source: Philippine Non-Metallic Ore Reserve; BM0

TABLE 3. Existing domestic supplier of unbeneficiated feldspar

F.A. Aguinaldo Feldspar Mines..... .	Ilocos Norte
G.V. Alvano Feldspar Mines.....	Ilocs Norte
Pansian Minerals.....	Ilocos Norte
Ventura, Cesar A. Claims	Ilocos Norte
Alwen Minerals and Industrial Corp.....	Nueva Ecija
RepublicGlass Corp.	Nueva Ecija
Legaspi, Nestor Claim	Cebu

Source: Mineral News Services, Nos. 75-78; BMG

Although the Philippines is endowed with an abundance of this mineral, they are nevertheless generally of poor quality compared to commercially imported feldspar. Table 4 shows the chemical composition of unbeneficiated feldspar.

Assuming 80% mineability and at the present rate of local production shown in Table 2, it is estimated that the feldspar reserve could well last for more than 1,400 years.

TABLE 2. Local production of unbeneficiated feldspar**

Year	QTY. (Kg)	P (Value)
1983	25,213,000	15,127.800
1982	15,213,000	3,738,186
1981	15,999,000	4,860,587
1980	15,925,000	4,340,483
1979	16,848,000	3,659,060
1978	18,073,000	3,272,335
1977	15,073,000	2,475,971

The recorded production figures for unbeneficiated feldspar are supplied by the major suppliers listed in Table 3.

TABLE 4. Chemical Composition of Unbeneficiated Feldspar

SiO2	66-76
$Al_2 6_3$	14-22
$Fe\ 0_3$	0 -.5
Ca ~	nil
Mg 0	nil
MaO2	6-8
L0²I	1 – 3

Soda-feldspar, soda-lime feldspar and soda-Potash feldspar are the varieties available in the country. These are used in the manufacture of assorted types of ceramic wares and glass products.

Supply and Demand

Even if the country is a producer of feldspar, which is a vital commodity in the ceramic and glass industry, large quantities of high quality feldspar are being imported to blend with locally produced feldspar

The apparent local demand for feldspar is estimated annually at 46,520 MT, forty eight (48) percent of which are utilized by the glass manufacturing industry and the remaining fifty-two (52)percent by the ceramic manufacturing industry.

On the other hand, the total local production of feldspar for ceramics and glass manufacturing is estimated at 25,213 MT/year. The main reason for the very low production of feldspar is that the local producers have been resorting to "selective mining" due to the generally poor quality of the local feldspar deposits. As a consequence of this, high-quality feldspar deposits are being depleted at a relatively faster rate.

The deficiency between the local production of feldspar and the local demand for it could easily be supplied by importation of high-quality feldspar. Thus, the industry, particularly ceramic,is dependent to a great extent on the imported material.

Moreover, due to the unprecedented increase in importation cost of this vital raw material coupled with the tight dollar situation of the country, prompted these industries to find ways of limiting importation. Various blends of imported and local materials have been formulated. In any case, the quality of products is sacrificed to a certain degree. The total demand accounted for imported feldspar is summarized in Table 4.

TABLE 4. Importation of Beneficiated Feldspar*

Year	(kg) Qty .	PValue
1982	1,855,048	2,658,207
1981	5,175,549	4,046.509
1980	3,021,919	2,584,360
1979	3,354,030	2,468,793
1978	2,940,119	2,016,161
1977	2,967,801	1,781,086

Notably, due to the significant difference between the price of local good quality feldspar (?600.00/MT) and imported feldspar (`?2,200.00 - P3,000.00/Mr), a number of ceramic manufacturers had expressed their alarm and readiness to utilize local feldspar as substitute provided that their product specifications are attained. The product specifications aimed by the project will be essentially patterned to or basically the same as the specifications of the imported Italian Feldspar. Table 5 lists the chemical composition of the imported mineral. For more additional impact to the industry, the bench scale beneficiation study will procure samples from existing major supplies located at Ilocos Norte as identified earlier in Table 3.

TABLE 5. Chemical Composition of Italian Feldspar**

SiO2	66-62%
Al_{2O3}	20.00%
$Fe\ 0_3$	0 –0.3%
CaO ~	nil
Mg 0	nil
Na2O	0 .66%
L0I	0.66%

Source: Foreign Trade Statistics, NCSO ** Source: Fil-Hispano Ceramics Inc.

Industrial Prospects

At present there are seven (7) active glass container factories, one (1) flat glass container factory, one (1) glass and bulb making plant and one (1) fiber glass container factory not to mention the small hand-shops that make varied tablewares. The total capacity of the glass industry as reported by BOI is 469,000 metric tons/annum.Therefore, the benef iciated feldspar requirement can be estimated at 31,892 MT, if 68 kg of feldspar is used to produce one ton of container glass, then this would amount to P70M/annum.

There is also a big demand for feldspar in the ceramic industry especially with exports projected to go up to $40 million annually. In 15 years (according to exports at the Ministry of Trade and Industry's Center for International Trade Exhibitions and Mission's program to upgrade export products) the country can be among the important ceramic producers in the world. The ceramic manufacturer is composed of (1) sanitary ware manufacturer, six (6) tile makers, four (4) dinnerwares factories, one (1) electrical ceramic producer and one-hundred four (104) pottery/artware factories. Due to lack of raw materials most of the factories operate at 60-70% capacity. If the factories operate at 90% capacity it is estimated that the feldspar requirement of the ceramic industry would amount to 39,780 MT/year valued at more than P87 M/year.

These only goes to show that current and future demands indicate an increasing trend for feldspar. However, it is ironical that aside from San Miguel Brewery which is beneficiating feldspar for its bottling plants using dacitic sands, no beneficiation is presently being done for other major sources of feldspar, notably feldspar in kikes and magmatic segregation zones and feldspar in acidic plutonic intrusives. Thus, it is hightime that efforts aimed at beneficiating local feldspar deposits be considered. In this way importation of this vital mineral will be eliminated and the resulting surplus can be a potential generating income from export.

IV. OBJECTIVES:

1. To characterize the various feldspar deposits for use in the ceramic and glass products

2. To establish an economical process for beneficiating local feldspar deposits to produce the suitable chemical composition and granulation needed by the ceramic and glass manufacturers

V. DURATION: One Year

.VI TECHNICAL DESCRIPTION/ACTIVITIES:

Among the different raw materials for ceramic and glass manufacturing, feldspar constitutes the biggest bulk of material imported by the industry. The emphasis of the project is on quality upgrading of low-grade feldspar deposits to the specifications of imported feldspar.

The local feldspar have a high iron content and also contains , a considerable amount of organic matters as reflected in its LOI. These organic matters cause excessive deformity and discolorationduring firing of co-ramic and glass products. The project will consist of (1) characterization of the ores, (2) determination of the most economical process of beneficiation to produce high quality feldspar. The first part would involve chemical and physical testing using standard laboratory testing procedures. Four methods of beneficiation process will be examined namely: a) gravity method of concentration, b) magnetic separation, c) electrostatic separation, and d) concentration by flotation. The study will look into the two most promising feldspar deposits namely: the Pasuquin deposit located at Ilocos Norte and the Gabaldan deposit situated at Nueva Ecija, Figure 1 illustrates the steps to be undertaken on the project.

.IMPLEMENTING AGENCY: Bureau of Mines and Geo-Sciences

.BUDGETARY REQUIREMENTS:

	PCIERD Assistance	BMG Counterpart
Personal Services	P51,600.00	P107, 460.00
Maintenance and Other Operating Expensses	148,400.00	-
	P200,000.00	P107, 460.00

Figure I SCHEMATIC DIAGRAM OF THE BENEFICIATION STUDY FOR FELDSPAR MINERALS

CRUDE FELDSPAR

PETROGRAPHIC ANALYSIS

X-RAY DIFFRACTION SCREEN ANALYSIS CHEMICAL ANALYS

MAGNETIC SEPARATION GRAVITY METHOD OF CONCENTRATION ELECTROSTATIC SEPARATION

FLOTATION METHOD OF SEPARATION

FELDSPAR CONCENTRATE (FINAL PRODUCT)

GANTT CHART

BENEFICIATION OF PHILIPPINE FELDSPAR FOR THE CERAMIC AND GLASS

SCHEDULE OF ACTIVITIES PERIOD OF ACTIVITY (MONTHS)

ACTIVITIES 1 I 2 I 3 I 4 I 5 I 6 I 7 I 8 I 9 I 10 I 11 I 12

A. Sample procurement & Preparation

B. Mineralogical Analysis

C. Beneficiation Tests

.X-ray Diffraction

.Petrographic Analysis

.Sizing Tests

Chemical Analysis

1 .Heavy Media Separation

2. Jigging

3. Tabling

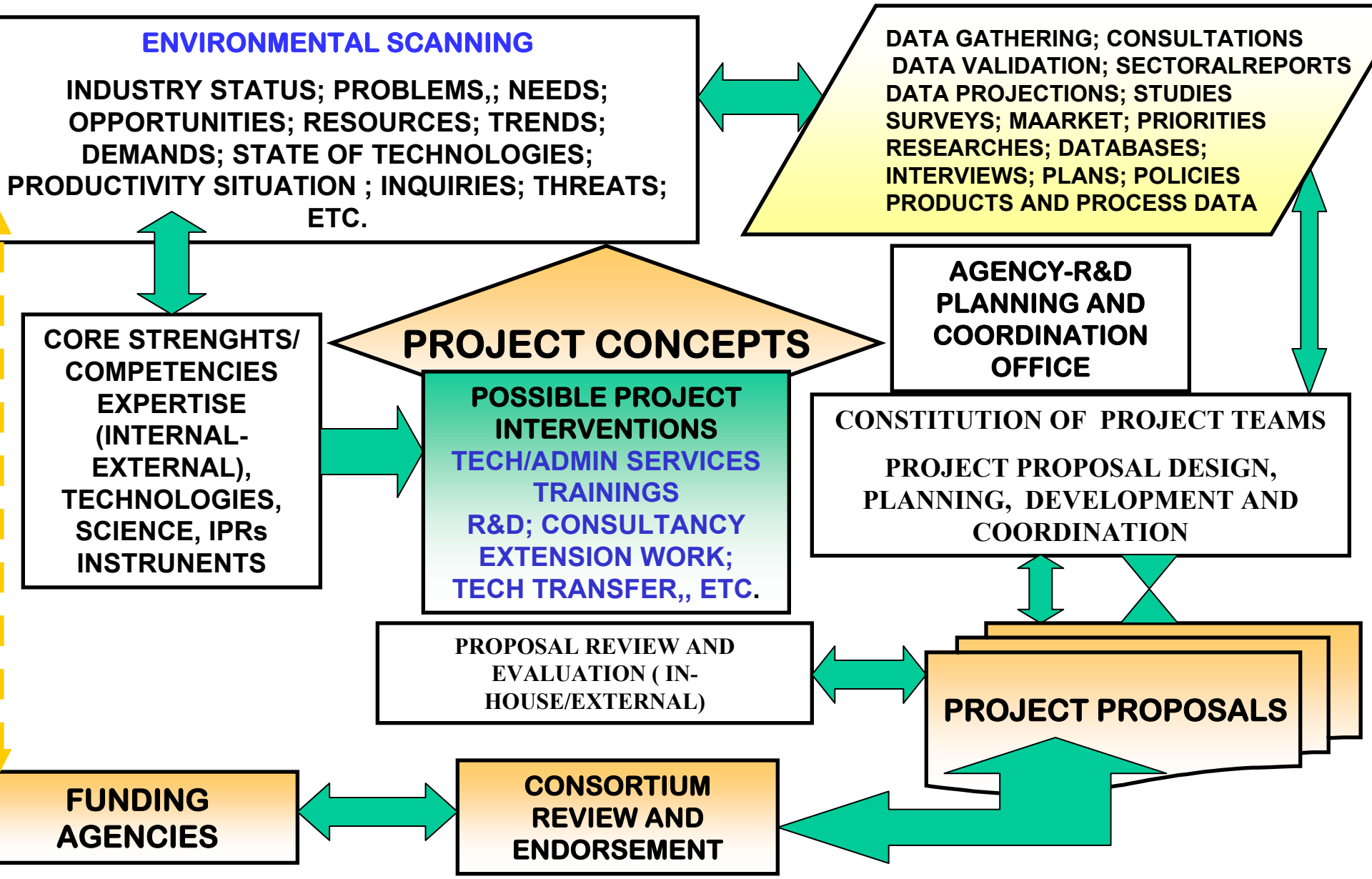
4. Magnetic Separation

5. Electrostatic Separation

6. Flotation

D. Preparation& Submission of Report

POSSIBLE GUIDE ON PROJECT CONCEPTUALIZATION AND DEVELOPMENT



ENVIRONMENTAL SCANNING

- RESOURCES AVAILABLE
  - COMPETITIVE ADVANTAGE
  - UNIQUE/SPECIAL RESOURCES
  - CURRENT AND POTENTIAL RESOURCES
- OPPORTUNITIES AND THREATS; ETC
  - EMERGING TRENDS AND MARKETS
  - STATE OF TECHNOLOGIES
  - EXPERTISE AND FACILITIES
- INDUSTRY STATUS AND PERFORMANCE
  - PRODUCTIVITY SITUATION
  - TECHNICAL PROBLEMS
    - CURRENT AND FUTURE NEEDS AND DEMANDS
    - PRODUCT CHARACTERISTICS (QUALITY, ETC.)
  - INQUIRIES

DATA AND INFORMATION

- DATA GATHERING; CONSULTATIONS
- DATA VALIDATION
- AVAILABLE STATISTICS
- SECTORALINDUSTRY REPORTS
- DATA PROJECTIONS; STUDIES
- SURVEYS AND MARKET REPORTS
- PROGRAM PRIORITIES
- RESEARCHES; DATABASES;
- INTERVIEWS; PLANS; POLICIES
- INDUSTRY PRODUCTS
- TECHNOLOGIES AND PROCESS DATA

CORE COMPETENCIES

- **Those combinations of complementary knowledge and skill bases that are difficult for competitors to imitate;. Embodied within the firm's personnel, within the technical and managerial systems and are shaped by the firm's culture**
- **a bundle of skills and technologies rather than a single discrete skill or technology that enables an organization to deliver value by providing a particular benefit to the customer**
- **the knowledge set that distinguishes and provides a competitive advantage and that differentiates an organization strategically**
- **THE BUNDLE OF FIRM-SPECIFIC KNOWLEDGE, SKILLS, TECHNOLOGICAL CAPABILITIES AND ORGANISATION THAT FORM THE BASIS OF THE FIRM'S ABILITY TO CREATE VALUE IN WAYS THAT OTHER COMPETITORS CANNOT DO SO EASILY**

STATUS OF THE CERAMIC/FELDSPAR INDUSTRY

Among the different raw materials for ceramic and glass manufacturing, feldspar constitutes the biggest bulk of material imported by the industry.

total local production of feldspar for ceramics and glass manufacturing is estimated at 25,213 MT/year. The main reason for the very **low production of feldspar** is that the local producers have been resorting to "selective mining" **due to the generally poor quality of the local feldspar deposits.**

Competing uses: The apparent local demand for feldspar is estimated annually at 46,520 MT, forty eight (48) percent of which are utilized by the glass manufacturing industry and the remaining fifty-two (52) percent by the ceramic manufacturing industry.

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Source:
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1977	2,967,801	1,781,086

CORE STRENGTHS

- SKILLS AND COMPETENCIES
- MULTI-DISCIPLINARY TECHNICAL EXPERTISE (INTERNAL-EXTERNAL)
- DEVELOPED TECHNOLOGIES
- IPRs INSTRUMENTS
- HR
- SERVICES AND FACILITIES

FORMS OF PROJECT INTERVENTION

- R&D
- SKILLS AND TECHNO-TRAININGS
- CONSULTANCY SERVICES
- EXTENSION SERVICES
- COMMERCIALIZATION AND TECH TRANSFER
- PROCESS AND PRODUCTIVITY IMPROVEMENT
- TECHNICAL AND ADMIN SERVICES
- DESIGN, DEVELOPMENT AND FABRICATION
- ETC.

R&D

INTERVENTIONS/OBJECTIVES:

- **TO CHARACTERIZE:THE VARIOUS FELDSPAR DEPOSITS FOR USE IN THE CERAMIC AND GLASS PRODUCTS**
- **TO ESTABLISH AN ECONOMICAL PROCESS FOR BENEFICIATING LOCAL FELDSPAR DEPOSITS TO PRODUCE THE SUITABLE CHEMICAL COMPOSITION AND GRANULATION NEEDED BY THE CERAMIC AND GLASS MANUFACTURERS**

The emphasis of the project is on quality upgrading of low-grade feldspar deposits to the specifications of imported feldspar.

INTERVENTIONS----- OBJECTIVES:

To characterize the various feldspar deposits for use in the ceramic and glass products

To establish an economical process for beneficiating local feldspar deposits to produce the suitable chemical composition and granulation needed by the ceramic and glass manufacturers

- **THE EMPHASIS OF THE PROJECT IS ON QUALITY UPGRADING OF LOW-GRADE FELDSPAR DEPOSITS TO THE SPECIFICATIONS OF IMPORTED FELDSPAR.**