

### 5.3 NEEDS ANALYSIS

In order to comprehensively sketch the structure and depth of development needs in CAAM, various needs identified through the surveys were ranked and categorized. In doing so, the concept of a three-layer structure is introduced. First, the needs expressed by people were classified into the layer of “development needs,” as show in the right column of Table 5.3-1. Then, the “development needs” were grouped based on their similarity and proximity, and raised into the layer of “sectors.” Finally, these sectors were further combined to form the highest layer of “categories.” As a result, various development needs were then converged into the four broad need categories of: *Basic Social Services*, *Public Facilities*, *Economic Infrastructure*, and *Livelihood*. This process of categorization and structure construction were also repeated in the analysis of the IBNA.

**Table 5.3-1 Need Category and Sector of CAAM**

CATEGORY	SECTOR	DEVELOPMENT NEEDS
BASIC SOCIAL SERVICES	Basic Utilities	Electrification
		Water Systems
	Education	Educational Facilities
		Day Care Centers
		Deployment of teachers
		Madrasahs
		Non-Formal Education
		Scholarships
		School buildings
		School Dormitories
		School Pathways
	Health	Barangay Pharmacies
		Health Centers
		Hospitals
		Medical Assistants
		Medicine and Medical Supplies
Housing/Sanitation	Sanitary Toilets	
	Core Shelters	
PUBLIC FACILITIES	Environment Management	Garbage Facilities
		Reforestation
		Disaster control
	Governance Facility	Barangay Halls
	Peace, Security and Risk Management	Barangay Outpost Headquarters
		Fencing
		Stairways
		Fire Hydrants
		Evacuation Centers
		Emergency Vehicles
	Religious Facilities	Churches
		Mosques

CATEGORY	SECTOR	DEVELOPMENT NEEDS
	Culture and Sports	Entertainment Equipment
		Multi-Purpose Centers
		Plazas
		Sports Facilities
	Others	Cemetery
ECONOMIC INFRASTRUCTURE	Industry/Tourism	Public Market Buildings
		Tourist Locations
	Ports	Ports
	Public Transportation	Public Terminal Buildings
		Waiting Sheds
		Vehicles
	Roads	Bridges
		Culverts
		Roads
LIVELIHOOD	Agriculture	Irrigation
		Farm Equipment/Facilities
		Farm Livelihood (livestock, Poultry and etc)
	Fisheries	Aquaculture
		Fish landing Docks
		Fishing Equipment/Facilities
	Non-Farm Livelihood	Small Business (dress making, food possessing, bakery and etc.)
		Micro-Finance
		Capacity buildings
		Job Employment

Table 5.3-2, located below shows the summary of the results of the Barangay Profiling. As we will discuss later, no significant differences were found between this and the results of the IBNA, which is reported in the next section. Nine out of the ten development needs of the IBNA are included in this table. Notably, the top three needs are exactly the same between the two surveys. The only difference in the top ten is the need for irrigation, which is ranked tenth in the Barangay Profiling and twelfth in the IBNA. However, since more communities were involved in the Barangay Profiling than in the IBNA, it is quite natural that the needs expressed through the Barangay Profiling are more diversified.

**Table 5.3-2 Needs Ranking of the Barangay Profiling**

Development Needs	1st	Pts	2nd	Pts	3rd	Pts	Times Listed 1st to 3rd	Total Pts	Rank
Roads	1,110	3	505	2	317	1	1,932	4,657	1
Water Systems	628	3	506	2	390	1	1,524	3,286	2
Farm Equipment/Facilities	260	3	409	2	502	1	1,171	2,100	3
Health Centers	245	3	361	2	311	1	917	1,768	4
School Buildings	223	3	268	2	281	1	772	1,486	5

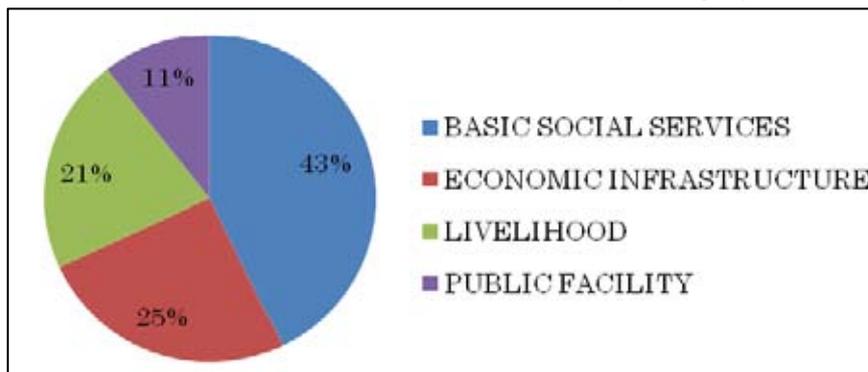
Development Needs	1st	Pts	2nd	Pts	3rd	Pts	Times Listed 1st to 3rd	Total Pts	Rank
Multi-Purpose Centers	163	3	238	2	231	1	632	1,196	6
Electrification	143	3	166	2	163	1	472	924	7
Small Businesses	62	3	98	2	194	1	354	576	8
Bridges	99	3	81	2	74	1	254	533	9
Irrigation	92	3	88	2	63	1	243	515	10
Madrasahs	61	3	104	2	107	1	272	498	11
Micro-Finance	40	3	91	2	162	1	293	464	12
Sanitary Toilets	33	3	100	2	131	1	264	430	13
Farm Livelihood	39	3	67	2	100	1	206	351	14
Disaster Controls	62	3	53	2	46	1	161	338	15
Fishing Equipment/Facilities	46	3	70	2	55	1	171	333	16
Sports Facilities	37	3	62	2	87	1	186	322	17
Barangay Halls	50	3	51	2	55	1	156	307	18
Core Shelters	36	3	42	2	43	1	121	235	19
Day Care Centers	18	3	39	2	37	1	94	169	20
Barangay Pharmacies	8	3	36	2	45	1	89	141	21
Fish Landing Docks	21	3	24	2	28	1	73	139	22
Public Market Buildings	11	3	9	2	14	1	34	65	23
Medicine And Medical Supplies	5	3	7	2	21	1	33	50	24
Ports	8	3	4	2	11	1	23	43	25
Hospitals	3	3	7	2	6	1	16	29	26
Mosques	3	3	8	2	4	1	15	29	26
Culverts	2	3	6	2	6	1	14	24	28
Fencing	1	3	3	2	13	1	17	22	29
Vehicles	2	3	3	2	6	1	11	18	30
Emergency Vehicles	1	3	4	2	2	1	7	13	31
Tourist Locations	3	3	1	2	1	1	5	12	32
Garbage Facilities	2	3	2	2	1	1	5	11	33
Public Terminal Buildings	1	3	1	2	1	1	3	6	34
Capacity Buildings	0	3	1	2	3	1	4	5	35
Deployment Of Teachers	1	3	0	2	2	1	3	5	35
Non-Formal Education	1	3	1	2	0	1	2	5	35
Scholarships	1	3	0	2	2	1	3	5	35
Aquaculture	0	3	2	2	0	1	2	4	39
Churches	1	3	0	2	0	1	1	3	40
Evacuation Centers	0	3	1	2	1	1	2	3	40
Job Employment	1	3	0	2	0	1	1	3	40
Medical Assistants	1	3	0	2	0	1	1	3	40
Plazas	0	3	1	2	1	1	2	3	40
Reforestation	0	3	1	2	1	1	2	3	40
Cemeteries	0	3	1	2	0	1	1	2	46
Educational Facilities	0	3	0	2	2	1	2	2	46
Fire Hydrants	0	3	1	2	0	1	1	2	46
School Dormitories	0	3	1	2	0	1	1	2	46

Development Needs	1st	Pts	2nd	Pts	3rd	Pts	Times Listed 1st to 3rd	Total Pts	Rank
Waiting Sheds	0	3	0	2	2	1	2	2	46
Barangay Outpost Headquarters	0	3	0	2	1	1	1	1	51
Stairways	0	3	0	2	1	1	1	1	51
<b>TOTAL</b>	<b>3,524</b>		<b>3,524</b>		<b>3,524</b>		<b>10,572</b>		

**(1) Analysis of the Needs by Category**

The summarized results of the Barangay Profiling were then sorted into four broad categories of development needs: 1) *Public Facilities*, 2) *Basic Social Services*, 3) *Livelihood*, and 4) *Economic Infrastructure*. As shown in Chart 5.3-1, the category of *Basic Social Services* was considered the most important in CAAM where many people among other things, still lack access to basic social services due to prolonged conflict and weak governance. It is therefore reasonable for CAPs to pay more attention to this category of needs. The category of *Livelihood* and *Economic Infrastructure* were ranked second and third with a very small gap between them in percentage points.

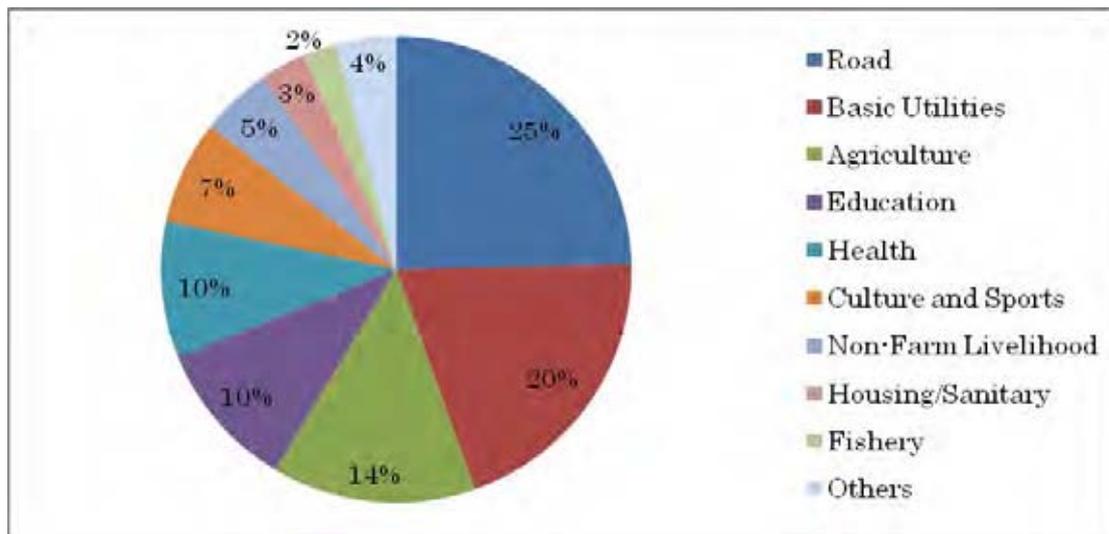
**Chart 5.3-1 Pie Chart of the Needs by Category**



**(2) Analysis of Needs by Sector**

Analysis by sector is the step before the analysis by category, positioned between the layer of individual needs and the layer of category. Chart 5.3-2 shows the structure of needs by sector in CAAM. *Roads* come first, followed by *Basic Utilities*, *Agriculture*, *Education* and *Health*. The diversity of the needs expressed was somewhat surprising to the Study Team who had thought that the needs of the *Roads* and *Basic Utilities* sectors might dominate the needs structure. The results also reveal the local people’s strong aspiration for *Education* in their areas.

Chart 5.3-2 Pie Chart of the Needs by Sector



### (3) Analysis of Needs, Provinces and Geographical Types

Table 5.3-3 shows the differences observed between the provinces. It is, however, prudent to note that the results of Compostela Valley and Davao Oriental should not be generalized since only one municipality of each province was included in the survey sample.

For other provinces, an identical tendency emerged especially in terms of the first and the second priority needs. As shown in Figure 5.3-1 below, the need for Roads is prioritized all over the CAAM. This is understandable as *Roads* are an indispensable piece of infrastructure which helps village people reach basic social services, as well as capture economic opportunities. In addition, only 23% of the barangay roads are paved. Shown by comparison among the topographical types, the *Highland* areas registered the largest proportion of *Road* needs as the first priority. However, a linear correlation does not exist between Road needs and the distance of barangays from the national roads. In other words, topography and geography may have more of an effect on people's demands for Roads, than the distance from national roads.

The need for *Water Systems*, the second priority in most provinces, is also universal in the region. High percentage points are indicated regardless of topographical type. Differences among them are slight; the *Highland* areas have the highest portion and the *Plain* areas have the lowest. Putting it another way, *Water Systems*, like *Roads*, are an ubiquitous need in CAAM.

From the third to the fifth rank, the dominant need types are School buildings and *Health centers*, which are listed under the *Basic Social Services* category, and *Farm Equipment/Facilities*, *Farm Livelihood* and *Small Businesses* are under the *Livelihood*

category. Some relationships between the distribution of individual needs and the actual socio-economic conditions also revealed by the Barangay Profiling. For example, in Maguindanao, where less elementary and high schools exist per unit of population, people placed *school buildings* in the second rank among development needs.

Some local characteristics also emerged here; for instance, people in Basilan ranked the needs of *Fishing equipment/Facilities* third, reflecting its island nature. Likewise, the Plains areas have more *Agriculture* needs, while *Coastal* areas have more *Fishery* needs.

However, there are also a few seemingly mismatched cases between the needs distribution and the regional status. In Maguindanao, *Water Systems* are ranked much lower than in other provinces even though more than 90% of all sources of drinking water in Maguindanao are from Hand Pumps and *Open Wells*. Such incongruence between the socio-economic realities and the needs ranking are observed in other provinces as well. The correlation analysis could not explain the absence of significant relationships between the socio-economic environment and these irregularities in needs ranking. Of course, the socio-economic status of the area considerably influences the way people feel about their development needs, but it must be understood that there are many other factors affecting their aspirations as well.

**Table 5.3-3 The Top Five Needs by Province**

Province	1	2	3	4	5
Lanao del Norte	Roads	Water Systems	Farm Equipment/ Facilities	Multi-Purpose Centers	School Buildings
Lanao del Sur	Water Systems	Farm Equipment/ Facilities	Roads	Health Centers	Multi-Purpose Centers
Compostela Valley	Roads	Water Systems	Small Business	Disaster Control	Farm Equipment/ Facilities
Davao Oriental	Roads	Water Systems	Bridges	Barangay Pharmacies	Electrification
Maguindanao	Roads	School Buildings	Health Centers	Farm Equipment/ Facilities	Water Systems
North Cotabato	Roads	Water Systems	Farm Equipment/ Facilities	School Buildings	Electrification
South Cotabato	Roads	Water Systems	Small Business	Sports Facilities	Irrigation
Sarangani	Roads	Water Systems	School Buildings	Small Businesses	Sports Facilities
Shariff Kabunsuan	Roads	Water Systems	Health Centers	Farm Equipment/ Facilities	Small Businesses
Sultan Kudarat	Roads	Water Systems	Health Centers	Small Businesses	Farm Equipment/ Facilities
Zamboanga del Norte	Roads	Water Systems	School Buildings	Health Centers	Electrification
Zamboanga del Sur	Roads	Water Systems	Farm Livelihood	Electrification	Farm Equipment/ Facilities
Zamboanga Sibugay	Roads	Water Systems	School Buildings	Electrification	Farm Equipment/ Facilities
Basilan	Roads	Water Systems	Fishing Equipment/ Facilities	Health Centers	Small Businesses

 Basic Social Services	 Livelihood
 Economic Infrastructure	 Public Facilities

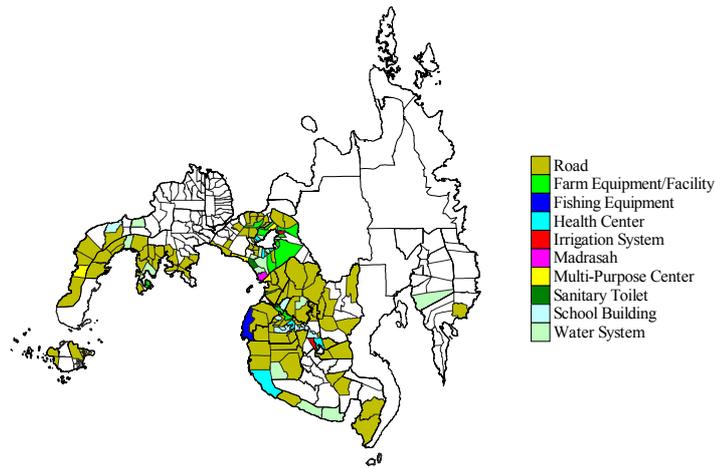
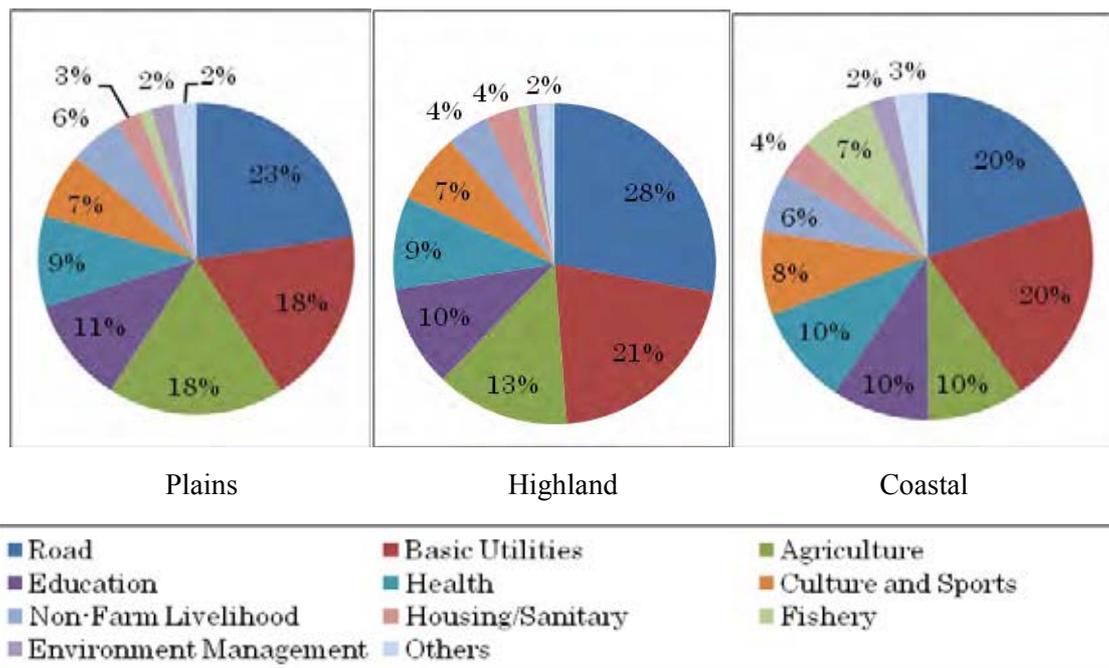


Figure 5.3-1 Primary needs distribution by Municipality

Chart 5.3-3 Pie Chart of the Needs by Geographical type



#### 5.4 ANALYSIS OF THE IBNA

The Field Teams conducted the IBNA in the survey area from July 2007 through October 2008. The IBNA had been originally planned for 150 barangays. However, since an unfavorable security status prevailed in the area, after August 2008 they could only complete 140 barangays, 10 barangays less than the target.

The IBNA's objective was to systematically reveal the crucial development needs felt by the people in the community by organizing focal group discussions in the communities. After three separate focal group sessions consisting of community leaders, women and youth respectively, a "consolidated final session" was held to craft a consensus for the community. We will first discuss the general findings which surfaced in the results of the consolidated final session. We will then move on to discuss some unique features articulated in terms of the needs expressed by the groups of community leaders, women and youth.

### (1) Consolidated Final Session

Table 5.4-1 shows the list of a variety of needs expressed through the consolidated final session. To tabulate the relative importance of individual needs, needs acknowledged as the first priority in the consolidated final session were given 3 points, the second priority 2 points and the third priority 1 point. Then the weighted points were summed up. The following is a brief outline of each of the prioritized needs of up to the tenth rank.

Needs listed as a first priority, as expressed in the consolidated final sessions were the construction and rehabilitation of *Roads*. This almost always got high scores because *Roads* are closely related to many other issues that people in CAAM are faced with. Field experience during IBNA taught us that for many barangays a trip to and from nearby national roads often takes more than an hour even by four-wheel-drive vehicle. Poor road conditions obviously have a huge negative effect on the accessibility of basic social services such as those provided at health facilities. This also diminishes economic opportunities for villagers; for instance, poor roads push up the transportation costs of their agricultural produce.

*Farm Equipment/Facilities* were ranked second in the list; only slightly higher than *Water systems* which were listed as third. In CAAM, the biggest portion of household income comes from farm products such as rice and corn farming. A shortage of *Farm Equipment/Facilities* reduces the productivity of farming in both quality and quantity. One example is the absence of solar dryers which forces farmers to sell less dried products, the price of which is at times 25% cheaper than dried ones. In conjunction with the agricultural sector, the need for *Irrigation* ranked twelfth. Similarly, *Irrigation* ranked tenth in the results of the Barangay Profiling.

The third priority listed was *Water Systems*. This includes the construction of shallow or deep wells and the improvement of water supplies from springs. The water supply significantly affects the quality of people's lives and health, and thus is one of the most critical issues for people. Various possibilities including both ground and surface water must be explored to meet the people's needs. Given the survey's results, JICA has implemented a pre-feasibility survey for *Water System* development in CAAM.

The fourth priority listed was the *Multi-purpose* Center. The adjective “multi-purpose” implies that this is more than a community gathering place, satisfying other needs by functioning as a health center and madrasah.

The fifth priority listed was the *School Building*. Many barangays are now struggling to accommodate an increasing number of children at their elementary schools. Schools in some barangays have to accommodate two to three grades in a single classroom. Other schools only have a roof under which children study on an earthen floor. The shortage of teachers and class equipment, such as desks, chairs and blackboards also hampers education in CAAM. While addressing education, we should not overlook the importance of *Madrasahs* in Muslim culture. The *Madrasah*, which is ranked seventh, tends to be viewed as a religious facility from the outside. However, madrasah education covers Arabic, algebra and other subjects, and therefore serves an important educational role in the CAAM. In fact, the Department of Education recognizes *Madrasahs* as official education facilities. Although some donors appear reluctant to support *Madrasahs*, the community need for *Madrasahs* should be properly taken into account during future development plans.

The need for *Health Centers* ranked sixth. This represents another important basic human need in the CAAM. The lack of health services in many barangays causes many people to suffer fatal illness which could be properly treated even if only primary health care services were available. The underlying challenge is not only the absence of needed facilities and medicine, but also the lack of medical workers required to perform the services. In addition, since the operational costs of health centers are high, it is difficult to hire health workers and buy medical supplies. It is therefore, not easy for poor barangays and municipalities to sustain the operation of a health center.

*Bridges* were listed eighth in priority. *Bridges* are a crucial lifeline for people who have to go across rivers and ravines. Some barangays rely on fragile wooden bridges without which they would be faced with complete isolation from the rest of the area. Despite ranking eighth, *Bridges* are for this reason, felt to be the most crucial development issue for these barangays.

*Fishing Equipment/Facilities* ranked ninth in priority. Fishing is one of the main income resources, especially in coastal areas. The lack of proper equipment reduces their production, and the inadequacy of production facilities such as landing sites and ice plants hamper their marketing activities. Distressed conditions often tend to lead to illegal fishing, which is damaging to the marine environment and their future ability to generate revenues. In order to promote sustainable fishing activities, support for the fisheries sector should be prioritized in *Coastal* areas.

*Disaster Control*, typically flood control is listed as tenth. Many barangays in CAAM are

vulnerable to flood. For example, Typhoon Frank (Fengshen) in June 2008 and subsequent precipitation caused a massive scale flood in Central Mindanao. This forced many people to evacuate for a long time and also badly damaged agricultural production. If this survey had been conducted in Central Mindanao after this disaster, the needs for *Disaster Control* would have been positioned much higher.

**Table 5.4-1 Ranking of the IBNA Result: Consolidated Final Session**

DEVELOPMENT NEEDS	1ST	Pts	2ND	Pts	3RD	Pts	Times Listed 1st to 3rd	Total Pts	Rank
Roads	35	3	13	2	15	1	63	146	1
Farm Equipment/Facilities	16	3	24	2	22	1	62	118	2
Water Systems	23	3	15	2	17	1	55	116	3
Multi-Purpose Centers	12	3	14	2	11	1	37	75	4
School Buildings	12	3	11	2	9	1	32	67	5
Health Centers	5	3	12	2	13	1	30	52	6
Madrasahs	7	3	11	2	5	1	23	48	7
Bridges	6	3	3	2	3	1	12	27	8
Fishing Equipment/Facilities	3	3	4	2	6	1	13	23	9
Disaster Control	4	3	4	2	0	1	8	20	10
Electrification	3	3	3	2	3	1	9	18	11
Farm Livelihood	6	3	0	2	0	1	6	18	
Sports Facilities	1	3	4	2	5	1	10	16	12
Irrigation	3	3	2	2	2	1	7	15	13
Core Shelters	1	3	5	2	0	1	6	13	14
Small Businesses	1	3	2	2	5	1	8	12	15
Barangay Halls	1	3	3	2	0	1	4	9	16
Barangay Pharmacies	0	3	4	2	1	1	5	9	
Day Care Centers	0	3	1	2	4	1	5	6	17
Scholarships	0	3	1	2	3	1	4	5	18
Fencing	0	3	1	2	2	1	3	4	19
Sanitary Toilet facilities	0	3	0	2	4	1	4	4	
Micro-Finance	0	3	1	2	2	1	3	4	
Hospitals	1	3	0	2	0	1	1	3	20
Mosques	0	3	1	2	1	1	2	3	
Public Market Buildings	0	3	1	2	0	1	1	2	21
Transportation	0	3	0	2	2	1	2	2	
Educational Facilities	0	3	0	2	1	1	1	1	22
Medicine and Medical Supplies	0	3	0	2	1	1	1	1	
Non-Formal Education	0	3	0	2	1	1	1	1	
Capacity Buildings	0	3	0	2	1	1	1	1	
Waiting Sheds	0	3	0	2	1	1	1	1	
<b>TOTAL</b>	<b>140</b>		<b>140</b>		<b>140</b>		<b>420</b>	<b>840</b>	

## **(2) Leader Group Sessions**

As shown in Table 5.4-2 below, the need for *Roads* and *Farm Equipment/Facilities* were the first and the second priorities respectively, and *Fishery* needs were ranked eighth by the leader group sessions. It is likely that community leaders are more sensitive to economic needs.

It is also observed that the results of this session are highly correlated with the collective results of the consolidated final sessions discussed above. The average correlation ratio of leader groups ranking with the consolidated group is 1.38. In comparison, the same ratios of women groups and youth groups are only 0.85 and 0.69 respectively. Please note that if a sector ranking and the consolidated ranking are completely the same, the ratio score is 3.00.

The opinions of the leader groups had the strongest influence on the results of the consolidated final sessions, while that of the youth groups had the weakest. The results may be interpreted as a reflection of a social hierarchy. However, it is quite reasonable to assume that leaders are more influential as they are already positioned as decision makers in barangay affairs. We feel the need to express that it would be an exaggeration if we gave the impression that leader groups dominated the consolidated final sessions.

**Table 5.4-2 Ranking of Needs: Leader Group Session**

DEVELOPMENT NEEDS	1ST	Pts	2ND	Pts	3RD	Pts	Times Listed 1st to 3rd	Total Pts	Rank
Roads	43	3	22	2	12	1	77	185	1
Farm Equipment/Facilities	21	3	21	2	29	1	71	134	2
Water Systems	18	3	23	2	16	1	57	116	3
Multi-Purpose Centers	14	3	15	2	11	1	40	83	4
School Buildings	7	3	11	2	14	1	32	57	5
Madrasahs	6	3	7	2	6	1	19	38	6
Health Centers	1	3	10	2	9	1	20	32	7
Bridges	7	3	1	2	5	1	13	28	8
Fishing Equipment/Facilities	2	3	8	2	5	1	15	27	9
Irrigation	5	3	1	2	3	1	9	20	10
Electrification	3	3	2	2	7	1	12	20	
Farm Livelihood	3	3	4	2	2	1	9	19	11
Core Shelters	1	3	7	2	1	1	9	18	12
Disaster Control	3	3	1	2	3	1	7	14	13
Barangay Halls	2	3	1	2	1	1	4	9	14
Sports Facilities	1	3	1	2	4	1	6	9	
Day Care Centers	2	3	0	2	2	1	4	8	15
Hospitals	1	3	0	2	0	1	1	3	16
Capacity Buildings	0	3	1	2	0	1	1	2	17
Culverts	0	3	1	2	0	1	1	2	
Emergency Vehicles	0	3	1	2	0	1	1	2	
Mosques	0	3	0	2	2	1	2	2	
Sanitary Toilet facilities	0	3	0	2	2	1	2	2	
Micro-Finance	0	3	0	2	2	1	2	2	
Scholarships	0	3	1	2	0	1	1	2	
Transportation	0	3	0	2	2	1	2	2	
Ports	0	3	1	2	0	1	1	2	
Fencing	0	3	0	2	1	1	1	1	
Public Market Buildings	0	3	0	2	1	1	1	1	18
<b>TOTAL</b>	<b>140</b>		<b>140</b>		<b>140</b>		<b>420</b>	<b>840</b>	

### (3) Women Group Sessions

The results of the women group sessions were tabulated in Table 5.4-3 below. This table shows that, compared with other groups, women groups had a tendency to give a higher priority to basic human needs, typically to *Water Systems* and *Health Centers*. Livelihood needs such as *Farm Livelihood* and *Small Businesses* were also considered very important by the women group sessions, because of their desire for alternative income opportunities.

**Table 5.4-3 Ranking of Needs: Women Group Session**

DEVELOPMENT NEEDS	1ST	Pts	2ND	Pts	3RD	Pts	Times Listed 1st to 3rd	Total Pts	Rank
Water Systems	31	3	13	2	15	1	59	134	1
Roads	21	3	14	2	12	1	47	103	2
Health Centers	12	3	18	2	14	1	44	86	3
School Buildings	10	3	14	2	9	1	33	67	4
Multi-Purpose Centers	10	3	10	2	6	1	26	56	5
Farm Equipment/Facilities	8	3	7	2	13	1	28	51	6
Madrasahs	7	3	7	2	10	1	24	45	7
Farm Livelihood	7	3	7	2	8	1	22	43	8
Small Businesses	4	3	7	2	10	1	21	36	9
Electrification	6	3	3	2	3	1	12	27	10
Bridges	5	3	4	2	3	1	12	26	11
Micro-Finance	4	3	4	2	5	1	13	25	12
Day Care Centers	3	3	4	2	2	1	9	19	13
Sanitary Toilet facilities	1	3	3	2	9	1	13	18	14
Irrigation	3	3	2	2	1	1	6	14	15
Barangay Pharmacies	1	3	2	2	3	1	6	10	16
Core Shelters	1	3	2	2	2	1	5	9	17
Disaster Control	2	3	1	2	1	1	4	9	18
Scholarships	0	3	3	2	2	1	5	8	19
Fishing Equipment/Facilities	0	3	3	2	1	1	4	7	20
Fencing	0	3	3	2	1	1	4	7	21
Barangay Halls	0	3	2	2	2	1	4	6	22
Medicine and Medical Supplies	1	3	0	2	3	1	4	6	23
Sports Facilities	1	3	1	2	0	1	2	5	24
Emergency Vehicles	0	3	2	2	0	1	2	4	25
Hospitals	1	3	0	2	1	1	2	4	26
Transportation	0	3	2	2	0	1	2	4	27
Birthing Clinics	1	3	0	2	0	1	1	3	28
Garbage Facilities	0	3	1	2	0	1	1	2	29
Public Market Buildings	0	3	1	2	0	1	1	2	30
Culverts	0	3	0	2	1	1	1	1	31
Mosques	0	3	0	2	1	1	1	1	32
Non-Formal Education	0	3	0	2	1	1	1	1	33
Waiting Sheds	0	3	0	2	1	1	1	1	34
<b>TOTAL</b>	<b>140</b>		<b>140</b>		<b>140</b>		<b>420</b>	<b>840</b>	

**(4) Youth Group Sessions**

The results of the youth group sessions were tabulated in Table 5.4-4. A unique feature of the youth’s ranking was their high prioritization of *Sports Facilities*; such as basketball courts and gymnasiums. Some may feel puzzled as to why they valued *Sports Facilities* so much when many of them do not receive a proper education and experience difficulties in finding jobs. It seems commonsense that finding solutions to these problems ought to be considered more important than funding *Sports Facilities*. Yet, let us straightforwardly accept what young people want.

**Table 5.4-4 Ranking of Needs: Youth Group Session**

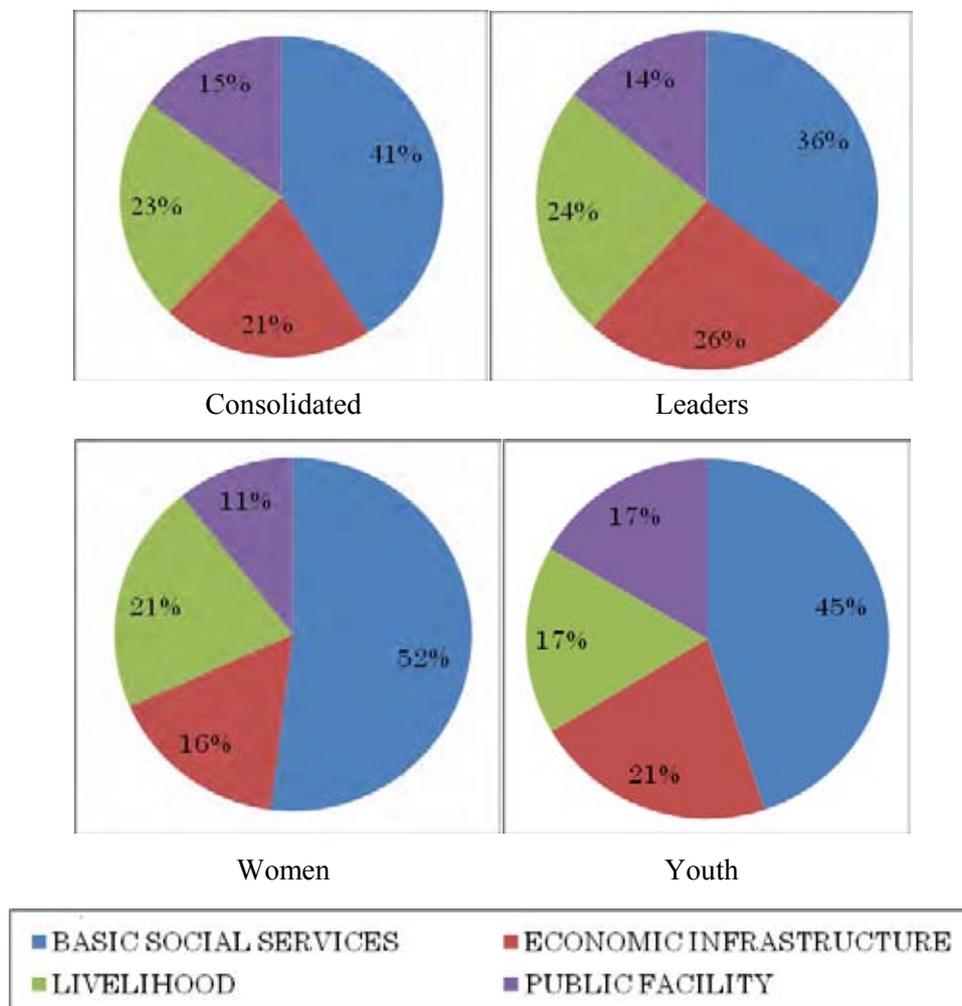
DEVELOPMENT NEEDS	1ST	Pts	2ND	Pts	3RD	Pts	Times Listed 1st to 3rd	Total Pts	Rank
Roads	20	3	17	2	6	1	43	100	1
Water Systems	18	3	18	2	6	1	42	96	2
Sports Facilities	13	3	17	2	21	1	51	94	3
Farm Equipment/Facilities	15	3	11	2	16	1	42	83	4
School Buildings	15	3	9	2	9	1	33	72	5
Madrasahs	13	3	9	2	7	1	29	64	6
Multi-Purpose Centers	8	3	8	2	13	1	29	53	7
Health Centers	6	3	12	2	5	1	23	47	8
Electrification	4	3	6	2	5	1	15	29	9
Bridges	4	3	4	2	6	1	14	26	10
Fishing Equipment/Facilities	3	3	3	2	5	1	11	20	11
Farm Livelihood	3	3	2	2	6	1	11	19	12
Sanitary Toilet facilities	1	3	4	2	8	1	13	19	
Scholarships	5	3	1	2	2	1	8	19	
Core Shelters	1	3	4	2	0	1	5	11	13
Disaster Control	2	3	1	2	3	1	6	11	
Irrigation	2	3	1	2	1	1	4	9	14
Mosques	1	3	2	2	2	1	5	9	
Barangay Halls	2	3	0	2	1	1	3	7	15
Small Businesses	0	3	2	2	2	1	4	6	16
Barangay Pharmacies	0	3	1	2	3	1	4	5	17
Day Care Centers	1	3	0	2	2	1	3	5	
Waiting Sheds	0	3	2	2	1	1	3	5	
Micro-Finance	1	3	1	2	0	1	2	5	
Public Market Buildings	1	3	0	2	1	1	2	4	18
Transportation	0	3	2	2	0	1	2	4	
Hospitals	1	3	0	2	0	1	1	3	19
Educational Facilities	0	3	1	2	1	1	2	3	
Fencing	0	3	1	2	1	1	2	3	
Entertainment Equipment	0	3	1	2	0	1	1	2	20
Medicine and Medical Supplies	0	3	0	2	2	1	2	2	
Emergency Vehicles	0	3	0	2	1	1	1	1	21
Non-Formal Education	0	3	0	2	1	1	1	1	
Plazas	0	3	0	2	1	1	1	1	
School Pathways	0	3	0	2	1	1	1	1	
Tourist locations	0	3	0	2	1	1	1	1	
<b>TOTAL</b>	<b>140</b>		<b>140</b>		<b>140</b>		<b>420</b>	<b>840</b>	

**(5) Analysis of Needs by Category**

Like the results of the Barangay Profiling, the summarized results of each session were sorted into four broad categories of development needs. The category of *Basic Social Services* was considered the most highly needed throughout the three groups. This category accounts for almost 50% of the total score, similar to the Barangay Profiling results. The women’s group gave even more attention to this category of needs than did the other groups.

Prominent differences are not observed between the Barangay Profiling and the IBNA in other categories as well. The category of *Economic Infrastructure* ranked second among all sessions, with a higher ratio in leader groups. This is an additional indication that leaders are interested more in economic issues while women pay attention to issues of basic human needs.

**Chart 5.4-1 Pie Chart of the Needs by Sector**



**(6) Analysis of Needs by Sector**

The needs expressed by the IBNA were classified into sectors in the same way as the Barangay Profiling (see Chart 5.4-2). Although the results were largely identical to that of

Barangay Profiling, some differences were recognized in Chart 5.4-3. *Agriculture* is ranked second in the IBNA, while the same is ranked third by the Barangay Profiling. The ranking for *Education* and *Culture*, and *Sports* in the IBNA is slightly higher than in the Barangay Profiling; by 4%. On the other hand, the Barangay Profiling registers more needs in the categories of *Roads* and *Basic Utilities*. The barangay officials were the source of the information for the Barangay Profiling, and they appeared to be more interested in the development of basic infrastructure such as *Roads* and *Basic Utilities*. The leaders were also interested in *Agriculture*, another indicator of economic interest. Women groups listed more needs in the *Basic Utilities* and *Health* categories. Youth groups were inclined to favor *Education* and *Culture* and *Sports* as shown in the Chart 5.4-2.

**Chart 5.4-2 Needs of the Consolidated Final Sessions by Sector**

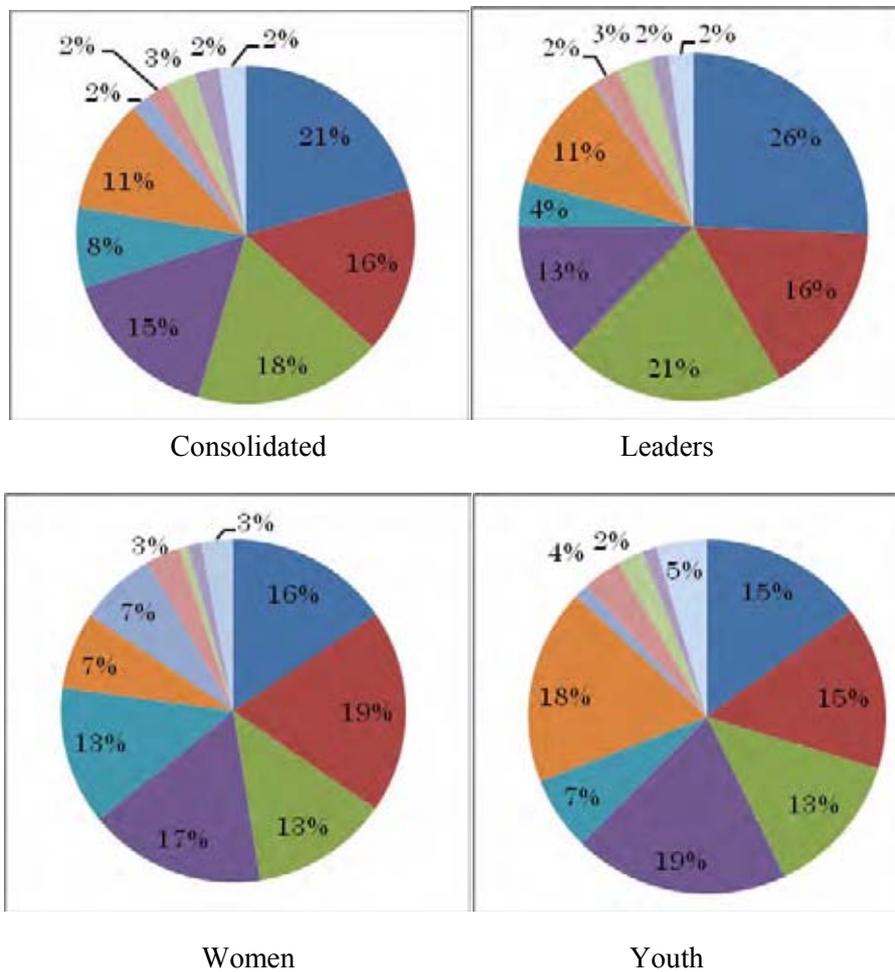
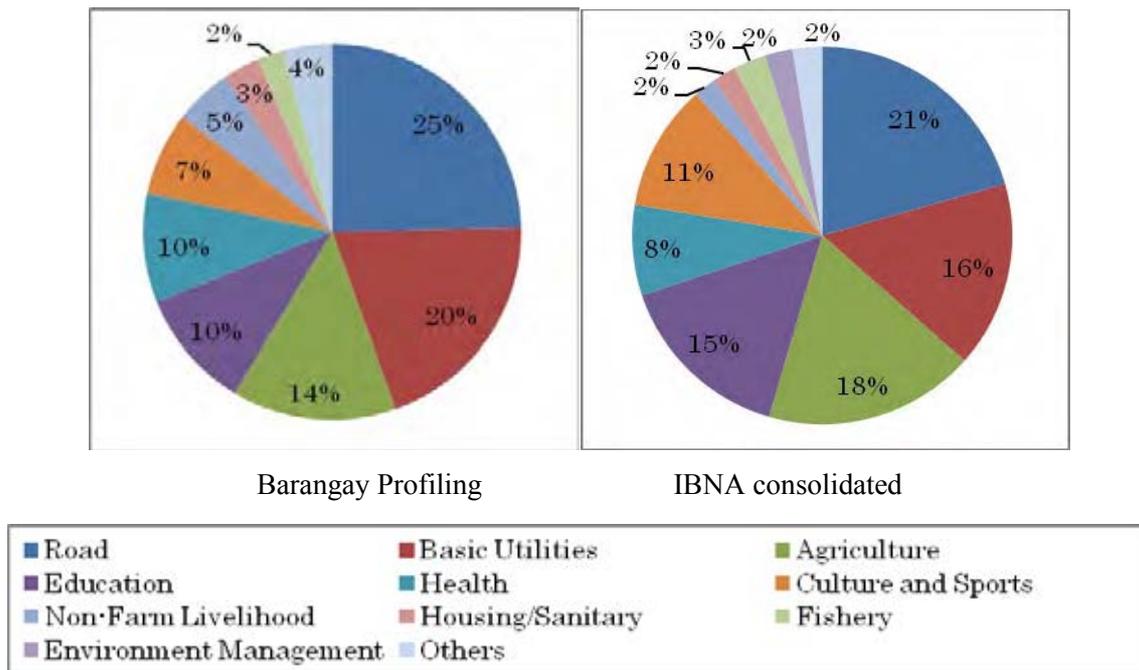


Chart 5.4-3 Comparison of Needs rank



(7) Analysis of Needs by Province and by Geographical type

Table 5.4-5 shows the provincial classification of the top three development needs as identified through the IBNA. The provincial ranking of the IBNA results contain less uniformity than that of the Barangay Profiling, probably reflecting their unique geographical and socio-economic conditions. In the Barangay Profiling, *Roads* and *Water Systems* were ranked as the first and the second priority in 13 out of 14 provinces, while the IBNA has only four provinces ranking *Roads* as the first priority. Provinces which posted *Water systems* as the first or second priority represented half of the cases in the Barangay Profiling. On the other hand, economic needs represented as *Farm Equipment/Facilities* and *Farm Livelihood* got higher ranks in IBNA. In general, *Basic Social Services* and *Livelihood* categories tended to be higher in the IBNA ranking, compared to the Barangay Profiling.

With regard to the topographical types, although the IBNA and the Barangay Profiling are basically similar, the IBNA indicates tendencies are clearer. In the IBNA, *Plains* areas placed a higher emphasis on *Agriculture*. The same is true for *Roads* in *Highland* areas; and *Education*, *Basic Utilities* and *Fisheries* in *Coastal* areas.

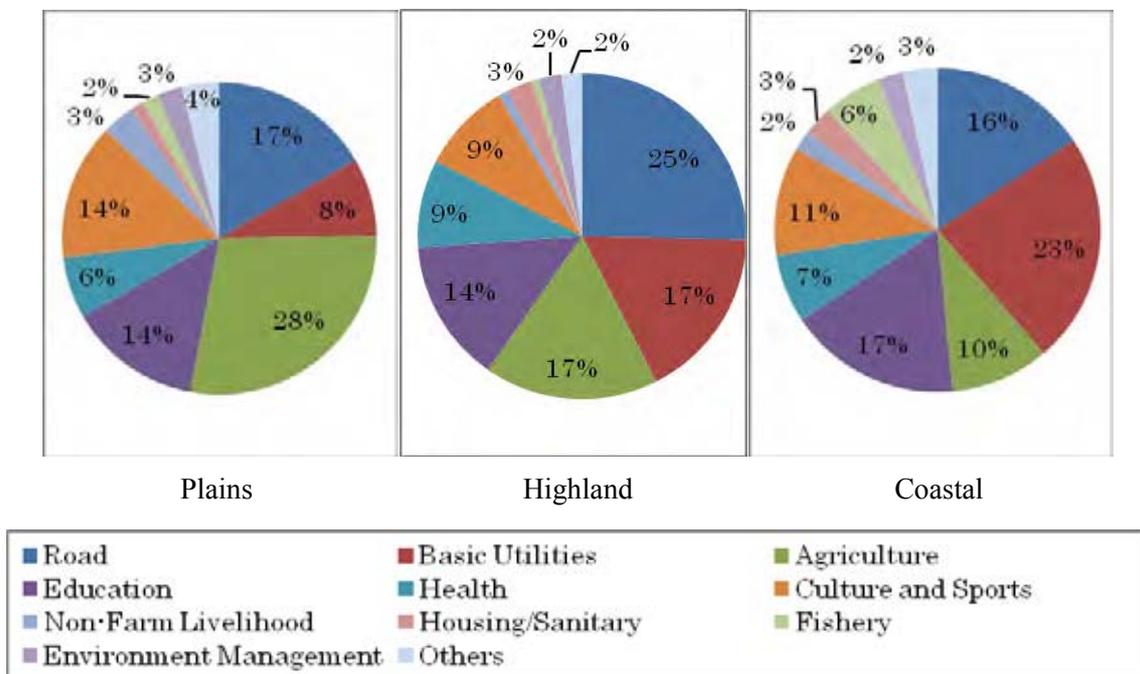
**Table 5.4-5 Five Priority Needs of the Consolidated Final Sessions in Five Provinces**

Province	1	2	3
Lanao del Norte	Water Systems	Roads	Farm Equipment/ Facilities
Lanao del Sur	Multi-Purpose Centers	Roads	Water Systems
Compostela Valley	Water Systems	Barangay Pharmacies	Irrigation
Davao Oriental	Farm Equipment/Facilities	Barangay Pharmacies	Madrasahs
Maguindanao	Farm Equipment/Facilities	School Buildings	Roads
North Cotabato	Farm Equipment/Facilities	Multi-Purpose Centers	Water Systems
South Cotabato	Madrasahs	Farm Livelihood	Day Care Centers
Sarangani	Water Systems	Roads	Madrasahs
Shariff Kabunsuan	Health Centers	School Buildings	Farm Equipment/Facilities
Sultan Kudarat	Roads	Disaster Control	Farm Equipment/Facilities
Zamboanga del Sur	Roads	Water Systems	School Building
Zamboanga del Norte	Roads	Health Centers	School Buildings
Zamboanga Sibugay	Roads	Water Systems	Madrasahs
Basilan	Roads	Water Systems	School Buildings

	Basic Social Services		Livelihood
	Economic Infrastructure		Public Facilities

**Chart 5.4-4 Pie Chart of the Needs listed by Geographical type**



## 5.5 COMMUNITY ACTION PLAN (CAP)

### (1) Recommended Need Categories

As discussed thus far, one of the most important findings is that the category of *Basic Social Services* is listed at the top of both the Barangay Profiling and the IBNA. This is a clear manifestation that the people in CAAM have strong aspirations for meeting their basic human needs. Breaking down the category into sectors, we see the top five sectors are *Roads, Basic Utilities, Education, Agriculture* and *Health*.

The needs of the *Roads* sector are the strongest in the Barangay Profiling and are ranked second in the IBNA. Road projects, however, often require considerable public investment, and thus should be formulated from a more comprehensive point of view in order to maximize the number of beneficiaries and, at the same time, realize cost-effectiveness. Therefore, the Study Team recommends preparing a full-fledged master plan and conducting feasibility studies with a focus on the farm-to-market road network in CAAM. Another reason for the preparation of a master plan lies in the technical difficulties associated with barangay-based surveys in specifying the financial requirements and clarifying the priorities in planning rural roads. Unfortunately, many duplications and overlapping among the expressed needs of the individual communities would prevent an incremental accumulation of needs from producing a harmonious picture for the road network in the region.

The sector of *Basic Utilities*, which is composed mainly of *Water supplies* and *Electrification*, ranks second in the Barangay Profiling and the fourth in the IBNA. As these need types are directly related to the quality of people's lives and, fortunately, could possibly be satisfied on the barangay level, this sector should be considered part of the urgent action plan in CAPs. However, when it is more appropriate to plan a large-scale water system or grid system that extends over the boundary of individual barangays, a master plan and a series of feasibility studies should be worked out in order to maximize the effect of the development intervention.

As for *Water System* development, we should take into consideration the fact that in this region there are abundant water resources, though not all are necessarily potable. Thus, in addition to conventional means for supplying water such as *Deep Wells* and *Hand Pumps*, we should examine new techniques that are suitable to the region. Small gravity filter systems could be one of the appropriate technologies, especially in areas near lakes, rivers and springs. This technology is durable and requires little maintenance.

The *Agriculture* sector ranks third in the Barangay Profiling and second in the IBNA. This sector is also worth examining in detail because it can provide a quick stimulus to farming productivity which is the primary source of income in CAAM. The *Fisheries* sector accounts for a relatively small portion of the total needs. Even so, fishing is one of main livelihood

activities in the *Coastal* areas. Thus support for *Agriculture* and *Fisheries* must be adopted as an approach to enhance income opportunities for the local people. Because the intervention may basically be made up of provisions in the form of facilities and equipment on a community basis in principle, providing support to these sectors is suitable for CAPs.

*Education*, the fourth sector in the Barangay Profiling and third in the IBNA, is also desperately needed in CAAM. The expressed needs mainly focused on education facilities, typically school buildings. However, an improvement in education can not be achieved simply by constructing facilities. Qualified teachers and good educational curriculum are a must. In addition, support for *Education* should always be carefully examined in a comprehensive manner, rather than by spot assistance for each barangay. These issues make the *Education* sector unfit for immediate inclusion into CAP. This sector most certainly requires a comprehensive sector study. Even so, some school buildings which need immediate repair and improvement as is necessary for securing the minimum environment for students should be embraced as a part of CAP.

*Health* is the fourth sector in the Barangay Profiling, with the same score as *Education*. It is fifth in the IBNA. This sector has a significant impact on human security in the area. Assistance to the *Health* sector appears to be provided on a community basis, comfortably falling into the framework of CAPs. Still, the lack of qualified health practitioners is a serious constraint in CAAM at present. At minimum, the training of barangay health workers and midwives must be incorporated into the sector program in the short term, and community-initiatives for availing qualified medical nurses and doctors must be developed in the long run. Consequently, it would be better to divide the *Health* sector program into a short-term plan and a long-term plan. The former can be used to tackle urgent human security issues by providing relatively simple facilities/equipment and training opportunities for the exiting health workers, while the latter would require more ambitious projects to alleviate the shortage of qualified medical workers over the long term.

The *Non-Firm Livelihood* sector, though it ranks seventh in both the Barangay Profiling and the IBNA, should also be incorporated in CAPs. This sector can help people who only have limited income sources, especially rural women.

Based on the discussion above, we have reached the conclusion that the categories of *Basic Utilities*, *Health*, *Education*, *Agriculture/Fisheries*, and *Non-Firm Livelihood* should be the focus of CAPs. The next step is to position these critical development sectors within a workable time frame. Figure 5.5-1 shows one of recommendable time frames.

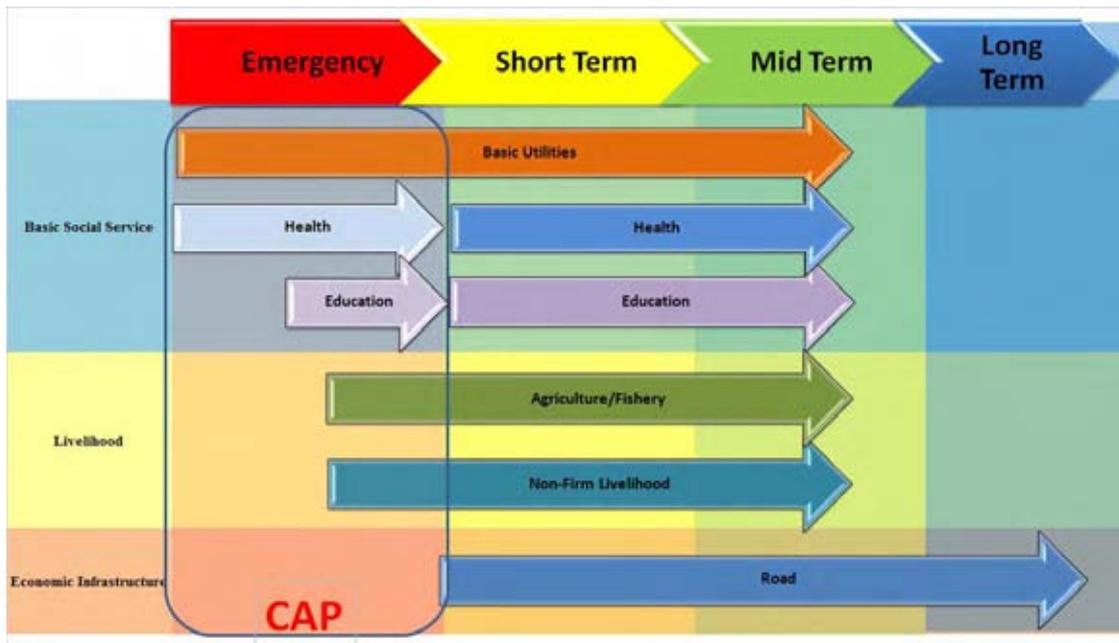


Figure 5.5-1 Time framework of the prioritized development sectors

(2) Recommendation in Area

The result of the social survey reveals the existence of development gaps between provinces and among municipalities in CAAM. The colored columns in the table indicate provinces whose development indicators remain below average for the entire CAA in each sector. A ✓ mark represents a highly prioritized sector in the social survey. The colored column with the mark, thus, would be the first long list of a CAP for the target area. Needless to say, additional careful screening and fine-tuning are necessary in the course of actual planning. The Barangay Database, one of the critical outputs of SERD-CAAM, is profoundly useful in narrowing down the target area in terms of barangay or of municipality with a set of certain conditions. Once criteria for the project implementation are set, the barangay database will be a great help with site selection for individual projects.

Table 5.5-1 Recommended area of CAP

Prioritized sector	Roads	Education	Basic utilities		Health	Agriculture
	Paved Roads	Elementary schools	Public Water Service	Electricity	Health centers	Irrigation
Lanao del Norte	✓	✓	✓			✓
Lanao del Sur	✓		✓		✓	✓
Compostela Valley	✓		✓			✓
Davao Oriental	✓		✓	✓	✓	
Maguindanao	✓	✓	✓		✓	✓
North Cotabato	✓	✓	✓	✓		✓
South Cotabato	✓		✓			✓
Sarangani	✓	✓	✓			
Shariff Kabunsuan	✓		✓		✓	✓

Prioritized sector	Roads	Education	Basic utilities		Health	Agriculture
Indicator	Paved Roads	Elementary schools	Public Water Service	Electricity	Health centers	Irrigation
Sultan Kudarat	✓		✓		✓	✓
Zamboanga del Norte	✓	✓	✓	✓		✓
Zamboanga de Sur	✓		✓	✓		✓
Zamboanga Sibugay	✓	✓	✓	✓		✓
Basilan	✓		✓		✓	✓

### (3) Consideration of Minority Needs

One should be careful when interpreting the results of the Barangay Profiling and the IBNA since attention tends to be drawn to the major needs existing in CAAM. Taken as a whole, this can lead us to unwittingly ignore the lower-ranked but critical needs felt only in a few communities. For example, since the number of farming communities is much larger than the number of fishing communities, specific needs felt in fishing communities may not be highlighted in the tabulated results. Similarly, specific needs felt in *Highland* areas such as the need for rice mills tend to be buried among the more numerically larger needs of Plains area farming. Similar issues can be found in the arena of social groups as well. It must be remembered that women’s needs may not necessarily be well reflected in the results of the consolidated final sessions.

Even though the expression of development needs from minority groups or the socially vulnerable may not be very prominent, the degree of necessity is the same as that of individuals comprising the majority and or dominant population. Each area and each social group has a set of specific problems to deal with. This fact necessitates prudent attitudes in formulating CAPs.

### (4) Cost estimation

The planned period for a CAP is three years, and will primarily target the five prioritized sectors by the needs analysis mentioned, namely *Basic Utilities, Health, Agriculture, Education* and *Non-Firm Livelihood*. Table 5.5-2, Table 5.5-3 shows two types of the rough cost estimation of the projects which may be applicable for a CAP. The “number of barangays” in the table also refers to the number of the first prioritized needs in the area.

In the Scenario 1, Table 5.5-2, *Water System* development is considered ground water development, whereas, Scenario 2 is planned to include surface water development which is less costly than ground water development. Scenario 1 excludes the *Education* sector since it needs soft-component development and may be fit for the short term development plan as mentioned above. On the other hand, scenario 2 includes the *Education* sector as a part of the CAP project, namely, school buildings/madrasah construction.

The total number covers almost 40% of the total CAA area which is a reasonable figure, considering the three year period. Since the situation differs from barangay to barangay, it is difficult to generalize the unit cost of a single project. The unit project cost in the table was estimated by the results of the IBNA, OSA and the IBNA feasibility study discussed in a later section of this report. Multiplying the target number and the estimated cost, the total cost estimation of the CAP program is estimated at almost three billion Pesos, or one billion Pesos per year. However, as this estimation is purely for the project implementation costs, we should look elsewhere for other costs such as for a feasibility study, and overhead in the actual implementation stage.

**Table 5.5-2 Cost estimation of the CAP: Scenario 1**

<b>Development needs</b>	<b>Number of Barangays</b>	<b>Unit Project Cost Estimation</b>	<b>Sub Total (Peso)</b>
Water Systems	628	4,000,000	2,512,000,000
Electrification (Generator)	143	500,000	71,500,000
Health Centers	245	500,000	122,500,000
Equipment/ Farm Facilities	260	1,500,000	390,000,000
Non-Farm Livelihood	39	1,500,000	58,500,000
Small Businesses	62	600,000	37,200,000
<b>Total</b>	<b>1,377</b>		<b>3,191,700,000</b>

**Table 5.5-3 Cost estimation of the CAP: Scenario 2**

<b>Development needs</b>	<b>Number of Barangays</b>	<b>Unit Project Cost Estimation</b>	<b>Sub Total (Peso)</b>
Water Systems	628	3,000,000	1,884,000,000
Electrification (Generator)	143	500,000	71,500,000
School Buildings/Madrasahs	284	2,000,000	568,000,000
Health Centers	245	500,000	122,500,000
Equipment /Farm Facilities	260	1,500,000	390,000,000
Non-Farm Livelihood	39	1,500,000	58,500,000
Small Businesses	62	600,000	37,200,000
<b>Total</b>	<b>1,661</b>		<b>3,131,700,000</b>

## 5.6 REVIEW OF DONORS' WORKS ON NEEDS

Other donors' projects have worked out similar surveys and analysis for community needs. The prioritized needs and sectors of this survey are compared with those of other donors' projects. Table 5.6-1 below is the list of projects which include needs assessment.

**Table 5.6-1 List of donors' needs assessment**

	<b>Information resource</b>	<b>Year of Publication</b>	<b>Donor</b>	<b>Study region</b>	<b>Methodology</b>
1	Social assessment of Conflict-Affected Areas in Mindanao	2003	The World Bank	Central Mindanao (Davao del Norte, Maguindanao, North Cotabato, Sultan Kudarat), Sulu, Basilan	Participatory workshops
2	Joint Needs Assessment for Reconstruction and Development of Conflict-Affected Areas in Mindanao	2005	The World Bank	CAA in Mindanao	Literature review, Consultation workshops, Key informant Interviews
3	Uncounted lives: Children, Women and conflict in the Philippines. A needs assessment of Children and Women affected by Armed Conflict.	2006	UNICEF	8 communities: Abra and Mindro Oriental (Luzon), Capiz and Leyte (Visayas), Surigao del Sur, Compostela Valley, North Cotabato and Maguindanao	Literature Review, FGD, Key informant Interviews
4	USAID Web Site Completed Barangay Infrastructure Program as of January 31, 2007 <a href="http://www.mindanao.org/components/cip-completed.htm">http://www.mindanao.org/components/cip-completed.htm</a>	2007	USAID	ARMM and Neighboring CAAM	Proposal application
5	RAPID RURAL APPRAISAL of Barangays in Malitubog-Maridagao Irrigation Program Communities (March 2007)	2007	JBIC	North Cotabato (Pikit, Aleosan, Carmen) Maguindanao (Pagalungan, Montawal) 56 barangays	Key informant interview, Participatory workshops

**(1) The World Bank**

The World Bank recently, conducted needs assessment studies twice in CAAM. The first one was conducted in the areas affected by the conflict in 2000, covering Sulu, Basilan, Davao del Norte, Maguindanao, North Cotabato and Sultan Kudarat. This survey aimed to help design effective medium-term development interventions in Mindanao.

The Table 5.6-2 shows the result of community needs identified by this study through participatory surveys. The needs ranking of Sulu and Basilan have some different results from our surveys. For example, Road needs are ranked rather low, which is the first priority in both the Barangay Profiling and the IBNA. One possible reason for this difference is the target area. For example, this survey may have been conducted in island regions where people use boats as daily transportation.

**Table 5.6-2 Community Needs in Sulu and Basilan (in ranking order)**

Needs in Sulu	%	Needs in Basilan	%
Water Supply	19	Livelihood Assistance	29
Livelihood Assistance	14	Road Improvements	18
Improve Health Service	11	Water supply	14
Access to Education	9	Improve Health Service	14
Electricity	9	Housing	5
Road Improvements	9	Access to Education	4
Others	30	Others	18

Source: Social assessment of Conflict-Affected Areas in Mindanao, the World Bank, 2003

The Table 5.6-3 shows the needs in Central Mindanao which includes target sites from the Barangay Profiling and the IBNA. Of particular note, in the World Bank study, types of needs as associated with *Social Capital* and *Institutional Arrangements* were investigated whereas the need for *Roads* do not appear. This might be because of differing ways of data gathering and analysis, but the reasons cannot be known for sure because there is no explanation of the details of the methodology in the report.

**Table 5.6-3 Community Needs in Central Mindanao (in random order)**

Needs in Central Mindanao (Davao del Norte, Maguindanao, North Cotabato and Sultan Kudarat)
Economic Recovery (e.g. Livelihood and job opportunity)
Governance (e.g. Education, Shelter and Health Infra)
Security (e.g. Peace situation)
Social capital and recreation facilities (e.g. Sports facility)
Institutional arrangement (e.g. Development plan, organization and ODA assistance)

Source: Social assessment of Conflict-Affected Areas in Mindanao, the World Bank, 2003

The Joint Needs Assessment (JNA), the second needs assessment study of the World Bank, is one of the most comprehensive needs analyses in CAAM in Mindanao. It was intended to design a program for reconstruction and development in the CAAM. The result of the needs assessment is divided into four categories; *Human Development, Rural Development, Finance and Private Sector Development, and Local Governance and Institutions*. Among the results, Table 5.6-4 below shows the community needs selected and sorted into the same categories as the analysis of the Barangay Profiling and the IBNA. This table tells us that the prioritized sectors are almost the same as the SERD-CAAM. However, there are some uniquely expressed needs in the JNA such as “*Keeping Children in School*” and “*Access to Assistance on Land Matters*”.

**Table 5.6-4 Needs in CAAM in Mindanao (in random order)**

Sector	Needs
<b>Roads</b>	Provision of access infrastructure/ destroyed infrastructure (e.g. Farm to market roads)
<b>Basic utilities</b>	Provision of basic Potable water
<b>Housing and Sanitation</b>	Provision of sanitary toilet facilities
<b>Education</b>	Access to education opportunities; learning environments and alternative education
	Keeping children in school (e.g. food for school children)
	Assistance for mothers and children (e.g. day care centers)
<b>Health and Nutrition</b>	Prevention of communicable diseases (e.g. Reproductive health and Immunization Program)
	Improvement in health infra service
	Access to primary health care (e.g. Mobile health clinics)
	Increase health services to women (e.g. IEC program)
<b>Agriculture</b>	Access to post harvest facilities
	Provision to support infrastructure (e.g. Irrigation)
	Employment & income generation (e.g. Crop and Fruit program)
	Increase access to skills training (e.g. Capacity building program)
	Provision of employment & income generation (e.g. Farming propagation)
<b>Fisheries</b>	Provision of employment & income generation (e.g. Seaweed area expansion and Fishing propagation)
<b>Livelihood/ Alternative income resource</b>	Provision of basic input, livelihood opportunities
	Enhancement of skills (e.g. Training assistance for women in business )
	Access to credit (e.g. Linkage to Micro credit and capacity building)
<b>Others</b>	Access to assistance on land matters (Training assistance for land matters such as land tenure policy)
	Improvement of the peace environment

Source: Joint Needs Assessment for Reconstruction and Development of Conflict-Affected Areas in Mindanao, the World Bank, 2003

Note: The table was compiled by the Study Team based on the source.

(2) UNICEF

UNICEF conducted a survey for the assessment of the conflict impact on women and children. It also sought to determine the relevant differences in the condition of armed conflict areas compared to non-armed conflict area. Although the survey was conducted not only in Mindanao, but also in Luzon and Visayas, the results can be of help for data validation, especially for the IBNA results of women group surveys. Table 5.6-5 shows the basic needs expressed by women in the UNICEF study and its ranking in the IBNA of women groups. It shows that there is a strong correlation between the results. Among the top ten results of the IBNA, nine needs are included in the UNICEF results. Other needs of the UNICEF study are also identified as prioritized needs in the IBNA results except for *Soil Analysis*.

**Table 5.6-5 Women’s Needs in CAAM in the Philippines (in random order)**

Sector	Basic needs expressed by the women	Ranking in IBNA Women’ sector
<b>Roads</b>	Better transport system and roads	2(Roads), 11(Bridges)
<b>Basic utilities</b>	Potable water	1(Water Systems)
	Electricity	10 (Electrification)
<b>Education</b>	Schools in their community	4(School buildings), 7(Madrasahs)
	Good quality teachers	4(School buildings), 7(Madrasahs)
	Scholarships	18(Scholarships)
	Day care centers	13(Day care centers)
<b>Health and Nutrition</b>	Health centers	3(Health centers)
	Doctors, nurses and other health personnel	3(Health centers)
	Pre-natal and family planning	23 (Birthing clinics)
	Medicine and vitamins	20 (Medicine and Medical Supplies)
<b>Agriculture</b>	Farm tools	7 (Farm Equipment/Facilities)
	Irrigation	15(Irrigation)
	Tractors	6(Farm Equipment/Facilities)
	Work animals	6(Farm Equipment/Facilities)
	Lower priced seeds	6(Farm Equipment/Facilities)
	Fertilizers and pesticides	6(Farm Equipment/Facilities)
	Soil analysis	None
<b>Livelihood and Alternative income</b>	Poultry and livestock	8 (Farm livelihood), 9(Small business)
	Job and livelihood opportunities	8 (Farm livelihood), 9(Small business)

Source: Uncounted lives: Children, Women and conflict in the Philippines; A needs assessment of Children and Women affected by Armed Conflict, 2006, UNICEF

Note: The table was compiled by the Study Team based on the source.

**(3) USAID**

USAID has been carrying out the Community Infrastructure Project (CIP) in ARMM and nearby CAAM through GEM, or Growth with Equity in Mindanao. Its field projects are selected basically from proposals submitted by the municipalities and barangays, we can to some degree deduce the trend of the development needs in communities from the number of implemented projects. Table 4.6-6 shows the number of categorized projects implemented in Lanao del Sur, Maguindanao, Shariff Kabunsuan, North Cotabato, Sultan Kudarat and Sarangani where the SERD-CAAM conducted the survey in the IBNA. Owing to the objective of GEM, “Accelerate economic growth in Mindanao”, its field projects tend to be economics projects. That would be the reason why the number of agriculture and business categories is higher than that of the IBNA and the Barangay Profiling. GEM has another format especially designed for education and community empowerment, thus projects of those categories are not included in the CIP project list.

**Table 5.6-6 Ranking of Completed Community Infrastructure Projects (CIP) in Lanao del Sur, Maguindanao, Shariff Kabunsuan, North Cotabato, Sultan Kudarat and Sarangani**

Category	No of Projects	Rank
<b>Agriculture</b>	106	1
<b>Roads</b>	57	2
<b>Basic utility</b>	21	3
<b>Business/Tourism</b>	19	4
<b>Culture/Sports</b>	18	5
<b>Environment management</b>	14	6
<b>Fisheries</b>	8	7

Source: Uncounted lives: USAID Web Site: Completed Barangay Infrastructure Program as of January 31, 2007  
“<http://www.mindanao.org/components/cip-completed.htm>”, 2007, USAID

Note: The table was compiled by the Study Team based on the source.

**(4) JBIC**

JBIC, or the Japan Bank of International Cooperation which has now been integrated with JICA, also conducted a needs assessment in association with its loan project, the Malitubog-Maridagao Irrigation Program in North Cotabato and Maguindanao. Like our social survey, this assessment included focal group discussions for needs assessment and made rankings in needs through a methodology called peer-wise ranking. The Study Team has re-categorized the results of the needs assessment conducted in 44 barangays and tabulated them in Table 5.6-7. As two studies used similar methodologies for assessing community needs in their fieldwork, the ranking results are almost identical; the ranking of the sectors is completely the same from the first to the fifth rank. However the ranks among the top five are slightly different, for example education is the first priority in the JBIC study, which is the

fourth priority in the IBNA and the Barangay Profiling. Such differences would be due to the different compositions of workshop participants. Teachers participated in JBIC workshop in many barangays, while the number of the total participants was usually less than 10 in the survey. This might be a reason why education sector is more highly prioritized than in the IBNA and the Barangay Profiling.

**Table 5.6-7 Needs ranking of barangays surrounding Malitubog-Maridagao Irrigation Program**

Category	Priority						Total Freq.	Times Listed 1st to 3rd	Rank
	1st	Pts	2nd	Pts	3rd	Pts			
Education	10	3	14	2	14	1	38	72	1
Basic Utilities	12	3	8	2	9	1	29	61	2
Roads	13	3	8	2	3	1	24	58	3
Agriculture	6	3	10	2	12	1	28	50	4
Health	1	3	4	2	3	1	8	14	5
Livelihood	1	3	0	2	2	1	3	5	6
Environment management	0	3	0	2	1	1	1	1	7

Source: Uncounted lives: RAPID RURAL APPRAISAL of Barangays in Malitubog-Maridagao Irrigation Program Communities, 2007, JBIC

Note: the Table was compiled by the Study Team based on the source.

### (5) Comparison of the Donor Needs Assessment

As we have seen, there are some differences in the terms of the needs priorities among the different assessments due to different factors such as locality, methodology and participants. However, the spectrum of priority needs show a remarkable consistency among them, including the Barangay Profiling and the IBNA. Table 5.6-8 shows a summary of the prioritized needs of the donor assessments. From the table, it is clear that only the Fisheries sector indicates some inconsistency, however, this is most likely reflective of geographical diversity. For example the JBIC assessment was conducted only in inland areas where fishermen are fewer. It is unknown why the USAID study did not include a *Health* category in its survey.

**Table 5.6-8 Summary of the Priority Needs of Donor Projects**

Prioritized Sector by the CAP analysis	WB1	WB2	UNICEF	USAID	JBIC
Health and Nutrition	○	○	○		○
Education	○	○	○	○	○
Basic Utilities	○	○	○	○	○
Roads	○	○	○	○	○
Agriculture		○	○	○	○
Fisheries		○		○	
Livelihood	○	○	○	○	○
Other highly prioritized needs	Institutional arrangement	Improve peace environment			

## 5.7 FEASIBILITY STUDY

The analysis of development needs provides an important understanding regarding the trends and characteristics of the development needs in CAAM. However, more detailed information on desired projects is needed in order to examine their technical feasibility, estimated costs, degree of expected impact, and the number of beneficiaries, and so on. Cost-benefit analysis and other feasibility examinations must be undertaken as a part of the effective formulation of CAPs.

The Study Team has been conducting pre-feasibility studies in sampling sites as shown in Table 5.7-1. The categorized average is also summarized in Table 5.7-2. In total, twenty four high priority needs were investigated. A word of caution may be required here; these sites were selected only for the sake of examining the general feasibility of meeting specific needs, and thus it does not indicate any commitment to future project implementations by any entity.

In order to have cost-benefit estimation, the Internal Rate of Return, or IRR and Present Value have been calculated with the assumption of a 10 % social discount rate and a project life of 6 to 10 years based on project characteristics. As is natural, project related economic activities such as livelihood and farm Facilities tend to have a higher IRR. In contrast, *Basic Social Services* projects have a relatively lower IRR. *Education* projects such as school and madrasah buildings have an even lower IRR and a negative Present Value. This is possibly because the direct beneficiaries are limited to children, the number of which is relatively smaller than that of other projects. *Road* projects also have a small IRR and a negative Present Value simply due to their higher costs. *Multipurpose buildings*, which are mainly aimed at having social gatherings, also show a lower economic value. These projects shouldn't be judged on their feasibility from an economic point of view even though the community highly prioritized them. Thus support from donors and the upper layers of government units are vital in order to support such projects.

**Table 5.7-1 Summary of 24 Pre-Feasibility Studies**

No.	Project needs	Location	Estimated Beneficiary	Cost Estimation (Peso)	Cost per Person	Present Value	IRR
1	Water System Development	Balut, Marogong, Lanao del Sur	2,000	3,690,000	1,845	Positive	14.2%
2	Water Spring Development	Nalus, Kiamba, Sarangani	3,000	4,000,000	1,333	Positive	8.3%
3	Water Spring Development	Mindupok, Maitum, Sarangani	3,000	4,180,000	1,393	Positive	19.0%
4	Health Center	Makainis, S.K.	2,000	550,000	275	Positive	19.7%

No.	Project needs	Location	Estimated Beneficiary	Cost Estimation (Peso)	Cost per Person	Present Value	IRR
	Construction	Pendatun, Maguindanao					
5	Health Center Construction	Sampao, Lutayan, Sultan Kudarat	2,000	510,000	255	Positive	11.2%
6	School Building Construction	Mangudadatu, Maguindanao	165	2,340,000	14,182	Positive	1.1%
7	School Building Construction	Upper Idteg, Paglat, Maguindanao	516	1,670,000	3,236	Positive	20.2%
8	Madrasah Building Construction	Palian, Tupi, South Cotabato	150	2,480,000	16,533	Negative	-4.8%
9	Madrasah Building Construction	Dungan, Aleosan, North Cotabato	128	1,770,000	13,828	Negative	3.4%
10	Road Rehabilitation	Tuanadatu, Maitum, Sarangani	5,000	56,260,000	11,252	Positive	13.8%
11	Road Rehabilitation	Padas, Pagayawan, Lanao del Sur	4,000	17,280,000	4,320	Negative	8.3%
12	Irrigation System Development	Bugawas, Datu Odin Sinsuat, Shariff Kabunsuan	3,000	8,580,000	2,860	Positive	57.8%
13	Farm Facilities (Warehouse and Solar Dryer) Construction	Kayupo, Pandag, Maguindanao	2,700	1,160,000	430	Positive	55.3%
14	Farm Facilities (Warehouse and Solar Dryer) Construction	Sampao, Guindulungan, Maguindanao	730	1,100,000	1,507	Positive	56.0%
15	Farm Facilities (Warehouse and Solar Dryer) Construction	Lower Taviran, Kabuntalan, Shariff Kabunsuan	600	1,650,000	2,750	Positive	38.6%
16	Farm Facilities (Farm Equipment)	Kayaga, Kabacan, North Cotabato	2,500	1,540,000	616	Positive	61.5%
17	Farm Equipment	Pagangan, Aleosan, North Cotabato	2,000	1,760,000	880	Positive	38.8%
18	Farm Animal Livelihood	Mayo, Columbio, Sultan Kudarat	500	1,580,000	3,160	Positive	88.7%
19	Fishing Livelihood	Penansaran, Datu Blah Sinsuat, Shariff Kabunsuan	2,000	2,640,000	1,320	Positive	186.4 %

No.	Project needs	Location	Estimated Beneficiary	Cost Estimation (Peso)	Cost per Person	Present Value	IRR
20	Bakery Livelihood	Malatimon, Ampatuan, Maguindanao	80	610,000	7,625	Positive	49.8%
21	River Protection Construction	Salabaca, Daladap, Esperanza, Sultan Kudarat	2,000	38,500,000	19,250	Positive	21.0%
22	Nika-an Spillway Construction	Paruayan, Alamada, North Cotabato	2,000	5,000,000	2,500	Positive	30.7%
23	Multi Purpose Center Construction	Kurentem, Datu Odin Sinsuat, Shariff Kabunsuan	1,000	1,760,000	1,760	Positive	10.9%
24	Multi Purpose Center Construction	Dungo-an, M'lang, North Cotabato	1,000	1,320,000	1,320	Negative	5.1%

	Basic Social Service		Economic Infrastructure
	Livelihood		Public Facility

**Table 5.7-2 Summary of 24 Pre-Feasibility Studies by Sector**

Project needs	No. of FS	Estimated Beneficiary	Cost Estimation (Peso)	Cost per Person	Present Value Positive/Negative
Basic Utilities	3	2,667	3,956,667	1,484	2/1
Health	2	2,000	530,000	265	2/0
Education	4	240	2,065,000	8,613	1/3
Road	2	4,500	36,770,000	8,171	1/1
Agriculture	7	1,719	2,701,667	1,572	7/0
Non-Firm Livelihood	1	80	610,000	7,625	1/0
Fishery	1	2,000	2,640,000	1,320	1/0
Environment Management	2	2,000	21,750,000	10,875	2/0
Culture and Sports	2	1,000	1,540,000	1,540	1/1

## 5.8 POTENTIAL PROJECT LIST FOR COMMUNITY ACTION PLAN

CAPs are expected to be implemented in the very near future in order to improve the quality of life of those in the CAAM communities which have been affected considerably by the prolonged conflict. The project list of the first priority needs in the IBNA is at present the best reliable long list for CAP projects. The projects based on IBNA needs will be welcomed by the stakeholders and communities since these projects were identified based on community consensus. However, we do not have to limit the target to only the IBNA sites. Other barangays in need, which can be easily identified through searching the Barangay Database, may be added to the CAP.

Table 5.8-1 shows the priority needs project for the IBNA which is categorized and presented by sector and area so that one can easily find candidates for future projects. However, information in the table such as the needs and estimated costs may not have a high level of detail or accuracy as they are merely based on the community declarations from workshops. Thus, as discussed already, a sector-wise master plan and a series of feasibility studies are recommended in some sectors before implementing CAP projects so as not to waste scarce resources due to duplication, and the confused priorities often associated with community-based development interventions.

**Table 5.8-1 List of the first priority projects of IBNA**

PROVINCE	MUNICIPALITY	BARANGAY	ROUND-UP			
			DEVELOPMENT NEEDS	DETAIL OF THE NEEDS	BENEFICIARIES (FAMILIES)	ESTIMATED COST
<b>WATER SYSTEM</b>						
NORTH COTABATO	PIGKAWAYAN	BANUCAGON	Water System: Level 1	N/A	N/A	N/A
LANAO DEL SUR	BALABAGAN	TATAYA	Water System: Level 2	Water source from the mountain of Pansor which is 6 km from Tataya	All residents of barangay Tataya and nearby barangays	N/A
LANAO DEL SUR	BINIDAYAN	BUBONGA-RANAO	Water System: Level 2	Spring development 2 km from the barangay.	All residents of barangay Bubonga-Ranao and nearby barangays	N/A
LANAO DEL SUR	LUMBATAN	LUMBAC	Water System: Level 2	Spring development 1 km from the barangay	All residents of barangay Lumbac and nearby barangays	N/A
LANAO DEL SUR	MAROGONG	BALUT	Water System: Level 2	Spring development with intake box 3 km from the barangay	All residents of barangay Balt and nearby barangays	3.7M
NORTH COTABATO	BANISILAN	SALAMA	Water System: Level 2	Larger Hose/ Pipelines Water Pump Reservoir	All residents of barangay Salama and nearby barangays	0.25M
SARANGANI	GLAN	PANGYAN	Water System: Level 2	Three (3) units reservoir with public faucets, seven (7) km piping from the spring water source to the barangay	90% of the residents in barangay Pangyan	N/A

PROVINCE	MUNICIPALITY	BARANGAY	ROUND-UP			
			DEVELOPMENT NEEDS	DETAIL OF THE NEEDS	BENEFICIARIES (FAMILIES)	ESTIMATED COST
SARANGANI	KIAMBA	NALUS	Water System: Level 2	Construction of spring development in Bocay-il spring water source 7 km away, 10ft x 10ft x 5ft dimensions with intake box, piping, and tab slabs	All residents of 9 out of 11 Purok in barangay Nalus	4.0M
SARANGANI	MAITUM	MINDUPOK	Water System: Level 2	Two (2) units of elevated water reservoir at 4m x 4m x 3m with complete accessories including pipelines and intake box	All residents of 9 Purok in barangay Mindupok (740 HH)	4.2M
SARANGANI	MALAPATAN	SAPU MASLA	Water System: Level 2	Four (4) units reservoir with 15-km piping lines and 16 units of communal public faucets	All residents of 17 sitios in barangay Sapu Masla (1025 HH)	N/A
LANAO DEL NORTE	MATUNGGAO	PANGI KABASARAN	Water System: Level 2	Reservoir: 3 m x 3m x 3m; pipes, submersible pump, generator	70% of the residents in barangay Pangi	1.2M
LANAO DEL NORTE	PANTAW-RAGAT	ALO-ON	Water System: Level 2	Reservoir: 3m x 3m x 3m; pipes, submersible pump	70% of the residents in barangay Alo-on	0.5M
LANAO DEL NORTE	POONA-PIAGAPO	LUPITAN	Water System: Level 2	Reservoir with distribution pipes direct to residents' houses	More than 700 residents of barangay Lupitan	N/A
LANAO DEL SUR	BUTIG	TIMBAB	Water System: Level 2		All residents of barangay Timbab	N/A
LANAO DEL SUR	LUMBA BAYABAO	BUAD LUMBAC	Water System: Level 2	Dimensions: 1.8 m x 1.6 m x 1.8 m	All residents of barangay Buad Lumbac	0.2M
ZAMBOANGA DEL SUR	LABANGAN	UPPER SANG-AN	Water System: Level 2	Renovation of Water System Water System Level 2 with communal tap stand/ faucet, Water Tank (Reservoir), Water Pump, Pipe	All residents of barangay Upper Sang-an	4.0M
ZAMBOANGA DEL SUR	MARGOSATUBIG	TALANUSA	Water System: Level 2	Water system and continuation of spring development and construction of reservoir	All residents of barangay Talanusa	3.0M
ZAMBOANGA SIBUGAY	ALICIA	LITAYON	Water System: Level 2	Water System 11 with water pump	All residents of barangay Litayon	3.0M
ZAMBOANGA SIBUGAY	BUUG	DATU PANAS	Water System: Level 2	3.5 km Kianan from spring source Construction and water reservoir with distribution pipes	All residents of Puroks 1 to 9 of Barangay Datu Panas	4.0M
NORTH COTABATO	PIGKAWAYAN	SIMSIMAN	Water System: Level 3	Existing water system will be converted to Level 3	All residents of barangay Simsiman	3.0M
COMPOSTELA VALLEY	PANTUKAN	MATIAO	Water System: Level 3	Construction of reservoir with distribution pipes	All residents of barangay Matiao	
ZAMBOANGA SIBUGAY	MALANGAS	SINUSAYAN	Water System: Rehabilitation	Electric motor pump of 700 wattage at PHP70,000.00 1,000 m pipes from Barangay Bacao to existing reservoir at PHP492,000.00	115 households of barangay Sinusayan	2.0M
MAGUINDANAO	BULUAN	DIGAL	Water System: Reservoir	3m x 3m dimension of reservoir	80% of the residents in barangay Digal and students in nearby school	N/A

PROVINCE	MUNICIPALITY	BARANGAY	ROUND-UP			
			DEVELOPMENT NEEDS	DETAIL OF THE NEEDS	BENEFICIARIES (FAMILIES)	ESTIMATED COST
<b>ELECTRIFICATION</b>						
MAGUINDANAO	DATU PAGLAS	BULOD	Electrification: National Power Corporation	Provision of Electrification System	All residents of Barangay Bulod (457 HH)	N/A
MAGUINDANAO	SHARIFF AGUAK	LABU-LABU 1	Electrification: National Power Corporation	Installation of transformer	All residents of barangay Labu-Labu 1 (903 HH)	0.3M
LANAO DEL SUR	KAPATAGAN	LUSAIN	Electrification: Power Generator	4 generators	All residents of 7 sitios in barangay Lusain	0.12M
<b>HEALTH CENTER</b>						
MAGUINDANAO	GEN. SK PENDATUN	MAKAINIS	Health Center - New Construction	1 Health Center w/ complete facilities	All residents of barangay Makainis and nearby barangays	0.6M
SARANGANI	KIAMBA	DATU DANI	Health Center - New Construction	10 m x 7m dimension with lavatory, kitchen with built - in CR and health facilities	All residents of barangay Datu Dni (284 HH)	N/A
SHARIFF KABUNSUAN	BARIRA	GADUNG	Health Center - New Construction	Standard size of health center with complete facilities	All residents of barangay Gadung (575 HH)	N/A
SULTAN KUDARAT	LUTAYAN	SAMPAO	Health Center - New Construction	Health center: Provision of health facilities with a dimension of 30 ft x 24 ft	All residents of barangay Sampao	0.5M
ZAMBOANGA SIBUGAY	SIOCON	MALAMBUHANGIN	Health Center - New Construction	Construction of Health Center (Area: 7m X 10m) with Health facilities ,Medicinal supplies and Health worker	All residents of barangay Malambuhangin	0.8M
NORTH COTABATO	ARAKAN	GREEN FIELD	Hospital	Concrete hospital with complete medical facilities 20 bedrooms Area is located over the hill Building 24 m x 24 m with complete facilities, Doctors, Nurses, Midwives, and other personnel	All residents of Arakan municipality and nearby municipalities in the Province of Bukidnon	9.5M
<b>FARM EQUIPMENTS/FACILITIES</b>						
LANAO DEL SUR	SULTAN DOMALONDONG	BACAYAWAN	Farm Equipment	Units: 1 tractor, 2 rice millers	All farmers of barangay Bacayawan	1.5M
ZAMBOANGA DEL NORTE	BALIGUIAN	DIANGAS	Farm Equipment	Provision of Farm Equipment (such as Mud Boat, Thresher and plows) 4 sets, 1 set each Sitio	All farmers of 4 Sittios in barangay Diangas	0.4M
LANAO DEL SUR	BAYANG	BANDINGAN	Farm Equipment: Tractor	1 tractor	All residents of barangay Bandingan	7.0M
NORTH COTABATO	KABACAN	KAYAGA	Farm Equipment: Tractor	Complete Set of Hand tractor, including thresher at each Sitio	All farmers of barangay Kayaga (7 sitios)	1.5M
LANAO DEL SUR	DITSAAN RAMAIN	BAGOANGUD	Farm Facilities	Solar Dryer (with warehouse): 60m x 24m; 1 tractor and 1 thresher	All farmers of barangay Bagoangud ( 350 farmers)	3.0M
MAGUINDANAO	PANDAG	KAYUPO	Farm Facility: Solar Dryer	30m x 50m or 15m x 20m dimension of Solar Dryer (in Sitio Dealings, Pagalungan & Purok 5)	70% of farmers in barangay. Kayupo and 30% of farmers in barangays Malangit, Damalusay and Salam	1.2M
MAGUINDANAO	SHARIFF AGUAK	KULOY	Farm Facility: Solar Dryer	1 unit Solar Dryer with Basketball court	90 % of farmers in barangay Kuloy	0.35M

PROVINCE	MUNICIPALITY	BARANGAY	ROUND-UP			
			DEVELOPMENT NEEDS	DETAIL OF THE NEEDS	BENEFICIARIES (FAMILIES)	ESTIMATED COST
MAGUINDANAO	GUINDOLONGAN	SAMPAO	Farm Facility: Solar Dryer With Warehouse	50 x 40 m (dimensions for solar dryer) 15 x 10 m (for warehouse)	All residents of barangay Sampao	1.1M
NORTH COTABATO	CARMEN	LANOON	Farm Facility: Solar Dryer With Warehouse	20m x 15m Solar Dryer	All farmers of barangay Lanoon and Pebpolan	1.4M
NORTH COTABATO	MIDSAYAP	LUMUPOG	Farm Facility: Solar Dryer With Warehouse	Solar Dryer: 20 x 30 m Warehouse: 18 x 24 feet	All farmers of barangay Lumupog	0.5M
SHARIFF KABUNSUAN	KABUNTALAN	LOWER TAVIRAN	Farm Facility: Solar Dryer With Warehouse	One (1) unit solar dryer with a dimension of 24m x 12m with basketball court and warehouse dimension is 40ft x 30ft.	All residents of barangay Lower Taviran (160 HH)	1.7M
SULTAN KUDARAT	LAMBAYONG	SADSALAN	Farm Facility: Solar Dryer With Warehouse	Solar Dryer: Construction of solar dryer with a dimension of 40m x 30m (1 unit per sitio)	All farmers of barangay Sedsalan with an estimated number of 1,400 individuals	N/A
SULTAN KUDARAT	PALIMBANG	MALISBONG	Farm Facility: Solar Dryer With Warehouse	Solar Dryer: Rehabilitation of 1 unit solar dryer with a dimension of 60m x 40m (earth filling and paving)	70% of farmers including youths in barangay Malisbong	N/A
DAVAO ORIENTAL	Tarragona	OMPAO	Farm Facility: Solar Dryer With Warehouse	Solar Dryer Dims:30m x 20m, Warehouse Dims: 12m x 8m, Corn Miller: 150 Hp	All farmers of barangay Ompao	N/A
MAGUINDANAO	SULTAN SA BARONGIS	MASULOT	Working Animals: Carabaos	150 carabaos (60% of population needs working animals)	60 % of the residents in barangay Masulot	3.0M
SHARIFF KABUNSUAN	BULDON	NUYO	Working Animals: Carabaos	Twenty (20) heads of working animals per sitio with 10 sitios in the barangay	All residents of barangay Nuyo (453 HH)	N/A
<b>FISHING EQUIPMENTS</b>						
ZAMBOANGA SIBUGAY	PAYAO	SILAL	Fishing Equipment: Fish Cage	5 sets of fish cage 1 unit of pump boat	All residents/fishermen in barangay Silal	0.25M
SHARIFF KABUNSUAN	DATU BLAH SINSUAT	PENANSARAN	Fishing Equipment: Pump Boat w/ Fish Net	100 pieces of pumpboat with fishing facilities	All residents of Penansaran (680 HH)	2.6M
<b>IRRIGATION SYSTEM/FACILITY</b>						
SARANGANI	GLAN	KAPATAN	Irrigation Facility: Lining Canal	One (1) Km in length with wripwrap	All residents of 5 sitios in barangay Kapatan (639 HH)	N/A
SHARIFF KABUNSUAN	DATU ODIN SINSUAT	BUGAWAS	Irrigation System: Communal	N/A	N/A	8.6M
<b>LIVELIHOOD</b>						
LANAO DEL SUR	BUADIPUSO-BUNTONG	TUKA	Livelihood	50 units pump boat (5Hp); 50 bags of rice inputs; 50 bags of fertilizer; microfinance	All farmers and women in barangay Tuka	0.6M
MAGUINDANAO	AMPATUAN	MALATIMON	Livelihood: Bakery	Mixer, Oven, Slicer, Gas Tank, Iron Tray Location: Poblacion	All residents of barangay Malatimon with about 1,950 individuals	0.6M
SULTAN KUDARAT	COLUMBIO	MAYO	Livelihood: Livestock - Carabaos	Ten (10) heads of carabaos per sitio	An estimated 500 farmers	1.6.M
SULTAN KUDARAT	PRESIDENT QUIRINO	PEDTUBO	Livelihood: Livestock - Carabaos	Provisions of 20 heads of carabao and 20 heads of cow per sitio	All residents of barangay Pedtubo	N/A

PROVINCE	MUNICIPALITY	BARANGAY	ROUND-UP			
			DEVELOPMENT NEEDS	DETAIL OF THE NEEDS	BENEFICIARIES (FAMILIES)	ESTIMATED COST
ZAMBOANGA SIBUGAY	MABUHAY	TANDO-COMOT	Livelihood: Livestock - Carabaos	5-year old working carabao 5HH per carabao 20 heads with 2 male carabaos PHP20,000 per female and PHP25,000 per male carabao. Total Cost: PHP450,000.00	All residents of barangay Tando-Comot	0.5M
NORTH COTABATO	ALEOSAN	PAGANGAN	Livelihood: Livestock - Cows	N/A	N/A	N/A
NORTH COTABATO	MAKILALA	SAGUING	Livelihood: Livestock - Cows	5 cows for breeding/female 5 male carabaos (8 months old at PHP 10,000.00 x 10 cattle)	All farmers of barangay Saguing including Muslim, Christian and IP's (278 HH)	0.1M
SOUTH COTABATO	POLOMOLOK	BENTUNG	Livelihood: Livestock - Cows	16 heads of cow: 2 bulls and 14 female cows	All residents of 7 sittings in barangay Bentung (351 HH)	0.4M
<b>BARANGAY HALL</b>						
LANAO DEL SUR	MARANTAO	KIALDAN	Barangay Hall	Three (3) rooms, 15m x 15m, office of chairman, temp. HC, session hall	All barangay officials and constituents in barangay Kialdan	1.0M
<b>MULTI-PURPOSE CENTER</b>						
LANAO DEL SUR	BALINDONG	NUSA LUMBA RANAO	Multi-Purpose Center: New Construction	Two-story building with dimensions of 50m x 40m with 2 toilets (1 for male and 1 female) (6 rooms each)	All residents of barangay Nusa Lumba Ranao	N/A
LANAO DEL SUR	GANASSI	MACABAO	Multi-Purpose Center: New Construction	Two-story building with dimensions of 30 m x 20 m with 12 classrooms for madarish	58 households of barangay Macabao	6-7M
LANAO DEL SUR	PUALAS	ROMAGONDONG	Multi-Purpose Center: New Construction	Construction of two-story building with a dimension of 30m x 20m with Mosque at the ground floor (with water facility)	All residents of barangay Romagondong	N/A
LANAO DEL SUR	TUGAYA	PINDOLONAN II	Multi-Purpose Center: New Construction	Dimensions: 50ft x 40ft (8 rooms), 4 rooms per side, 2 toilets for male and female (with water facility); open space at the center for social gatherings	All residents of barangay Pindolonan II (52 HH)	N/A
NORTH COTABATO	KABACAN	SIMONE	Multi-Purpose Center: New Construction	Building size is 30 ft x 100 ft	All residents of barangay Simone	1.0M
NORTH COTABATO	MATALAM	TACULEN	Multi-Purpose Center: New Construction	Construction of new multi-purpose building (2 class rooms with comfort room) This serves as Day Care Center during Mon-Thurs and Madrasah during Fri-Sunday	160 pupils (Arabic & Day Care) from different puroks of Taculen and nearby barangays	0.6M
LANAO DEL SUR	MULONDO	DIMARAO	Multi-Purpose Center: New Construction	Dimensions: 60m x 24m	All residents of barangay Dimarao and nearby barangays	3.0M
LANAO DEL SUR	PICONG	MIMBALAWAG	Multi-Purpose Center: New Construction	Dimensions: 18m x 9m	All residents of barangay Mimbawag	N/A
LANAO DEL SUR	TAMPARAN	TATAYAWAN NORTH	Multi-Purpose Center: New Construction	Dimensions: 21m x 15m	All residents of barangay Tatayawan North	0.36M
SHARIFF KABUNSUAN	DATU ODIN SINSUAT	KURENTEM	Multi-Purpose Center: New Construction	One (1) of building with 6 classrooms (standard size)	All pupils and students of barangay Kurentem (536 HH)	1.8M

PROVINCE	MUNICIPALITY	BARANGAY	ROUND-UP			
			DEVELOPMENT NEEDS	DETAIL OF THE NEEDS	BENEFICIARIES (FAMILIES)	ESTIMATED COST
ZAMBOANGA SIBUGAY	NAGA	BANGAKAWBANGKAW	Multi-Purpose Center: New Construction	Construction of Multi-purpose center in the barangay with complete facilities	All residents of barangay Bangkawbangkaw	1.0M
NORTH COTABATO	MIDSAYAP	KUDARANGAN	Multi-Purpose Center: Renovation	Construction of its walls, ceiling and flooring, painting with complete set of facilities	All residents and organization in barangay Kudarangan and nearby sitios	0.6M
NORTH COTABATO	M'LANG	DUNGGUAN	Multi-Purpose Center: Renovation	N/A	N/A	1.3M
<b>SCHOOL BUILDING</b>						
LANAO DEL SUR	MASIU	TALUB LANGI	School Building	4 unit buildings with 3 classrooms each (23m x 15m/unit)	All pupils and students of barangay Talub Langi	3.0M
MAGUINDANAO	DATU ANGGAL MIDTIMABANG	NUNANGEN	School Building: New Construction - Elementary	2 Rooms for Grade 1 7 Rooms (Grade 1-6)	290 Pupils of barangay Nunangen	0.3M
MAGUINDANAO	MANGUDADATU	KALIAN	School Building: New Construction - Elementary	2 unit school building with 4 rooms (Standard Size) with complete facilities	All students of barangay Kalian and some nearby barangays	2.3M
MAGUINDANAO	PAGLAT	UPPER IDTEG	School Building: New Construction - Elementary	3 unit of Building (4 rooms) Standard Size for School/Madrasah with complete facilities and comfort rooms	All students from Upper Idtig and 30% students from lower idteg	1.8M
MAGUINDANAO	TALITAY	KILADAP	School Building: New Construction - Elementary	2 Classrooms (7 m x 8 m per Classroom) with complete facilities and comfort room	90 pupils of Mapandala Elem School (from 4 Sitios of Kiladap and nearby barangays)	0.5M
NORTH COTABATO	BANISILAN	TINIMBACAN	School Building: New Construction - Elementary	Additional school building with complete set of facilities	All students of barangay Tinimbacan	0.5M
SHARIFF KABUNSUAN	MATANOG	KIDAMA	School Building: New Construction - Elementary	Three (3) units of school building (4 classrooms standard size) with comfort rooms and complete facilities	All students of barangay Kidama (315 HH)	N/A
BASILAN	AKBAR	LINUNGA	School Building: New Construction - Elementary	3 school building compose of 6 rooms	230 students who are now studying in Lamitan City (440 Households of barangay Linungan)	2.6 M
LANAO DEL SUR	KAPAI	PINDOLONAN	School Building: New Construction - Elementary	Elem: Two-story building with six (6) classrooms	Pupils and students of barangay Pindolonan and nearby barangays	N/A
ZAMBOANGA DEL SUR	DIMATALING	BACAYAWAN	School Building: New Construction - Elementary	Construction of school building with 3 classrooms for Grades 1, 2 and 3 Size 20m x 30m (To accommodate 50 pupils) Estimated Cost: PHP750,000.00	Grades 1-3 with about 150 pupils (50 pupils per classroom)	1.8M
ZAMBOANGA DEL NORTE	LABASON	BALAS	School Building: New Construction - High School	Construction of two-story building with 4 classrooms (with provisions of facilities such as chairs, tables, chalkboard & cabinets) Additional classroom teachers	175 students from 1st & 2nd year of Balas High School 200 incoming 1st year high school or elementary graduates from nearby barangays, 50 students, transferees from Poblacion High School.	3.0M

PROVINCE	MUNICIPALITY	BARANGAY	ROUND-UP			
			DEVELOPMENT NEEDS	DETAIL OF THE NEEDS	BENEFICIARIES (FAMILIES)	ESTIMATED COST
SHARIFF KABUNSUAN	NORTHERN KABUNTALAN	LIBUNGAN	School Building: Renovation - Hard Materials	2 units of elementary school buildings (1 unit has 2 classrooms and another unit has 4 classrooms) another 1 unit building for office and visitors' room with CR	187 students from grades 1 to 6	N/A
<b>MADRASAH</b>						
SULTAN KUDARAT	LEBAK	DATUKARON	Madrasah	Madrasah: Six (6) classrooms building with dimensions of 8m x 7m per classroom	All Arabic pupils and students of barangay Datukaron, estimated 150 students	N/A
LANAO DEL SUR	MALABANG	MANGGAHAN	Madrasah: New Construction	1 Madrasah building with table, chair, blackboard		N/A
LANAO DEL SUR	TUBURAN	ALOG	Madrasah: New Construction	Three (3) classrooms Madrasah building	All Arabic pupils and students of barangay Alog	N/A
SOUTH COTABATO	TUPI	PALIAN	Madrasah: New Construction	Two (2) classrooms (8m x 7m dimensions)	155 pupils of barangay Palian from about 575 HH	2.5M
ZAMBOANGA SIBUGAY	TITAY	DALANGIN MUSLIM	Madrasah: New Construction	Construction of Additional Madrasah with complete facilities, with computer (for 120 Pupils)	120 pupils of barangay Dalangin Muslim	2.0M
NORTH COTABATO	ALEOSAN	DUNGGUAN	Madrasah: Renovation	N/A	N/A	1.8M
<b>ROAD AND BRIDGE</b>						
LANAO DEL SUR	MALABANG	BACAYAWAN	Road: Paving	Road from Panganiban to Bacayawan with a distance of 700 meters	All residents of barangay Bacayawan	N/A
LANAO DEL SUR	PAGAYAWAN	GUIARONG	Road: Paving	Rehabilitation and paving of the existing 7 km road from the national highway to Guiarong (2 lanes)	All residents of barangay Guiarong, and nearby barangays such as Ayong, Paigoay and Bangon	N/A
LANAO DEL SUR	PAGAYAWAN	PADAS	Road: Paving	Rehabilitation and paving of the existing 7-km road from Paraba, Ganasi to barangay Padas (2 lanes)	All residents of barangay Padas and nearby barangays	N/A
SHARIFF KABUNSUAN	NORTH UPI	GANASI	Road: Paving	Concrete road with a standard size, 4 km from the national road to barangay proper including the 4 sets of box culvert	All residents of barangay Ganasi (230 HH) and nearby barangays such as Nuran, Biarong and Bongo.	N/A
BASILAN	LAMITAN	BOHEIBU	Road: Paving	Rehabilitation of 2-km road from the boundary of Brgy Cabobo to Brgy Boheibu	All residents of barangay Boheibu.	N/A
LANAO DEL NORTE	KAUSWAGAN	TACUB	Road: Paving	Road: Four (4)-km long	All residents of barangay Tacub and nearby barangays	N/A
LANAO DEL NORTE	MUNAI	PANGAO	Road: Paving	Four (4)-km long	All residents of barangay Pangao and nearby barangays	N/A
LANAO DEL SUR	SAGUIARAN	MAPANTAO	Road: Paving	Continuation of 140-m road from provincial road to barangay proper; additional 500-m road	All residents of barangay Mapantao and nearby barangays such as Pantao, Cadayonan, Malinang	N/A
ZAMBOANGA DEL NORTE	SIBUCO	LAKIKI	Road: Paving	Concrete road – 6 km from the boundary of Poblacion Sibuco going to barangay Lakiki  90-m concrete bridge (elevated)	All residents of barangay Lakiki	N/A

PROVINCE	MUNICIPALITY	BARANGAY	ROUND-UP			
			DEVELOPMENT NEEDS	DETAIL OF THE NEEDS	BENEFICIARIES (FAMILIES)	ESTIMATED COST
ZAMBOANGA DEL NORTE	SIRAWAY	LIBUCON	Road: Paving	Paving of Farm to 6-km market road with construction of 50-m Concrete Bridge	All residents of barangay Libucon and nearby barangays, such as Pisa Puti, and Pisa Itom)	N/A
ZAMBOANGA DEL SUR	DINAS	NIAN	Road: Paving	Paving of roads which makes traveling easier and comfortable to all vehicles who pass by and eventually lowers the transportation cost of farm products and prices of basic commodities in the barangay	All residents of barangay Nian	N/A
ZAMBOANGA DEL SUR	LAPUYAN	LUANAN	Road: Paving	Paving of 3-km road is needed to make the delivery of farm services and farm goods better and faster.	All residents of barangay Luanan	N/A
ZAMBOANGA SIBUGAY	KABASALAN	SINIMAN	Road: Paving	Paved 5-km road from crossing Brgy. Sininan to the barangay hall	All residents of barangay Siniman	N/A
ZAMBOANGA SIBUGAY	OLUTANGA	LOOC SAPI	Road: Paving	3-km rehabilitation of road	All residents of barangay Loooc Sapi	N/A
ZAMBOANGA SIBUGAY	RT. LIM	SILINGAN	Road: Paving	Road Paving Barangay to National Road 5 to 7 km; barangay Silingan to Tigbalabog – 3 km	All residents of barangay Silingan	N/A
MAGUINDANAO	DATU SAUDI	GAWANG	Road: Farm-to-Market Road	Earth fill and gravel (3 km) Gawang to Dapiawan Market 1-m thick and 4-m wide	About 350 House Holds in barangay Gawang and nearby barangays, such as Andavit, Elian, and Tee	N/A
MAGUINDANAO	DATU UNSAY	META	Road: Farm-to-Market Road	1 km (Proper Bantingao to municipal road)	All residents of barangay Bantingao and other residents of barangay Meta	N/A
MAGUINDANAO	TALAYAN	KATIBPUAN	Road: Farm-to-Market Road	2.5 km White stone (class A) 8-m wide x 2.5 km 12 cu. M (Sitio Kilaram to Katibpuan)	80 % of the residents in barangay Katibpuan and 60 % of the residents in sitio Kilaram with about 1,725 individuals	N/A
SARANGANI	MAITUM	TUANADATU	Road: Farm-to-Market Road	18-km long with bridge	All residents of barangay Tuanadatu (423 HH) and nearby barangays	N/A
SULTAN KUDARAT	ISULAN	BUAL	Road: Farm-to-Market Road	FMR: Earth filling and gravelling with distances of 4 km for site 1, 2.5 km for site 2 and 2 mini bridges connecting the road of site 2.	All farmers of barangay Bual and nearby barangays, such as Daguma and Lagandang	N/A
SULTAN KUDARAT	KALAMANSIG	LIMULAN	Road: Farm-to-Market Road	FMR: Earth filling and gravelling of 20-km existing road	All residents of barangay Limulan	N/A
NORTH COTABATO	LIBUNGAN	CABPANGI	Road: Gravelling	3-km portion of the road must be rehabilitated and gravelled	All residents of the barangay Cabpangi	N/A
SARANGANI	MALAPATAN	PATAG	Road: Gravelling	12.5-km all-weather road	All residents of barangay Patag (371 HH) and nearby barangays	N/A
SULTAN KUDARAT	PALIMBANG	KANIPAAN	Road: Gravelling	Gravelling of 2.5-km existing road and provision of box culvert	All residents and about 255 farmers of barangay Kanipa-an	N/A

PROVINCE	MUNICIPALITY	BARANGAY	ROUND-UP			
			DEVELOPMENT NEEDS	DETAIL OF THE NEEDS	BENEFICIARIES (FAMILIES)	ESTIMATED COST
LANAO DEL NORTE	TANGCAL	LINAO	Road: Graveling	Twelve (12)-km long	All residents of barangay Linao and nearby barangays	N/A
LANAO DEL SUR	GANASSI	BAYA	Road: Opening	5-km long from the barangay to the national highway	All residents of barangay Baya (322 heads)	N/A
LANAO DEL SUR	MADALUM	BATO	Road: Opening	Opening and paving of 2-km FMR (new one lane)	All farmers from the barangay Bato and nearby barangays such as Kormatan, Madaya and Dandamun	N/A
LANAO DEL SUR	MADALUM	LINAO	Road: Opening	2.6 km from the paved road to the farm	All farmers of barangay Linao or 120 individuals with 84 Households	N/A
LANAO DEL SUR	PUALAS	BADAK	Road: Opening	1-km long from Badak to Romagondong with pavement of 30ft x 10ft in dimensions	All residents of barangay Badak	N/A
LANAO DEL NORTE	MAGSAYSAY	LAWIGADATU	Road: Opening	Fifteen (15)-km long	About 1,500 people of the barangay Lawigadatu	N/A
LANAO DEL SUR	BALABAGAN	PINDOLONAN	Road: Rehabilitation	5-km long From the national road to Sitio MPI of Pindolonan	All residents of barangay Pindolonan	N/A
MAGUINDANAO	SOUTH UPI	KIGAN	Road: Rehabilitation	5 km x 4 m (Pandan to Kigan)	All residents of barangay Kigan and nearby barangays, such as San Jose and Pandan with about 1,560 individuals	N/A
NORTH COTABATO	ARAKAN	DOROLUMAN	Road: Rehabilitation	Rehabilitation, drainage and graveling (6 km for the 4 sitios) 24 culverts: (Estimated Cost is 3.6 M) Paving of public market circuit (1 km around public market: PHP1.2 M) All rolling roads will be paved 1.1 km for 2 sitios: PHP 1.5M/km	All residents of barangay Doroloman and nearby barangays	N/A
BASILAN	LANTAWAN	BAUNGIS	Road: Rehabilitation	Construction of 4 km barangay road. This is the most difficult part of the road. Almost all means of transportation get stuck. This part is 98% inaccessible during rainy season.	All residents of barangay Baungis and students who are studying in barangay Canibugan	N/A
ZAMBOANGA SIBUGAY	TUNGAWAN	DATU TUMANGGONG	Road: Rehabilitation	Road Rehabilitation From Purok 1 near school site to datu tumanggong river – 4 km, from purok 1 near school site to Sitio Gubo 3km, From Purok 1 near school site to Ginacotan river 3-km rehabilitation road.	All residents of Barangay Datu Tumanggong and nearby barangays	N/A
LANAO DEL SUR	KAPATAGAN	SALAMEN	Bridge: Concrete Bridge	200-meter long	All residents of barangay Salamen	N/A
NORTH COTABATO	ALAMADA	PARUAYAN	Bridge: Concrete Bridge	Two concrete bridges especially in Campo 1. The site is located at Hillapas and Nicaan River	All residents of barangay Paruayan, and nearby municipality of Banisilan, Wao, Bukidnon, and Cagayan de Oro City	N/A
SHARIFF KABUNSUAN	SULTAN KUDARAT	DARAPANAN	Bridge: Concrete Bridge	N/A	N/A	N/A
SULTAN KUDARAT	BAGUMBAYAN	TUKA	Bridge: Concrete Bridge	Construction of 1-km long Ala bridge	All residents of barangay Tuka and nearby barangays	N/A

PROVINCE	MUNICIPALITY	BARANGAY	ROUND-UP			
			DEVELOPMENT NEEDS	DETAIL OF THE NEEDS	BENEFICIARIES (FAMILIES)	ESTIMATED COST
LANAO DEL SUR	TAGOLOAN II	MALINAO	Bridge: Concrete Bridge	Length: 30m	All residents and farmers of barangay Malinao	N/A
ZAMBOANGA DEL SUR	KUMALARANG	BOYUGAN WEST	Bridge: Hanging Bridge	Construction of 50-m long concrete bridge	All residents of barangay Boyugan West	N/A
<b>HOUSING PROJECT</b>						
LANAO DEL SUR	BACOLOD-KALAWI	BALUT	Housing Project: Core Shelter	Construction of 48 housing units in Balot	About 48 households with 303 individuals	N/A
<b>DISASTER CONTROL</b>						
MAGUINDANAO	DATU PIANG	KALIPAPA	Water Control: Controlled Dam	N/A	All residents and farmers of barangay Kalipapa	N/A
SULTAN KUDARAT	ESPERANZA	DALADAP	Water Control: Dike	Concrete construction with dimensions of 7-km long, 12-ft high	Residents and Farmers of barangay Daladap and nearby barangays	N/A
SULTAN KUDARAT	SEN. NINOY AQUINO	MIDTUNGOK	Water Control: Dike	Concrete or cyclone construction with a dimension of 1.5 km in length and 15ft in height (to be placed in Mintopok boundary)	All residents and farmers of barangay Midtungok or about 4,000 people	N/A
LANAO DEL NORTE	LINAMON	LARAPAN	Water Control: Sea Wall	Seawall: 100 m x 1m x 0.6m	About 126 households of barangay Larapan	N/A
<b>COVERED COURT</b>						
SARANGANI	MAASIM	KAMANGA	Covered Basketball Court	30m x 20m Concrete/steel structure with concrete chairs, sports facilities	All residents of barangay Kamanga with 2,929 individuals (585 HH)	N/A
<b>PORT</b>						
SHARIFF KABUNSUAN	PARANG	LIMBAYAN	Port	Concrete costal port with a dimension of 500m x 3m	All residents of barangay Limbayin (512HH)	N/A

## **CHAPTER 6**

### **SERD-CAAM GIS**

#### **6.1 GIS DATABASE PREPARATION FOR SERD-CAAM PROJECT**

The GIS Database development task under the Study is in support of the other tasks and activities to use geographic data and information combined with mapping and analysis. Through this process, GIS will be utilized to determine geographic patterns and relationships in the data collected under the Study. The results of this spatial analysis will give the Study a better insight on the present condition and help focus on the course of actions in planning for the socio-economic development of conflict-affected areas.

The objectives of the GIS database development component of the Study are:

- 1) To develop a GIS database that will be utilized for the formulation of the Action Plan and Socio-Economic Development Plan for the Conflict Affected Areas in Mindanao (SEDP-CAAM),
- 2) To integrate any existing GIS database with those which are to be developed based on data obtained by the Study. The product GIS database will be utilized by BDA and other related agencies for future planning, and
- 3) To provide technical support and training to the staff of BDA and other related agencies on the application of GIS to maintain and update the developed SERD-CAAM GIS Database.

##### **6.1.1 Study Tasks and GIS Database**

The Study involves collection of information from various sources to analyze the existing condition of the study area, which includes:

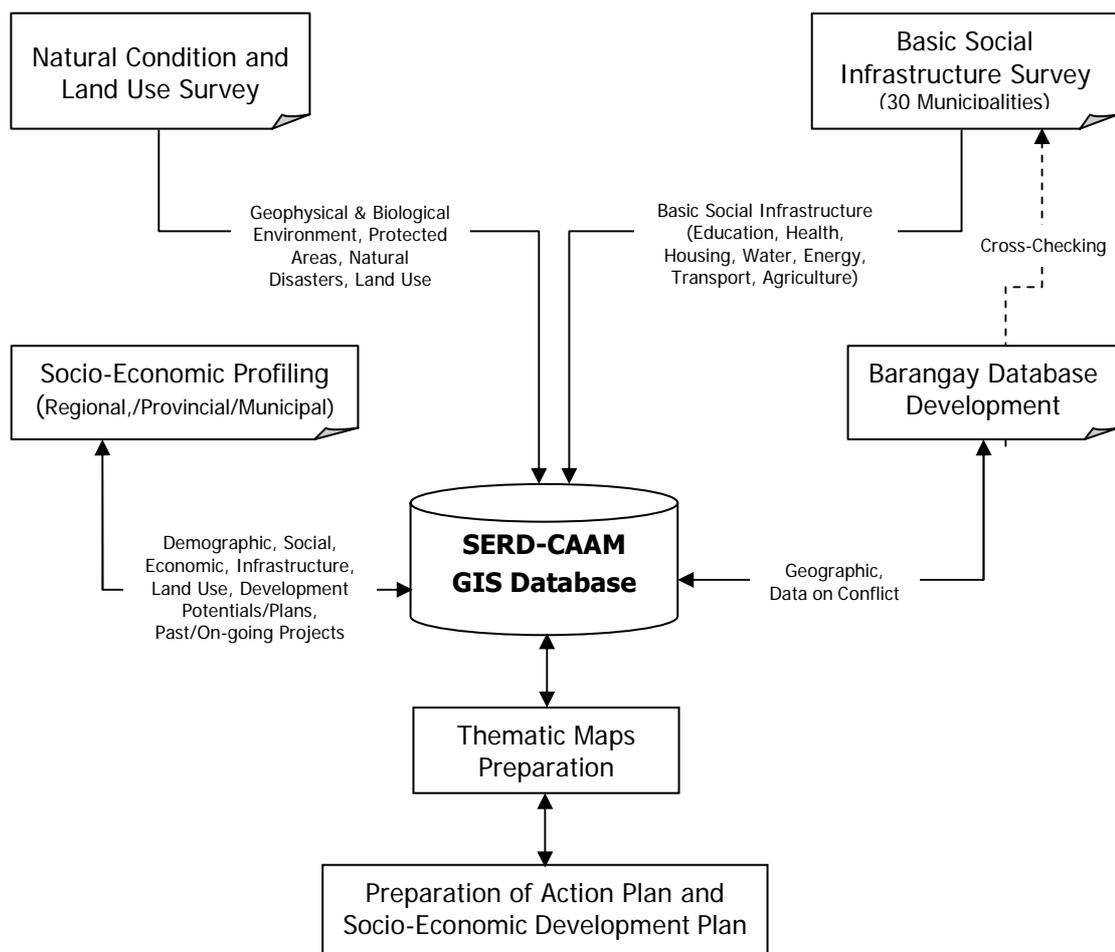
- geographic information and boundary conditions,
- natural condition,
- regional, provincial and municipal socio-economic profiles,
- barangay profiles and needs survey,
- basic social infrastructures at selected municipalities, and
- socio-economic programs and projects for the conflict-affected areas in Mindanao.

The data and information obtained from the different Study Tasks and Activities through

secondary data collection and actual ground surveys conducted by the Study Team are developed into a database for the SERD-CAAM project, as illustrated in Figure 6.1-1.

Figure 6.1-1 presents the contents of the SERD-CAAM GIS database which covers the administrative boundaries, physical and natural environment and conditions (geophysical and biological environment), demographic information, socio-economic information, programs and projects in the study area, infrastructure, development potentials and conflict-related information. The database will focus at regional, provincial and municipal levels in Mindanao and some barangay information in the conflict-affected areas.

To effectively utilize the GIS database, thematic maps will be prepared based on the results of the different surveys and data gathering activities and will be used to analyze the present condition of the study area and assess the necessary action plans for urgent rehabilitation at the community level and the socio-economic development interventions for a larger scale impact.



**Figure 6.1-1 Interrelationships Among Study Tasks and GIS Database Development**

Data were collected at different line agencies to populate the GIS database. At the same time, the Study Team conducted different surveys illustrated in Figure 6.1-1 which were used as additional data that supplemented or cross-checked the data obtained from different line agencies. Theme maps were prepared from the geodatabase and were utilized to support the analysis for action plan and socio-economic development plan.

### 6.1.2 Components of the GIS Database Development

The GIS database development task has two components: (1) Satellite Image Acquisition and Data Processing, and (2) GIS Database Development and Theme Maps Preparation.

#### 6.1.2.1 Satellite Image Acquisition and Data Processing

The first task of the GIS Database Development was the acquisition of satellite images covering the entire Mindanao area with a resolution of 20m or higher and a cloud cover ratio of less than 20%. 61 Satellite images were procured covering the Study area in Mindanao from year 2003 to 2007. These images were analyzed and processed to develop the landcover map of Mindanao. The landcover map processed from the satellite images were compared to NAMRIA's landcover map based on Landsat Images. Table 6.1-1 presents the satellite image acquisition and data processing. The satellite images were digitally geo-rectified and enhanced to produce satellite image mosaics of the entire area. The resulting images were then analyzed and interpreted using remote sensing techniques to generate the land cover map for Mindanao. These images were used to prepare the base map for the entire Mindanao including administrative boundary maps, land cover and land classification and natural environment condition.

**Table 6.1-1 Satellite Image Acquisition and Data Processing**

Activities	Accomplishment	Remarks
1. Satellite Image Acquisition	<ul style="list-style-type: none"> <li>• 61 Aster Satellite Images Acquired</li> <li>• Resolution : 20m or better</li> <li>• Cloud Cover: &lt; 20%</li> <li>• Year Coverage: 2003 - 2007</li> </ul>	<ul style="list-style-type: none"> <li>• 12 Archived Landsat ETM+ scenes were initially used to prepare Mindanao provincial maps</li> <li>• The 61 Aster Satellite Images were used to analyze land cover</li> </ul>
2. Satellite Image Processing and Analysis	<ul style="list-style-type: none"> <li>• Images were checked for quality, date and coverage</li> <li>• Images geo-rectified and enhanced</li> <li>• Satellite images processed to generate Landcover Map</li> </ul>	The resulting land cover map is being reviewed and compared with previous land cover map produced by NAMRIA

Figure 6.1-2 shows the Satellite Image mosaic of Mindanao while Figure 6.1-3 illustrates the land cover maps generated from the Landsat and Aster Satellite Images.

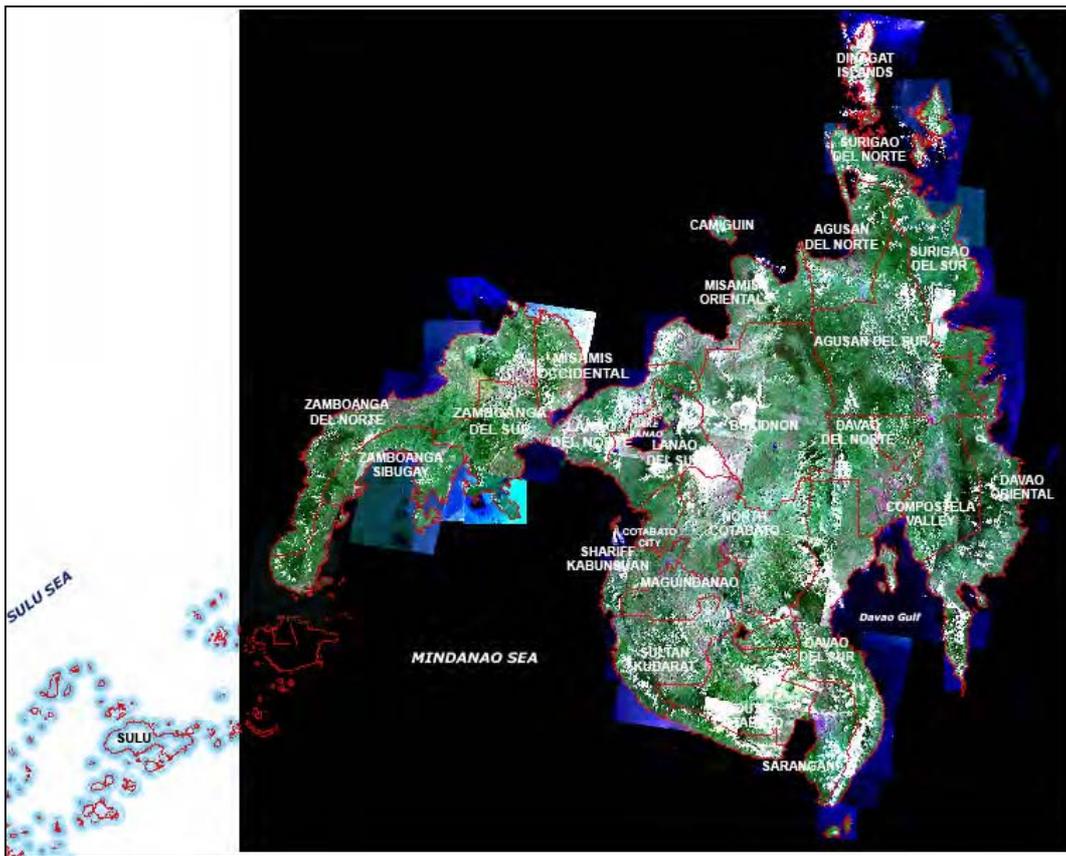


Figure 6.1-2 SERD-CAAM GIS Database



Figure 6.1-3 Land cover Map for Mindanao Based on Aster 2003-2007 Satellite Image

### **6.1.2.2 GIS Database Development**

The GIS database development activities include:

- Surveys and data gathering,
- data encoding,
- database build-up, and
- theme maps preparation.

Surveys and data gathering, encoding and database build-up has been completed. The source is shown in Table 6.1-2. Secondary data were collected from different agencies (including NEDA, DENR, DPWH, DSWD, etc.) and funding institutions to determine the existing condition in Mindanao. The Study Team also collected additional data through profiling surveys (regional, provincial, municipal, and barangay levels) and basic social infrastructure surveys which were used as input to the database.

Figure 6.1-4 illustrates the details of the basic contents of the database. The SERD-CAAM GIS database was developed to provide a baseline socio-economic condition of Mindanao in general and the project area, in particular. The initial database contained the results of the surveys and data gathering conducted by the Study Team considering its geographic relationships. In this case, the GIS database is limited in range to the scope of the Study.

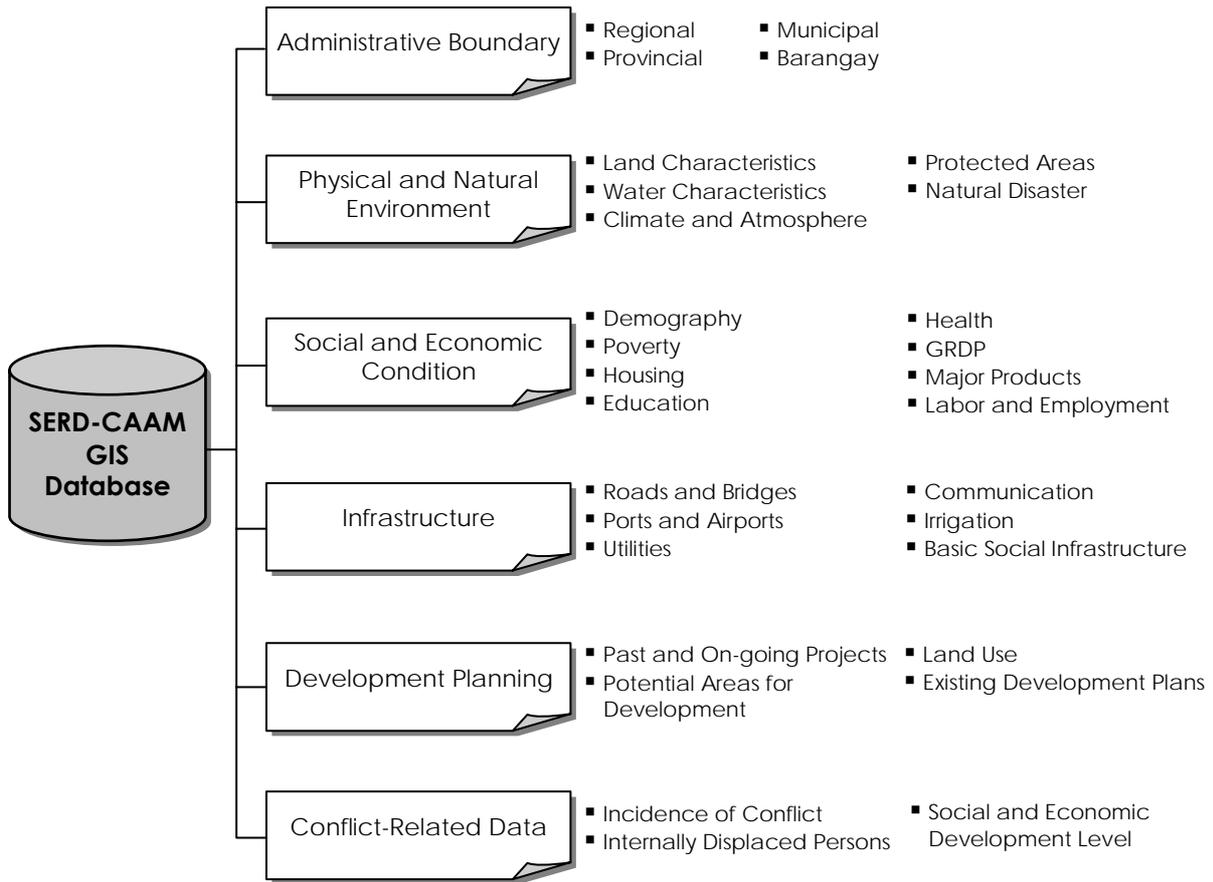


Figure 6.1-4 SERD-CAAM GIS Database

Under this task, theme maps were prepared to illustrate the geographic and spatial distribution of the data collected under different surveys. The theme maps were finalized with the contents presented in Table 6.1-3. A Sample of theme maps prepared is shown in Figure 6.1-5.

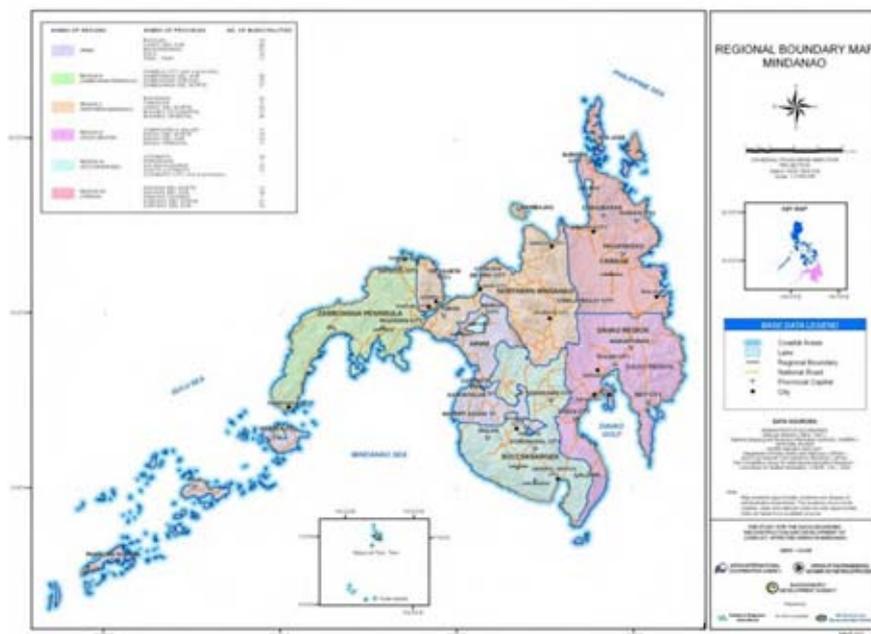


Figure 6.1-5 Sample of Theme Map

**Table 6.1-2 Progress of SERD-CAAM GIS Database Development**

Data Category		Description/Contents	Source
1.	Administrative Boundary	Regional, Provincial, Municipal and Barangay Boundaries	NAMRIA DENR ASTER Image (2003-2007)
2.	Land Characteristics	2002 Land Cover : Classification based on NAMRIA Land Cover Class	NAMRIA LANDSAT Image (2000-2002)
		2007 Land Cover	ASTER Satellite Image (2003-2007)
		Geology : Geological Structure in Mindanao	MGB, Ed.1, 1963, C 2004
		Soil Type in Mindanao	BSWM, 1950
		Soil Class in Mindanao	NAMRIA
		Land Classification : NAMRIA	NAMRIA
		Forest Cover in Mindanao	FMB, 2003
		Mineral Deposits : Minerals found in certain areas in Mindanao	MGB
		Production Forest : Areas in ARMM with productive forests	BSWM
		Protection Forest : Areas in ARMM with protected forests	BSWM
	Water Characteristics	Groundwater : Groundwater depth for ARMM area	BSWM
	Climate and Atmosphere	Climate Class : Type II, III, & IV climate class in Mindanao	PAGASA
		Monthly Rainfall : Monthly precipitation or rainfall in Mindanao	PAGASA, 2007
	Climate and Atmosphere	Monthly Relative Humidity : Ratio of water vapor in air to max. water vapor air can hold, per month	PAGASA, 2007
		Monthly Temperature Change : Max and Min temperature (°C)	PAGASA, 2007
		Monthly Wind Direction	PAGASA, 2007
		Monthly Wind Speed	PAGASA, 2007
		Annual PAGASA Station Data	PAGASA
	Protected Areas	Protected Areas in Mindanao	PAWB, 2004
		Key Biodiversity Areas	PAWB, 2006
	Natural Disaster	Flood Prone Areas	MGB
		Magnitude of Past Earthquakes : Earthquakes from 1897 to 2007 with magnitude of depth	PHILVOLCS, 1897-2007
		Landslide Susceptibility Due to Earthquake	PHILVOLCS, 2004
Soil Erosion : Areas with potential risk		BSWM	
Tsunami Risk Areas : Tsunami risk generators and potential		PHILVOLCS, 1994-1996	
Active and Inactive Volcanoes		PHILVOLCS, 2001	
Fault Lines and Trenches		PHILVOLCS, 2000	
Frequency and Cyclones		PAGASA	
Liquefaction Areas		PHILVOLCS	
El Nino Vulnerability for Agriculture		BSWM	
La Nina Vulnerability for Agriculture	BSWM		

Data Category	Description/Contents	Source	
3. Social and Economic Condition	Demography	Population Density : Provincial and Municipal	NSO, 1990-2000
		Population Growth : Regional, Provincial and Municipal	NSO
		Population Distribution by Religious Affinity	NSO, 2000
	Poverty	Annual Per Capita Poverty Thresholds, 2003-2004	NSO
		Annual Per Capita Poverty Thresholds and Incidences, 2002-2003	NSO
		Income Poverty Gap, Severity Poverty Per Region, 2000-2003	NSO
		Income Poverty Gap, Severity Poverty Per Province, 2000-2003	NSO
	Housing	Total Housing Expenditure/Percent Total Family Expenditure, 1997-2000	NSO, 2000
		Number of Households in Occupied Housing Units by Status of Tenure by Region	NSO, 2000
		Informal Settlements	NHA, 2000
	Education	Cohort Survival – Private and Public Elementary Schools, 1995-2003	NSO
		Cohort Survival – Private and Public Secondary Schools, 1995-2003	NSO
		Distribution of Government and Private Schools, 2002-2004	NSO
		Functional Literacy Households Population (10 to 64 years old), 1994-2003	NSO
		Net Participation Rate in Public and Private Elementary Schools, 1995-2003	NSO
		Net Participation Rate in Public and Private Secondary Schools, 1995-2003	NSO
		Simple Literacy Household Population, 1989, 1994, 2000)	NSO
		Distribution of Schools by Level of Education, 1985-1995	NSO
		Enrollment in Government and Private Schools by Level of Education, 1985-1995	NSO
		Number of Public and Private Schools per Region, SY2002-2003	NSO
		Number of Public and Private Schools per Region, SY2003-2004	NSO
		Number of Public and Private Schools per Region, SY2004-2005	NSO
	Health	Distribution of Licensed Government Hospitals and Health Facilities per Region, Province and Municipality	NSO
		Distribution of Licensed Private Hospitals and Health Facilities Per Region, Province and Municipality	NSO
		Number of Hospitals	NSO
		Number of Barangay Health Facilities	NSO
		Estimated Vital Rates of Life Expectancy of Birth (1980-2000)	NSO
		Mortality By Age Group Health By Region, Province and Municipality	NSO, 2000
Projected Life Expectancy At Birth By Sex and By Region 1995-2005		NSO	
Under 5 Years Mortality Rate, 1990-1998, 2003		NSO	

Data Category		Description/Contents	Source
3. Social and Economic Condition	Utilities	Telecom Subscribers	NTC, 2006
		Water Districts	PAWD
		Electric Cooperative System	NEA, 2003-2005
		Headquarters	NEA, 2003-2005
		Electrification Backbone Line	NEA, 2003-2005
		Electrification Sub-Station Headquarters	NEA, 2003-2005
	GRDP	Gross Regional Domestic Product (GRDP) of 1985 Prices (2000 – 2002)	NSO
		Gross Regional Domestic Product (GRDP) of 1985 Prices (2002 – 2004)	NSO
		Gross Regional Domestic Product (GRDP) Current Prices (2000 – 2002)	NSO
		Gross Regional Domestic Product (GRDP) Current Prices (2002 – 2004)	NSO
	Major Products	Palay Volume of Production by Region	BAS
		Coconut Volume of Production by Region	BAS
		Corn Volume of Production by Region	BAS
		Mango Volume of Production by Region	BAS
		Pineapple Volume of Production by Region	BAS
		Rubber Volume of Production by Region	BAS
	Labor and Employment	Labor Force Distribution	NSO
		Employment by Class	NSO, 2003
		Unemployment Rate, 2002-2003	NSO
Employed, 2002-2003		NSO	
Unemployed, 2002-2003		NSO	
Employment Ratio, 2002-2003		NSO	
4. Infrastructure	Roads and Bridges	National Roads	DPWH, 2007 ASTER Image, 2003-2007
		Bridge Inventory	DPWH, 2007 ASTER Image, 2003-2007
		Road Condition	DPWH, 2007 ASTER Image, 2003-2007
		Kilometer Post	DPWH, 2007 ASTER Image, 2003-2007
	Ports and Airports	Airports	ATO, 2004
		Seaports	NEDA PPA
		Primary and Secondary Tide Stations	CGSD NAMRIA
	Communication	Location of Post Offices	PPC, 2004
	Social Infrastructure	Licensed Hospitals	NSO
		Colleges and Universities	CHEDRO, 2006
		Private Elementary and High Schools	DepEd, 2005-2006
		Public Elementary Schools	DepEd, 2006-2007
		Public High Schools	DepEd, 2006-2007
	5. Development Planning	Past and On-going Projects	JBIC ASF Project Locations
GGP-JFY Projects			EOJ, 2007
SERD-CAAM On-The-Spot Assistance Projects			SERD-CAAM Study, 2007
SERD-CAAM Quick Impact Projects			SERD-CAAM Study, 2007

Data Category		Description/Contents	Source
5. Development Planning	Past and On-going Projects	Agricultural Projects	DA
		Communication Projects	DOTC
		Education Projects	DepEd
		Environmental Projects	DENR
		Facility Projects	DSWD
		Housing Projects	DSWD
		Infrastructure Projects	DPWH
		Social Projects	DSWD
		Transport Projects	DOTC
		Water Supply Projects	DSWD
	Potential Areas for Development	Existing ISAG (Industrial Sand and Gravel)	MGB DENR, 2007
		List of Issued Exploration Permits (EPs) and Temporary Exploration Permits (TEPs)	MGB DENR, 2007
		List of Issued (MPSA) Mineral Production Sharing Agreement	MGB DENR, 2007
		Mining Potential Areas	MGB
		Crop Development Areas	BSWM
Tourist Attractions		DOT, 2004-2005	
6. Conflict-Related Data	Internally Displaced Persons (IDP)	IDPs at Regional, Provincial and Barangay Levels	DSWD

- NOTES:
1. NAMRIA : National Mapping and Resource Information Authority
  2. DENR : Department of Environment and Natural Resources
  3. MGB : Mines and Geosciences Bureau
  4. BSWM : Bureau of Soils and Water Management
  5. FMB : Forest Management Bureau
  6. PAGASA : Philippine Atmospheric, Geophysical and Astronomical Services Administration
  7. PAWB : Protected Areas and Wildlife Bureau
  8. PHILVOLCS : Philippine Institute of Volcanology and Seismology
  9. NSO : National Statistics Office
  10. NHA : National Housing Authority
  11. NTC : National Telecommunications Commission
  12. PAWD : Philippine Association of Water Districts
  13. NEA : National Electrification Administration
  14. BAS : Bureau of Agricultural Statistics
  15. DPWH : Department of Public Works and Highways
  16. ATO : Air Transportation Official
  17. NEDA : National Economic and Development Authority
  18. PPA : Philippine Ports Authority
  19. PPC : Philippine Postal Corporation
  20. CGSD : Coast and Geodetic Survey Department
  21. JBIC-ASF : Japan Bank for International Cooperation-ARMM Social Fund
  22. EOJ : Embassy of Japan
  22. JICA : Japan International Cooperation Agency
  23. SERD-CAAM : The Study on Socio-Economic Reconstruction and Development of Conflict-Affected Areas in Mindanao
  24. DA : Department of Agriculture
  25. DOTC : Department of Transportation and Communication
  26. DepEd : Department of Education
  27. DSWD : Department of Social Welfare and Development
  28. LGU : Local Government Unit

**Table 6.1-3 Contents of SERD-CAAM GIS Theme Maps**

Map Category		Theme Maps
1. Administrative Boundary		Maps on Regional, Provincial, Municipal and Barangay Boundaries. Administrative boundaries are based on NAMRIA, DENR and LGUs.
2. Physical Condition and Natural Environment	Land Characteristics	2002 and 2007 Landcover Map; Mindanao Geologic and Mineral Deposits Map; Soil Class Map; Soil Type Map; Slope Map; Land Classification Map; Forest Cover Map; Protection and Production Forest Map
	Water Characteristics	Groundwater Map
	Climate and Atmosphere	Climate and Atmosphere Map
	Protected Areas	Protected Areas Map; Key Biodiversity Areas Map
	Natural Disaster	El Nino/La Nina Vulnerability Map; Disaster Risk Areas Map; Flood Prone Areas Map; Landslide Susceptibility Due to Earthquake Map; Soil Erosion Map; Liquefaction Prone Areas Map; Frequency of Cyclones
3. Social and Economic Condition	Demography	Regional, Provincial and Municipal Distribution Map; Municipal Household Population Distribution Map; Barangay Population Distribution Map; Population Distribution by Religious Affinity; Y2000 Provincial and Municipal Population Density Map; Estimated Vital Rates of Life; Under 5 Mortality Rate;
	Poverty	Severity of Poverty for Year 2000; Severity of Poverty for Year 2003; 2004 Annual Per Capita Poverty Thresholds; 2003 Annual Per Capita Poverty incidences
	Housing	1997 Total Housing Expenditure Map; 2000 Total Housing Expenditure Map; Number of Household in Occupied Housing Units by Status of Tenure; Informal Settlements Map
	Education	Y2001 Cohort Survival Private and Public Elementary School; Y2003 Cohort Survival Private and Public Elementary School; Distribution of Government and Private Schools; Net Participation Rate Private Elementary School; Net Participation Rate Private Secondary School; Simple Literacy Household Population;
	Utilities	Location Map of Electric Utilities; Location Map of Water Districts;
	GRDP	Gross Regional Domestic Products, 1985 Prices; Gross Regional Domestic Products, Current Prices (2002-2004)
	Major Products	Palay Volume of Production by Region; Coconut Volume of Production by Region; Corn Volume of Production by Region; Mango Volume of Production by Region; Pineapple Volume of Production by Region; Rubber Volume of Production by Region
	Labor and Employment	Employment by Class; 2003 Employment Map; 2002 Employment Map;

Map Category		Theme Maps
4. Infrastructure	Roads and Bridges	Transport Facilities Map; Road Map
	Ports and Airports	Transport Facilities Map; Tide Stations
	Communication	Telecom Map; Post Office Locations
	Social Infrastructure	Distribution of Hospitals and Health Facilities per Region; Colleges and Universities Map; Private Elementary and High Schools; Public Elementary Schools; Public High Schools; Licensed Hospitals
5. Development Planning	Potential Areas for Development	Mining Potential Area; Mining MPA-Mining Production Sharing Agreements (MPSA); Exploration and Temporary Permits; Industrial Sand and Gravel Permits; Crop Development Areas; Tourist Attractions
6. Conflict-Related Data	Incidence of Conflict	Conflict-Affected Area (Municipal and Barangay);
	Internally Displaced Persons	2000 and 2003 IDP - Provincial; 2000 and 2003 IDP - Regional; IDP - Barangay

## 6.2 CAPACITY BUILDING FOR BDA AND OTHER RELATED AGENCIES

The GIS Training Program, which forms part of the Capacity Building and Technical Transfer for BDA staff and related agencies, was aimed at providing sufficient knowledge and skills to manage, maintain and upgrade the GIS database that was developed during the course of the Study. Data collected was stored in GIS database format and presented as GIS thematic maps which will be made available to BDA and related agencies for their application to socio-economic development planning and policy decision making and evaluation. It was expected that with sufficient training, BDA and other related agencies would be able to fully utilize the database and make it sustainable.

In Figure 6.2-1, the SERD-CAAM GIS Database was developed from the different Study surveys conducted and utilized to formulate the Action Plan and Socio-Economic Development Plan. The GIS Database, together with the other databases of the Study, is supposed to be managed by proper organization/agency(s) among the stakeholders after the completion of the Study. Since BDA is deemed to take an important role, it was necessary to capacitate BDA in maintaining the GIS Database.

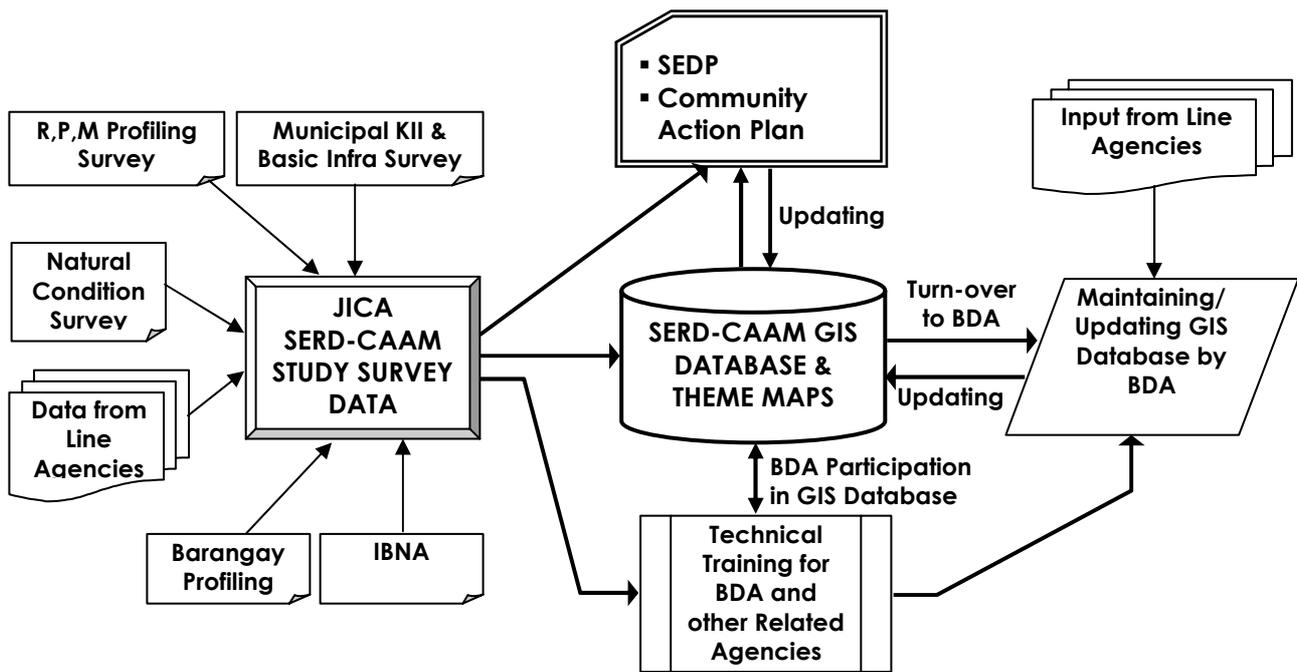


Figure 6.2-1 Maintenance and Update of SERD-CAAM Database

### 6.2.1 Training Objective

The training consists of two modular parts; the Executive Level for GIS awareness, and the Technical Level for GIS Skills. The objectives, and target participants for these programs are summarized in Table 6.2-1. The Executive Level Module was a combination of appreciation and awareness of the importance and applications of GIS in planning, including policy formulation and evaluation. The Technical Level focused on the necessary knowledge and skills needed to update and maintain the SERD-CAAM GIS database generated.

Table 6.2-1 Result of GIS Training

Training Component	Contents/Topics	Date Conducted
GIS Awareness Training	<ul style="list-style-type: none"> <li>• Application of GIS to Development Planning</li> </ul>	<ul style="list-style-type: none"> <li>• July 19, 2007 (Cotabato City)</li> </ul>
GIS Technical Training	<ul style="list-style-type: none"> <li>• Module 1: Map Appreciation and Basic Cartography</li> <li>• Module 2: Introduction to Global Positioning System (GPS) and Geographic Information System (GIS)</li> <li>• Module 3: Introduction to Land Use Planning and Remote Sensing</li> <li>• Modules 4: Introduction to ArcGIS</li> <li>• Module 5: GIS On-the-job Training</li> <li>• Module 6: GIS On-the-job Training</li> </ul>	<ul style="list-style-type: none"> <li>• July 23-26, 2007 (Quezon City)</li> <li>• August 21-23, 2007 (Cotabato City)</li> <li>• Sept 10-13, 2007 (Cotabato City)</li> <li>• Oct 15-18, 2007 (Cotabato City)</li> <li>• Nov 19-22, 2007 (Cotabato City)</li> <li>• Dec 17-18, 2007 (Cotabato City)</li> </ul>

## **6.2.2 Training Participants**

Representatives from the different project beneficiary organizations and government agencies attended the training modules. For the GIS Awareness Seminar, participants included representatives from the OPAPP and the Bangsamoro Development Agency (BDA), Executives and Managers of the different government line agencies (NEDA, ARMM-RPDO, DAR, GRP/MILF CCCH and JBIC-ASF) as well as staff members of these agencies. For the next 6 training modules, selected participants from the BDA and other government agencies in Mindanao were chosen to attend all the training modules conducted. Every training module was also attended by representatives from the training organizers.

There are thirteen (13) participants for the GIS Technical Training Modules from the different agencies including:

- Bangsamoro Development Agency (BDA) : 4 participants
- OPAPP : 1 participant
- GRP-CCCH : 1 participant
- MILF-CCCH : 1 participant
- RPDO-ARMM : 1 participant
- NEDA Region IX : 1 participant
- NEDA Region XII : 2 participants
- DENR-EMB Region XII : 1 participant
- Zamboanga del Sur Prov'l Gov. Office : 1 participant

## **6.2.3 Training Activities**

For each of the training modules, lecturers discussed several topics with regard to the GIS technology, its uses and benefits. All of the trainings/seminars conducted focused on the basic concepts and overview of GIS and the ArcGIS software. The basic mapping and cartography concepts were first discussed before the participants were introduced to the GIS technology to give them an idea of the advantages and disadvantages of using software in the production and composition of maps. Participants were also asked to complete several exercises for each of the training topics discussed. Two of the training modules focused on the actual manipulation and use of the ArcGIS software wherein participants were able to perform and apply the skills and knowledge that they have gained during the previous modules. This knowledge was then put into use by the participants during their project conceptualization and composition exercises.

After each training module, participants were given training evaluation forms to fill out. This was given to assess the activities and the lecturers during the end of each module. They were also asked to give their comments and suggestions for further improvement of the training program.

### 6.2.3.1 GIS Awareness for Development Planning

This module conducted on 19 July 2007 in Cotabato City was attended by 24 participants from BDA and related agencies and was aimed at providing the participants with greater level of awareness of the basic concepts and principles of the GIS technology and the potential benefits from the application.

The seminar is the first among a series of seminars in the technology transfer component of the project. This one day seminar was intended for the BDA and other related agencies' executives and managers. This module was given to the technical staff and users of the GIS database to make them fully aware of and to understand the features and kinds of maps in regards to their production and use as well as their importance in the creation of geographic databases and their applications in development planning. At the end of the session the participants were expected to have a basic knowledge on the various aspects of GIS as a tool for planning and policy formulation.

The training basically consisted of lectures which included: (a) Development planning theory and practice, (b) Maps and geographic information for development planning; GIS as a development planning tool, (c) Basic concepts of GIS; historical background, definitions and benefits, and (d) GIS functions, planning and implementation, applications, issues and problems.



**Photo 6.2-1 GIS Awareness Seminar**

Table 6.2-2 GIS Training Program

Training Program	Objectives	Conduct of Training	Participants	Training Modules
Part 1: <b>GIS Awareness for Development Planning</b>	To provide the Executives and/or Managers of the BDA and other related agencies with the awareness, basic concepts and principles of GIS technology and the potential benefits from this application particularly in development planning activities.	<ul style="list-style-type: none"> <li>This is a one (1) day lecture/seminar on the basic concepts and applications of GIS. Examples/case studies are used to guide the participants on GIS applications.</li> <li>Periods for discussions and open forum will give the participants an opportunity for interaction with the resource persons.</li> </ul>	<ul style="list-style-type: none"> <li>BDA decision makers, managerial level personnel and senior officers of related agencies.</li> </ul>	<ul style="list-style-type: none"> <li>Awareness Seminar Module</li> </ul>
Part 2: <b>GIS Technical Training</b>	<p>Provide the users and technical staffs of BDA and other related agencies with:</p> <p>a) the basic concepts of map-making, map usage and the GIS technology itself.</p> <p>b) sufficient skills relative to the GIS database development and maintenance such as;</p> <ol style="list-style-type: none"> <li>Developing GIS database</li> <li>Utilizing GIS database</li> <li>Preparing thematic maps</li> <li>Updating GIS database</li> </ol> <p>c) background on remote sensing, its concepts and principles, processes and applications.</p> <p>d) sufficient hands-on exercises to make them more prepared and confident in maintaining the GIS database after the project hand-over.</p>	<ul style="list-style-type: none"> <li>This training program is a series of lectures, exercises and hands-on activities.</li> <li>Hand-outs and other reference materials are provided to participants to aid them in greater understanding of the topics being presented. When appropriate, satellite imageries and other visual materials are used for the manual exercises while computer terminals made available for hands-on activities.</li> <li>Specific activities are provided for hands-on and on-the-job-training after lectures for the skills training of participants in map preparation and GIS database management and maintenance. Exercises will make use of data for a selected pilot municipality.</li> <li>The venue for the training is selected to provide the most conducive environment for the training lectures and exercises.</li> </ul>	<ul style="list-style-type: none"> <li>Technical Staffs of BDA and related agencies who are/will be handling GIS database management and updating.</li> <li>The technical training is limited to about 10 participants who are expected to attend all the modules for this session.</li> <li>Screening and selection of participants is done prior to acceptance.</li> </ul>	<ul style="list-style-type: none"> <li>Module 1: Introduction to Map Appreciation and Basic Cartography</li> <li>Module 2: Introduction to GPS and GIS</li> <li>Module 3: Introduction to Land Use Planning and Remote Sensing</li> <li>Module 4: Introduction to ArcGIS</li> <li>Module 5: GIS On-the-Job Training (Building the Database)</li> <li>Module 6: GIS On-the-job Training (Updating and Managing the Database)</li> </ul>

### 6.2.3.2 GIS Technical Training

The GIS Technical Training consisted of six modules summarized in Table 6.2-3 which had already been conducted with thirteen participants from BDA and other related agencies.

**Table 6.2-3 GIS Technical Training Modules**

Module Contents	Objectives
Module 1: Map Appreciation and Basic Cartography  (July 23-26, 2007)	The first module aimed at: <ul style="list-style-type: none"> <li>• identifying different kinds of maps and their uses and applications;</li> <li>• effectively extracting information from maps;</li> <li>• understanding and appreciating the process of creating maps;</li> <li>• understanding how maps are used by different agencies and how maps help these agencies to provide efficient services.</li> </ul>
Module 2: Introduction to GIS and GPS  (August 21-23, 2007)	The second module aimed at: <ul style="list-style-type: none"> <li>• understanding the basic concepts of GIS and GPS</li> <li>• knowing the GIS data models and data input</li> <li>• learning GIS database management systems and spatial data analysis</li> </ul>
Module 3: Introduction to Land Use Planning and Remote Sensing  (September 10-13, 2007)	The third module is aimed to provide the participants with adequate knowledge and concepts of land use and land use planning and remote sensing concepts and principles, as well as the applications and benefits in using remote sensing technology for development planning activities
Module 4: Introduction to ArcGIS/ArcView 9.x  (October 15-18, 2007)	The fourth module introduced the participants to ArcGIS which is currently the most commonly used software in government agencies in the country. The participants are expected to learn the use and application of ArcGIS/ArcView in this session
Module 5: GIS On-the-Job Training  (November 19-22, 2007)	The fifth module was dedicated to hands-on and on-the-job-training, on actual geographic database creation, manipulation, management, and maintenance using ArcGIS software.
Module 6: GIS On-the-Job Training  (December 17-18, 2007)	This last module provided the participants with greater time to use the computers and the database and acquire more in-depth skills in manipulating their database to update, manage and maintain the same. Exercises made use of data for a selected pilot municipality.

#### (1) Module 1 Training

In the first module, which was conducted in Manila, the participants were given lectures and exercises on the basics of mapping and cartography. The lectures were reinforced with observations and field trips which included: FF Cruz's facilities on mapping and GIS applications, Phivolcs, TransCo and NAMRIA. Photo 6.2-2 shows the different activities during training.



Photo 6.2-2 Module 1 Technical Training

**(2) Module 2 Training**

The second module, which covered the introduction to GIS and GPS, was conducted in Cotabato City. Lectures and exercises were given to the participants covering GIS data preparation, creation of contour maps, attribute data management and overlay (sieve) analysis. The training activities for the second module are shown in Photo 6.2-3.



Photo 6.2-3 Module 2 Technical Training

**(3) Module 3 Training**

The third module (also conducted in Cotabato City) focused on land use and land use planning and the application of GIS and mapping in preparing the Comprehensive Land Use Plan. The participants were then tasked to identify and describe the land use they observed in a block selected for the exercise. Remote sensing was discussed with focus on information extraction by multi-spectral image interpretation. As an exercise, the participants were tasked to identify different spatial objects such as roads, buildings, trees, rivers, etc. from Landsat TM data in false color composite and IKONOS multi-spectral data in natural color composite.



**Photo 6.2-4 Module 3 Technical Training**

**(4) Module 4 Training**

Since the SERD-CAAM GIS Database is being developed using the ESRI Software ArcGIS, the participants were introduced to its basic concepts and its operational use. The session focused on the appreciation of the features of ArcGIS Version 9.2 software and its basic applications and interfaces. This included performing any GIS task, from simple to advanced, including mapping, geographic analysis, data editing and compilation, data management, visualization, and geo-processing. The participants also learned the different editing components of ArcGIS and how to use these components in manipulating their geographic data. They were introduced to the three main components of the software namely: (1) ArcMap; (2) ArcCatalog; and (3) ArcToolbox. Exercises on using ArcGIS were given including map preparation.

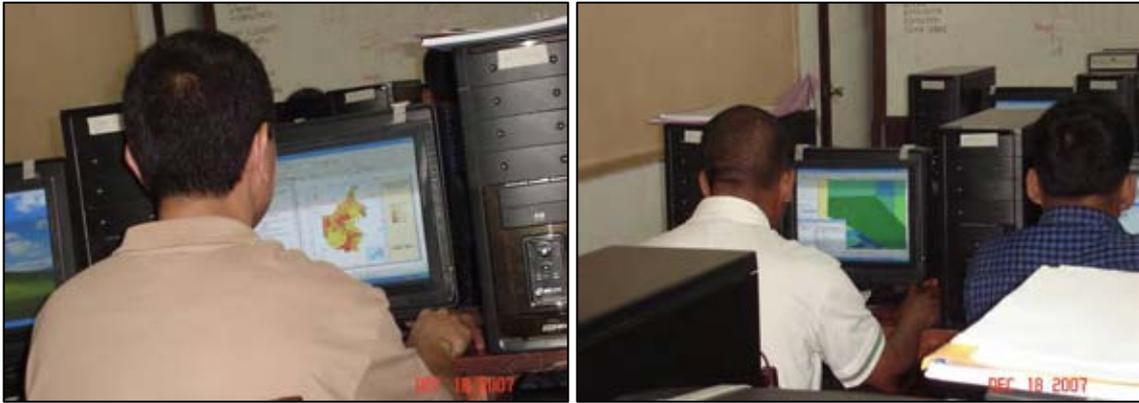


**Photo 6.2-5 Module 4 Technical Training**

**(5) Module 5 Training**

The hands-on-training allowed the participants to orient themselves with the ArcGIS software and its many uses, including building a database, analyzing data, joining attributes and composing a map. Each participant was asked to conceptualize and create individual projects

based on the data given including the partial data from the SERD-CAAM Mindanao database. Base maps were created by the trainees through geo-referencing and digitizing boundaries. After creating the maps, each trainee was given the chance to make a presentation of the map they had created explaining the procedures of how it was done.



**Photo 6.2-6 Module 5 Technical Training**

**(6) Module 6 Training**

The sixth module is a continuation of the on-the-job-training to further enhance the participant's skills in using ArcGIS and creating theme maps. Case maps practice was given to the participants to develop the geodatabase, analyze the data and prepare theme maps of their choice for the ARMM province. Maps produced by each trainee were then presented during the closing ceremony as part of their accomplishment. Photo 6.2-7 shows some activities during the sixth module.



**Photo 6.2-7 Module 6 Technical Training**



**Photo 6.2-8 GIS Technical Training Closing Ceremony**

### **6.3 NEXT STEPS**

The SERD-CAAM GIS Database will be the baseline geo-database not only for the Study, but also for those involved with the SEDP implementation and other developmental work in Mindanao. It is expected that a proper organization/agency(s) will maintain and update the GIS Database in collaboration with related stakeholders. In this regard, a guideline for managing the database has been prepared by the TWG.