Collective Action for Rehabilitation of Global Public Goods
CGIAR Genetic Resources Systems - Phase 2 (GPG2)

Activity 2.4

(Develop and disseminate decision-support tools to
enhance the cost-effectiveness of collection management)

Final Report

Evaluating Cost-Effectiveness of Collection Management: *Ex-situ* Conservation of Plant Genetic Resources in the CG System

March 2010

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Acknowledgments

This activity involved an intensive data collection. To complete this activity we counted with the help of several staff across center that gladly provided us with information or guided us to the right sources. We would like to thank:

CIAT: C. Bejarano, M. Cortez, J. Martinez, J. Mena, A. Palau, L. M. Quintana, J. Soto, J. Uribe
CIMMYT: V. Chavez J. Gumafelix
ICRISAT: R.P. Thakur, A.G. Girish, B. Ashok Kumar
IITA: A. Bamikole
IFPRI: P. Zambrano, S. Yan
ILRI: J.Bongo
IRRI: M. Aquino, P. Gonzales, A. Telosa, M. Telosa, T. Santos
Consultants: V. Komerell, B. Koo

In particular, we would like to thank Brigitte La Liberte (project coordinator until January this year) for the remarkable support in completing this activity.

SECTION 5

Conservation and Management of Genetic Resources of Sorghum, Pearl millet, Chickpea, Pigeonpea, Groundnut and other Small millets in the ICRISAT Genebank

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ICRISAT operates as a system of genebanks with a main genebank located in Patancheru, (India) and other 3 genebanks located in Niamey (Niger), Nairobi (Kenya) and Bulawayo (Zimbabwe). Each of these genebanks perform all the regular operations and conserve and distribute accessions to users according to their location. In its active collection the ICRISAT genebank at Patancheru holds more than 119,000 accessions of sorghum, groundnut, chickpea, pigeonpea, pearl millet and six other small millets (finger millet, foxtail millet, barnyard millet, kodo millet, little millet and proso millet). In total the genebank conserves accession of 11 different crops that represent 70 – 80% of the available diversity (Upadhyaya *et al.* 2008). Additionally, accessions of groundnut and pearl millet are also stored at Niamey, accession of sorghum and pearl millet at Bulawayo, and accessions of sorghum, pigeon pea and chickpea at the Nairobi genebank (Koo *et al.* 2004). In this evaluation we have evaluated only the Patancheru genebank and the main genetic materials conserved in its facilities. [11] The only previous cost evaluation of the ICRISAT genebank corresponds to the work of Koo *et al.* (2004) that also concentrated on the accessions kept at Patancheru.

The establishment of the collection at Patancheru was based on donations from existing collections in India, USA, Puerto Rico, Iran, Lebanon, Mozambique, Tanzania, Uganda and Kenya among other countries, and on targeted collections ICRISAT efforts launched between 1974 and 1997 (Upadhyaya *et al.* 2008, Koo *et al.* 2004). The main management challenges in the Patancheru genebank are the number of accessions held and the wide variety of crops. The various genebank activities are depicted in Figure 5.1. This genebank

[11] Currently ICRISAT staff is working on the collection of information in the Nairobi genebank.

has one of the largest collections in the CG system. While most of the materials are seed propagated, there are also a number of wild materials that do not produce seed and need to be conserved and multiplied using special facilities. The collection includes landraces (82%), non-domesticated species (2%), advanced and old cultivars (1%), and breeding lines (15%).

Several of the operations in the ICRISAT genebank are labor intensive. A clear example is seed processing of groundnuts that demands quantity and quality of labor. So far the cheap labor in India has helped to maintain the level of operations. We speculate that the increase in labor costs could be future constraint for the efficient management of genebank operations. The diversity of crops also adds to the complexity of the system and can have a potential impact on the aggregated costs, especially on the general management costs. The information collected can help to explore these hypotheses (see Section 9).

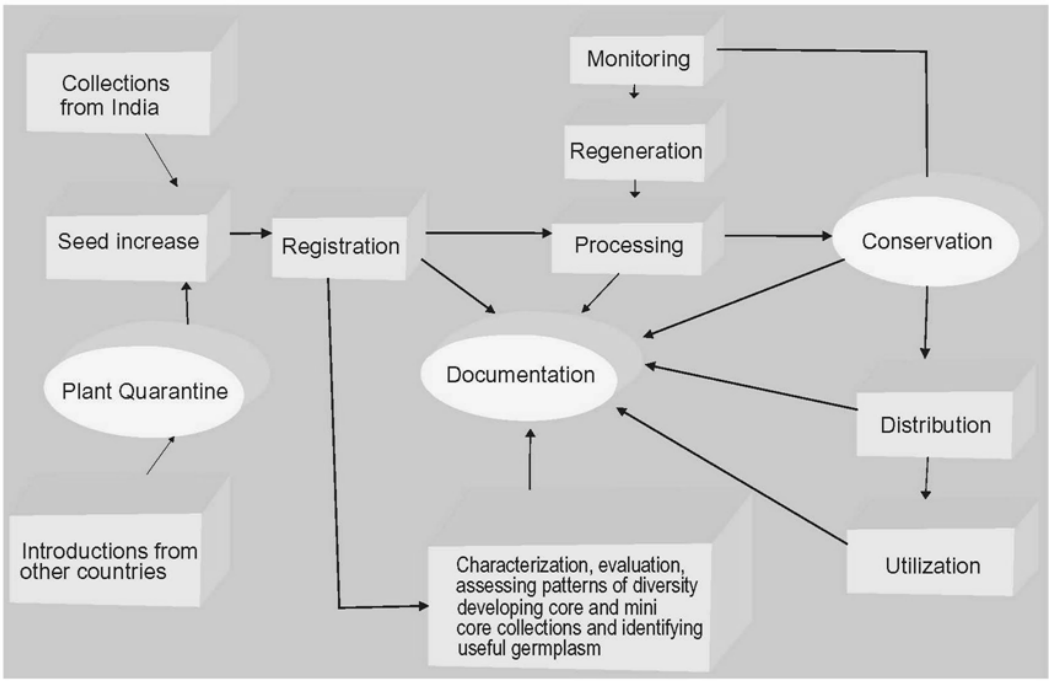
Another factor to take into account in this genebank is the aging of the scientific and technical staff. The replacement of experienced staff will definitively have an impact on the performance and cost of the operations. To avoid some of this potential negative impact the current practice at ICRISAT is to have overlapping training periods with outgoing and incoming staff. This practice has not been yet implemented at the genebank but the costs and benefits of implementing it can be easily be simulated using the current costs information available.

5.1. Data

Detailed information on accessions manipulated, inputs use and related costs was collected for 2006 and 2007 for the six main types of crops conserved in the Patancheru genebank: chickpea, pigeon pea, groundnut, sorghum, pearl millet and small millets (Figure 5.2). We also collected information on numbers of accessions manipulated per operation for 2008. The best estimations of total and average costs per accession therefore correspond to 2006 and 2007. Note that each material has accessions that are cultivated and also wild accessions that require special conservation and multiplication facilities. The costs reported in this study include costs of these special facilities and

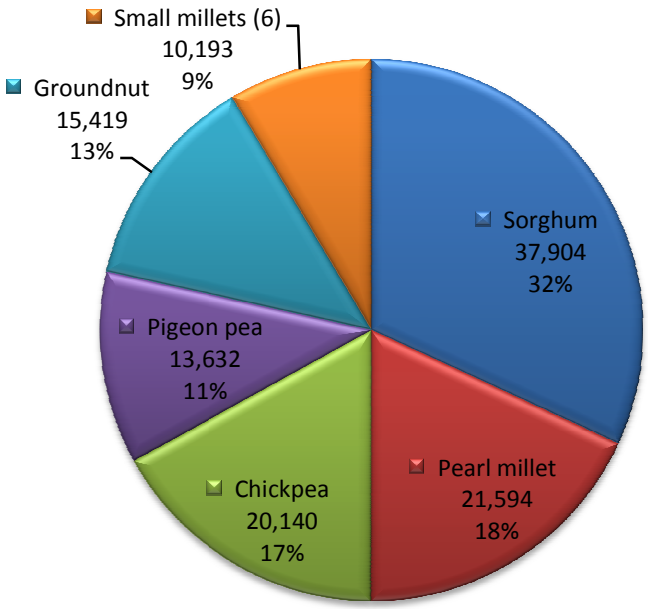
inputs used for wild materials. Costs reports however are consolidated per type of material.

Figure 5.1. Operational flow chart of ICRISAT genebank activities.



Source: Upadhyaya personal communication

Figure 5.2. Accessions held by the ICRISAT genebank by type of material



5.2. Results

The total and operational costs for 2007 of the Patancheru genebank are presented in Tables 5.1 to 5.6. Sorghum records the largest number of accessions conserved in this genebank. In 2007 the most expensive operation in average terms was the acquisition of new materials (US$80) followed by characterization (US$ 17) and distribution (US$ 17). As it has been mentioned several times the number of accessions manipulated in each operation has a great impact over the average costs. About 21 new accessions of sorghum were introduced to the system, while 521 were distributed to users. In terms of total costs however, the operation that required higher investment was general management (US$ 43,000) followed by characterization (US$ 41,000) and regeneration (US$ 28,000). The largest share of the general management and regeneration cost corresponds to the quasi-fixed inputs (qualified staff), while in the case of characterization the largest expense corresponds to variable costs mostly field supplies. In Patancheru, sorghum characterization occurs during the rainy and post-rainy season, while regeneration occurs only during the post-rainy season.

The second crop with the highest number of accession stored at Patancheru is pearl millet. Pearl millet is the sixth most important cereal world-wide and is the main food source in the poorest regions of India and the African continent[12]. This is a highly cross pollinated crop that requires special regeneration conditions to avoid genetic drift (Table 5.2). Thus average regeneration cost of pearl millet (US$ 60) tends to be higher than for the other crops. The second and third most expensive operations are acquisition (US$ 30) while distribution (US$ 25) due to the low number of accessions acquired and distributed in 2007. In total costs, characterization (US$ 37,000) and regeneration (US$ 47,000) demand more investment than the other operations.

Chickpea is the world's third most important food legume, cultivated mainly in Algeria, Ethiopia, Iran, India, Mexico, Morocco, Myanmar, Pakistan, Spain, Syria, Tanzania, Tunisia and Turkey. Chickpea ranks third in number of accessions held at the genebank with a large variation of different traits. In order to target better the users' needs and the distribution of materials ICRISAT genebank has developed core collection consisting of

[12] http://www.icrisat.org/newsite/what-we-do/crops/PearlMillet/Pearlmillet/coreMillet.htm

about 2,000 accessions (Upadhyaya *et al* 2001). As shown in Table 5.3, distribution on average costs US$ 16/accession (in 2007). The most expensive operations for this material are acquisition (US$ 45 per accession), characterization (US$ 39/accession) and regeneration (US$ 26/accession). These are typically expensive field operations that demand mobilization of resources. The largest cost component of these average costs are qualified labor and field supplies.

Pigeonpea is an important legume crop mostly produced in Asia, Africa, Latin America and the Caribbean region[13]. Similar to pearl millet, pigeonpea is an often cross pollinated crop (up to 40%) which has implication on total and average characterization and regenerations costs. Thus regeneration of pigeonpea was the most expensive operation in 2007 (US$ 60 / accession) followed by characterization (US$ 42.3 / accession). About 270 accessions of pigeonpea were distributed in 2007, leading to an average cost of almost US$ 19 per accession shipped. During this year there were no accession acquired, duplicated, added to long term storage, evaluated for germination or sent for seed health evaluation. In table 5.4 we report the total an average costs of longer storage and viability testing of 2006.

Groundnut is a self-pollinated crop that is mainly grown in developing countries in Asia and Africa (95.5% of total production). The crop is grown mostly by smallholder farmers under rain-fed conditions with limited inputs[14]. ICRISAT genebank at Patancheru holds around 15,000 accessions of cultivated and wild materials. The regeneration (US$ 53,000) and characterization (US$ 52,000) of these materials demand the highest investments compare to the other genebank operations performed on this crop. In 2007, there were no new groundnut accessions acquired by the genebank. This year a total of 117 accessions were distributed to user at an average cost of US$ 17.74/ accession. Adding an accession into long-term conservation also reported relatively high cost (US$ 11/ accession). This high cost is probably due to two main reasons: a) we used numbers of accession added the year of evaluation, and not total number of accession on long-term storage; and 2) in 2007, only pearl millet and groundnut accessions were added to long-

[13] http://www.icrisat.org/newsite/crop-pigeonpea.htm
[14] http://www.icrisat.org/newsite/crop-groundnut.htm

term storage, thus the variable costs, mainly electricity was allocated to only these two crops. These costs represent the total for cultivated and wild materials.

Patancheru genebank also holds an important collection other small millets, around 10,000 accessions. Finger millet, a self pollinating crop, is originally native to the Ethiopia and highly adaptable to higher elevations[15]. Foxtail millet regarded as a native of China, it is one of the world's oldest cultivated crops. This crop ranks second in the total world production of millets and provides food to millions of people, mainly on poor or marginal soils in southern Europe and in temperate, subtropical and tropical Asia[16]. Kodo millet was domesticated in India almost 3000 years ago. Kodo millet has a high nutritional value, with a protein content of 11% and very high fiber content[17]. Little millet was domesticated in India and shows resistance to adverse agro-climatic conditions[18]. Proso millet is considered a self-pollinated crop, but natural cross-pollination may occur. This millet generally matures between 60-90 days after planting and can be grown successfully in poor soil and hot dry weather[19]. Barnyard millet is the fastest growing of all millets and produces a crop in six weeks. It is grown in India, Japan and China as a substitute for rice when the paddy crop fails[20].

Given the different number of species the conservation of small millets is a challenging task. The costs associated to their conservation and maintenance are however comparable to the other types of material conserved in the Patancheru genebank. In 2007 the most expensive operation was acquisition (US$ 54 / accession), but only 43 new accessions were acquired. Characterization (US$ 20,000), regeneration (US$ 27,000) and safety duplication (US$ 25,000) demanded most of the conservation and management investment in 2007. As most of the other crops maintained in this genebank, the distribution of accessions of small millets is a relatively expensive operation (US$ 18 / sample). In 2007 about 337 accessions of small millets were sent to users around the world.

[15] http://www.icrisat.org/newsite/crop-fingermillet.htm
[16] http://www.icrisat.org/newsite/crop-foxtailmillet.htm
[17] http://www.icrisat.org/newsite/crop-kodomillet.htm
[18] http://www.icrisat.org/newsite/crop-littlemillet.htm
[19] http://www.icrisat.org/newsite/crop-prosomillet.htm
[20] http://www.icrisat.org/newsite/crop-barnyardmillet.htm

Molecular characterization: At ICRISAT molecular characterization of germplasm collections is an important activity. Core collections (10% of entire collection), mini core collections (10% of core or 1% of entire collection) are genotyped to study population structure, assess genetic diversity and to identify trait-specific genetically diverse accessions for use by the crop improvement scientists besides identifying duplicates in the collections. This important activity was not costed in any of the areas/activities of genebank operations.

Table 5.1. Operational Costs (US$) of ICRISAT Genebank: SORGHUM – 2007

Activities	No. access.	Total capital cost (US$)	Total quasi-fixed cost (US$)	Total labor variable costs (US$)	Total non-labor costs (US$)	Average capital cost (US$/acce.)	Average quasi-fixed cost (US$/acce.)	Average variable labor cost (US$/acce.)	Average non-labor costs (US$/acce.)	Total AC*
Acquisition	21	14.86	1,543.62	0.00	146.12	**0.71**	**73.51**	**0.00**	**6.96**	**80.46**
Characterization	2,377	2,335.98	18,151.29	2,893.18	20,647.20	**0.98**	**7.64**	**1.22**	**8.69**	**17.54**
Safety duplication	0	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Long term storage	0	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Medium term storage	1,080	4,328.83	1,741.45	0.00	4,643.97	**4.01**	**1.61**	**0.00**	**4.30**	**5.91**
Germination testing	1,962	1,950.36	4,320.66	0.00	999.94	**0.99**	**2.20**	**0.00**	**0.51**	**2.71**
Regeneration	4,603	3,592.04	18,641.39	1,705.55	7,755.91	**0.78**	**4.05**	**0.37**	**1.68**	**6.11**
Seed processing	3,457	2,341.05	2,526.64	951.00	2,699.76	**0.68**	**0.73**	**0.28**	**0.78**	**1.79**
Seed health testing	300	0.00	777.38	0.00	1,200.64	**0.00**	**2.59**	**0.00**	**4.00**	**6.59**
Distribution	521	154.27	6,247.27	0.00	2,601.54	**0.30**	**11.99**	**0.00**	**4.99**	**16.98**
Information management	37,904	1,876.56	10,046.32	0.00	764.64	**0.05**	**0.27**	**0.00**	**0.02**	**0.29**
General management	37,904	7,371.98	42,078.18	0.00	1,743.12	**0.19**	**1.11**	**0.00**	**0.05**	**1.16**
Total**	**N.A.**	**23,965.95**	**106,074.19**	**5,549.73**	**43,202.84**	**8.69**	**105.69**	**1.86**	**31.98**	**139.54**

(*) Operational costs, do not include capital costs.
(**) The total cost values do not reflect the total cost of conservation of this material it just report how much in average the genebank spent that year on this type of material.

Table 5.2. Operational Costs (US$) of ICRISAT Genebank: PEARL MILLET – 2007

Activities	No. access.	Total capital cost (US$)	Total quasi-fixed cost (US$)	Total labor variable costs (US$)	Total non-labor costs (US$)	Average capital cost (US$/acce.)	Average quasi-fixed cost (US$/acce.)	Average variable labor cost (US$/acce.)	Average non-labor costs (US$/acce.)	Total AC*
Acquisition	423	299.32	9,901.07	0.00	2,943.20	**0.71**	**23.41**	**0.00**	**6.96**	**30.36**
Characterization	2,094	2,057.87	29,277.81	1,040.29	7,443.38	**0.98**	**13.98**	**0.50**	**3.55**	**18.03**
Safety duplication	0	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Long term storage	684	1,811.41	2,004.24	0.00	5,496.30	**2.65**	**2.93**	**0.00**	**8.04**	**10.97**
Medium term storage	112	448.92	180.60	0.00	481.60	**4.01**	**1.61**	**0.00**	**4.30**	**5.91**
Germination testing	2,433	2,418.57	5,105.32	0.00	1,239.99	**0.99**	**2.10**	**0.00**	**0.51**	**2.61**
Regeneration	793	618.83	26,246.09	8,148.23	12,914.52	**0.78**	**33.10**	**10.28**	**16.29**	**59.66**
Seed processing	1,723	1,166.80	1,909.19	897.42	1,394.39	**0.68**	**1.11**	**0.52**	**0.81**	**2.44**
Seed health testing	0	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Distribution	34	10.07	663.98	0.00	169.77	**0.30**	**19.53**	**0.00**	**4.99**	**24.52**
Information management	21,594	1,069.08	5,576.75	0.00	435.62	**0.05**	**0.26**	**0.00**	**0.02**	**0.28**
General management	21,594	4,199.84	24,424.74	0.00	993.06	**0.19**	**1.13**	**0.00**	**0.05**	**1.18**
Total**	**N.A.**	**14,100.70**	**105,289.77**	**10,085.95**	**33,511.83**	**11.34**	**99.15**	**11.29**	**45.51**	**155.96**

(*) Operational costs, do not include capital costs.
(**) The total cost values do not reflect the total cost of conservation of this material it just report how much in average the genebank spent that year on this type of material.

Table 5.3. Operational Costs (US$) of ICRISAT Genebank: CHICKPEA – 2007

Activities	No. access.	Total capital cost (US$)	Total quasi-fixed cost (US$)	Total labor variable costs (US$)	Total non-labor costs (US$)	Average capital cost (US$/acce.)	Average quasi-fixed cost (US$/acce.)	Average variable labor cost (US$/acce.)	Average non-labor costs (US$/acce.)	Total AC*
Acquisition	72	50.95	2,737.36	0.00	500.97	**0.71**	**38.02**	**0.00**	**6.96**	**44.98**
Characterization	1,200	1,179.29	20,166.96	5,107.71	21,462.73	**0.98**	**16.81**	**4.26**	**17.89**	**38.95**
Safety duplication	0	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Long term storage	0	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Medium term storage	2,581	10,345.11	4,161.75	0.00	11,098.24	**4.01**	**1.61**	**0.00**	**4.30**	**5.91**
Germination testing	2,871	2,853.97	5,835.00	0.00	1,463.21	**0.99**	**2.03**	**0.00**	**0.51**	**2.54**
Regeneration	1,650	1,287.61	21,447.29	4,179.04	17,735.80	**0.78**	**13.00**	**2.53**	**10.75**	**26.28**
Seed processing	4,231	2,865.20	3,742.22	2,678.87	3,899.52	**0.68**	**0.88**	**0.63**	**0.92**	**2.44**
Seed health testing	309	0.00	800.70	0.00	1,968.65	**0.00**	**2.59**	**0.00**	**6.37**	**8.96**
Distribution	944	279.51	10,790.19	0.00	4,713.73	**0.30**	**11.43**	**0.00**	**4.99**	**16.42**
Information management	20,140	997.10	6,324.16	0.00	406.29	**0.05**	**0.31**	**0.00**	**0.02**	**0.33**
General management	20,140	3,917.05	22,850.98	0.00	926.19	**0.19**	**1.13**	**0.00**	**0.05**	**1.18**
Total**	**N.A.**	**23,775.79**	**98,856.62**	**11,965.62**	**64,175.33**	**8.69**	**87.82**	**7.42**	**52.75**	**148.00**

(*) Operational costs, do not include capital costs.
(**) The total cost values do not reflect the total cost of conservation of this material it just report how much in average the genebank spent that year on this type of material.

Table 5.4. Operational Costs (US$) of ICRISAT Genebank: PIGEONPEA, 2006 - 2007

Activities	No. access.	Total capital cost (US$)	Total quasi-fixed cost (US$)	Total labor variable costs (US$)	Total non-labor costs (US$)	Average capital cost (US$/acce.)	Average quasi-fixed cost (US$/acce.)	Average variable labor cost (US$/acce.)	Average non-labor costs (US$/acce.)	Total AC*
Acquisition	0	0.00	1,052.07	0.00	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Characterization	798	784.23	19,190.65	7,179.37	7,372.68	**0.98**	**24.05**	**9.00**	**9.24**	**42.28**
Safety duplication	0	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Long term storage (2006)	247	956.98	1,303.45	0.00	2,868.13	**3.87**	**5.28**	**0.00**	**11.61**	**16.89**
Medium term storage	469	1,879.84	756.24	0.00	2,016.69	**4.01**	**1.61**	**0.00**	**4.30**	**5.91**
Germination testing (2006)	623	474.93	2,031.87	0.00	243.59	**0.76**	**3.26**	**0.00**	**0.39**	**3.65**
Regeneration	426	332.44	17,832.24	0.00	7,777.87	**0.78**	**41.86**	**0.00**	**18.26**	**60.12**
Seed processing	895	606.09	654.13	1,116.20	784.54	**0.68**	**0.73**	**1.25**	**0.88**	**2.85**
Seed health testing	0	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Distribution	270	79.95	3,744.40	0.00	1,348.21	**0.30**	**13.87**	**0.00**	**4.99**	**18.86**
Information management	13,632	674.90	4,960.51	0.00	275.00	**0.05**	**0.36**	**0.00**	**0.02**	**0.38**
General management	13,632	2,651.30	15,806.92	0.00	626.91	**0.19**	**1.16**	**0.00**	**0.05**	**1.21**
Total	**N.A.**	**7,008.73**	**65,049.26**	**8,295.57**	**20,201.89**	**6.99**	**83.64**	**10.24**	**37.73**	**131.62**

(*) Operational costs, do not include capital costs.
(**) The total cost values do not reflect the total cost of conservation of this material it just report how much in average the genebank spent that year on this type of material.

Table 5.5. Operational Costs (US$) of ICRISAT Genebank: GROUNDNUT – 2007

Activities	No. access.	Total capital cost (US$)	Total quasi-fixed cost (US$)	Total labor variable costs (US$)	Total non-labor costs (US$)	Average capital cost (US$/acce.)	Average quasi-fixed cost (US$/acce.)	Average variable labor cost (US$/acce.)	Average non-labor costs (US$/acce.)	Total AC*
Acquisition	0	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Characterization	900	718.50	31,252.19	6,409.20	14,709.24	**0.80**	**34.72**	**7.12**	**16.34**	**58.19**
Safety duplication	0	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Long term storage	1,931	4,154.17	5,658.16	0.00	15,516.61	**2.15**	**2.93**	**0.00**	**8.04**	**10.97**
Medium term storage	363	1,181.94	585.32	0.00	1,560.89	**3.26**	**1.61**	**0.00**	**4.30**	**5.91**
Germination testing	1,934	1,561.76	4,274.01	0.00	985.67	**0.81**	**2.21**	**0.00**	**0.51**	**2.72**
Regeneration	2,400	1,521.44	33,306.74	6,360.08	13,308.68	**0.63**	**13.88**	**2.65**	**5.55**	**22.07**
Seed processing	4,694	2,582.24	4,080.62	5,804.22	6,142.26	**0.55**	**0.87**	**1.24**	**1.31**	**3.41**
Seed health testing	1,475	0.00	3,822.11	0.00	5,965.14	**0.00**	**2.59**	**0.00**	**4.04**	**6.64**
Distribution	117	28.14	1,491.62	0.00	584.22	**0.24**	**12.75**	**0.00**	**4.99**	**17.74**
Information management	15,419	620.12	4,282.88	0.00	311.05	**0.04**	**0.28**	**0.00**	**0.02**	**0.30**
General management	15,419	2,436.11	17,741.12	0.00	709.09	**0.16**	**1.15**	**0.00**	**0.05**	**1.20**
Total**	**N.A.**	**14,804.42**	**106,494.75**	**18,573.50**	**59,792.84**	**8.64**	**72.99**	**11.01**	**45.15**	**129.15**

(*) Operational costs, do not include capital costs.
(**) The total cost values do not reflect the total cost of conservation of this material it just report how much in average the genebank spent that year on this type of material.

Table 5.6. Operational Costs (US$) of ICRISAT Genebank: SMALL MILLETS – 2007

Activities	No. access.	Total capital cost (US$)	Total quasi-fixed cost (US$)	Total labor variable costs (US$)	Total non-labor costs (US$)	Average capital cost (US$/acce.)	Average quasi-fixed cost (US$/acce.)	Average variable labor cost (US$/acce.)	Average non-labor costs (US$/acce.)	Total AC*
Acquisition	43	30.43	2,058.57	0.00	299.19	**0.71**	**47.87**	**0.00**	**6.96**	**54.83**
Characterization	1,737	1,707.03	16,596.98	491.13	3,763.05	**0.98**	**9.55**	**0.28**	**2.17**	**12.00**
Safety duplication	3,042	2,031.15	21,508.12	0.00	3,930.45	**0.67**	**7.07**	**0.00**	**1.29**	**8.36**
Long term storage	0	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Medium term storage	147	589.20	237.03	0.00	632.10	**4.01**	**1.61**	**0.00**	**4.30**	**5.91**
Germination testing	127	126.25	1,263.65	0.00	64.73	**0.99**	**9.95**	**0.00**	**0.51**	**10.46**
Regeneration	1,737	1,355.50	14,741.86	8,929.57	3,537.64	**0.78**	**8.49**	**5.14**	**2.04**	**15.66**
Seed processing	4,926	3,335.85	3,600.30	4,987.16	3,953.89	**0.68**	**0.73**	**1.01**	**0.80**	**2.55**
Seed health testing	0	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Distribution	337	99.78	4,412.50	0.00	1,682.76	**0.30**	**13.09**	**0.00**	**4.99**	**18.09**
Information management	10,193	504.64	4,239.93	0.00	205.62	**0.05**	**0.42**	**0.00**	**0.02**	**0.44**
General management	10,193	1,982.45	12,084.66	0.00	468.75	**0.19**	**1.19**	**0.00**	**0.05**	**1.23**
Total**	**N.A.**	**11,762.28**	**80,743.59**	**14,407.86**	**18,538.18**	**9.36**	**99.97**	**6.44**	**23.12**	**129.54**

(*) Operational costs, do not include capital costs.
(**) The total cost values do not reflect the total cost of conservation of this material it just report how much in average the genebank spent that year on this type of material.