Agricultural Technology Transfer Society

Khartoum North, Block 9 Kafori

الجمعية الطوعية لنقل التقانات في المجال الزراعي

الخرطوم بحرى، مربع 9 كافوري

Name of the applicant:	Agricultural Technology Transfer Society (ATTS)
Nationality of the applicant	ATTS is non-governmental Sudanese organization ,
Legal status	ATTS is accredited by the Ministry of Humanitarian Affairs in the Sudan according to the work permit No.2234 dated January 21st 2009 .
Partners	Pastures and Forage Department, Kassala State. Livestock owners in the localities of Humashkoraib and Kassala. Banana and horticultural crops growers in Kassala locality. Forestry department in Kassala state. .
Applicant's contact details for the purpose of this action	
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Title of action	Capacity building of livestock owners in Kassala state in the utilization of non-conventional feeds in livestock nutrition .
Total duration of the action	One year
Amount ($) of requested funding	

Overall objective of action

This action attempts to utilize untapped feed sources such as uneaten and wasted organic mass composed parts of the Banana plant, pruned and fallen parts of fruit trees in addition to dead parts of Dom (***Hyphaene thebaica***) tree for feeding livestock in some parts of Kassala state especially in the dry season.

Target groups

Small livestock holders in rural and suburban areas of Kassala locality and Humashkoraib locality.

Final beneficiaries

1. Small livestock holders in Kassala and Humashkoraib localities of Kassala sate.
2. Owners of orchards for growing bananas and citrus fruits.
3. Forestry department in Kassala state.
4. Pasture and Forage department in Kassala state.
4. Bodies concerned with environmental safety in Kassala state.
5. Veterinary authority in Kassala state.

Relevance of the action

Livestock keeping is a common means of generating income and securing food to families in Kassala state. However, it is challenged by shortages in conventional feed supplies, notably, in the dry season. This action attempts to utilize untapped feed sources for feeding livestock in some parts of Kassala State especially in the dry season.

1-Description of the action

1-a. Background

Kassala State is situated in eastern Sudan between latitudes 14^{o} 15' and 37^{o} 15' N and longitudes 34^{o} 30' and 37^{o} 55' E. Eritrean hills lie down to the east of Kassala, River Nile and Red Sea States to the North; Khartoum and Gadarif States to the west and the south. Kassala State covers an area of about 24,282 km^2 and is made up of four localities namely; Kassala, Nahr Attbara, Sittete and Humashkorab. The four major towns of Kassala State are Aroma, Kassala, Khashm el Girba and New Halfa. The northern part of Kassala is arid and the southern parts have semi-arid climate. Aridity decreases gradually with movement towards the south. The central part falls between arid and semi-arid zones.

The economy of Kassala state depends on crop production under rainfed and irrigated conditions in addition to horticultural and livestock production. Kassala state supported about **5241418** head of sheep, goat, cattle and camel in 2011 predominantly, under the pastoral system of production. The capacity of the pastoral system to support livestock is dependant on rainfall. Rainfall exhibited marked decline in previous years indicating the drought conditions prevailing in the state. The capacity of the range to support livestock is further reduced by the expansion of agricultural schemes over grazing land, overgrazing and illegal removal of browse trees. Stock feed shortage, especially in the dry season, is currently a major constraint to livestock production in Kassala state. Although Kassala state produces crop residues (sorghum stalks & groundnut haulm after October every year; cotton seed stalks and wheat straw between April & May) the harvested quantities (Table 1) can only support the dry matter requirements of the state's herd for approximately two months and for the rest of the year the herd has to rely on overgrazed and exhausted pastures to feed itself.

Table (1): Cropped areas, crops , crop yield and crop residues.

Crop	Area (1000 feddans)	Production (1000 tons)	Assumed crop residue per ton of production	Crop residue (tons)
Sorghum	123	184.5	2	369,000
Cotton	43	66.822	0.4	26.7288
Sesame	30	15	1.0	15,000
Ground nuts	29	34.0	0.42	12,180
Wheat	10	10	0.7	7,000
Annual total tonnes of crop residues				403,207
Annual total tonnes of dry matter		From crop residues		403,207
		Needed by Kassala state herd		1,560,458
		Deficit		-1,157,251

1. b.Non-conventional feeds (NCF)

Conventional feeds are the common known standards for supplying protein and energy needs of livestock. However, there are many suitable alternatives that may be considered to meet nutritional requirements while reducing feed bill. These feed sources have the additional advantage of not competing with human diet. Some of the non-conventional feeds that may be considered alternatives to conventional feeds in Kassala state include Dom tree (*Hyphaene thebaica*) products (DTP) , banana by-products (BBP) , falling & pruned parts of fruit trees (mango, orange, grapefruit, lemon and guava) designated here as NCF. The relative prevalence & distribution of NCF in the localities Kassala State is given in Table 2.

Table 2: Subjective assessment of non-conventional feeds in Kassala localities. (- = none;+=little;++=moderate;+++=abundant)

Locality	DTP	UBBP	FPPFT
Kassala	+	+++	+++
Nahr Attbara	*	-	-
Gash	+	+++	+++
Sittete	+++	-	-
Humashkorab	+++	-	-

DTP= Dom tree products; BBP= banana by-products and FPPFT= Falling & pruned parts of fruit trees (mango, grapefruit, lemon and guava)

The area under cultivation for fruits, vegetables and fodder were not available. The state is known for its significant production of fruits and vegetables. Kassala supplies large amounts of banana, lemon, grapefruits and mango. It is self sufficient in vegetables and fruits. Table 2 provides subjective assessment of the availability of non-convention feeds in Kassala state. Both Kassala and Gash localities have large quantities of uneaten banana plant parts (UBPP) ; falling & pruned parts of fruit trees (FPPFT) whereas Sittete and Humashkorab localities support the greatest number of Dom trees.

1.c. Feeding NCF to livestock

1.c.1. Feeding culled vegetables and remains of vegetables

The effective use of culled vegetables and remains of harvested vegetables in animal nutrition is dependent on several factors. These factors have been reviewed by Ammermann & Henry (1998) who pointed out that Eastern European countries are making more use of vegetable by-products in animal feeding than any other countries. Nutrient composition of several vegetable residues and cull vegetables with potential value as feedstuff has been reported by different sources in literature (Anonymous, 1960). Generally water content is high in these vegetables. Moreover, crude protein is low. Bouecque and Fiems (1988) have summarized additional compositional data for potatoes and tomatoes. Organic matter digestibility for several by-products has been estimated with sheep by regression and difference method (Gasa *et al*, 1989). Very few documented studies have been reported on the use of cull vegetables and vegetables residues as animal feed. Daily gains of as high as 1.35 kg/day have been reported for steers fed on citrus pulps (Van Horn *et al*, 1975).

1.c.2. Feeding Oil palm (*Elaeis guianensis*) fronds

The feeding of oil palm (*Elaeis guianensis*) fronds to livestock is well established in Malaysia where it is used as a substitute for grasses because forage is a limiting factor. Oil-palm fronds belong to the category of fibrous crop residues, which also includes by-products such as rice straw. Studies comparing oil-palm trunks as a roughage feed (Oshio *et al.* 1990) with rice straw supported the use of the oil-palm materials as a source of roughage for ruminants, as did a long-term feeding trial of oil-palm trunks for beef production (Abu Hassan *et al.* 1991).

The recommended level of oil-palm fronds in the total mixed rations (on a dry matter basis) are 50% for beef cattle, and 30% for dairy cattle and goats (Abu Hassan et al., 2005). Whole oil-palm fronds (the petiole and leaflets), chopped into lengths of about 2 cm, are utilized as cattle feed either green, or conserved as silage in combination with other ingredients as total mixed rations (Abu Hassan and Ishida 1991, Ishida and Abu Hassan 1992). The chemical analysis and metabolizable energy (ME) value of oil-palm fronds indicate that they are suitable as a roughage source (Alimon and Hair Bejo 1995).

The digestibility and intake of NaOH-treated oil palm fronds (OPF) was higher than chopped OPF or OPF-silage. Intake was lower for OPF silage than the chopped OPF but the digestibility was comparable. Compared to the fresh-chopped OPF, OPF silage has advantages for animal feeding, in terms of ease of handling, storage, less labour usage, easy to be transported.

1.c.3. Feeding date palm by-products

Date-palm by-products (DPBP) are classically used as a complementary feeding source for livestock in Tunisia (Genin et al., 1975). DPBP are viewed as a relatively good and economic feeding source for small ruminants and dromedaries and solving part of the problem of disposing wastes. DPBP as a security fodder has low crude protein content (3 to 6.5% of dry matter).

The effects of feeding ensiled urea treated date palm fronds, ground *Prosopis juliflora* pods and a by-product concentrate on performance and meat quality was studied in Omani sheep (Osman et al., 2007). The urea treated date palm fronds silage was prepared by ensiling shredded palm fronds in a 30 g/l urea solution for 5 weeks. Sheep fed the date palm fronds were in good health throughout the trial but had lower feed intakes than those fed Rhodes grass hay but feed intake/body weight was similar across diet groups (30 g/kg).The authors concluded that the palm by-products might be used for feeding Omani sheep for maintenance or during times of nutritional shortage frequently experienced in the arid tropics.

Bahman , Topps and Rooke (2002) conducted, in Kuwait , two production experiments of 12 weeks duration, with lactating Friesian and Holstein cows .Beginning in week 5 of lactation the cows were offered a high concentrate diet together with freshly cut alfalfa and either barley straw or shredded senescent date palm leaflets (DPL). Milk yields, milk composition and live weight gains of cows given either DPL or barley straw in the two experiments did not differ significantly. Individual intakes of either roughage, measured in experiment 2, were also similar. The authors concluded that date palm leaves, which are waste byproducts in Kuwait, could be an acceptable alternative to imported barley straw as roughage for dairy cows in Kuwait.

1.c.4. Feeding Banana leaves and stems

A study of the available literature on the use of bananas for feeding livestock shows that most of the research work in this area was carried out in the Latin American countries which collectively produce about 35–50% of the worlds total banana production.

Every part of the banana plant (except the roots and suckers) can be and have been used to feed livestock in various parts of the world. Most of the research work on this subject has been carried out in Latin America and certain Asian countries; including India and the Philippines. Whole, fresh green leaves may be fed directly to animals or after being ensiled with an easily fermentable carbohydrate such as molasses. Banana stalk or pseudostem may be chopped and fed raw, or ensiled with easily fermentable carbohydrates.

Ruminants are well suited to use the vegetative parts and peels of bananas. Babatunde (1981) reported that banana leaves could be used as emergency feed for ruminants, but that the digestibility decreased as the level of banana leaves increased in the ration. He further stated that the pseudostems could be fed fresh, but that chopped ensiled pseudostems enriched with readily fermentable carbohydrates such as molasses was the best way of feeding them to ruminants.

Foulkes and Preston (1978) reported that the dry matter of banana leaves and pseudostems was relatively digestible for ruminants, i.e. 65% digestibility for leaves and 75% for the pseudostems. However, despite this apparently high DM digestibility, the leaves and pseudostems alone can barely meet the maintenance requirements of ruminants. They recommended that urea and a highly digestible forage or sweet potato foliage should be used as supplements to pseudostems or leaves being fed. In fact, it has been well established that the greatest limitation to using bananas as a feed for ruminants is the lack of fermentable nitrogen and hence banana diets must always be supplemented with a source of nitrogen such as urea. Perez and Roldan (1984) further clarified this situation when they compared banana diets fed with and without cotton seed cake to cattle in Colombia. Their results revealed significant improvements in average daily gain as the level of cotton seed cake supplementation increased from 1 to 2 kg/day/cow.

Dehydrated, green, milled banana (banana pulp flour) has been successfully used as a source of starch in the preparation of calf feeds and specifically in the manufacture of milk replacers. In Ecuador, Spiro (1973) and Rihs *et al*. (1975) tested various levels of banana flour in ruminant diets and found that banana flour could successfully replace up to 50% of the cereal in the feeds of young growing and finishing cattle.

Chenost *et al*. (1971) and Geoffroy and Chenost (1973) carried out digestibility trials on goats in cages and reported that when bananas and forages were offered *ad lib* separately, the kids consumed bananas at a level amounting to about 20–40% of their ingested dry matter. When the two were blended together, the dry matter and digestible organic matter rose sharply as the content of bananas increased in the ration from 0 to 20%. Also, the DM intake was greater when ensiled rather than fresh green bananas were fed.

Viswanathan *et al*. (1989) used sheep to investigate the nutritive value of banana stalk. In this study dried banana stalk replaced 0, 20, 40 and 50% Paragrass hay. The feeding trial lasted for 60 days and showed that feeding the banana stalk did not have any detrimental affect on the health of the animals and that although the daily live weight gains were low the rate increased up to 40% level of inclusion after which it started to decline. The dry matter intake per body weight $^{0.75}$ was fairly similar in all treatments.

The best way of feeding fresh green banana fruits is to chop them and sprinkle some salt on the slices since the fruits are very low in the in-organic nutrients. Cattle relish this material. For ensiling purposes, the chopped green bananas are preferred to the ripe fruits which lose some of their dry matter and, in particular sugars during ensiling. Similarly, green fruits are more easily dried than ripe fruits which are very difficult to completely dehydrate.

1.d. Specific objectives of the action

1- **Assessment of NCF mass and utilization in Kassala & Humashkoraib localities** .This deals with the identification of sites of NCF (UBBP , DTP and FPPFT), owners of NCF, estimates of annual quantities , monthly distribution, current usage (uses, users , applied technologies , quantities utilized and sale price).

2- **Identification of beneficiaries** (livestock owners in areas where NCF are available) and their **organization** into beneficiary groups on regional basis. **Initiation of meetings** with members of each beneficiary group to elect 10 of its members to attend training in NCF technologies and animal nutrition.

3- **Conduct training for elected members of beneficiary** groups in animal nutrition & management (Annex I) .

4. **Conduct training for elected members of beneficiary** groups in technologies used to upgrade the nutritional value and palatability of NCF (Annex II).

4. **Organize demonstrations** for practical feeding of treated NCF to ruminants.

5- **Visit** the beneficiaries **and respond** to their remarks on NCF technologies and livestock performance on treated NCF in order to improve methods and maximize benefits from the action.

1-c: Means of realizing objectives

Item	**Methodology**	**Responsibility**		**Outcome**
		Professionals (see Annex III for profiles)	**Assistants**	
1-Assessment of NCF mass and utilization in Kassala & Humashkoraib localities	Field trips will be and made to of Kassala and Humashkoraib localities in order to identify and quantify NCF inside each locality. A questionnaire (see Annex1) will be used to collect information on NCF and samples of NCF will be collected to conduct proximate chemical analysis in the laboratory.	1.Project co-ordinator	1. Enumerators. 2-Facilitators. 3-Technicians. 4. A staff member of the pasture and forage department in Kassala. 5- A staff o member of the Forestry department in Kassala. 6- A staff member of the Horticultural department in Kassala. 7. A staff member of the Veterinary Authority in Kassala	Assessment report.
2- Identification & organization of beneficiaries	a. Organization of beneficiaries (livestock owners) inside localities into groups according to their habitats. b. Election of 10 livestock owners by members of each beneficiary group to attend training in the NCF technologies.	1.Project co-ordinator 2.Community mobilization specialist	1-Facilitators. 2. A staff member of the Pasture and forage department in Kassala. 3. A staff member of the Veterinary Authority in Kassala. 4- A staff member of the Horticultural department in Kassala	1-Beneficiaries at community level organized into groups. 2-Ten freely elected individuals in each beneficiary group to attend training in NCF technologies.
3-Training in the basics of animal nutrition & management	a. Training of elected members of beneficiary groups in the basics of animal nutrition, feed conservation and storage.	1.Animal Nutrition specialist	1- Facilitators. 2-Technician.	300 elected members of beneficiary groups trained the basics of animal nutrition and feed conservation..
3- Training in technologies used to upgrade the	a. Training of elected members from beneficiary groups in	1. Animal Nutrition specialist	1- Facilitators. 2-Technician. 3-Feed factory engineer	300 elected members of beneficiary groups

nutritional value of NCF.	NCF technologies Details of technologies are given in Annex II).			trained in technologies to upgrade nutritional value of NCF.
4-Demonstrations in feeding treated NCF to livestock	Demonstration of feeding treated NCF to livestock	1.Animal Nutrition specialist	1- Facilitators. 2-Technician.	300 elected members of beneficiary groups shown demonstrations in feeding NCF to livestock.
5-Follow up visits to beneficiary groups	Visits to all beneficiary groups to discuss and listen to comments on the performance of livestock o NCF	1-Co-ordinator 2.Animal Nutrition specialist	1- Facilitators.	Evaluation and response to remarks and observations collected from field visits.

e. Implementation plan

Activity↓Month→	1	2	3	4	5	6	7	8	9	10	11	12
NCF mass and utilization assessment	■	■										
Identification & organization of beneficiaries			■									
Training basic animal nutrition & management				■	■	■						
Training NCF treatment technologies							■	■	■			
Feeding treated NCF demonstrations										■		
Follow up visits to beneficiary groups											■	■

f. Methodology

- Meetings with beneficiary group discussion and elections of individuals who will undergo training**.**
- Theoretical lessons.
- Practical hand-on-work training in treatment of NCF to upgrade its nutritional value and palatability..
- Illustrations and films.
- Group discussion.
- Demonstrations

g. Potential added value

The action will select and train some livestock owners in basic animal nutrition and technologies to upgrade quality of NCF .This will encourage the use of farmer-to-farmer extension model to enhance the spread of good nutritional management and NCF technologies among other livestock keepers in the community.

The action will demonstrate to livestock owners methods of cutting, preserving of excess forage grass in the wet season and crop residues in the harvesting season. The conserved feeds may to be used at times of feed scarcity for feeding productive animals to sustain their production.

The use of fodders that contain tannins (e.g. acacia pods) has been shown to reduce the incidence of worm infestations, which is one of the constraints limiting small ruminants' production. The trainers will be shown how to incorporate acacia pods in feeds to reduce parasitic infections in mall ruminants.

Expected output

- Training is a way to get more skilled livestock owners in animal nutrition and feeding at times of feed scarcity. Thus they manage their animals in the best way in the dry season and reduce the side effects of feed shortage.
- The success of this action will encourage other states which face feed shortage to quote it.

Banking instructions

	Unit Cost US $	Unit Quantity	Unit Type	Year 1	Total
Project Support Costs					
Professional Project Staff					
Project Coordinator	4000	12	month	48,000	48,000
Community mobilization specialist	3000	1	month	3,000	3,000
Animal Nutrition specialist	3000	9	month	27,000	27,000
Subtotal				**78,400**	**78,400**
Supplies					
Portable feed chopper diesel operated	3000	2	piece	6,000	6,000
Portable feed mixer	4000	2	piece	8,000	8,000
Molasses	200	2	ton	400	400
Urea	2000	1	ton	2,000	2,000
Sorghum	600	4	ton	2,400	2,400
Peanut meal	500	4	ton	2,000	2,000
Common salt	30	50	sac	1,500	1,500
Plastic covers	200	30	piece	6,000	6,000
Cart with donkey	2000	2	piece	4,000	4,000
Sacks	50	20	pack	1,000	1,000
Four gallon plastic jerkin	70	20	dozen	1,400	1,400
Subtotal				**33,300**	**33,300**
Support Staff					
Pasture department representive.	700	3	month	2,100	2,100

Name of account Agricultural Technology Transfer Society .
Bank : Faisal Islamic Bank , University of Khartoum Branch
Account No.: 8029

h. Budget Allocation

Forestry department representive	700	3	month	2,100	2,100
Horticultural department representive	700	3	month	2,100	2,100
Veterinary Authority representive	700	3	month	2,100	2,100
Secretary	500	12	month	6,000	6,000
Accountant	700	12	month	8,400	8,400
Facilitator (2)	700	9	month	12,600	12,600
Technician (2)	500	9	month	9,000	9,000
Enumerator (4)	400	2	month	3,200	3,200
Guard	200	12	month	720	720
Cleaner	200	12	month	720	720
Car driver	500	12	month	6,000	6,000
Subtotal of support staff				**49,040**	**49,040**
Transportation					
Khartoum-Kassala return ticket	100	6	Ticket	600	600
Shipment of Goods	1000	3	Trip	3000	3,000
Subtotal of transportation				**3,600**	**3,600**
Vehicle and Running Costs					
Vehicle rentals	4500	12	month	54,000	54,000
Vehicle running costs & fuel	1500	12	month	18,000	18,000
Subtotal of vehicle & running cost				**72,000**	**72,000**
Other Office Costs					
Office Rental	1200	12	office	14,400	14,400
Utilities (water and electricity)	300	12	bill	3,600	3,600
Telephone / fax	500	12	month	6,000	6,000
Postage / Courier	200	12	month	2,400	2,400
Stationary / Supplies	1000	12	month	12,000	12,000
Maintenance	1000	12	month	12,000	12,000
Documentation / Reporting	1000	12	month	12,000	12,000
Advertising / Visibility	1000	12	month	12,000	12,000
Subtotal of office costs				**62,400**	**62,400**
Total of subtotals					**220,340**
Office overhead costs (%))		**5**	**%**	**11,017**	**11,017**
Grand TOTAL					**231,357**

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Annex I: Urea treatment of NCF

The most common artificial nitrogen fertilizer used in agriculture is urea. One of the attractions of ruminant nutrition is that the microbial organisms in the digestive tract are able to convert large amounts of inorganic nitrogen into useful microbial proteins. These latter products can be digested and incorporated into the animal's own body tissues. As high crude protein levels of straws are low there is an opportunity to improve it by adding urea to it (at not more than 1% by weight to avoid toxic effects in small ruminants). Fertilizer grade urea provides no energy contribution but the crude protein equivalent of the nitrogen content is extremely high at 266.0%.

The ratio of water-urea solution to NCF is 1:1 (500 liters of solution for 500 kg of NCF) .It is stressed that adequate casing using plastic covers and the exclusion of air (also water that may seep in) is of paramount importance in obtaining a good-quality finished product. The used sacks and mud cover are recommended as the least cost solution.
The stack of treated NCF should be opened usually after a minimum of 3 weeks. If it is well sealed, it can be left for several months without adverse effects. It is best to synchronize treatment with feeding whenever possible. There is need to wait for 1-2 days before animals become accustomed to the treated NCF. More important is that animals should not be given access to more palatable feeds, either as grazing or in confinement.

Annex II: Urea-Molasses-NCF- Blocks

Feed blocks are a solidified mixture of agro-industrial by-products used for supplementing poor quality roughages and native rangelands. They are considered as a catalyst supplement, allowing a fractionated, synchronized and balanced supply of the main nutrients (i.e. energy, nitrogen, minerals and vitamins) for animals. The value of feed blocks lies in their role as cost-effective supplements. In this action Molasses blocks will be made of molasses (35%), NCF (38%) ,urea (2%) ,salt (5%) ,durra (5%) ,oil meal (10%) and cement (5%).

1. Annex III: Profiles of professional staff

Professor El Sammani El Gaili.: B.V.Sc (1968), M.V.Sc. (1971), U.of.K, PhD. Bristol (1975).
Proposed position in this action: Project Manager
He is university professor of animal production .Taught independently animal management, animal production, animal breeding and genetics, intensive sheep production and meat technology. Coordinated training courses in sheep and goat management to NGOs in Kassala, training in HACCP as applied to meat animal ,Meat technology to veterinarians . Led teams of animal scientists who conducted dozens of studies on goat and sheep production, including feeding ,nutrition ,growth and development , meat quality and safety. He offered livestock consulting services to major agricultural development projects in the Sudan including Feasibility Study for the development of Upper Attbara River area (1980), Feasibility Study for Merowi Irrigation Project (2006). Feasibility Study of Sondos Agricultural Scheme(2007), Feasibility Study for heightening Rosaries Dam (2008) ,Feasibility for the development of Tamara Agricultural Project in Nahr an Nil state (2009). Published three books on: investment opportunities in animal resources of the Sudan (2006) , livestock breeds suitable for red meat production in the Arab World (1983) ,Meat production in the Sudan (1978) and Meat production from indigenous Saudi sheep breeds(1992). Professor Gaili is a member of the National Committee of Organic Agriculture in the Sudan. He supervised over 25 postgraduates, delivered public lectures and published media articles on livestock production .

Professor Yousif Rizgalla Sulieman is a professor of animal feeding and nutrition .He holds B.V.M.S. , 1964, M.Sc. 1970 and Ph.D. (New castle upon Type - England), 1984.

Proposed position in this action: Animal nutrition trainer and NCF treatment specialist . Prof.Yousif is animal nutrition specialist and director of the central animal nutrition research laboratory, Kuku, Khartoum North (1977-1985), Livestock officer at Ghazal Gawazat Range and Livestock Resources Station in Southern Dar Fur (1964 - 1968). Livestock officer and director of Umbanein Livestock Resources Station in the Blue Nile Province and consultant to the nutrition laboratory – Kuku (1997-1999). Professor Yousif was the National Coordinator For FAO Technical Cooperation project for upgrading straw and urea treatment of straw to improve its quality (1986 - 1989).He was a member of FAO Regional Task Force on the utilization of molasses / urea block and

urea treatment of straw .He participated to training course on Sheep and Goat production in the Sudan, organized by the Arab centre for Semi-Arid And Arid Development (ACSAA) Khartoum, in 1995; and to training courses on Animal Feeds and Feeding in the Su1tanate of Oman .He was member of expert team (AOAD ,1997).on utilization of Crop residues and Agro- industrial byproducts . Professor Yousif published several research papers and supervised postgraduate students registered for master degree in animal nutrition.

Name of Staff : Moawia Mohamed Mustafa
Proposed position in this action: Community mobilization specialist
Education : B.Sc. Arts Cairo University- Khartoum 1968;**1972** Diploma in social policy Institute 0f Social Studies The Hague ,Netherlands,1984 M.Sc in Environmental Studies University of Khartoum. Trained in Project Appraisal Land Rights and land Tenure Systems, Natural Resources Surveys and studies ,Environmental Impact Assessment, Environmental Perception and Ethno science, Environmental Hazards Management, Emergency Relief Operations Logistics Handling Allocation Monitoring Follow-up Reporting and Evaluation, Food and non-food Needs Assessment
Positions held: .Rural Development Inspector, Senior Development Inspector1974-1987, Relief Desk Officer 1987-1994,4-Director of Socio-Economic Studies Section1999-2002,5-Director of The Administration for land Use and Desertification Control 2002-2006,6-Private Socio-economist Consultant2006
Tasks Assigned –Community mobilization to set criteria for selecting non-DDR participant in training -Promote re-integration of DDR elements into their communities –organize communities into groups of common livelihood- –Explain to members of communities ways and means for developing their projects through banks and money lending organizations.
1. Umjwasir development project , Northern State.1999 up to 2005 client : ADRA Sudan NGO Activities 1-Social transformation 2-Women development 3- Restocking of animals
2. Ingessana development project -Year: 1972 - Main project features: This community was living in an isolated area. They developed their own culture based on their traditions and are strongly tied to their hills. The development intervention was based on the introduction integrated package of multi-disciplinary activities e.g. improved methods of cultivation ,animal husbandry adult education and primary health care etc .