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NEEDS ASSESSMENT IN
PROSTHETICS PRODUCTION AND DISTRIBUTION
IN SRI LANKA

A Report Prepared By PRITECH Consultant:
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During The Period:
OCTOBER 19 - NOVEMBER 11, 1990

TECHNOLOGIES FOR PRIMARY HEALTH CARE (PRITECH) PROJECT
Supported By The:

U.S. Agency For International Development
CONTRACT NO: AID/DPE-5969-7-00-7064-00
PROJECT NO: 936-5969

AUTHORIZATION:
AID/S&T/HEA: 2/25/92
ASSGN. NO: HSS 101-SL

TABLE OF CONTENTS

I.	Summary Description of the Scope of Work	1
II.	Purpose of the Project	2
III.	Methodology	2
IV.	Summary of Observations and Findings	5
V.	Main Conclusions	12
VI.	Primary Recommendations	13
Appendix: Proposal to USAID/Colombo:		
	The Jaipur Foot Project of Sri Lanka	15

Sri Lanka Trip Report

I. Summary Description of The Scope of Work

The assignment was to include the following tasks and was to be carried out in conjunction with USAID/Colombo, Sri Lanka.

1. Assessment of numbers of individuals currently in need of orthopedic work and projected needs;
2. Assessment of current and planned orthopedic service capacities;
3. Assessment of the adequacy of medical preparation for fitting of prosthetic/orthotic;
4. Assessment of the viability of institutions providing services and their ability to expand and improve;
5. Recommendation on organizations through which USAID could best support orthopedic work in Sri Lanka;
6. Recommendations to USAID on appropriate technical areas for support, e.g. equipment, supplies, training, technical assistance, etc.;
7. Recommendations on dollar levels of assistance;
8. Assisting USAID in assuring that if continued services are needed after AID funding is discontinued that there will be capability to provide them; and,
9. Assistance with developing grant documents including: setting measurable goals and objectives, defining areas and funding levels for assistance, assuring that USAID support is targeted on prosthetic and related assistance for civilian victims of civil strife and that if other cases are treated that funding come from other sources, and developing evaluation criteria such as cost data.

II. Purpose of The Project

To assist USAID Colombo and a local PVO, the Friends-in-Need Society, in drawing up a program for the expansion of technical assistance in prosthetic production and distribution to victims of the on going civil war in Sri Lanka.

III. Methodology

Before making recommendations it was necessary to determine what already exists in Sri Lanka. Pertinent information was needed in order to develop a profile. Questions centered around:

A. Who are the patients--men, women and children?

How many amputees are there?

What is the cause of their prosthetic/orthotic problem-war, disease, accidents, or birth deformities?

What is the level of amputation--upper or lower extremity, below knee, above knee, bilateral, below of above elbow?

What is the condition of the stumps and do they show good surgical techniques?

Are the patients provided physical rehabilitation?

Is vocational rehabilitation available?

What occupations and skills did the patients possess before the trauma and what are they capable of now?

Do they have an artificial limb?

What does their society feel about them?

B. Who provides prosthetic/orthotic devices in Sri Lanka?

What are the conditions of the workshops?

Where are they located?

Are there facilities to house and feed patients while they wait for the prosthetic/orthotic device to be fabricated?

What is the state of the equipment, machinery, tools, and material used in the fabrication of the devices?

What material is used in the fabrication of the prosthetic/orthotic devices?

What is the amount, availability and quality of material used?

What kind of logistical chain exists to supply workshops?

What is the skill level of prosthetists/orthotists/workmen?

Do the workmen make both upper and lower extremities?

What is the quality of the devices produced?

What is the production level?

What kind of training and continuing education is available?

How much does a limb cost and who pays for it?

C. What is the medical care like?

What is the professional experience and training of the health care providers?

What are the government health care systems and how do they compare with the private health care systems?

What is the condition and location of the facilities--clinics, hospitals and rehabilitation centers?

What is the extent of the medical infrastructure throughout the country?

D. What are the conditions in the country?

What is the economic situation?

What is the technical level?

What is the ability of the present system in providing prosthetic/orthotic devices?

What is the condition and accessibility of the transportation network in the country?

To begin with, I met with Mr. Randall Casey and Mr. Nagalingam Mahesan of the USAID program office in Sri Lanka. We discussed their thoughts on the extent and types of civilian casualties resulting from the civil war, what they thought might be possible solutions, and their practical knowledge of the overall medical, political, military, and economic situation in Sri Lanka.

I requested that I be able to meet with as many people as possible at all levels who are involved with the amputee problem in Sri Lanka and to see as many prosthetic/orthotic workshops and medical facilities as possible throughout the country including the war zone. They told me that I could go everywhere except to the city of Jaffna. It was the middle of the war zone and a battle was in process.

Arrangements were made for me to meet the people and visit the facilities I had requested. I am confident I received a good overall view of the situation. Mr. Mahesan, a Sri Lankan who had worked as a government employee for the British, Sri Lankan and now the United States government, accompanied me to all the places and people that we visited. His 49 years of professional experience was invaluable in assisting me with this project. His knowledge of the customs, mores, history, political, military and economic situation helped me gain a great deal of background information very quickly.

People and Places Visited

Mrs. Swarna Ferdinand, Hony, Secretary, Colombo Friends-in-Need Society (FINS). This is the PVO that submitted the proposal to USAID to increase productivity and quality of limbs for all amputees. This PVO was inaugurated in 1831 and is an approved charity. The FINS has four workshops that fabricate the Jaipur Foot Project. The project was started by FINS in 1985 and its workshops are in Colombo, the capital; Kandy in the middle of the island; Galle at the southern end of the island; and Jaffna at the northern end of the island.

Visited the FINS workshop in Colombo.

Met with Mr. N.W.E. Wijewantha, Director of Social Services for the Sri Lankan government.

Met with the Chairman of the Sri Lankan Red Cross, ICRC, and League of Red Cross.

Visited the Orthopedic Section at the Colombo General Hospital.

Met with Dominique Gerrard of Handicap International.

Visited the FINS workshop in Kandy, a town in the center of the island.

Visited the Ragama Rehabilitation Center on the outskirts of Colombo.

Met with Brigadier Dr. Thurairajah at the Military Hospital, Colombo and toured the officer and enlisted men's wards.

Met with the FINS Technical Research Committee Members.

Visited the School for the Blind at Ratmalana, south of Colombo.

Visited the Sarvodaya Tricycle (wheelchair) workshop on the southeast end of the island.

Visited the FINS workshop in Galle at the south end of the island.

Met with Dieter Wendland, Chief orthopedic technician and owner of private prosthetic/orthotic workshop, Matammana Orthopedic Suppliers Company (Pvt) Ltd.

Met with Dr. Robert Russell, Executive Director, Central Council of Social Services which is the national coordinating body of non-governmental organizations.

IV. Summary of Observations and Findings

There are a large number of civilian and military casualties as a result of the long and difficult civil war this country is enduring. While precise statistics on the civilian casualties are hard to come by, particularly in the northern province where the fighting is the most intense, it can be reasonably assumed that there have been tens of thousands who have been wounded or killed.

A ten year old health report estimated there were approximately 30,000 amputees in Sri Lanka. In the ten years since that report was written the normal crippling injuries or diseases prevalent in the country would have increased that figure above 30,000. The beginning of the war in 1983 would have added to the increase in two ways: (1) the direct result of violence to the individual; (2) indirectly due to war conditions which damaged or destroyed the health facilities and infrastructures that normally would have provided preventive care to the populace at risk from crippling diseases.

Sri Lanka not only suffers from old health problems such as worms, malaria, polio etc, they also suffer from new health problems normally associated with the modern countries--high blood pressure, cancer and diabetes--all of which can cause crippling and amputations.

For all of these reasons there is a great need for prosthetics in Sri Lanka. But there is only one viable provider of prosthetics in the whole country. The Friends-in-Need Society set up an artificial limb program in Colombo in 1985 called The Jaipur Foot Program. The FINS, chartered in 1831, primarily mission was to alleviate the suffering of the physically handicapped of Sri Lanka. The International Human Assistance Program in June 1983 submitted a proposal to the FINS to begin a Jaipur Foot Project modeled on the one in India. The project was initiated in 1983 when the FINS sent three disabled men to Jaipur, India to train at the limb fitting center on how to build this low-cost, low tech limb. They trained under an American prosthetist, Mr. Robert Singer for three months. The FINS then hired Mr. Singer to move to Sri Lanka where he became the production manager for a year at the new limb shop in Colombo and helped them to develop the Jaipur Foot program. It was fully successful and has been in operation for five years. The success was so great that people asked the FINS to expand the Jaipur Foot program into other parts of the country. They did so in three other locations; Kandy, Galle and Jaffna.

The philosophy from the beginning was that those who could pay 1000 Rs for a Jaipur limb. All others were to be given the Jaipur limb free of charge with the help of sponsors from the public, and to those nominated by the Department of Social Services for which the state agreed to pay 1000 Rs. Here the state had paid much higher prices to commercial agencies.

The Colombo location is a corner lot with an administrative building, a workshop and attached living quarters where the patients are housed and fed while they wait for the limb to be fabricated. The grounds and buildings are well kept, clean and neat. A physical therapist is on location and provides rehabilitation training to the patient during their stay. The PT is a Norwegian on contract for a year.

The length of stay for a below knee amputee is approximately seven to eight days and an above knee amputee approximately 12 to 14 days. This is the time it takes to build the Jaipur limb into final form and to provide rehabilitation and get training.

I had read quite a bit about the Jaipur limb which was first used in India to successfully fit large numbers of amputees with an inexpensive "low tech" limb. There has been controversy surrounding the limb because it was low tech and thought by some prosthetists and medical professionals in the west to be too crude due to the materials used and the lack of prosthetic training of the workmen who fabricated the limb.

The important point about the Jaipur limb though was the fact that it was designed by professor Pramod Karan Sethi of Jaipur, India with the, in his words, "poor Indian masses in mind." As such it was successful because thousands of amputees have been fitted with the limb and use it on a daily basis. This would have been impossible to do with the modern western limb which is composed of specially formulated chemicals, plastics and component parts which in turn are manufactured from metals and plastics with their own intricate formularies and procedures. These modern limbs do indeed require a skilled, well trained prosthetist who takes years to develop the expertise needed to fit and fabricate such a limb. In addition, the modern limb is fabricated using a wider range of equipment and tools than is normally found in less developed countries. Added to all of these requirements for fabrication of a modern limb is the absolute necessity for a logistical chain to insure a steady flow of resupplies of all chemicals, plastics, materials, component parts, and replacement parts in case of equipment breakdowns.

I spent quite a bit of time over a week and a half watching and evaluating the Jaipur limb at all stages of construction and comparing it to the modern limb. I was impressed with what I observed. The Jaipur foot itself is made from vulcanized rubber on a production line basis. The rubber is readily available in that part of the world. Pieces of rubber in a modular concept, ankle, heel, midfoot, and separate toes, all covered by a thin sheet of rubber the skin color of Sri Lankans, are put together in a metal form and heated in an oven to vulcanize the parts together into a human shaped barefoot complete with toes.

The foot is somewhat flexible and will bend enough at the ankle to allow an individual to squat, an absolute necessity in a society where squatting is the norm for working, resting and going to the toilet. The human-looking barefoot is important because people go barefoot or wear sandals instead of shoes plus the custom in Asia is to remove footwear before entering the home or place of worship, therefore the cosmetic Jaipur foot has easier acceptability by the amputee because it looks like a foot.

The shank of the limb is made from a sheet of aluminum. The workman measures the opposite limb to get the correct size, or estimates it if the amputee is bilateral. He then draws the measurements out on the aluminum sheet in blue ink and cuts it out with a pair of metal shears. Then he uses a mallet and an inch-and-a-half thick iron rod held in a vise to bend the metal around into the shape of the shank. When this is done the edges are welded into a seam. Then a wooden plug with a hole in it is driven into the bottom of the shank. The Jaipur foot, which has a bolt sticking from the top of the ankle, is bolted onto the plug in the shank. The workman periodically fits the amputee and using a mallet adjusts the fit with as much skill as possible by hammering out pressure areas and making what changes can be made to make the fit as comfortable as possible. When it fits as good as he can make it, the finishing touches are added. The seams and edges of the metal are smoothed out. A cotton sockette is pulled over the shank and a resin, mixed to the individual's skin color, is spread thinly over the sockette to give the limb a natural skin appearance and color. A sockette is used because the resin will not bond directly to the metal. Next the inside of the shank is lined with a corduroy fabric. Lastly leather straps to hold the limb in place are attached and given their final attachments.

This process takes five to six days longer for the above knee. The thigh section must be fabricated and a knee joint made. The knee is made using a simple locking-unlocking brace which is connected with rivets to the shank and thigh. The harnessing is more involved and includes a waist belt.

The finished limb is very functional. It is waterproof, and is used in the rice paddies, by fishermen, and workmen of all occupations. It is extremely durable lasting up to three years with hard use.

It takes a lot of skill to make the leg but once the workman are trained and set up in a shop they make the limbs at a very low cost and quickly. A limb can be made in a matter of hours.

The head of the workshop was in India attending a class on plastics at the Jaipur workshop during the time of my visit. The purpose of that training was to explore ways for the Colombo Jaipur Foot project to improve the quality of the limbs they were making.

The Friends-in-Need Society has a five year track record. They have made approximately 3000 limbs during that period of time. Their production of limbs has increased to over 41 a month at the Colombo workshop since the increase in hostilities in April.

They have won the support of the general public, the Sri Lankan government agencies, the military, and international organizations. Of particular note is the fact that they accept all patients: men, women and children, regardless of their political or economic background. The amputee is put on a register when he/she applies for a limb. They are charged 1000 Rupees (\$37.00 US) for the limb. If they have no money the FINS has a list of sponsors they draw from who donate money for limbs for people who have no money. The military and government agencies pay FINS for the patients they send to the FINS.

The program has become so well known that surgeons throughout the country have altered their surgical techniques so that the stump will be in better shape for fitting an artificial limb. Government and military hospitals refer their patients to the Friends-in-Need society to be fitted with the Jaipur limb.

The FINS has the correct philosophy of total rehabilitation and they put it into practice with their various programs of counseling, physical rehabilitation, helping the amputee to get in touch with suitable vocational training institutions, assisting them with small loans to help them get established with a business, and conducting a six month follow-up on each amputee.

Once the amputee receives a limb from the FINS, they can have it repaired or replaced by the FINS anytime afterwards. This assures the amputee peace of mind for the future.

An admirable and unusual quality of the Friends-in-Need Society is that they register children on their waiting lists. An important element of this is once the child receives a limb then he/she will continue to receive a replacement limb whenever necessary as the child grows into adulthood. Children are not usually provided limbs in Third World situations simply because there are so few resources that only the breadwinner can be considered for a limb.

The FINS has formed a technical board composed of engineers, surgeons, businessmen and other professionals to explore the ways and means by which improvements can be made to the Jaipur Limb. The purpose of the board is to improve the overall quality of prosthetics provided by the FINS's workshops. They intend to do this by using plastics and other synthetic materials, explore and adopt more advanced technologies in production and increase the production of the workshop.

One night I was invited to meet the technical board for conversation and dinner. They were all sincerely interested in their role on the board and anxious to contribute to the further success of the FINS's Jaipur Foot program. At their request, I presented a discourse on the history and present condition of prosthetics in America and my experiences and thoughts on prosthetic programs in Third World countries.

The General hospital in Colombo is typical of an overworked, understaffed, undersupplied rehabilitation section in a developing country. The surgeon in charge of the prosthetic/orthotic workshop located in a wing of the hospital, has done as much as possible to improve the workshop but he has been severely limited by a lack of money, material and trained individuals. I was told, in answer to a question I asked about supplies, that the General Hospital had placed an order for supplies in 1974 and had not received it yet. They do what they can but the limbs are rudimentary and the production is low. There are 55 workers of whom three have received recent training. The building they work in is an old, poorly lighted barn-like structure. The machinery is old and there is a severe shortage of material to work with.

In August they made 15 temporary and 13 permanent limbs. In September, 43 temporary and six permanent, in October 44 temporary and eight permanent. The temporary limbs are made of plaster cast sockets, two iron strips for a shank, and a wooden bar as a foot. These were heavy uncomfortable devices but the young military patients I saw using them were able to walk after a fashion. I did not see an example of a permanent limb but I was told by a number of people outside the hospital that they were very poor quality and the amputees did not wear them.

The workload in amputees has increased since April which has caused a conflict because the workshop must also continue to produce the day to day routine bracing required by the regular patient load in the 2500 bed hospital.

The surgeon said with proper equipment and supplies he thought the workshop could produce 1000 limbs per year. I think that would be very difficult, even if those thousand were only temporary limbs.

The Ragama Rehabilitation Center on the outskirts of Colombo is a group of buildings scattered about in a large park-like setting of grass and trees. The lady who showed us around was doing the best she could but the Ragama Center was not able to meet any demands due to lack of materials, equipment and staff.

The World Health Organization who has provided some material within the last year to strengthen the prosthetic/orthotic workshop where one prosthetist and one orthotist were located. However, the few pieces of equipment were non-operative.

The prosthetist had been trained in Japan. I had heard that Japan had done this with a few people and I was curious to see and talk to this man who had the opportunity to go through the training program in Japan. After talking to him and reviewing the training materials I am of the opinion that the Japan training is a waste of time. For one thing Japan is not known for its prosthetic programs. Secondly the method and materials used in training are totally inadequate. The individual goes to Japan for six months. The first month is spent in language training and five months in training to use plastics. The end result is one confused individual who is sent back to an environment where there is no equipment, materials, supplies or backup of any kind.

The lady said they were trying to start a program at Ragama but I think there is little hope of that happening. It looked as if there was very little assistance provided to Ragama on any of its programs. They did not even have any money to dig a desperately needed well for fresh water.

The military hospital was a pleasant surprise. It was the cleanest Third World hospital I had ever seen. The Doctor Director, Brigadier Thurairajah, kept his staff on their toes. The military hospital staff, men and women, had smart looking clean uniforms and wore spit shined shoes. Both the enlisted men's wards and the officer's wards were clean, neat and well lighted from natural light. The toilets were clean and did not have the noxious odors I have come to expect in the hospitals in developing countries. The wards were full of

wounded soldiers, mostly amputees. The men were clean as were their beds and surrounding areas. They were alert and seemed to have as good morale as one could expect under the circumstances. There seemed to be adequate staff on each ward. I was impressed with everything I saw.

The Army Surgeon had the interest of his patients in mind. He had, at the time I was there, 168 amputees. Of those 100 had been measured for a limb and 48 fitted with a temporary limb. He has each amputee measured for a limb even though the workshops can not build them a permanent limb for a couple of years. He feels obligated to do something for his men and is extremely frustrated that they will have to wait years to receive a permanent limb.

He has explored all possible solutions to his dilemma and asked me if I had any ideas. He told me he was a desperate man. He wanted to build his own prosthetic workshop and bring in a certified prosthetist from America or elsewhere to build western limbs (plastic) and train a cadre of Sri Lanka prosthetists to learn the trade. I tried to dissuade him and told him why it would be impractical by listing all of the requirements needed to fabricate a western limb.

He sends all of his amputees out to be fitted and have a limb made so he had good knowledge and an opinion on the prosthetic workshops around town.

He sends most of the soldiers to FINS. He told me that Friends-in-Need society had built the most limbs for his soldiers. They had built 38 at a cost of 1000 rupees apiece.

He had sent a few to the General Hospital workshop. They had built four at no cost to a fellow government agency but the quality was not so good and production was low.

Even Ragama had built four limbs. Their charge was 8,000 Rupees but the quality was low and production was extremely low.

He sent soldiers to "the German" who had the only private workshop in Sri Lanka. He built the only true western limb available in Sri Lanka. He had built seven for the military at a cost of 13,500 Rupees apiece. The doctor believed the German made the best leg but one limb took him months to make and it would be years, perhaps a lifetime, before the German could build a leg for all the amputees. It was therefore impossible to consider this as an answer.

Of all of them the Army surgeon believed the German made the best leg but he was slow. The Jaipur Foot, he thought was functional but crude. However their production was high. Therefore, he used the Jaipur limb as the temporary limb because he could get more of his amputees walking quicker. He was planning to use the German limb as the permanent limb.

When I toured the wards, a number of the amputees had their artificial limbs with them. I was lucky enough to see all the types of limbs made by the different limb workshops and even more lucky to talk to a few soldiers who had been issued both the Jaipur leg (their temporary limb) the German leg (their permanent limb).

The consensus of the soldiers was that they liked the cosmetic appearance of the plastic western limb made by the German but they thought the Jaipur limb was the most functional. They wore the Jaipur limb because it was practical but they wore the western limb for special occasions. The Jaipur limb was nice because the foot looked natural and it bent at the ankle. They would wear sandals and remove them whenever they wanted.

They liked the soft inner liner on the western limb but they did not like the foot nor the immovable ankle.

All the soldiers agreed that the best limb would be a combination of the Jaipur foot attached to the western shank and socket.

In an afternoon meeting with Mr. N.W.E. Wijewantha, Director of Social Services for the Sri Lankan government, and his staff, he informed me that his service sent many amputees to the Friends-in-Need society. The FINS was well known and respected throughout the country for their philosophy and for their Jaipur Foot program. He told me there is no private limb company in Sri Lanka except the German man and that limb was too expensive except for the rich. There was one other private company which could order a western limb by mail from outside the country but still only the rich could afford it.

A mail order limb is always a disappointment to the amputee because it rarely fits properly. It is possible that a mail order limb could work if a certified prosthetist took the measurements, filled out the mail order forms accurately, and made the modifications and fine adjustments when the limb arrived and was fitted to the patient. But even if such a prosthetist existed in a Third World country, the time, expense and high rate of failure makes the process a waste of time, energy and resources. Not only that, repair and replacement of the limb must be considered. How will that be done, who will do it, and who will pay for it?

Social Services had once tried a mail order limb with one of their employees who had lost an arm above the elbow. He was brought into the office and asked to show me his arm. It had been ordered from another country and was a western type plastic arm with a cosmetic hand. The artificial limb was useless now. The harness was a rope made of twisted rags, both cables used to control the elbow and hand had broken long ago and the covering for the hand had deteriorated considerably. When I asked him why he still wore the limb he replied he wore it for cosmetic purposes.

This example clearly made my point that the western limb was worthless without the extensive logistical backup of material, equipment and supplies and a skilled prosthetist to properly utilize it all.

I had a conversation with the German who was very open in discussing the situation and environment within which he worked. He has been in Sri Lanka about six years. He builds the old style traditional plastic limb. It is a slow process at one or two limbs a month. The technology and methods he uses are outdated compared to what is being used today in America and Europe.

This is not to say the limbs are poorly constructed because they are not. The workmanship is good, the cosmetics is good and the socket utilizes a soft leather insert. However there have been changes within the last five years in technology, material, component parts and fitting techniques which have advanced the western limb in terms of comfort, lightness and function beyond what the German builds today.

He recognizes that and he told me there are new things in prosthetics that he is eager to learn about. However, he said, it is very difficult for him to get useful information from overseas and there are many difficulties in getting some materials and component parts from outside Sri Lanka.

V. Main Conclusions

The intensification of the war has put a burden on everyone. No one seems to think the war will be over soon. The violence has added significantly to the amputee population, both civilian and military. There is only one viable prosthetic limb producer in Sri Lanka and that is the Friends-in-Need Society's four workshops. The fact they are a local PVO, have established a five year track record of producing limbs, and have made most 3000 limbs of acceptable quality puts them among the few successful Third World prosthetic operations in the world. It has certainly contributed to a wonderful reputation in their own country.

The FINS are considered neutral in the civil war. They provide limbs to anyone, man, woman or child, regardless of their politics, religious or economic background. This perception is strengthened by the fact they also have a workshop in Jaffna, the main center of the Tamil stronghold. Both Tamils and Sangalese work together within the FINS. The Tamils and the government forces have not interfered with the FINS's workshops, including the one at Jaffna in the center of the fighting. The FINS's reputation is such that both sides recognize their neutrality and both sides benefit from the limbs they produce. It was reported to me that the Jaffna workshop remains untouched in an unspoken agreement between both sides as the fighting takes place all around the building where the workshop is housed.

Government officials in both the civilian agencies and the military are dependent on the FINS for limbs.

It is important to not start more amputee programs but to stick with one that has proven it works. The FINS is a growing concern and any assistance they receive from USAID will show rapid growth in production and quality. They have increased their production as much as possible since the latest round of fighting started in April 1990. However they can do no more without more material and more trained workmen at all four locations.

The FINS has a strong determination to succeed and the proper attitude of serving all who need their help. That drive coupled with the wide based community support they have ensures the continued success of their amputee program. They started the Jaipur Foot program on their own and have run it for five years on their own. There is a great deal of justifiable pride in such an accomplishment.

They have developed their own technical board to improve the Jaipur Foot. This progressive step is another indication of why this five year old program has achieved such success. The individuals responsible for managing and directing the FINS take their roles very seriously and are not content to be caretakers. They are interested in making a positive contribution.

They are committed to increasing the skill level of the workmen. The Colombo shop manager was in India attending a course on plastics that the FINS board thought would help improve the Jaipur limb. They also plan to develop a training class for all their workmen to improve their skills. And they plan to hire more workmen, train them so as to increase the output of all four shops.

The FINS needs money to increase productivity of their four workshops in order to meet the unexpected escalation of violence in the country that has led to loss of limbs to men, women and children. They have a realistic plan to increase the production over a three year period.

This will be done by improving, replacing or replenishing the equipment, machinery, tools, and material in each workshop. They will also develop a continuing education plan for the workmen and intend to hire new workmen to train as prosthetists and orthotists.

The FINS has sustained the program for five years and will have no trouble sustaining it at the end of the three year period of additional funding they are requesting from the United States.

I assisted them in writing their plan and I feel confident that it will be successful. I draw that conclusion based on their track record, their successful administrative organization, their functioning workshops, their trained work staff, their proven rehabilitation concept, the community support for the FINS and their well established commitment to the patient.

VI. Primary Recommendation

1. USAID should agree to fund the FINS request for \$375,000 over a three year period; 1991, 1992, and 1993.
2. FINS should provide quarterly reports to USAID, Colombo. Included in the report should be;
 - a. The work conducted at each of the workshops; Colombo, Kandy, Galle and Jaffna.
 - b. A record of patients treated at each facility with breakdown by; age, sex, location of amputation, cause of amputation, home of patient by village and district, and occupation at time of injury.
 - c. A record of other prosthetic or orthotic appliances provided patients; canes, wheelchairs, braces, etc. A breakdown of information (same as above) on the patient should be provided.

- d. Status of the budget.
3. The FINS should have a written rehabilitation plan as part of each patient's file.
 4. The physical therapist should have a clinical plan which outlines the procedure to follow when evaluating a patient and developing a method of treatment. This would be beneficial in training other therapists by providing them with an orderly process to follow and would also insure that each patient's problems are addressed in a methodological manner.
 5. A training plan should be developed for the workshop for each position. Included in the plan for any particular job would be a list of goals and objectives each trainee or employee is expected to complete or reach during the training phase. A test or evaluation at each stage of the plan should be given to the individual and his rating be made a part of his training file.
 6. USAID should consider providing additional funding to FINS to cover the costs of sending Mr. Robert Singer, an American prosthetist who was the Colombo workshop manager for a year, back to Colombo for a month or two to provide training in plastics. He would also assist in exploring methods of combining the Jaipur Foot and the western limb to develop a more comfortable limb. He also could provide training in fitting and fabricating upper limb prostheses.
 7. I would like to evaluate this program six and 12 months after it is funded. This project has the most potential for a USAID humanitarian project for amputees that I have seen or read about. Perhaps the Jaipur Foot is a program USAID should consider as a potential answer to other amputee programs in developing countries with civil strife.
 8. Additional funds should be provided to send an American, prosthetists, Wijegupta Ellepula to Sri Lanka to assist Robert Singer in training and development.
 9. An additional 20,000 U.S. dollars should be provided to FINS for the express purpose of importing prosthetic component parts unavailable in Sri Lanka. These include upper extremity parts such as wrist units, gloves (or hooks as determined by the FINS) and elbow joints. Lower extremity parts such as knees and ankles.
 10. The FINS should develop an action plan with milestones. This would act as a guide for them in setting production levels.
 11. The FINS and the Colombo AID should establish a link with me so that I can answer questions, assist in providing technical information, recommending trainers or acting as a trouble shooter on any problems that arise.

FREDERICK DOWNS, JR.
Director, PSAS
VA Central Office
810 Vermont Avenue, N.W.
Washington, D.C. 20420
Phone No.: (202) 233-2011
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APPENDIX

**Proposal to USAID/Colombo
The Jaipur Foot Project of Sri Lanka**

JAIPUR FOOT PROJECT OF SRI LANKA

SUMMARY DATA SHEET

COUNTRY	Sri Lanka
ACTIVITY TITLE	Jaipur Foot Project
TOTAL USAID CONTRIBUTION	US \$375,000
TOTAL PVO CONTRIBUTION	US \$238,550
LIFESPAN OF PROJECT	3 Years, 1991 - 1993
ACTIVITY LOCATION	Workshops in Colombo, Jaffna, Kandy and Galle. The beneficiaries are from all parts of Sri Lanka.
PVO NAME	Colombo Friend-in-Need Society
PVO HOME OFFICE	171, Sir James Pieris Mawatha Colombo 2 Telephone 421551
DATE REGISTERED WITH GSL	1831 - The very first organized charitable institution in (Ceylon) Sri Lanka with Sir Edward Barnes, Governor, as Patron.
PROJECT MANAGER	Mrs. Swarna Ferdinand (Outgoing)
CONTACT PERSON	Ms. Jeanne Samuel
DATE OF SUBMISSION TO AID	November 1, 1990

A. Activity Purpose

This is a formal proposal from the Colombo Friend-in-Need Society, to USAID for a grant of \$375,000 from the US Prosthetic Assistance Project. This will be used to increase productivity at our 4 workshops in order to meet the unexpected escalation of violence in the country that has resulted in immense civilian hardships and loss of limbs to men, women and children.

The money will be used to increase the production of artificial limbs over a 3 year period. This will be done by improving, replacing or replenishing the equipment, machinery, tools, and material in each workshop.

The Friend-in-Need Society will also develop a continuing educational plan for current prosthetic and orthotic workmen and to provide a training program for new workmen who will be hired as trainees. The FINS will also enhance its present rehabilitation program in the areas of physical therapy, counselling of the amputee and family, gait training, vocational training and job placement. They will also provide housing and food for the amputee during the period he is being fitted with a prosthetic limb and rehabilitated.

The average demand for prosthetics prior to June 1990 was about 1000 legs and 500 arms. The FINS expects this demand to significantly increase during the next 3 years mainly due to the civil strife. There is not place for the citizens to go except to FINS because there are no other viable prosthetic/orthotic workshops in Sri Lanka.

Meanwhile, the number of orthotic problems and amputations due to road, rail, and industrial accidents, wounds, and disease show no signs of abating. These factors will also add a burden to the need for prosthetic and orthotic devices. There are estimated to be approximately 30,000 amputees in Sri Lanka.

The Government is unable to meet the crisis and sends its patients, both civilian and military, to the Friends-in-Need Society for the fitting of artificial limbs.

B. Background

The Colombo Friend-in-Need Society (FINS) was inaugurated in 1831 and is an approved charity. The society runs the foremost prosthetic/orthotic workshops in Sri Lanka and provides artificial limbs, orthotics and other prosthetic appliances such as wheelchairs and canes to all disabled people free of charge. The FINS accepts all disabled men, women and children regardless of their ethnic, religious, cultural or political background. They also provide physical rehabilitation, assistance with job placement, assistance with vocational rehabilitation, and provision of one time grants to amputees to help them overcome their personal disaster.

In 1965, the Colombo FINS, with assistance of the President of Sri Lanka and others, set up a workshop for the production of Jaipur limbs. The Jaipur foot, an innovation by Professor P.K. Sethi of India, was designed to provide low cost prosthetic particularly suited to the needs of amputees in the developing countries.

The Jaipur foot enables the amputee to squat or sit cross legged on the floor and work for a whole day comfortably on rugged terrain such as jungle footpaths and hill country slopes. The limb is water proof, enabling the amputee to work in the rice paddies or as a fisherman. Heavy duty work such as drawing water from the well for irrigation or climbing trees is possible.

As a result, amputees can remain in their tropical villages among their own families without having to migrate to urban areas to beg or plead for social welfare.

Since its inception in Colombo in 1985, the Jaipur foot program has supplied artificial limbs to over 2500 amputees. A branch of the workshop was established by the FINS at Kandy in March 1986, a branch at Jaffna in July 1987 and a branch at Galle in November 1987. The location of these workshops, especially Jaffna in the North, has enabled FINS to serve citizens on all sides of the current civil strife. This has been recognized and appreciated by all concerned. The present capacity of these workshops to turn out prosthetics is given below:

April 30, 1990

Colombo per month average	41 Lower limbs
Kandy per month average	1
Jaffna per month average	8
Galle per month average	3
	<u>53</u> per month

Approximately 60% of the cases are below the knee amputations and 40% are above the knee. Of the total, approximately 2-4 individuals at each location are bilateral amputees. All branches of the FINS receive full support from the local community both in volunteers and by financial assistance from organizations, private individuals, and the Government.

As of September 30, 1990, no less than 2535 persons have been fitted with Limbs. The program expanded over the years to include:

- The economic rehabilitation of the limb users through the provision of soft loans for self employment income generating ventures
- The provision of vocational training to enable amputees obtain suitable employment
- Physiotherapy
- Job placement for those fitted with limbs
- Provision of one time grants to overcome disasters affecting the amputees.

The Colombo Friend-in-Need Society has demonstrated its ability to manage the project. The Society is recognized by the government and the general public. The Ministry of Social Services and the military, channels patients to the Society for the fitting of Jaipur Limbs and program enjoys a very favorable reputation.

While no formal evaluation has been done on the project, experts have recommended the technical and managerial quality of the program.

The management and staff are eminently qualified to carry out the project and met all technical standards. Key paid staff include:

Project Manager, Research and Rehabilitation
Project Manager, Administration
Workshop Manager
Hostel Matron
Physiotherapist

Volunteer Consultants include:

Orthopedic Surgeons
Engineers
Lawyers
Doctors
Accountants
Polymer Chemists
Development Specialists

At the four workshops there are a total of 26 paid workmen of whom 17 are disabled. Similarly 6 disabled persons are employed in the three administrating offices out of a total of 20 paid staff members. The management and staff speak English as a second language and English is used during the training of these individuals.

Most machinery and tools for the production of the Jaipur limb are available in the local market. (see attachment).

Most materials and equipment for the production of the limbs are freely available in the local market. This includes aluminium for sockets, rubber compounds, PVC, leather and metal for the joints.

The only component parts that are imported are, wrist and elbow joints for artificial arms, Hip-Disarticulation units, and rubber gloves from India. From past experience there is no problem in the procurement of these items.

The activity is compatible with the Governments priorities and is in keeping with current USAID initiatives in Health.

C. Who Will Benefit

In the three year period of this proposal, the direct beneficiaries will be:

4,000	will receive lower limbs
600	will receive upper limbs
450	will receive wheelchairs
300	will receive tricycles
2,500	will receive crutches
2,000	will receive orthotic braces
9,850	Total

From the past statistics, it is estimated that 87% of the lower limb amputees are males and 13% are females. Children included in the above figures are approximately 7%. (See attachment). Statistics on numbers of children in the other prosthetic/orthotic categories are not presently available, but are estimated to be somewhat higher than 7%.

It is important to note that all children who are accepted into the program are provided with replacement limbs all during their growing years. This is important for their physiological and psychological development.

All amputees can have their limb repaired at any time and can have a replacement limb made when their present limb can no longer be repaired. For all disabled who enter the program they will be provided physiotherapy, counselling and other after case services.

The indirect beneficiaries, who are the immediate family members of the disabled will be approximately 40,680.

The number of indirect beneficiaries was obtained by multiplying the total number of direct beneficiaries (10,170) times (4), the average number in each family.

From past experience the target group, the physically disabled, has found the program to be extremely beneficial. The limbs have stood the test of time and rugged use. Many of the users have regained their former jobs or have been able to obtain new jobs in the industrial and commercial sectors. Others in agriculture and fisheries have continued to make a living from these activities.

In some cases training in new skills have been provided for those who have not been able to fit into their earlier forms of employment. The selection of these persons has been carried out on a case by case basis taking into consideration:

- The type of employment at the time of the accident which caused the disability.
- The potential difficulty in regaining that particular form of employment.
- The economic status of the person, (can the person pay for the training or not).
- The feasibility of the training in terms of the potential demand for the new skill.

D. Implementation Plan

1. Goals:

The Goals the FINS has set for itself for the next three years are as follows:

<u>GOALS</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>
a. Fit Jaipur Lower Limbs	1000	1250	1750
b. Fit Artificial Arms	150	200	250
c. Provide Accommodation	Yes	Yes	Yes
d. Provide Physiotherapy and Counselling	Yes	Yes	Yes
e. Technical Training	Yes	Yes	Yes
f. Carryout improvements to limb	Yes	Yes	Yes
g. Machinery and Equipment	Yes	Yes	Yes
h. Provide Wheelchairs	200	150	100
Invalid Tricycles	100	100	100
Provide Crutches	900	900	700
i. Provide loans	100	100	100
j. Provide Orthopedic Appliances	Yes	Yes	Yes

These goals will be accomplished through increased training improved technology and upgrading of machinery, equipment and materials.

2. Training:

The training of Friend-in-Need Society, personnel is a fundamental benefit of the proposal. The purpose will be to provide appropriate training to enhance the knowledge, skills, and attitudes to existing and new technicians and management staff.

The training methods used will be a combination of non-formal adult education programs with on-the-job training through job rotation. Job enhancement and coaching by professionals and senior staff will be used. Trainees will be enrolled in training programs offered by other Sri Lankan and foreign institutions.

The specific objectives will be:

- a. To provide four new technicians (one from each branch) training at Jaipur, India under the supervision of Professor Sethi.
- b. To provide four existing technicians training in Prosthetics and Orthotics.
- c. To upgrade the skills of all existing and new technicians by providing refresher training courses to be conducted by expatriate professionals. These professionals will work alongside the workshop staff as they impart their knowledge to them.
- d. To provide four managers training in effective management techniques.
- e. To upgrade the existing library through subscriptions to pertinent journals and purchasing reference materials, videos and cassette tapes.
- f. To upgrade the On-the-Job Training capability of the workshop by meeting the standards of the National Apprentice Board. This will ensure the receiving of nationally recognized Diplomas by the trainees.
- g. To provide all staff personnel with training in counselling with special emphasis in the handling of trauma cases.

3. Improved Technology:

The Jaipur limb is serving the purpose for which it is produced. Nevertheless, the Friend-In-Need Society not only seeks to improve its service to the disabled by expanding the productivity of their workshops, they have embarked on a plan to develop and improve the existing technology with a view of improving patient care and comfort. They have formed a Technical Board (see attachment) whose specific objectives are:

- a. to develop a better quality limb using plastics and other synthetic materials
- b. to explore and adapt more advance technologies in production
- c. increase the production of the workshop.

4. Upgrade:

All four workshops will have an upgrade and expansion of the machinery and equipment plus a steady supply of material used to fabricate and repair prosthetic/orthotic appliances. (see attachment)

5. Evaluation Plan:

The Colombo Friend-in-Need Society will produce and submit to USAID reports on a quarterly and annual basis indicating progress against goals.

USAID will conduct an independent evaluation half-way through the project and on End-of-Project evaluation at the end of the three year period.

D. FINANCIAL NARRATIVE

The project will be implemented in four locations: Colombo, Kandy, Galle and Jaffna. Separate budgets and controls will be operated to ensure financial accountability and management.

The project will be managed by the Colombo office.

The accounting system adopted is based on the historic cost accounting concept which is the generally accepted system and is recognized by the Department of Inland Revenue.

Messrs. Tudor V. Perera & Company, a recognized Public Accounting and Auditing Company are the Society's auditors. The books are audited annually and published statements are open for inspections.

Sustainability

The continuity of the program is assured after the end of the grant from USAID. The general public and other donor agencies such as CIDA, NORAD, AIDAB, ODA, have expressed growing interest in the work but have also funded various activities carried out by the Colombo Friend-in-Need Society. The limbs are presently sponsored by the public, Department of Social Services, and the Military. This basis will continue.

Funds are slowly coming in but is not sufficient to meet the demand for new limbs, replacements, improvements to plant and machinery, research and development, and training.

The grant from USAID will ensure that these vital components are completed. The money will be used to expand and improve the existing program. This enhanced activity with the funding will provide the foundation for the sustainability of the program.

Workshop Premises

There is no construction component to achieve the objectives of the project since the Society already owns the land and buildings which house the headquarters and workshop Colombo.

The Galle branch is housed in the premises of a Trust and an agreement signed allowing the Society to carry out its activities.

The Kandy branch is on leased property, costing US \$650 annually.

The Jaffna branch is negotiating the purchase of appropriate land. The British High Commission has pledged funding for the construction of building when the land is secured.

USAID funds will therefore not be used for this purpose.

Machines and Tools

Existing machinery and tools, some of which is five years old will be replaced.

Additional new machinery and equipment will be purchased to meet increased demands for limbs as well as to upgrade to overall quality of the machinery and tools.

Technical assistance will be necessary for training of workshop personnel. This will include travel and educational material. Four new workmen and two new administrative employees will be hired.

The workshop manager is presently attending a training seminar in India at the Jaipur Institute on utilizing plastic materials to modernize the Jaipur limb. When he returns he will provide a list of the additional machinery and material necessary to work with the plastic technology.

Research funds will be used to evaluate and analyze existing technologies in other countries in order to develop improvements on the prosthetic and orthotic presently utilized in the FINS workshop.

The Jaipur Foot Project

Proposed Budget
1991 to 1993

	TOTAL US\$	PVO CONTRIBUTION US\$	USAID CONTRIBUTION US\$
Production of lower limbs 4,000 x \$37.5	150,000	60,000	90,000
Production of upper limbs 600 x \$125	75,000	30,000	45,000
Production of Orthotic Braces 2,000 x \$28	56,000	22,400	33,600
Provision of Orthopedic Appliances			
- Wheelchairs 450 x \$162.5	73,125	29,250	43,875
- Tricycles 300 x \$100	30,000	12,000	18,000
- Crutches 2,500 x \$25	62,500	25,000	37,500
Training	37,500	15,000	22,500
Research	25,000	10,000	15,000
Machinery	40,000	16,000	24,000
Hostel facilities	30,000	12,000	18,000
Salaries	<u>17,000</u>	<u>6,800</u>	<u>10,200</u>
TOTAL	596,375	238,550	357,825
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Contingency			17,175
			<u>375,000</u>

The foreign exchange costs are estimated to be 15% of the budget.

Production of Lower Limbs

	1991	1992	1993	TOTAL
No. of Limbs	<u>1000</u>	<u>1250</u>	<u>1750</u>	<u>4000</u>
	US \$	US \$	US \$	US \$
Material Costs	18,750	23,437	32,813	75,000
Admin. & Labour	6,750	8,438	11,812	27,000
Operating Expenses	6,000	7,500	10,500	24,000
Transport, etc.	<u>6,000</u>	<u>7,500</u>	<u>10,500</u>	<u>24,000</u>
TOTAL	<u>37,500</u>	<u>46,875</u>	<u>65,625</u>	<u>150,000</u>
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Provision of Upper Limbs

	1991	1992	1993	TOTAL
No. of Limbs	<u>150</u>	<u>200</u>	<u>250</u>	<u>600</u>
Cost of imported Components	13,125	17,500	21,875	52,500
Other materials	750	1,000	1,250	3,000
Admin. & Labour	1,875	2,500	3,125	7,500
Operating Expenses	2,250	3,000	3,750	9,000
Transport, Etc.	<u>750</u>	<u>1,000</u>	<u>1,250</u>	<u>3,000</u>
TOTAL	<u>18,750</u>	<u>25,000</u>	<u>31,250</u>	<u>75,000</u>
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Production of Orthotic Braces

	1991	1992	1993	TOTAL
No. of Appliances	<u>500</u>	<u>700</u>	<u>800</u>	<u>2000</u>
	US \$	US \$	US \$	US \$
Material Costs	9,800	13,720	15,680	39,200
Admin. & Labour	1,400	1,960	2,240	5,600
Operating Expenses	<u>2,800</u>	<u>3,920</u>	<u>4,480</u>	<u>11,200</u>
TOTAL	<u>14,000</u>	<u>19,600</u>	<u>22,400</u>	<u>56,000</u>
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Hostel Facilities

	1991	1992	1993	TOTAL
	US \$	US \$	US \$	US \$
Salaries	1,495	2,300	3,105	6,900
Food	3,250	5,000	6,750	15,000
Overheads	1,105	1,700	2,295	5,100
Travel & Medical Asst.	<u>650</u>	<u>1,000</u>	<u>1,350</u>	<u>3,000</u>
TOTAL	<u>6,500</u>	<u>10,000</u>	<u>13,500</u>	<u>30,000</u>
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Technical Training

	US \$
1. One Prosthetist from USA to stay in Sri Lanka for two months (Airfare, accommodation, subsistence, etc.)	18,750
2. One Prosthetist from India (Senior Technician from the Jaipur Centre) to stay in Sri Lanka for three months	2,500
3. To send four Sri Lankan technicians in Prosthetics and Orthotics overseas (India) for training	<u>16,250</u>
	37,500

Salaries

	1991	1992	1993	TOTAL
	US \$	US \$	US \$	US \$
Administrative Salaries				
1 Proj. Manager	1,800	1,800	1,800	5,400
1 Book-keeper	1,200	1,200	1,200	3,600
Technical Staff				
1 Colombo				
1 Jaffna				
1 Kandy				
1 Galle	<u>2,000</u>	<u>3,000</u>	<u>3,000</u>	<u>8,000</u>
TOTAL	5,000	6,000	6,000	17,000
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THE TECHNICAL BOARD

AIM: To develop and improve the existing technology with a view of improving patient care and comfort.

- SPECIFIC OBJECTIVES:
1. To develop a better quality limb using plastics and other synthetic materials.
 2. To explore and adapt more advanced technologies in production.
 3. Increase the production of the limbs.

The success of any new innovation will be assessed six months after the limb is fitted. A Questionnaire will be sent to the users requesting an evaluation of the limbs.

COMPOSITION:

Patron

Professor P.K. Sethi
Innovator of the J.F. Technology
Winner of the Magsaysay Award for Community Service.

Chairman

Dr. J.K.S. Weerasekera,
F.R.C.S. (Eng.) Consultant Surgeon-in-Charge
Orthopedic Unit, Colombo General Hospital.

Secretary

Ms. Jeanne Samuel, Project Manager,
Rehabilitation and Research, Jaipur Foot Programme,
Colombo.

Members

Mr. Arujuna De Zoysa

BSc (Mechanical Engineering), Senior Lecturer,
Computer Technology and Engineering,
Open University of Sri Lanka.

Dr. Kamal Weeraperuma

PhD (Polymer Chemistry), Lecturer,
Chemistry, Open University of Sri Lanka.

Mr. Gamini Kulatunge

BSc (Mechanical Engineering)
MSc (Foundry) Lecturer, Appropriate
Technology, Open University of Sri Lanka.

Mr. Krisan Jayawardene

Mechanical and Marine Engineer.
Works Manager at Walkers & Sons, a leading
engineering company in Sri Lanka. Designer and
Producer of special hot air oven for vulcanising foot
pieces at the Jaipur Foot Workshop, Colombo.

Mr. Tissa Jinasena

Bsc (Agriculture and Production Engineering)
Director, Jinasena & Co., a leading engineering
company in Sri Lanka.

Mr. P.P. Jayasinghe

Representing the Rubber Research Institute of Sri
Lanka.

Additional Comments for the Report

I assisted the Friends-in-Need Society in formatting and writing the rough draft of their proposal to Colombo AID.

A copy of the rough draft is attached as part of my report. Although it seems to be a modest proposal, it is my sincere belief that the Friends-in-Need Society are fully capable of meeting their goals and surpassing them.

The reasons for my confidence comes from 3 sources, one is that Ms. Swarna Ferdinard and Ms. Jeanne Samuel have done an excellent job of managing the Jaipur Foot Project for five years. Although, Ms. Ferdinard is leaving to emigrate to Australia, she has done an admirable job of training Ms. Samuel to carry on. Ms. Samuel impressed me as a very capable manager and I have full trust in her abilities to manage the program.

Secondly, my confidence also stems from the members of the technical board, whom I met. These individuals are genuinely concerned and enthusiastic about the future of the Jaipur Foot Project. Their interest and professionalism will help to ensure success.

Third, it was obvious that the Board of Management of the Jaipur Foot Program in Sri Lanka have done an excellent job of supporting and guiding the project managers, Ms. Ferdinard and Ms. Samuel.

Their presence on the board and their participation through leadership and concern for the people of Sri Lanka have contributed to the exemplary reputation of the Friends-in-Need Society throughout Sri Lanka.