



# Annual report 2011-12



## **SELCO Foundation**

Now in the second year since its founding, the organization has grown to different advocacy sectors and projects, and expanded its overall capacity and outreach. 2012 was SELCO Foundation's most ambitious year yet.



# Annual report 2011-12

## SELCO Foundation

### Letter from the Board of Trustees

This Financial Year (2011-12) has been our first full year of operation. It has been a very interesting year, with major organizational milestones being achieved, key programs being kicked off and a strong base established for future activities. Some of the main highlights of FY 2011-12 are:

- **SELCO** Foundation received certification under section 12AA of the I.T. Act on 9th May 2011, and was allotted the number DIT(E)BLR/12AA/S-2255/AAKTS0145G/ITO(E)-3/Vol 2011-12.
- The Foundation received exemption under section 80(G) of the I.T. Act on 21st June 2011, and was allotted the registration number DIT(E)BLR/80G/70/AAKTS0145G/ITO(E)-3/Vol 2011-2012.
- In May 2011, **SELCO** Foundation entered into an agreement to provide feasibility studies and awareness services for the provision of environmentally friendly energy technologies and water conservation, with Drishtee Foundation.
- On 8th June, 2011, The Lemelson Foundation (Portland, USA) announced a grant of USD 650,000 towards setting up **SELCO** Rural Labs, a project of **SELCO** Foundation. The grant will be payable in 5 installments spread over 5 years. **SELCO** Foundation has applied for and is awaiting permission to receive the funds under the FCR Act, from the Ministry of Home Affairs, Government of India..
- A new administrative office of the **SELCO** Foundation was opened on 17th May 2011 at #742 (Ground Floor), 15th Cross, 6th Phase, JP Nagar, Bangalore, to provide seating and work space for the Foundation staff.
- On 26th November, 2011, the Foundation secured permission from SDM College of Engineering, Ujire, to use a large room on its 4th Floor for its activities, on a rent-free basis.
- The Foundation added some key staff members in the form of Dr. Anand Narayan (Program Manager and Head, **SELCO** Labs), Mr. Sam Cocks (Principal Mechanical Engineer) and Ms. Surabhi Rajagopal (Analyst).

The Foundation is glad to have launched several major programs this year, which are described in detail in this report.

### Special recognition

The Foundation would like to acknowledge the tremendous support received from Menda Charitable Trust (MCT), Bangalore, towards the Light for Education Program. Not only has MCT contributed significant funds, it has also mobilized more funds from other like-minded organizations like Technology Alumni Association (TAA), Rotary Club of Bangalore, Rotary Club of Indiranagar, etc



## Product and service related programs

### Light for Education - The first 2000

#### Need and Concept

The programme, which sought to address problems in the rural education system with energy access, has scaled up rapidly over the last year, with significant donor support and speedy identification and implementation. What began as a small experiment through the **SELCO** Labs with 30 students in 1 school has expanded to provide access to more than 2000 students under the banner of 'Light for Education' (LFE). The programme was first conceived to simultaneously address problems of inadequate, inappropriate energy access for students and poor academic performance and low school attendance. LFE aims to eliminate the use of kerosene by providing a safe, cost-effective and reliable solution to these problems.

#### Model

The system essentially consists of the following three parts

- A centralized charging station at the school
- The study light, kept in the student's house, and
- A pocket size battery pack which is charged in the school and powers the light

Students are given an LED powered study light by the school, which includes a small detachable battery that can be recharged at the school's solar recharge center. Therefore, school attendance becomes crucial to access lighting at home, adding an incentive for parents to ensure their child attends school.

It is believed that this light source would also enable students to complete their work in relative comfort and fare better in academics. Once schooling has been completed, every student beneficiary is expected to return the study lamp and battery back to the school, which can then be redistributed to the next batch of students, creating a sustainable model for lighting the homes of students. The replacement of kerosene would bring added health benefits to households in the long run. The base cost per student in this model works out to Rs. 1500 (all inclusive), most of which is covered currently through donor funding. However, a mandatory user fee of Rs. 200 for the first year and Rs. 150 for every subsequent year is collected from students and will be used for the maintenance of the system.



1. CHILDREN SHARING A STUDY LIGHT

#### Developments

Over the last year, 2224 lamps have been provided through 42 schools spread predominantly across the state of Karnataka, with few projects in Tamil Nadu and Orissa. The programme has scaled up and become more streamlined. An impact assessment study of nearly 50% of the schools was conducted by the Labs during the months of January and February. The results indicate that while a large majority of students come from electrified households, the unreliability of electricity supply makes LFE a viable



solution. Attendance rates are seen to have improved and students and their siblings are able to use the light for studying while the woman in the house is able to use it while cooking.

## **Impact Measurement**

A detailed impact survey is also conducted on an annual basis with the help of college students from Ujire. It provides the benefit of a close look at the program operations and impact, while also allowing for a deeply educational experience for students conducting the survey, some of whom are visiting deprived communities for the first time in their lives. The survey results indicate an 87% increase in student attendance, a 97% improvement in homework completion and a 95% improvement in awareness about renewable energy. 51% of the users said they shared the light with a sibling or neighbor.

## **Challenges**

Problems have been noticed with the technology in particular with battery and connector defects. Steps have been taken to modify the design to overcome these problems and train regional technicians in lamp-battery repairs to avoid delays in servicing and repair of problematic units. Currently, the operational elements of collecting and servicing lamps and redistributing them at the start of the next academic year are being worked on. The lack of a sustainable financing model and inability to recover capital costs may be seen as a limitation. However, the mandatory student contribution has been emphasized with few exceptions to ensure a sense of ownership from the beneficiary.

## **Future plans**

Thanks to the generosity of our donors, funding has been raised for the next 2000 study lamps to be made accessible. The overall target for the coming year is to provide access to around 5000 students. The program is being streamlined to ensure fewer technical issues, faster redressal of problems and better collection of feedback. Focus is also being laid on viewing LFE as a holistic programme, moving beyond mere lighting to other energy requirements in the education space.

## **Key Learnings**

- School-centric program: There is clearly a benefit in associating the program with the school (as opposed to giving individual lamps to students). Every stakeholder (student, teachers, parents, village elders) then sees the program in a larger context, as a community initiative rather than a one-off donor effort.
- Dealing with maintenance concerns: Since the lamp is not owned by the students, the handling is a lot rougher. This means 2 things: a) the training and awareness creation among the users has to be a lot more rigorous b) the school has to be roped in to be a part of the maintenance process – by acting as the enforcer of maintenance rules. In this regard, we have introduced some documents to be signed off by the schools, which indicate their consent to be part of the awareness and maintenance process.
- Technical issues (connectors): The product is as strong as its weakest link. In this case, the lamp connectors have to be made more robust. We have moved away from the RCA jack used in Year-1, to the barrel DC jack, which seems to be much more durable. Towards the end of 2012, the product manufacturer was changed, to ensure smoother supply and better product reliability.
- Difference in service structure: The service effort for this model is much higher than for the regular home lighting systems, and the approach has to be re-tuned for LFE. The common failure points (connectors, wires, battery cases) need to be anticipated and spares kept in stock. There has to be a quick turnaround of spare parts when issues are reported.
- Dealing with collection of Maintenance fee: Our efforts to collect an annual maintenance fee from every student have not always been very successful. This is an area where we need to figure out alternative strategies.



## Integrated Energy Centers (IECs)

### Need and Concept

Integrated Energy Centres are solar powered community centres that can host a range of basic services and activities that are lacking in any under-served community. The centres aim at positively impacting quality of life and livelihoods by addressing fundamental energy needs and services relying on energy. The services, activities and structure of an IEC are generally designed depending on the need in a particular community. Each IEC is custom designed to best suit local environments and situations such that every aspect of it can be sustainable. Income generated by the IEC through the various services is used to recover all costs including running, maintenance and capital costs of the centers. The centers are typically run by partners, operators, groups or entrepreneurs from the community itself.

The concept of Integrated Energy Centers (IEC) was born out of the H1- a centralized solar charging unit stationed in the temple town of Dharmasthala in Southern Karnataka, and administered by **SELCO** Foundation. The Foundation realized the potential in scaling up this model to serve customers who could not, for various reasons, access reliable energy services. By targeting populations that are migratory in nature and settlements that are unauthorized or temporary, the IEC makes it possible to access basic energy services on a rental model for lighting, mobile charging, water purification, refrigeration, audio-visual aids and community televisions. It also creates a space to undertake vocational training and awareness camps, and a platform to foster a sense of ownership, responsibility and empowerment within the community.



2. INTEGRATED ENERGY CENTER

### Model and Activities

The IECs in Bangalore were set up in partnership with GMR-Varalakshmi Foundation as the community partner, with **SELCO** completing the technical installation. The center in Chitradurga, where **SELCO** has been the technical and field partner, would be the first entrepreneur-driven IEC for which is financed by a bank loan. Through these three centers, lantern rentals, study light rentals, mobile charging are occurring at present. User-based studies are being conducted to look at the feasibility of adding a community television at Tubrahalli, adding hawker lighting service to the Chitradurga IEC, testing of improved cook-stoves that can be rolled out through the two IECs in Bangalore and creating a market linkage for Kowdi work (a local handicraft), where the IEC can be used as the work center for women.

### Challenges

Problems have been encountered with the early discharge of lanterns. This is in part due to the habit of slum dwellers to leave the light on all night, resulting in excessive draining of the lantern batteries. Efforts are being made to address the issue by providing more solar power and also modifying lantern design. Monitoring and follow-up to ensure timely collection of rental fee proved difficult at first, but with our



ground partners handling the details of this aspect, **SELCO** Foundation is concentrating on expansion, provision of other services and overall operation and maintenance of the IECs.

## Developments

Three IECs have been set up so far.

- The first one is co-located within the community school in Pai Layout slum, Bangalore,
- The second is an independent structure made of bamboo composite at Tubrahalli slum, Bangalore.
- The third is a mobile energy center in Chitradurga district where the charging station is located in the house of the entrepreneur and a tricycle is used to cater to communities that are scattered in a radius of 4 kilometers.

The women residing in some of the Bangalore slums hail from Northern parts of Karnataka that practice a handcraft known as Kowdi, which involves stitching together pieces of scrap cloth with a running stitch. These women have not viewed this as a marketable skill and make Kowdi blankets mainly for personal use.

**SELCO** Foundation ran a pilot project in a temporary school in Kodichikkanahalli slum, Bangalore to demonstrate that IECs could be used as a training space to facilitate local creation of marketable products, in this case, utilizing Kowdi handcraft. Solar-powered lights were installed in the school and a designer helped train the women to make marketable products such as jackets, bags, belts, file covers, pillow cases etc. out of their Kowdi skill.



3. WOMAN SEWING IN KOWDI STYLE

The Foundation is now in the process of creating a full-fledged market linkage including orders for the product, trainers and all required technological support to help roll out this programme on a larger scale. The aim is to turn this into a comprehensive model that could include solar-powered sewing machines to finish the products within the energy center itself, while also ensuring a market for the products and facilitators to work with the women in the community.

## Small scale agricultural machines

### Need and Concept

There is currently a huge labour shortage in rural India which is causing hardship for small-scale farmers. This program looks to identify and develop machinery which will be beneficial to help reduce the labour requirement and then make these products available and accessible to farmers, specifically prioritizing paddy production, as this is one of the most adversely affected activities within farming.



There are three processes which are currently being addressed: transplanting, threshing and dehusking. Several prototypes of the thresher have developed and tested with farmers. Two prototypes of the dehusker have also been constructed and undergone extensive in-lab tests. For the transplanting process, a Chinese, manual transplanter has been identified as having potential for farmers in this region. Two of these have been acquired and extensively tested. Following these, there have been discussions with two other organizations working with farmers on how we can make these more widely available to the farming community.



4. SMALL SCALE PADDY THRESHER

In order to capture our experiences from our machinery testing for the benefit of other organizations engaging in similar activities, a document on machinery testing with small-scale farmers has been created.

## Energy Access

Over the last year, **SELCO** Foundation has undertaken to understand the potential for utilization of decentralized renewable energy services and models (apart from solar). The basis for this effort is to increase communities' access to energy services by capitalizing on all available local resources. For these purposes, research studies, prototype development and demonstrations are being undertaken.

### Hybrid solar-wind systems

The Foundation, through its **SELCO** Labs project, has partnered with the Projects division of **SELCO** Solar Light (P) Ltd. to work out the technical feasibility and implementation of a hybrid solar-wind system. This project is based primarily on interest expressed by several solar-only customers on the need for greater energy efficiency and reliability during the rainy season. Having completed the basic research on hybrid systems, the work on identifying users for testing and prototyping the system has begun.

### Small wind energy

Recognizing the opportunities available in a number of regions in Karnataka that benefit from high wind speeds, the Labs plans on investigating the potential for wind power to provide cheaper home lighting systems for some customers. Focused work will commence once the solar-wind hybrid project has completed its first test systems (no sooner than October 2012). The learning from these larger systems will be utilized in the development wind home lighting systems.



5. SMALL WIND TURBINE PROTOTYPE



An anemometer is being developed within the Labs towards furthering this project on small scale wind energy, logging information at a low cost. It is expected to cost under Rs. 3,000, versus around Rs. 20,000 which a comparable anemometer would cost on the market. This anemometer is in the latter stages of development and will soon be ready to be placed in various sites across the state to measure and log wind speed data over the course of the next year. The results could be useful in wind project siting at a later date.

### **Mini-grids**

The purpose of **SELCO** Labs' Mini-grid project is to create, catalogue, and disseminate best practice techniques for organizations (including **SELCO**) wishing to install and manage mini-grids. This decentralized system would be particularly useful for remote rural communities. Work is being undertaken on community identification and assessment, partner engagement, business plan development and post-installation management. During the course of the last year, a community assessment study was conducted by the Labs for a village in Hosahalli, a village two hours southwest of Mysore. The focus is on testing a standardized community assessment technique developed by the Labs to quickly evaluate the energy needs of potential users, the community's political environment, the geographical layout of the community, and local partners. Over the next year, the Labs will conduct assessments in communities in Karnataka and Tamil Nadu, with a view to undertake a pilot project for experimentation purposes.



6. COOKSTOVE BEING UTILIZED

### **Biomass cook-stoves**

Although a significant amount of research and work has gone into designing and disseminating improved biomass efficient cook-stoves, the Labs believes that there is still a significant amount of work required before the problem is cracked. Towards this end, the Labs has narrowed the focus down to communities in Bangalore's urban slums, where households spend a substantial part of their income on purchasing firewood and cook indoors on traditional stoves that emit smoke and could have health impacts.

Having identified the specific target community to work with, the Labs aims at conducting ground-level research to understand the cooking habits of these households, their perceptions and problems. These inputs will be used over the next 5-6 months to identify and test stoves available in the market or to design low cost, fuel-efficient cook-stoves using locally available resources and infrastructure. The larger goal is to involve community members in the process of manufacturing and popularizing these stoves and encouraging greater efficiency in the use of firewood for cooking. This programme will be carried out through existing IECs in particular slums.

### **Biogas**

With the view to analyze the current scenario in the field of biogas, a state of the market report on biogas was written. This paper is based on information from expert interviews and ground level observations. The lack of feedstock availability and issues in maintenance appear to be some important barriers to successful implementation of biogas plants. At a larger scale, community plants appear to have failed mainly due to social aspects. There is an interest over the next year to explore, with the scientific community, the usage of other feedstock for biogas generation and implement a pilot project with the help of appropriate technical support and monitor it for better understanding of viability and feasibility.



## Rural Training programme

This programme contributes to the development of skilled human resources and capacity building that the Foundation sees as integral to the creation of an appropriate ecosystem for effective provision of energy services. About 26 youth from around Karnataka were trained at **SELCO** Foundation's first training program on 'Solar Home Lighting system installation and maintenance' held at RUDSETI, Ujire, during December 2011. Combining theory lessons, intensive practice sessions, and a 2

weeks field training, this met with good response, and many of the trainees will become either solar technicians or entrepreneurs.

The Labs believes that similar training programmes for rural youth could add value by equipping them with employable skills and prove useful in the near future for dissemination and maintenance of technology being developed by the Labs- including small wind energy, small scale agricultural machinery, mini grid and hybrid energy models, biomass cook-stoves and so on.



7. TRAINING SESSION



## Outreach

**SELCO** Foundation has been engaged in reaching out to the larger student community, in urban as well as rural areas, with a view to increase awareness and stimulate interest in the social sector, in general and the renewable energy sector, in particular.

The Labs has hosted visitors from India and abroad, interested in understanding more about the activities and programmes being run and clarifying deliverables. There have been visits both to our Bangalore division as well as the Ujire Rural Labs. The visitors over the year have included:

- Robert Black from the Natural Resources Defence Council (NRDC),
- Erin Tochen , Program Officer from the Lemelson Foundation,
- Lakshmi Jagannathan, Head of Department from Dayanand Sagar College of Engineering and Management,
- A leadership team from Intel-India and a group of African Solar Entrepreneurs.

Students (about 200) from various Pre University (PU) colleges in and around Ujire visited the Labs to get an exposure to the work done. **SELCO** Labs and its employees have actively reached out to students and professionals through a host of lectures and interactive discussions at various forums including the Jagriti Yatra-2011, the Indo-Korean Science and Technology Forum and Srinivas Institute of Technology as part of a programme on 'Design and Deployment opportunities in Decentralized Alternative Energy Technologies'. Labs' personnel have spoken at seminars organized by Intel-India, Mahindra et cetera on issues of low cost energy for rural India.

A more organized Outreach programme is being developed for the next year which will include taught courses on social innovation and design and challenges of the sector and a college-based design challenge with an opportunity to take an idea forward and implement with the **SELCO** Labs. The Labs aims to be more actively involved and make its presence felt at University-level events concerning energy access and rural poverty.

## Policy Advocacy

In an effort to make the practitioner's voice an integral part of policy framing, the **SELCO** Foundation is entering the realm of Policy outreach and advocacy. **SELCO** Foundation, borrowing from **SELCO**'s 17 years of experience on the field, would be a credible voice to speak and opionate on national and international level policies relevant to rural energy access, decentralized renewable energy sources and social entrepreneurship.

Over the next couple of months, a more detailed plan on the bottom-up approach that will be used in this sphere, including the assimilation of views from ground-level, albeit non- English speaking, practitioner networks. The Policy wing will work towards more visibility and stronger presence at forums that implement and discuss energy access issues. One of the ambitious goals of this programme is to make the practitioner's role and presence mandatory in policy framing in Energy and Social sectors at the National and international levels.



## Internship program

**SELCO** Labs offers internship opportunities to students from India and abroad from varying fields of study including social work, design, environmental and development studies, business management and engineering. During the financial year 2011-12, **SELCO** Labs has played host to 20 interns between Ujire and Bangalore. The main programmes and issues where interns were involved include the following

### Agriculture:

- Field testing, demonstrations and feedback on small scale agricultural machinery
- Design modifications on Drier, De-husker and thresher
- Development of low cost wind anemometer

### Education:

- Light for Education- Impact assessment study
- Study on the business and technological feasibility of using Solar powered school projectors in rural schools

### Urban energy poverty and waste management:

- Livelihood generation activities through Integrated Energy centers
- Improved designs for low cost, efficient biomass cook-stoves
- Use of solar-powered hawker lighting
- Waste management

The potential projects that would require involvement of interns include the efficient cook-stove programme in urban slums, socio-economic feasibility of installing a community television through the energy center, further research on livelihood generation through these centers, business models for disseminating agricultural machinery and support in modifying designs of machinery. A more ambitious college outreach programme is being developed for the coming year which would add to intern requirements..



**8. INTERNS IN GROUP MEETING**



## Financial Highlights

Financial summary

Takeaways

Description of financial outlook, strategy

Activities would largely continue on similar lines to last year, though we aim to be more focused and process driven. All of our large programs described earlier are expected to continue, though with some changes. As more of our programs are starting to show maturity with the gradual emergence of market ready products and services, we are finding a need to goal of setting up multiple Labs in order to look at the needs, problems and solutions in more diverse locations and communities.start including enterprise incubation programs or at least having ready access to incubation services. To this end, we intend to collaborate with the **Selco** Incubation Center set up under the S3IDF umbrella, while also seeing how we can work with Villgro.

Expanding our Inspiration, Outreach and Education related activities is also something we are considering.

## Major Donors (2011-12)

<i>Donor</i>	<i>Amount</i>
Menda Charitable Trust	Rs. 10,28,000
Rotary Club of Indiranagar	Rs. 10,00,000
Rotary Cliub of Bangalore	Rs. 7,50,000
Sindhi Federation of South India	Rs. 1,50,000



## Audit Report (2011-2012)



M/s Ramesh Ashwin & Karanth

CHARTERED ACCOUNTANTS

Premier Presidency  
# 35/17, 1<sup>st</sup> Floor  
Langford Road  
Opp. St. Joseph College  
Bengalore - 560 025  
Phone: 080 41464630

### Auditors' Report

1. We have audited the accompanying balance sheet of **Selco foundation** as at March 31<sup>st</sup> 2012 and also the Income & Expenditure Account for the year ended on that date annexed thereto. These financial statements are responsibility of management of **Selco foundation**. Our responsibility is to express an opinion on these financial statements based on our audit.
2. We conducted our audit in accordance with auditing standards generally accepted in India. Those standards required that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statements presentation. We believe that our audit provides a reasonable basis for our opinion.
3. We report that:
  - i. We obtained all the information and the explanations, which to best of our knowledge and belief were necessary for the purposes of our audit.
  - ii. The Balance Sheet and Income & Expenditure Account dealt with by this report are in agreement with the books of accounts.
  - iii. In our opinion and to the best of our information and according to the explanations given to us, the said financial statements give a true and fair view in conformity with the accounting principles generally accepted in India:
    - a) in case of the balance sheet, of the state of affairs of the Trust as at 31<sup>st</sup> March, 2012;
    - b) in case of the income & expenditure account, Surplus for the year ended on the date;

Date: 20/07/2012

For Ramesh Ashwin & Karanth  
Chartered Accountants,  
Prashanth Karanth  
Partner  
M.No.214235  
F.R.No.0106805





## Organization

### Advisory Board

B.R. Prahakara  
Chief Executive,  
Gokula Education Foundation

Thomas Pullenkay  
Former Vice President  
**SELCO** Solar Light Pvt.

K. Jairaj  
Additional Chief Secretary  
Government of Karnataka

Adriana Halloran  
Founding Member  
Halloran Philanthropies

Harish Hande  
Managing Director,  
**SELCO**-India

Erin Tochen  
Program Officer,  
Lemelson Foundation

Patrick Maloney  
Principal,  
Imprint Capital Advisors

### Team

Anand Narayan  
Program Manager

Sam Cocks  
Principal Mechanical Engineer

Surabhi Rajagopal  
Principal Analyst

### Interns & volunteers

Might need some addition to interns

Quentin Bezier

Anajli Kumar

Anantha Murthy

Anand Boob

Renny Lopez

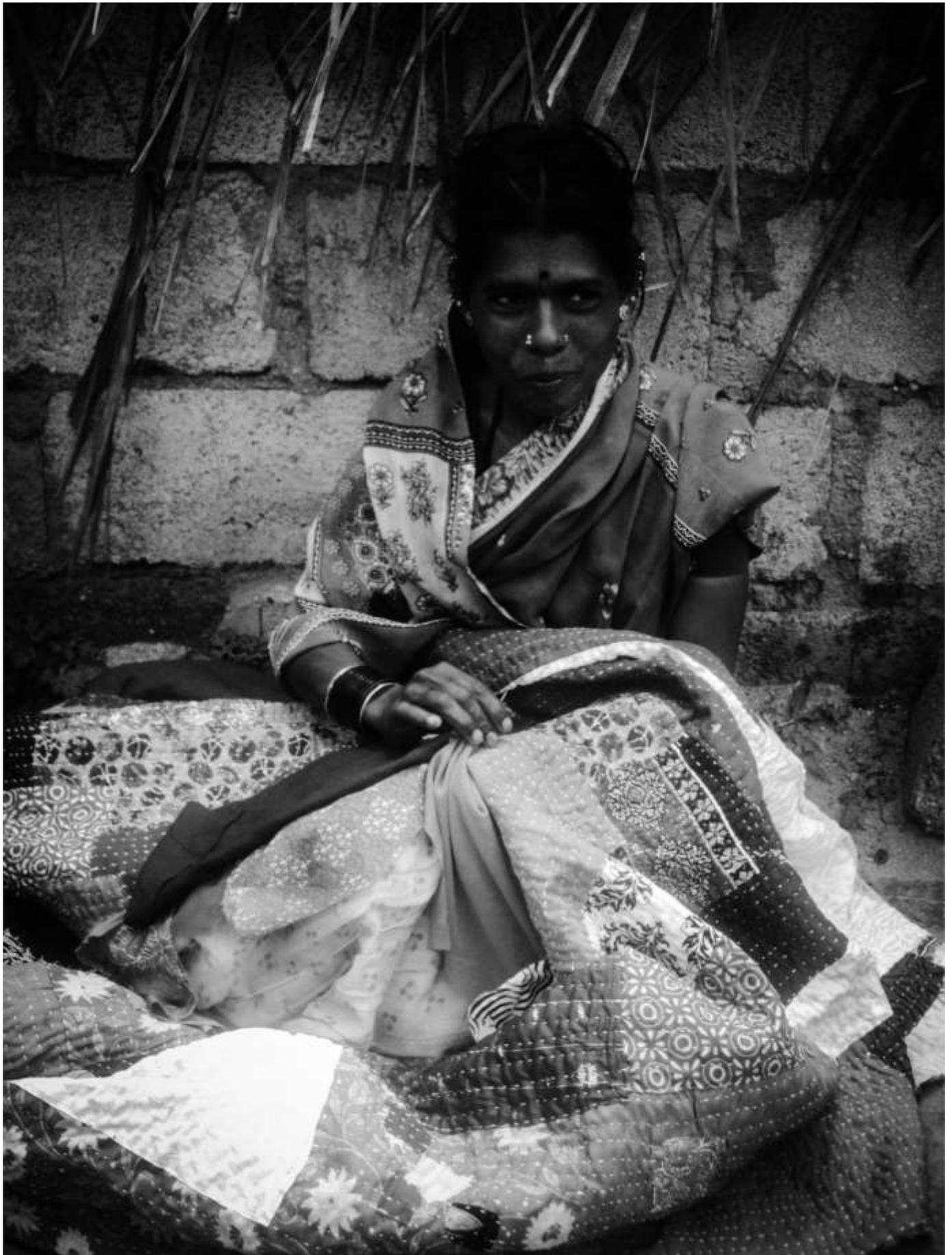
Chaitrasri R Rao

Ann-Lena Jahnsen

Emily MacAteer

Deepthi Bhat

Kanmani Bala



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