

Impact Assessment Report For Suryamitra Training Program December 2020

Acknowledgment

This report is an analytical representation of the impact assessment study undertaken by Innovative Financial Advisors Private Limited (Fiinovation) of the Suryamitra Training Program for the trainees and the trainers (ToT) for solar PV installation. The study has been conducted in across 11 sample states in the country – Assam, NCT Delhi, Gujarat, Himachal Pradesh, Maharashtra, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh, Uttarakhand and West Bengal. The samples for the trainees and the master trainers have been drawn from a few districts in these states.

Team Filnovation would like to thank, appreciate and acknowledge all the individuals who have provided support, agreed to be interviewed, assisted or contributed to the entire study in any manner.

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This study has been a truly amazing experience for the entire Fiinovation team. We are really pleased to present this work and believe that this will provide a strong foundation for wellanalyzed project information so that the Skill Council for Green Jobs is able to review the positives aspects as well as the challenges hindering the successful implementation of the project. Basis this they may take necessary course corrections to steer the project on the road to success. Further, this report will help in understanding the sustainability quotient to see if the project is truly leaving a lasting impact on the lives of the beneficiaries.

Table of Contents

Acronyms	02
Executive Summary	03
The Impact at a Glance	04
Chapter 1: Prologue to the study	07
1.1 Introduction	08
1.2 Suryamitra Training Program	09
1.3 Background of the present study	10
1.4 Objectives of the study	10
1.5 Scope of the study	11
1.6 Methodology of the present assessment study	11
1.6.1 Secondary research phase	11
1.6.2 Stakeholder engagement in the primary research phase	12
1.6.3 Sampling strategy for the assessment study	12
1.6.4 Sample collection	13
1.7 Challenges faced in conducting the study	13
Chapter 2: Impact of Suryamitra Training Program on the Trainers	14
2.1 Prologue to the training of trainers (ToT) program	15
2.2 Demographic characteristics of the sample trainers	15
2.2a Distribution of trainers by gender	15
2.2b Distribution of trainers by age-group	16
2.2c Distribution of trainers by highest educational qualification	16
2.3 Economic characteristics of the sample trainers	17
2.3a Distribution of trainers by tenure of association with the solar sector	18
2.3b Distribution of trainers by status of employment in the solar sector	19
2.3c Distribution of trainers by their monthly income in the solar sector	20
2.4 Trainers perception on the Suryamitra training program	20
2.5 Impact of the Suryamitra training program on the ToT	21
2.5a Distribution of trainers by their responses on the impact of the training program on	22
2.5b Distribution of trainers by their responses on the impact of the training program on	23
their technical knowhow	20
2.5c Distribution of trainers by their responses on the impact of the training program on	24
the availability of new job opportunities	_ ·
2.5d Distribution of trainers by their responses on following safety practices at work	25
2.5e Distribution of trainers by their responses on improvement of performance in the	26
sector	20
2.5f Distribution of trainers by their responses on increase in income post training	27
2.6 Impact of the Suryamitra training program on the trainer's family	28
2.7 Rating the Suryamitra training program	29
2.7a Distribution of trainers rating on the curriculum	29
2.7b Distribution of trainers rating on the capacity building aspect	30
2.7c Distribution of trainers rating on the role of the training partner	31
2.7d Distribution of trainers rating on the overall program	30

Chapter 3: Impact of Suryamitra Training Program on the Trainees	33
3.1 Prologue to the training of trainees	34
3.2 Demographic characteristics of the sample trainees	34
3.2a Demographic characteristics of the sample trainees	34
3.2b Educational qualification of the sample trainees	35
3.3 Economic characteristics of the sample trainees	36
3.3a Distribution of trainees by tenure of association with the solar sector	36
3.3b Distribution of trainees by their employment status	37
3.3c Distribution of trainees by their mode of employment	38
3.3d Distribution of trainees by their monthly income	39
3.4 Trainees perception on the Suryamitra training program	40
3.5 Impact of the Suryamitra training program on the trainees	41
3.5a Distribution of trainees by their responses on the impact of the training program on the current engagement	41
3.5b Distribution of trainees by their responses on the impact of the training program on their technical knowhow	42
3.5c Distribution of trainees by their responses on the impact of the training program on the availability of new job opportunities	43
3.5d Distribution of trainees by their responses on following safety practices at work	44
3.5e Distribution of trainees by their responses on improvement of performance in the sector	45
3.5f Distribution of trainees by their responses on increase in income post training	46
3.6 Impact of the Suryamitra training program on the trainee's family	47
3.7 Rating the Suryamitra training program	48
3.7a Distribution of trainees' ratings on the curriculum	48
3.7b Distribution of trainees rating on the performance of the training partner	49
3.7c Distribution of trainee's rating on the overall program	50
Chapter 4: Way forward	51
4.1 Introduction	52
4.2 Observations from the field	52
4.3 Suggested way forward	52
Annexure 1: In-depth Interview Schedule for Suryamitras	54
Annexure 2: In-depth Interview Schedule for ToT	57
Annexure 3: Glimpses from the field	60

Acronyms

- CAPI Computer Assisted Personal Interview
- CII Confederation of Indian Industry
- FGD Focus Group Discussion
- FY Financial Year
- IDI In-depth Interview
- KII Key Informant Interview
- MNRE Ministry of New and Renewable Energy
- NISE National Institute of Solar Energy
- PMKVY Pradhan Mantri Kaushal Vikas Yojana
- SCGJ Skill Council for Green Jobs
- ToT Training of Trainers
- TP Training Partner

Executive Summary

The Suryamitra training program aims to provide skilled technicians for installation, commissioning, Operation & Maintenance in the field of solar technology. The main objective of this program is to train the 10+2 passed, ITI/diploma holders/ as field technicians to execute National Solar Mission (NSM) programs across the country. The program deserves a special mention keeping in mind the revision of solar energy target of 100 GW to be achieved by 2022. This on one hand would require spreading awareness about the use of solar energy as a prime source in suitable geographies, on the other would call for a pool of trained and skilled workforce to support the growing and evolving demand in the sector. Since the inception in 2015-2016 till date, more than 67000 trainees have been trained under the Suryamitra training program supported by various central and state sponsored schemes. The present study is an outcome of the call by Skill Council for Green Jobs to assess the impact that the training program has had on the trainees including the ones who have taken the Training of Trainers program.

The study covers more than 1500 trainees (including trainers) from 11 states representing a vast geographical diversity. The states included in the study are Assam, Delhi, Gujarat, Himachal Pradesh, Maharashtra, Rajasthan, Tamil Nadu, Telangana Uttar Pradesh, Uttarakhand and West Bengal and happen to be the forerunners in training the Suryamitras.

The study maps the demographic and the economic characteristics of the beneficiaries in the different sample states. 1004 trainees and 505 trainers have been considered as samples and have been proportionately distributed in the sample states based on the number of candidates trained till date. It clearly emerges from the study that it has been highly beneficial for all the trainees (including the trainers) and can be substantiated from the following findings emanating from the on-field data.

- 95.7 per cent of the trainees and 78.6 per cent of the trainers reported to have improvement in their technical knowhow post training.
- 88.5 per cent of the trainees and 53.9 per cent of the trainers reported to have increased jobopportunities post training.
- 96.1 per cent of the trainees and 93.3 per cent of the trainers reported to have improvement in their performance in the sector post training.
- 80.5 per cent of the trainees and 45.7 per cent of the trainers reported to have increase in income post training.
- 99.3 per cent of the trainees and 51.9 per cent of the trainers reported to have experienced improvement in their quality of living post training.
- 23.5 per cent of the trainers rated the program 3 out of 4 while 64.9 per cent rated it 4 out of 4.

Distribution of the trainers in the study states by their rating on the overall program



• 36.4 per cent of the trainers rated the program 3 out of 4 while 51.9 per cent rated it 4 out of 4.

Distribution of the trainers in the study states by their rating on the overall program



Source: On-field data, 2020

The Impact at a Glance

Promoted by the Ministry of New and Renewable Energy (MNRE) and Confederation of Indian Industry (CII), Skill Council for Green Jobs is relentlessly catering to the supply-side requirements of green jobs. A large number of the potential workforce have been trained as Suryamitras and based on its success, in recent years Programs like Vayumitra and Varunmitra have also been launched keeping in mind the growing demand for manpower in the green sectors. Till date more than 67000 trainees have been trained as a part of the Suryamitra Program in 26 states and Union Territories. However, for the present impact assessment study 1500 trainees from 11 sample states of Assam, NCT Delhi, Gujarat, Himachal Pradesh, Maharashtra, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh, Uttarakhand and West Bengal have been selected. Both master trainers from the ToT program and trainees have been interviewed using Computer Assisted Personal Interview (CAPI) techniques to assess the impact of the training program on the identified beneficiaries.

Demographic and economic characteristics of beneficiaries have been collated in the following table.

Demographic and economic characteristics		Percentage of trainees	Percentage of trainers	
	Ago Group	Less than 25	57.9	7.7
$\begin{pmatrix} 1 & 0 \\ 1 & 0 \end{pmatrix}$		26-30	30.4	45.7
	Age-Oroup	More than 30	11.7	46.6
\bigcirc		Total	100.0	100.0
		10th Pass/ ITI Diploma	73.6	14.1
	Educational	Graduate/ BE/ B.Tech	22.8	37.2
	Qualification	Post-Graduate/ M.Tech	3.6	48.7
		Total	100.0	100.0
Î.	Status of Employment	Unemployed	7.3	-
		Self-employed	28.8	24.6
		On pay-roll	64.7	75.4
		Total	100.0	100.0
		Less than INR 10000	39.9	-
(र)	Income	INR 10000-12000	15.7	-
	range for	INR 12001- 14000	25.8	-
J>	Trainees	More than INR 14000	11.0	-
		Total	100.0	-
_		Less than INR 20000	-	43.4
€	Income	INR 20001-40000	-	34.5
	range for	INR 40001- 60000	-	7.7
J. 2	Trainers	More than INR 60000	-	14.5
		Total	-	100.0

Table I: Demographic and economic characteristics of the trainees and the trainers

Source: Collated from on-field study

It is evident from the above table that more than half of the trainees are less than 25 years of age while more than 46 per cent of the trainers are aged more than 30 years. Similarly, close to two-third of the trainees have completed class 10 along with soe training on ITI and 48.7 per cent of the trainers reported to have completed Post graduation degree. More than half of the trainers and trainees were engaged on payroll with companies serving in the sector.

The following observations emerge from the demographic mapping of the beneficiaries of the Suryamitra Program:

- There's scope for making the program more gender inclusive if not gender neutral. Female candidates can be mobilized and encouraged for performing the different activities suitable for them.
- Evidently, most of the trainees are young and mostly fresh entrants to the job market. Concomitant to
 encouraging the young age cohorts, qualified individuals in higher age groups can also be mobilized and
 encouraged to take up the training and work in the sector. This will increase the efficiency of operations
 and improve the productivity in the solar sector and therefore cater to the growing demand in the sector
 in a better manner.
- In the regime of Atmanirbhar Bharat, schemes may be conceptualized and designed to support the selfemployed Suryamitras which in long run will help in creating a self-reliant nation in terms of green energy services.

The Ratings of the program given by the beneficiaries have been collated in table II. More than half of the trainers (51.9 per cent) and trainees (64.9 per cent) rated the program 4 out of 4 reflecting their satisfaction with the overall program (Table II).

Table II: Rating the program

Rating scale for the Suryamitra Program		Percentage of trainees	Percentage of trainers	
~		1	5.2	1.8
ድሏዊ		2	6.4	9.9
Rating Scale	3	23.5	36.4	
	4	64.9	51.9	
		Total	100.0	100.0

Source: Collated from on-field study

Evidently, more than 80 per cent of the beneficiaries rated the program 3 and 4. This can be further substantiated by the responses that the beneficiaries have given on the impact that the program has had on them (table III).

Table III: Impact of the program

Impact of the Suryamitra Program			Percentage of trainees	Percentage of trainers
Impact the prog on the		Improvement in technical knowhow	95.7	78.6
	Impact of	Increased job opportunities	88.5	53.9
	the program on the beneficiaries	Improved performance in the sector	96.1	93.3
		Increase in income	80.5	45.7
		Impacted quality of living in family	99.3	51.9
		Total	100.0	100.0

Source: Collated from on-field study

It is evident from the above illustration that more than 90 per cent of the trainees have reported improvement in their technical knowhow, 88.5 per cent reported incidence of increased job opportunities, 96.1 per cent reported improved performance in the sector, 80.5 per cent reported an increase in income and 99.3 per cent reported improved quality of living at the family level. Similar responses have also been received from the trainers who participated in the Suryamitra training program.

Chapter 1 Prologue to the study

1.1 Introduction

Skill development is critical for the growth of the renewable energy sector. Developing a skilled workforce requires clear focus and commitment by the Government, industry, and key stakeholders. In 2015, the Government of India created the Skill Council for Green Jobs (SCGJ) under the National Skill Development Mission. SCGJ is a not for profit society created by the Ministry of Skill Development and Entrepreneurship and is promoted by the Ministry of New and Renewable Energy (MNRE) and Confederation of Indian Industry (CII). The council, aligned to the mandates of the National Skill Development Mission aims to identify training needs of the green businesses sector, institute dedicate training centers, develop technical courses, and address the skill development needs of manufacturers and service providers within the Green Business Sector.¹ SCGJ acts as a bridge between the Government of India, State Governments and industry for developing strategy & implementing programs for Skills Development, correlated to Industry needs and also aligned to best International practices. It implements nation-wide, Industry led, collaborative skills development & entrepreneur development initiatives that will enable meet India's potential for "Green Businesses".

It may be mentioned in this regard that green business sector refers to the one which contributes to preserve the environment operating either in the traditional sectors like construction and manufacturing or in the emerging energy efficient sectors which use renewable energy sources.

SCGJ in concurrence with the Government of India's National Policy for Skill Development and Entrepreneurship, 2015² on one hand, empanels training institutes to train the individuals catering to the green job market and on the other, creates qualification packs for the different sectors that come under the green domain and accordingly trains the workforce (both trainers and employees). This is done mainly with the aim of generating a national level database of skilled manpower in the green sector that can be directly used by the industry players as per requirement. The SCGJ's efforts to skill the workforce in green jobs is intended to address the following objectives:

- · Improve energy efficiency and promote efficient utilisation of raw materials
- Limit the emission of green house gases
- Protect and restore ecosystem
- Minimise the waste generation and pollution
- Support adaptation to the effects of climate change

The council tries to manifest the above mentioned objectives in 14 different green sectors – solar PV, solar thermals, wind energy, small hydro, biomass power, energy storage, bio-fuels, clean cook stoves, green construction, green transport, carbon sinks, solid waste management, water management and electronic waste management. The skill development ecosystem in the country needs to be addressed in a holictic manner, starting with basics such as ensuring that thetraining institutions have the necessary lab equipmentto ensuring regular training of trainers and assessors. In that context, SCGJ is expanding the reach of its activities to addressthe existing challenges across the training delivery system while working in close collaboration with the industryfor skill development. As the renewableenergy sector grows, corporate trainings and upskillingcourses will also be required at scale to upgrade the skills of existingemployees to keep up with the technological advancements in the sector.

¹Available at: <u>https://bit.ly/33IGIKW</u>, accessed on 7th November, 2019.

²Available at: <u>https://bit.ly/2pEXzKj</u>, accessed on 7th November, 2019.

1.2 Suryamitra Training Program

Revision of the Solar Energy target of 20 GW set by the Jawaharlal Nehru National Solar Mission (JNNSM) to 100 GW by 2022 under the National Solar Mission, calls for an increase in the consumer base on one hand and increased domestic manufacturing base for solar energy, on the other. Adoption of green energy as a prime resource in favourable geographies would not only ensure efficient use of energy and raw materials, but also would help to limit greenhouse gas emissions, minimize waste and pollution, protect and restore ecosystems along with adaptation to the effects of climate change.³ As envisaged in research studies, inadequacy of skilled workforce is plaguing the achievement of the solar targets in the country, as the demands of the consumers cannot be met because of this skill-gap.⁴ Simultaneously, greater consumer base also needs to be created so that a sustainable and thriving solar sector is created in the country.⁵

With the target of bridging the gap between the Government of India, the state governments and the industries catering to the green sector, SCGJ develops strategies and plan program interventions in alignment to the best international practices in the sector. In this regard, mention may be made of their Suryamitra Program which has integrated a vast array of renewable energy institutions so that the access to renewable energy education is more widespread and universal.⁶ Designed by the National Institute of Solar Energy (NISE), the training program aims to develop skilled and employable Suryamitras. Aligning the training program with the mandates of Pradhan Mantri Kaushal Vikas Yojana (PMKVY), SCGJ since its inception in 2015 till date, has successfully trained more than 67,000 Suryamitra trainees across all schemes. With more than 400 SCGJ affiliated training centres, the Suryamitras have been trained in 26 states and UTs of the country – Andhra Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Mizoram, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Tripura, Uttar Pradesh, Uttarakhand and West Bengal.⁷ Suryamitra training program is also conducted as a part of state mission schemes supported by the respective state governments. MNRE sponsors the training program implemented mainly through NISE while the SCGJ functions as the certification and assessment agency. The job description of the Suryamitra is summarized in box 1 along with the minimum educational qualification required.

Box 1: Job description and minimum educational qualification required for Suryamitra

Suryamitra Brief Job Description:

Solar PV Installer checks, adapts, implements, configures, installs, inspects, tests, and commissions different components of photovoltaic systems, that meet the performance and reliability needs of customers by incorporating quality craftsmanship and complying with all applicable codes, standards, and safety requirements.

Role Description:

Solar PV Installer is specialized for mechanical, civil and electrical installations of Solar Power Plants as well as maintaining them properly and has the communication & soft skills.

NSQF level 4

Minimum Educational Qualifications

10th pass + ITI / Diploma (Electrical, Electronics, Civil, Mechanical, Fitter, Instrumentation, Welder)

Minimum Job Entry Age	18 years.
Experience	Not Required.

³Available at: <u>https://bit.ly/31Pe7yQ</u>, accessed on 26th October, 2020.

⁴Available at: <u>https://on.nrdc.org/3jyk61e</u>, accessed on 26th October, 2020.

⁵Available at: <u>https://bit.ly/35FAdF5</u>, accessed on 26th October, 2020.

⁶Available at: <u>https://bit.ly/32kMz1X</u>, accessed on 26th October, 2020.

⁷Available at: <u>https://bit.ly/3oBmxno</u>, accessed on 26th October, 2020.

1.3 Background of the present study

Concomitant to the formulation of training programs for the employees in different green jobs, SCGJ has also conducted training Program for the trainers in collaboration with specialized institutions. Table 1.1 illustrates the cumulative total of trainees trained under the Suryamitra training program across all schemes.

Table 11	l· Trainees	trained	under Su	rvamitra	Training	program	till Se	n 2020
iuple i.	i. mumees	uamea	under Su	ryannua	manning	program	un se	p 2020

SI. No	Number of trainees	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	Cumulative Total
1	Suryamitra trainees	2789	17385	22061	25344	67579

Source: Information shared by Skill Council for Green Jobs.

It is envisaged from the above table that the number of trainees trained under the Suryamitra Training Program has increased more than 9 folds between Financial year 2016-17 to FY 2019-20 (from 2789 to 25344). This indicates the growing importance that the green jobs related to Solar PV Installation have received in recent years. Though there are 18 other job roles across the solar PV segment, Solar PV Installer or Suryamitra is a key job role as it trains Installers on checking, implementing, configuring, installing, inspecting, testing, and commissioning different components of photovoltaic systems, that meet the performance and reliability needs of customers by incorporating quality craftsmanship and complying with all applicable codes, standards, and safety requirements. It provides required skills for the installers to be employed for both solar rooftop and large scale utility projects, making it a flagship program in renewable energy domain under the skilling ecosystem in the country.

The present study has been conducted in response to the call by SCGJ to assess the impacts of the training program on the certified Suryamitras engaged in Solar PV installations in the rooftop and utility scale projects for large scale solar installations along with their operations and maintenance.

1.4 Objectives of the study

The study has focused on the following objectives:

- To measure the progress of the Suryamitra training program since its inception and to assess the impacts of the training on key stakeholders- certified trainees, training partners and trainers in terms of improved skills and employability, jobs created and demand met, availability of the trained manpower realized due to the training provision (including TOTs).
- To map the matching demand of skilled manpower from the industry and supply of skills delivered through the targeted training. In addition, assess the employability of certified trainees, any skill gaps and suitably identify upskilling needs of the trainees and trainers if any, in line with the evolving requirements of the solar industry for sustaining a dynamic process for skill development in solar across the country.
- Assessing the employability of certified trainees and the sustainability of the industry while sustaining a dynamic process for skill development to meet the diverse skill needs in the growing solar sector.
- To identify a set of recommendations on improving the training delivery under the program to create a larger impact through jobs and availability of trained manpower.

To realise the objectives of the study, targeted survey has been conducted across two key stakeholders – certified trainees and trainers from the selected states. Questionnaire were developed to elicit responses from all the targeted stakeholders. The supply side information has been mapped from the responses received from the master trainers on a range of topics including on effectiveness of the skills training as a factor to promote employability. Consistent with this approach, the survey methodology was based on the development of specific questionnaires to capture and cross information from different perspectives.

1.5 Scope of the study

The scope of work of the study covers the following:

- To study the benefits received by the stakeholders using participatory methodologies.
- To measure the socio-economic impacts of the project on the trainees and the trainers.
- To assess limitations of the training program across geographies and suggest course correction methods for improving training delivery.

The completion of this study has helped in mapping the impact created by the intervention. Additionally certain course correction strategies have been provided to align the Program with the mandates of National Policy for Skill Development and Entrepreneurship so that skilling and capacity building initiatives are fully aligned with the manpower required by the solar industry and accordingly India emerges to be a leader in delivering targeted skiling across renewable energy sector

1.6 Methodology of the present assessment study

The research methodology identifies a change scenario / language which include understanding the changes in quality of life of the beneficiaries, setting indicators that define success and the viability of the identified activity to realize the end result. There has been an integration of technical and human interfaces while collecting of the quantitative and qualitative data for the impact assessment study.

The study has been divided in two phases as follows:

- Secondary Research Phase and
- Primary Research Phase or Quantitative and Qualitative Data Collection Phase.

1.6.1 Secondary research phase

The report collates information of the total number of trainees and master trainers trained by the different training partners in different states across the country. The background research has helped a lot in drafting the data tools, justifying the findings from primary study and collating the findings.

The research team and field investigators have documented and gathered information on constraints, opportunities and improvements that can be made within the existing Suryamitra program. The interviews and discussions have been conducted through structured and semi-structured questionnaires using Computer Assisted Personal Interview (CAPI) Technique to derive quantitative data and have been extended to discussion with respondents in order to supplement the structured findings of the questionnaires with qualitative information.

The data collection exercise has been quantitative as well as qualitative in nature. The sample respondents have been interviewed and consulted through structured guidelines developed for IDI and KII questionnaires which were administered. The interviewers have been trained for conducting simultaneous translation of the questionnaires from English into Spoken Hindi/vernacular for the respondents, who gave responses and remarks in Hindi/vernacular, which has been translated and recorded into written English on the individual questionnaires.

All of the data collected in the field and recorded on the questionnaires/ tabs has been reviewed collectively. All of the quantifiable data have been synced, with additional comments and remarks recorded during individual interviews and separated according to stakeholder groups and questionnaire design, and then documented. Qualitative findings have been collated along with the quantified data in the findings for a better understanding of the prevalent situation.

1.6.2 Stakeholder engagement in the primary research phase

The following stakeholders have been identified and interviewed using tools designed specifically for the study.

- Trainees Trainees who have been trained under the project.
- Master trainers-Trainers who have been trained under ToT program.

1.6.3 Sampling strategy for the assessment study

Sample size determination is the act of choosing the number of observations or replicates it to be included in a statistically representative sample. The sample size is an important feature of any empirical study in which the goal is to make inferences about a population from a sample. However, in practice, the sample size used in a study is determined based on the expense of data collection though it should have sufficient statistical power to represent the real-time situation.

For the purpose of the study, the sample size has been tailor made in accordance to the project being assessed and the type of assessment study being conducted in mutual agreement with the donor. Around 3.0 per cent of the trainees trained under the Suryamitra Training Program have been covered as samples. The coverage of samples had been fixed to be around 1500 covering 11 states representing the entire geography namely Assam, NCT Delhi, Gujarat, Himachal Pradesh, Maharashtra, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh, Uttarakhand and West Bengal in the ratio of 2:1 for the trainees and the trainers. The state-wise sample has been computed on the basis of the proportionate distribution to the total number trained in each of the states. The sample selection by states is based on the secondary research summarized in table 1.2.

SI. No	Sample States	Total number of trainees trained (Pan India) until Sep 2020	Estimated sample size for trainers	Sample size for trainees
1	Assam		7	8
2	Delhi		203	410
3	Gujarat		28	57
4	Himachal Pradesh		46	87
5	Maharashtra		27	60
6	Rajasthan	67579	24	49
7	Tamil Nadu		40	76
8	Telangana		18	36
9	Uttar Pradesh		87	167
10	Uttarakhand		5	10
11	West Bengal		20	44
	Total		505	1004

Table 1.2: Sample-size calculation for the Impact Assessment Study

Source: Secondary Data provided by Skill Council for Green Jobs

As evident from the secondary research, a total of over 85,000 trainees have been trained under various training programs in Solar sector conducted by SCGJ until Sep 2020. Out of this, over 67,000 are trained in Suryamitra program conducted through multiple schemes including PMKVY, MNRE etc.

1.6.4 Sample collection

The collection of information pertaining to the study has involved several steps. Initial contact has been established with the stakeholders through an introductory phone call, followed by an email with the attached interview schedule. The information from the trainers has been collected digitally by sending them soft copies of the interview schedules. The responses have been coded and tabulated.

However, the introductory calls to the trainees revealed that they were not very comfortable in digitally responding to the questions. Therefore, the responses of the trainees were collected over phone using CAPI and later on decoded and tabulated.

1.7 Challenges faced in conducting the study

The study was conceptualized in the pre-COVID time and therefore, the methodology initially proposed had to be modified in accordance with the requirement of the time. The following challenges were faced while conducting the study:

- The occurrence of the pandemic have stretched the work beyond the proposed timeline
- Many of the trainees, who were mobilised in the months of January and February, lost their jobs because of the pandemic.
- Connecting with the trainees took a lot of time as they would be busy with on-field activities during the office hours.
- Unlike the certified trainees and trainers, concerned training partners could not be surveyed properly through a structured questionnaire however their views were documented and their inputs were factored in during the study.

Despite the above-mentioned challenges faced while interacting with the concerned stakeholders, the proposed sample size have been successfully captured and their views have been documented.

Chapter 2

Impact of Suryamitra Training Program on the Trainers

2.1 Prologue to the training of trainers (ToT) program

The training of trainers (ToT) program is dedicated to deliver accredited training service to trainees. The individuals need to have the aptitude of training others to ensure employable candidates at par the requirements of the green industries. For delivering Suryamitra training, Trainers need to possess the minimum qualification skills of ITI/ Diploma in Electrical, Electronics, Civil, Mechanical, Fitter or Instrumentation along with substantial experience in working in the sector.

2.2 Demographic characteristics of the sample trainers

The following section highlights the demographic characteristics of the trainers.

2.2a Distribution of trainers by gender

As evident from table 1.2, 505 trainers have been interviewed of which more than 92.1 per cent were male and the remaining 7.9 per cent were female. The state-wise distribution of the sample trainers by gender is illustrated figure 2.1.



Figure 2.1: Distribution of the trainers by gender in the study states

Source: On-field data, 2020

As evident from the above figure, in almost all the states, the trainers trained under the Suryamitra Program were male, except for the state of Telangana, where the samples reflected gender parity. Solar installation job requires at times travel and work at project sites which are often in remote locations and that is the major reason for limited participation of female candidates, including at trainer's level. Gender-related issues have also been incorporated in the standards for skills training procedures. As the deployment of grid interactive solar rooftop particularly in urban areas increases, it is expected that more female trainees would join the sector for both installation and O&M roles.

2.2b Distribution of trainers by age-group

Though minimum age parameter has not been benchmarked for the ToT program, the education qualifications required for the same reflects that the trainers to be trained under the Suryamitra training program, need to be more than 21 years of age. It is evident from the field observation that majority of the trainers trained for the ToT program were above 25 years of age. The state-wise distribution of the trainers by age is depicted in figure 2.2.





Source: On-field data, 2020

On an average, 7.7 per cent of the trainers for the ToT Program were less than 25 years age, whereas 45.7 per cent were aged between 26 to 30 years and 46.5 per cent were aged 30 years and above.

2.2c Distribution of trainers by highest educational qualification

As mentioned in the Model Curriculum for the Solar PV Installer (Suryamitra), the trainers for the ToT program need to have minimum 3 years of relevant experience for ITI/Diploma (Electrical, Electronics, Civil, Mechanical, Fitter, Instrumentation) or minimum 2 years of relevant industry experience for those who have completed Batch (Civil / Mechanical/ Electrical/ Instrumentation/ Electronics/ Electrical and Electronic engineering). On an average, 37.2 per cent of the trainers had completed bachelor's degree in Engineering, 14.1 per cent had completed ITI and the remaining 48.7 per cent had completed Post Graduation degree.



Figure 2.3: Distribution of the trainers by educational qualification in the study states

Source: On-field data, 2020

It is evident that in Uttarakhand, all the trainers selected in the sample had completed post Graduation degree. However, the highest number of trainers who had completed post graduation was found in Telangana, followed by Tamil Nadu.

2.3 Economic characteristics of the sample trainers

The economic characteristics of the trainers have been mapped using the following indicators as summarized below:

- · Tenure of association with the Solar sector
- Status of current employment
- Monthly income

2.3a Distribution of trainers by tenure of association with the solar sector

It is evident from the information collected on field that 42.2 per cent of the trainers have been associated with the Solar sector for less than 3 years, while 38.0 per cent have been associated for 3– 5 years and 19.8 per cent have been associated for more than 5 years. The state-wise distribution of the trainers on the basis of the duration of their association with the solar sector is illustrated in figure 2.4.



Figure 2.4: Distribution of the trainers by their duration of association with the solar sector in the study states

Source: On-field data, 2020

It is interesting to note from the above figure that close to 60 per cent of the trainers in Assam had been associated with the sector for more than 5 years, 40.0 per cent each in Uttarakhand and West Bengal. More over in the states of Telangana, Rajasthan more than half of the trainers have been engaged with the sector for less than 3 years.

2.3b Distribution of trainers by status of employment in the solar sector

More than a quarter of the trainers are engaged with companies and the state-wise situation is reflected in table 2.5.

Figure 2.5: Distribution of the trainers by their status of employment in the solar sector in the study states



Source: On-field data, 2020

In almost all the study states, more than half of the trainers are engaged with the training partner/organisations/ companies which provide training in the sector. Self employed trainers are basically freelancers who are usually not on payroll of any firm but can offer services to any concerned training institution as per their terms and conditions of contract. For the trainings of higher NSQF level job roles, more freelancer trainers could be available as they require more specific skill sets.

2.3c Distribution of trainers by their monthly income in the solar sector

Evidently, 43.4 per cent of the trainers earn between INR 10,000 to 20,000 per month, whereas 34.5 per cent earn between INR 40,000-60000, 7.5 per cent earn between INR 40,000 to 60,000 and the remaining 14.5 per cent earn more than INR 60,000 per month. The state-wise income distribution of the trainers has been summarized in figure 2.6.





Source: On-field data, 2020

The above illustration reveals that states like Tamil Nadu, Uttarakhand and West Bengal have more than half of their trainers earning between INR 10,000 to 20,000 per month. However, trainers in the states of Rajasthan and Telangana have more than one quarter of their trainers receiving more than INR 60,000 per month. Presumably, the income of the trainers is dependent on their years of experience, their association with the solar sector and also the company with which they are engaged.

2.4 Trainers perception on the Suryamitra training program

The trainers had been asked to respond to their perception about the difficulty level of the curriculum of the training program as easy, moderately difficult or very difficult. More than 60.2 per cent of the trainers felt that the curriculum of the training program was easy whereas the remaining 39.8 per cent felt it to be moderately difficult. The difficulty level mentioned by the trainers was mainly because of the lack of time devoted to certain specific topics and the inability of the training partners (TPs) to demonstrate situations because of the lack of infrastructure. The state-wise perception of the trainers on the curriculum of the training program is highlighted in figure 2.7.

Figure 2.7: Distribution of the trainers by their perception on the difficulty level of the training program in the study states



Source: On-field data, 2020

It is evident from the above illustration that more than half of the trainers in all the study states felt that the curriculum of the training program was easy, whereas the rest felt that it was moderately difficult.

2.5 Impact of the Suryamitra training program on the ToT

The impact of the training program on the trainees has been mapped using the following indicators:

- · Whether the training has helped the trainers in their current engagement
- · Whether the training has helped the trainers in improving their technical knowhow
- Whether post training, new job opportunities have opened up for the trainers
- Whether the trainer follow safety practices taught during the training program
- · Whether the performance of the trainer has improved after being trained
- · Whether the income of the trainer has increased post training

2.5a Distribution of trainers by their responses on the impact of the training program on the current engagement

It has emerged from the on-field observations that most of the trainers voluntarily participated in the training program and more than 80 per cent of the trainers mentioned that the training program has helped them a lot in their current engagement. Though most of them had befitting academic qualification to work in the sector, the Suryamitra training program has helped them to communicate with the trainees in a better manner. The state-wise distribution of the responses of the trainers on this aspect has been summarized in figure 2.8.





Source: On-field data, 2020

It appears distinctively from the above illustration that in all the states, the training program has greatly helped the trainers in further training candidates to the level of being gainfully engaged in the sector.

2.5b Distribution of trainers by their responses on the impact of the training program on their technical knowhow

As mentioned earlier, the trainers who have been trained for the ToT program had relevant skills and education qualification to get trained, yet more than 78 per cent mentioned that the training has helped them in improving their technical knowhow. The state wise distribution of the responses has been summarized in figure 2.9.





Source: On-field data, 2020

It is evident that in all the states, the Suryamitra Training Program has had a significant positive impact on the technical knowhow of the master trainers. The notion is supported by the observation that in all the states, the trainers have responded positively on their technical knowhow being improved by the training program.

2.5c Distribution of trainers by their responses on the impact of the training program on the availability of new job opportunities

The trainers were mostly engaged with different institutions providing training in the sector. However, after the successful completion of the training program and the receipt of the certificate, many of them opted for better job opportunities in the sector. 53.9 per cent of the total trainers got exposed to new job opportunities post training, while for the rest, they continued working with their previous organizations. The state wise distribution of the responses has been summarized in figure 2.10.





Source: On-field data, 2020

It is evident from the above figure that in the states Maharashtra, Madhya Pradesh and Gujarat, new job opportunities have opened for 74.1 per cent, 65.2 per cent and 60.7 per cent trainers respectively. However, the others, continued working in their previous positions in the same organization.

2.5d Distribution of trainers by their responses on following safety practices at work

The trainers were asked to respond on the observance of safety practices at their work place, to which 57.1 per cent of the trainers responded positively. The ones who did not follow, mentioned that their current job role as a trainer did not require following any kind of safety practices, other than the times when they were training candidates. The state wise distribution of the responses has been summarized in figure 2.11.



Figure 2.11: Distribution of the trainers in the study states by their responses on following safety practices at workplace

Source: On-field data, 2020

It is evident from the above figure that in almost all the states barring Tamil Nadu, Telangana and Uttarakhand, majority of the trainers followed safety practices at work especially while demonstrating the hands on training of solar installation. This was mainly because of the fact that they worked both on-field and as trainers in solar PV Panel Installation and so emphasised on the practical installation trainings. The rest were engaged mainly as trainers in institutes and possibly didn't showcase hands- on trainings much.

2.5e Distribution of trainers by their responses on improvement of performance in the sector

The trainers were asked to respond whether their performance in the sector has improved post training. It is inspiring to note that 93.3 per cent of the trainees mentioned that the training has positively impacted their performance in the sector. The state wise distribution of the responses has been summarized in figure 2.12.





Source: On-field data, 2020

It is evident from the above figure that in all the study states, the trainers have mentioned about their sectoral performance having improved post training. In the states of Assam, Uttarakhand and West Bengal, all the trainers mentioned that the training has helped them a lot to improve their performance in training the trainees for the sector.

2.5f Distribution of trainers by their responses on increase in income post training

The trainers were asked to respond whether the training had any impact on their income. Though close to 54 per cent of the trainers mentioned that there had been no increase in income, for the rest, income had increased. For 20.6 per cent, income had risen by INR 5000, for 12.1 per cent there was a rise in income between INR 5000-10,000 and for 12.9 per cent trainers, there was a income rise of more than 15,000. 0.2 per cent of the trainers mentioned about an income rise in the band of INR 10,000-15,000. The state wise distribution of the responses has been summarized in figure 2.13.



Figure 2.13: Distribution of the trainers in the study states by their responses on increase in income

Source: On-field data, 2020

It is evident from the above figure that majority of the trainers mentioned that there had been no increase in income post training. However, in Assam, 57.1 per cent of the trainer mentioned about a rise in income in the range of INR 5,000-10,000 along with Uttarakhand where 40 per cent of the respondents mentioned to have experienced an income rise in the same range.

2.6 Impact of the Suryamitra training program on the trainer's family

17.2 per cent of the trainers mentioned that the Suryamitra Training program did not have any significant impact on their family members. However, for 26.7 per cent of the trainers, quality of life in the family has improved post training and this was mainly because of the exposure they received during the training. Similarly, 19.2 per cent mentioned that there had been a rise in their contribution in the family income. However, 37.2 per cent of the trainers mentioned that they have experienced multi-faceted impact at the family level as with increasing economic contribution to the family, the quality of life of the family members as well as accessibility to amenities of improved living condition were also available. The state-wise distribution of responses has been collated in figure 2.14.

Figure 2.14: Distribution of the trainers in the study states by their responses on impact of the training program on their family



Source: On-field data, 2020

It is evident from the above illustration that the Suryamitra training program had multifaceted impact on the trainers 'family in Assam (57.1 per cent), Gujarat (57.1 per cent), Himachal Pradesh (45.7 per cent) and Uttar Pradesh (44.8 per cent).

2.7 Rating the Suryamitra training program

The trainers were asked to rate the training program on a scale of 1 to 4, where 1 would reflect the least score and 4 would mean the highest score. The program was rated mainly on the following three components:

- · Rating on the capacity building of the trainer
- Rating on the performance of the training partner
- Rating on the overall performance of the program

2.7a Distribution of trainers rating on the curriculum

On being asked to rate the content of the curriculum of the Suryamitra Training Program, 54.3 per cent mentioned that it was very successful attempt. 18.6 per cent mentioned that it was somewhat successful, while 13.9 per cent mentioned that it could be better. However, 13.3 per cent of the trainees mentioned that the program needed substantial improvement. The state-wise distribution of the responses has been collated in figure 2.15.



Figure 2.15: Distribution of the trainers in the study states by their rating on the curriculum content

Source: On-field data, 2020

In almost all the states, the trainers mentioned that the curriculum for the Suryamitra Training program had been very successfully designed. One of the suggestions that had come up was regarding greater emphasis to be laid on the practical content in the curriculum than theory. It has been observed that the infrastructural facilities available with the TPs were often not sufficient to demonstrate the practical requirements in the field and therefore, more on-site visits were suggested to be incorporated in the curriculum.

2.7b Distribution of trainers rating on the capacity building aspect

On being asked to rate the degree of capacity building through the Suryamitra Training Program, 60.2 per cent mentioned that it was very successful. 22.0 per cent mentioned that it was somewhat successful, while 11.3 per cent mentioned that it could be better. However, 6.5 per cent of the trainees mentioned that the program needed substantial improvement. The state-wise distribution of the responses has been collated in figure 2.16.



Figure 2.16: Distribution of the trainers in the study states by their rating on the degree of capacity building

Source: On-field data, 2020

It is interesting to note that in all the states, more than 40 per cent of the trainers mentioned that the training program was very successful in enhancing their capacity in the sector and this is reflected in the high percentages of assertive response in the sates of Maharashtra, Himachal Pradesh, Gujarat, West Bengal etc. However, trainers suggested that there should be scope of up-skilling and re-skilling the trainers at regular intervals. Also, some paid courses could be introduced so that the interested ones could take advanced courses relevant to the sector's requirement.

2.7c Distribution of trainers rating on the role of the training partner

On being asked to rate the role of the training partners of the Suryamitra Training Program, 62.8 per cent mentioned that the TPs were very helpful. 14.5 per cent mentioned that it was somewhat helpful, while 11.7 per cent mentioned that they could be better. However, 11.1 per cent of the trainees mentioned that the TPs needed substantial improvement. The state-wise distribution of the responses has been collated in figure 2.17.





Source: On-field data, 2020

In all the study states, more than 40 per cent of the participants of the ToT Program mentioned that the training partners were very helpful during the training. However, some of them faced difficulty as the medium of instruction was English and felt that the training should be conducted more in local vernacular for better understanding. Some of the participants also mentioned that there was a need of regular capacity building of the trainers so that they could deliver the training program with greater efficiency.

2.7d Distribution of trainers rating on the overall program

The trainers were also asked to rate the overall program on a scale of 1 to 4, 1 meaning the lowest rating and 4 reflecting the highest rating and the popularity of the training program. It is evident from the fact the more than half of the trainers have rated it to be very successful. The state-wise responses of the trainers on the overall training program has been summarised in figure 2.18.



Figure 2.18: Distribution of the trainers in the study states by their rating on the overall program

Source: On-field data, 2020

The trainers considered the overall impact of the training program and therefore, while rating the Suryamitra training program, they considered the impact it has had on them from the perspectives of increase in income, improvement in job opportunities, increasing performance and increasing technical knowhow. The trainers in almost all the study states felt satiated after attending the program as more than 75 per cent of the trainers rated the program 3 and 4.

Chapter 3

Impact of Suryamitra Training Program on the Trainees

3.1 Prologue to the training of trainees

The Suryamitra Training Program endeavours to train individuals who possess the basic qualification of having passed the board examination of class 10 along with ITI or Diploma course on any of the courses on Electrical, Electronics, Civil, Mechanical, Fitter, Instrumentation and Welder. Successful completion of the training program would help the trainees to carry out site survey for the installation of Solar PV System, assess the customers Solar PV requirement, procure the components required for installing Solar PV System, identification and use of the tools and tackles used for Solar PV system installation, installation of the civil, mechanical and electrical components of Solar PV System, testing, commissioning and maintaining the Solar PV System and most importantly maintaining personal health and safety at the project locations. The total training program duration for the trainees is 300 hours comprising of 115 hours of theory and 185 hours of practical.

3.2 Demographic characteristics of the sample trainees

The demographic characteristics of the trainees have been mapped using the parameters of age and educational qualification.

3.2a Demographic characteristics of the sample trainees

Keeping in mind the basic educational qualification required for getting trained as Suryamitra, all the trainees were aged 20 years or more. However, 88.4 per cent of the trainees were aged between 20 - 30 years and the remaining 11.6 per cent were more than 30 years of age. The state-wise age distribution of the trainees has been summarized in figure 3.1.



Figure 3.1: Distribution of the trainees in different age groups in the study states

Source: On-field data, 2020

It is evident from the above figure that in the trainees in the states of Assam, Gujarat, Himachal Pradesh, Maharashtra and Rajasthan were aged between 20 and 30 years. For most of the trainees, this was the first exposure to the professional field.

3.2b Educational qualification of the sample trainees

As mentioned in the preceding section, the minimum educational qualification that would make an individual eligible for getting training was completion of Class Xth along with completion of ITI Course or Diploma. It is evident from the on-field data that 73.6 per cent of the trainees had completed 10th along with training from ITI, whereas 22.8 per cent of the trainees reported themselves to be graduate and the remaining 3.6 per cent had completed post-graduation degree. The state-wise distribution of the trainees by their educational qualification is summarized in figure 3.2.





Source: On-field data, 2020

It is evident from the above figure that the trainees in all the states were 10th pass, except in Uttar Pradesh were 9.6 per cent of the trainees had completed post graduation. In states like Delhi, Assam, Gujarat, Tamil Nadu and Telangana, a quarter or more trainees have reported to have completed graduation.

3.3 Economic characteristics of the sample trainees

The economic characteristics of the trainees have been mapped using the following indicators as summarized below:

- · Tenure of association with the Solar sector
- Status of current employment
- Monthly income

3.3a Distribution of trainees by tenure of association with the solar sector

It is evident from the fact that most of the trainees had joined the training program after completion of their education and therefore, the trainees have not reported to be engaged in the sector for a very long duration. On an average, 52.7 per cent of the trainees have reported to be engaged with the solar sector for less than a year, whereas 43.6 per cent reported to be engaged with the sector for 1–3 years. Only a handful of 3.7 per cent trainees were engaged with the solar sector for more than three years. The state-wise distribution of the trainees by duration of association with the solar sector has been summarized in figure 3.3.



Figure 3.3: Distribution of the trainees by educational qualification in the study states

Source: On-field data, 2020

In the states of Assam, all the trainees reported to have been associated with the solar sector for less than one year. In the states of Maharashtra, Delhi, Uttar Pradesh and West Bengal, 5.0 per cent, 3.9 per cent, 6.0 per cent and 18.2 per cent trainees respectively have reported to be engaged in the sector for more than 3

3.3b Distribution of trainees by their employment status

The trainees were asked about their status of employment in the sector and many of them mentioned that they were working with companies operating in the sector while some of them were self employed. Many of the trainees have reported to have lost their jobs because of the pandemic. On an average, 64.7 per cent of the trainees have reported to be working with organizations and close to 30 per cent reported to be self employed. The remaining 7.3 per cent reported to be unemployed for the past 2–3 months because of the pandemic. The state–wise distribution of the trainees by duration of association with the solar sector has been summarized in figure 3.4.



Figure 3.4: Distribution of the trainees by the nature of employment in the study states

Source: On-field data, 2020

Though the solar PV system has a huge scope, yet more than 50 per cent of the respondents in the states of Assam, Uttarakhand and West Bengal have reported to be unemployed for the past few months and have been hit hard by the COVID-19 pandemic. In the states of Tamil Nadu, Gujarat and Maharashtra, more than three quarters of the trainees have reported to be working with companies.

3.3c Distribution of trainees by their mode of employment

Despite the fact that close to 65 per cent of the trainees were engaged with some organization, it is evident that 45.9 per cent were under contractual engagement and only 18.2 per cent were engaged on company's payroll. As the pay in the contractual engagement was quite low, around 6.4 per cent of the trainees mentioned that they were associated with other works to meet the ends meet. 21.6 per cent of the trainees were on company's pay roll and 20.3 per cent were having their own shop. However, it's heart wrenching to find that 5.8 per cent of the trainees were unemployed because of the repercussions of COVID-19. The state-wise distribution of the trainees by duration of association with the solar sector has been summarized in figure 3.5.





A higher proportion of trainees in the states Gujarat, Maharashtra and Rajasthan were engaged in contractual terms. A considerable number of trainees had their own enterprise or business in the states of Uttarakhand, Telangana and Himachal Pradesh.

Source: On-field data, 2020

3.3d Distribution of trainees by their monthly income

As mentioned earlier, the contractual engagement did not offer the trainees to earn much and therefore evidently, 40.9 per cent of the trainees reported to be earning less than 10,000. 22.5 per cent earned between INR 10,000-12,000 while 25.6 per cent earned between INR 12,001-14,000 and the remaining 11.0 per cent earned more than INR 14,000. The state-wise distribution of the trainees by duration of association with the solar sector has been summarized in table 3.1.

Table 3.1: Distribution of the trainees in different ranges of income in the study states

		Ranges of income				
	State	Less than INR 10,000	INR 10,000 -12,000	INR 12,000 -14,000	More than INR 14000	Total
-	Self-employed	100.0	0.0	0.0	0.0	100.0
am	Unemployed for past 2 months	100.0	0.0	0.0	0.0	100.0
Asso	Working with companies	0.0	0.0	0.0	100.0	100.0
	Total	75.0	0.0	0.0	25.0	100.0
	Self-employed	23.8	30.2	34.9	11.1	100.0
ihi	Unemployed for past 2 months	55.6	0.0	0.0	44.4	100.0
De	Working with companies	48.1	21.1	18.4	12.4	100.0
	Total	41.0	22.9	22.7	13.4	100.0
rat	Self-employed	0.0	50.0	50.0	0.0	100.0
uja	Working with companies	41.2	52.9	5.9	0.0	100.0
Ō	Total	36.8	52.6	10.5	0.0	100.0
shal esh	Self-employed	12.5	0.0	75.0	12.5	100.0
ade	Working with companies	61.9	0.0	38.1	0.0	100.0
ΞŢ	Total	48.3	0.0	48.3	3.4	100.0
<u>ہ 5</u>	Self-employed	0.0	0.0	50.0	50.0	100.0
Mah rashti	Working with companies	38.9	5.6	38.9	16.7	100.0
	Total	35.0	5.0	40.0	20.0	100.0
an	Self-employed	0.0	37.5	62.5	0.0	100.0
sth	Unemployed for past 2 months	50.0	0.0	0.0	50.0	100.0
aja	Working with companies	65.7	28.6	5.7	0.0	100.0
Ř	Total	53.1	26.5	14.3	6.1	100.0
	Self-employed	0.0	46.7	53.3	0.0	100.0
imi	Unemployed for past 2 months	100.0	0.0	0.0	0.0	100.0
ЪЯ	Working with companies	37.3	45.8	16.9	0.0	100.0
_	Total	31.6	44.7	23.7	0.0	100.0
anc	Self-employed	0.0	50.0	50.0	0.0	100.0
nge	Unemployed for past 2 months	100.0	0.0	0.0	0.0	100.0
ea	Working with companies	14.3	42.9	42.9	0.0	100.0
F -	lotal	16./	41./	41./	0.0	100.0
ar esh	Self-employed	30.3	32.9	23.7	13.2	100.0
rad	Working with companies	35.2	13.2	28.6	23.1	100.0
ā	Total	32.9	22.2	26.3	18.6	100.0
<u>o</u> p	Self-employed	100.0	0.0	0.0	0.0	100.0
ltta char	Unemployed for past 2 months	100.0	0.0	0.0	0.0	100.0
5 ⊻	Total	100.0	0.0	0.0	0.0	100.0

		Ranges of income					
	State	Less than INR 10,000	INR 10,000 -12,000	INR 12,000 -14,000	More than INR 14000	Total	
_	Self-employed	0.0	0.0	100.0	0.0	100.0	
West senga	Unemployed for past 2 months	87.5	0.0	12.5	0.0	100.0	
	Working with companies	50.0	0.0	0.0	50.0	100.0	
	Total	72.7	0.0	18.2	9.1	100.0	
	Self-employed	22.0	31.9	35.4	10.5	100.0	
Total	Unemployed for past 2 months	79.5	0.0	5.5	15.1	100.0	
	Working with companies	45.1	22.2	22.2	10.6	100.0	
	Total	40.9	22.5	0.0	11.0	100.0	

Source: On-field data, 2020

It is evident from the above table that the monthly pay received by the trainees in the sector is quite low. However, of the trainees who have been unemployed for the past two-three months have been associated with other activities related to electrical jobs and have also taken to other kinds of entrepreneurship to meet the ends meet.

3.4 Trainees perception on the Suryamitra training program

The trainees had been asked to respond to their perception about the difficulty level of the curriculum of the training program as easy, moderately difficult or very difficult. 67.4 per cent of the trainees felt that the program was easy to understand; whereas 30.0 per cent felt that the program was moderately difficult for them to understand and the remaining 2.6 per cent responded that the program was very difficult for them. The difficulty in understanding the program was mainly because of the language barrier as most of the training sessions were conducted in English. The trainees also felt that they should be exposes to more practical hands-on training so that the practical situations could be dealt with ease. The state-wise perception of the trainers on the curriculum of the training program is highlighted in figure 3.6.



Figure 3.6: Distribution of the trainees by their responses on the difficulty level of the program in the study states

It is evident from the above illustration that majority of the trainees felt that the training program was easy to understand.

3.5 Impact of the Suryamitra training program on the trainees

The impact of the training program on the trainers has been mapped using the following indicators:

- · Whether the training has helped the trainees in their current engagement
- · Whether the training has helped the trainees in improving their technical knowhow
- · Whether post training, new job opportunities have opened up for the trainees
- · Whether the trainees follow safety practices taught during the training program
- · Whether the performance of the trainees in the sector has improved after being trained
- · Whether the income of the trainee has increased post training

3.5a Distribution of trainees by their responses on the impact of the training program on the current engagement

On being asked about the impact of the training program on the current employment, 85.9 per cent of the trainees mentioned that it had been of great help and support, while the remaining 14.1 per cent mentioned that despite attending the training program, the trainees could not be engaged in job-roles as per their expectations. The state-wise distribution of the responses of the trainers on this aspect has been summarized in figure 3.7.



Figure 3.7: Distribution of the trainees by their responses on the impact of the training program on their current engagement in the study states

Source: On-field data, 2020

It appears distinctively from the above illustration, that in all the states, the training program has greatly helped the trainees in performing the job roles that they were currently engaged in. The responses have been highly assertive in the states of Gujarat, Delhi, Maharashtra, Tamil Nadu, Telangana and Uttar Pradesh. Evident from the higher percentages of unemployment of the trainees in the sector in Uttarakhand, many reported that the training program had not been helpful in their currently engagement.

3.5b Distribution of trainees by their responses on the impact of the training program on their technical knowhow

Most of the individuals who have been trained for the program had registered for the training program post completion of their graduation and post graduation degrees and it is interesting to note that more than 95 per cent of the trainees mentioned that their technical knowhow have improved post attending the training. This reflects a vast disconnect between the academic curriculum and the market requirement and how such training program helps in bridging the gaps. The state wise distribution of the responses has been summarized in figure 3.8.



Figure 3.8: Distribution of the trainees in the study states by their responses on the impact of the training program on their technical knowhow

Source: On-field data, 2020

It is evident that in all the states, the Suryamitra Training Program has impacted the technical knowhow of the trainees working in the solar sector. The notion is supported by the observation that in all the states, the trainees have responded positively on their technical knowhow being impacted by the training program.

3.5c Distribution of trainees by their responses on the impact of the training program on the availability of new job opportunities

Though placement post successful completion of the training was not a part of the mandate, yet, 88.5 per cent of the trainees mentioned that the training program had helped them to get jobs in the solar sector. The state wise distribution of the responses has been summarized in figure 3.9.



Figure 3.9: Distribution of the trainees in the study states by their responses on the impact of the training program on availability of new job opportunities

Source: On-field data, 2020

It is evident from the above figure that in almost all the study states, new job opportunities had opened for the trainees except in the states of Uttarakhand, West Bengal and Assam where higher proportion of the trainees reported that they did not get new job opportunities post training.

3.5d Distribution of trainees by their responses on following safety practices at work

It is evident that 96.4 per cent of the trainees followed safety practices at work. However, they mentioned that providing the PPE kits complementary with the training would be of immense help as purchasing these often pinched their pockets given the low pay in the sector. The state wise distribution of the responses has been summarized in figure 3.10.





It is evident from the above figure that the trainees engaged in the solar sector in all the study states were following the safety practices taught to them during the training. In many cases, they often disseminated the basic information to their household members to ensure that they were also protected.

Source: On-field data, 2020

3.5e Distribution of trainees by their responses on improvement of performance in the sector

The trainees were asked to respond whether their performance in the sector has improved post training. It is inspiring to note that 96.1 per cent of the trainees mentioned that the training has positively impacted their performance in the sector. The state wise distribution of the responses has been summarized in figure 3.11.



Figure 3.11: Distribution of the trainers in the study states by their responses on improvement of performance in the sector

Source: On-field data, 2020

It is evident from the above figure that in all the study states, the trainers have mentioned about their sectoral performance having improved post training. In the states of Gujarat, Himachal Pradesh, Maharashtra and Uttar Pradesh all the trainees mentioned that the training has helped them a lot to improve their performance in handling the Solar PV system in accordance to the requirement of the market and that of their customers.

3.5f Distribution of trainees by their responses on increase in income post training

The trainers were asked to respond whether the training had any impact on their income. Though close to 19.5 per cent of the trainees mentioned that there had been no increase in income, for the rest, income had increased. For 39.8 per cent, income had risen by INR 5000, for 30.2 per cent there was a rise in income between INR 5000-10,000 and for 14.9 per cent trainers, there was a income rise of more than INR 10,000. The state wise distribution of the responses has been summarized in figure 3.12.





Source: On-field data, 2020

More than 80 per cent of the trainees have mentioned about the increase in income post training and states like Himachal Pradesh and Telangana have higher proportion of trainees who have experienced an increase in their monthly income.

3.6 Impact of the Suryamitra training program on the trainee's family

The Suryamitra training program did not have any direct component of increasing income of the trainees apart of a one-time amount given to them post completion of the training. However, as mentioned in the preceding section, a large number of trainees opted for change of job post training and therefore has experienced an increase in income, which in turn has increased their contribution to the family in many cases. As quality of life is often linked with the household income, therefore, 16.9 per cent of the trainees mentioned that there has been an improvement in the quality of the family members post training and 46.3 per cent mentioned that their family income has increased as a result of their increased contribution to the family fund. The state-wise distribution of responses has been collated in figure 3.13.





Source: On-field data, 2020

It is evident from the above illustration that despite the fact that the Suryamitra training program had not much scope of impacting the family lives of the trainees, yet, in many of the study states like Uttar Pradesh, Telangana, Tamil Nadu, Himachal Pradesh and Delhi, the trainees mentioned about impacting their families post completion of the training program.

3.7 Impact of the Suryamitra training program on the trainee's family

The trainees were asked to rate the training program on a scale of 1 to 4, where 1 would reflect the least score and 4 would mean the highest score. The program was rated mainly on the following three components:

- · Rating on the content of the training program
- Rating on the performance of the training partner
- Rating on the overall utility of the program

3.7a Distribution of trainees' ratings on the curriculum

On being asked to rate the content of the curriculum of the Suryamitra Training Program, 66.7 per cent mentioned that it was very successful attempt and the program had benefited them to a great extent. 18.1 per cent mentioned that it was somewhat successful, while 5.4 per cent mentioned that it could be better. However, 9.8 per cent of the trainees mentioned that the program needed substantial improvement. The state-wise distribution of the responses has been collated in figure 3.14.



Figure 3.14: Distribution of the trainers in the study states by their rating on the curriculum content

Source: On-field data, 2020

The trainees in the states of Gujarat, Himachal Pradesh, Maharashtra, Tamil Nadu, Telangana and Uttar Pradesh were highly satisfied with the training program and this is evident from the share of responses of the trainees on the program being very successful.

3.7b Distribution of trainees rating on the performance of the training partner

The trainees were asked to rate the performance of the training partners and close to two third mentioned that the training partners were exceptionally helpful. However, the rest of the trainees who had suggested that the program required improvement were mainly because of the fact that the training partners did not communicate much in their vernacular language making it difficult for them to understand the curriculum easily. However, it has been envisaged that training institutions often did not have all the instruments required for training the and therefore, exposing the trainees to real-life concerns of the solar sector was a difficult task and theoretical knowledge did not help much in problem solving. The state-wise distribution of the responses has been collated in figure 3.15.



Figure 3.15: Distribution of the trainees in the study states by their rating on the performance of the training partners

Source: On-field data, 2020

It is interesting to note that in all the states, more than 60 per cent of the trainees mentioned that the training partners were very helpful disseminating the knowledge to the trainees and this is evident from the responses from Gujarat, Himachal Pradesh, Maharashtra, Tamil Nadu and Telangana. However, trainees suggested that there should be scope of regular up-skilling for the trainees who were interested. Also there should be a portal to submit the feedback of the training program by the trainees.

3.7c Distribution of trainee's rating on the overall program

The trainees were also asked to rate the overall training program on a scale of 1 to 4 where one would mean the least score and 4 would reflect the highest score. The state-wise distribution of the responses has been collated in figure 3.16.



Figure 3.16: Distribution of the trainers in the study states by their rating on the overall program

It is evident from the above illustration that a large number trainees it the states of Gujarat, Maharashtra, Himachal Pradesh, Tamil Nadu, Telangana and Delhi have rated the Suryamitra training program 4 out of 4. This indicates that they were content with the training program and the impact it has had on their lives.

Source: On-field data, 2020

Chapter 4 Way forward

4.1 Introduction

The research team from Filovation during the assessment study made detailed observation of the trainees (including master trainers), the training process and the training partners. The observations have been summarized in the following section. Basis the observations, the team proposes the following recommendations.

4.2 Observations from the field

- The training partners in most of the states were well equipped in terms of infrastructure required for covering the theoretical portions of the curriculum. However, though the basic instruments for conducting the practical sessions were there, yet, the complexity of the field operations in some cases could not be handled because of the inability to demonstrate the situations in-situ.
- The trainees were mobilized by the training partners mainly through advertisements in local newspapers, communication through local ITIs and through social media. Once the applications were received, the candidates were screened to check whether they met the basic eligibility criteria for participating in the program. In some of the training centres in Maharashtra, West Bengal, Himachal Pradesh and Uttarakhand, placement support was also provided.
- The trainees and the master trainers mentioned about the increasing the scope of the training by providing opportunities of up-skilling at regular intervals.
- The trainers also mentioned that paid options should also be provided for getting trained in using advanced techniques currently being used in the solar sector.
- The trainers and the trainees in states like Rajasthan, Uttar Pradesh and Delhi mentioned that despite the fact that the solar PV system was highly beneficial, yet there was need to popularize the same amongst users at household and community levels.
- As envisaged during the data collection phase, it emerged that many trainees did not continue work in the sector despite being trained as Suryamitras. This was mainly because of the fact that the available jobs were far away from their home town and the pay they were being offered was not lucrative.
- Some trainees mentioned about their inability to perform better in the sector because of their lack of skills in spoken English and computer skills.

4.3 Suggested way forward

It is imperative that a collaborative model between the training partners and the industrial players would help to implement the Suryamitra training program more effectively. Based on the above observations, the following suggestions are being put forward through this study:

Skill Council for Green Jobs (SCGJ) could consider the option of on-site sessions with the trainees so that
they are exposed to hands-on solution of real-time problems. Industry partners can also extend their
support in this regard, by allowing internship facilities for the trainees. This on one hand will help the
trainees get exposed to on-site training and on the other assess the gap in the skill requirement as
required by the industrial partners and accordingly the training program can be realigned. In the same
context, active participation of industry in National Apprenticeship Promotion Scheme (NAPS) would be
crucial to undertake "on the job trainings" for the trainees. SCGJ can facilitate in implementation of the
concerned scheme in close coordination with industry all other key stakeholders to ensure that significant
number of trainees are hired by the industry as solar apprentices.

- Multiple Centre of Excellence (CoEs) have been established by SCGJ with a focus on providing skilling/upskilling/reskilling on a range of solar technologies, innovations, entrepreneurship & manufacturing. Industry engagement together with facilities and support provided by CoEs create suitable opportunities for youth to get skilled through theory classes and practical experiential learning for better understanding of tools, technology and the overall sector.
- As mentioned by the trainees (including the master trainers), SCGJ should reconsider options for the upskilling the trainees at regular intervals. Trainees who had extra-ordinary performance could be recommended by the training partners for the up-skilling program.
- Training partners could be supported by SCGJ to conduct awareness drives in communities for greater usage of green energy for fulfilling the power requirements at individual, household and community levels. This in turn would increase the market requirement of the Solar PV Systems.
- To further the aspirations of trainees and respect associated with skilling, more Skill Awards across suitable platforms at state levels shall be instituted in close association with major stakeholders. SCGJ has been actively involved across various skilling competitions in green business from regional, national to global level and that experience shall be crucial to empower the trainees particularly in tier II and III cities. A monitoring mechanism could be set up to monitor the performance of the trainees trained to ensure that they stay in the sector for at least two-three years post training. This would also ensure that the knowledge inculcated in the trainees is utilized in performing their job roles.
- Some content on basic spoken English, other soft skills and computer handling could also be introduced as a part of the curriculum to help the trainees handle the customer's requirement in a better manner. Though these attributes are included in the training standards as generic and specific skills, training delivery all on these aspects might not be fully integrated during the actual trainings.

Annexure 1: In-depth Interview Schedule for Suryamitras

1. Key Information:

SI. No	Question	Codes	Response
1.1	Location of survey	loc_survey	
1.2	District	District	
1.3	State	State	Uttar Pradesh=1 Rajasthan=2 Gujarat=3 Maharashtra=4 West Bengal=5 Assam=6 Tamil Nadu=7 Telangana=8 Delhi=9 Uttarakhand=10 Himachal Pradesh=11
1.4	Date of survey	Date	
1.5	Name of surveyor	name_surveyor	

2. Background information of the trainees

SI. No	Question	Codes	Response
2.1	What is your name?	Name_res	
2.2	What is your gender?	Gender_res	Male=1 Female=2
2.3	What is your age in completed years?	Age_res	Years
2.4	What is the highest education attained by you? (completed class)	Edu_res	10th Pass & ITI/ Diploma=1 Graduate=2 Post Graduate=3
2.5	How many years are you associated with solar sector?	Asso_solar	Less than 1 year=1 1 to 3 years=2 More than 3 years=3
2.6	When did you get trained as a Suryamitra? Mention month and year	Train_year_Suryamitra	

2.7	What kind of work do you specialise in PV installation? (Possibility of multiple-response)	Specialize_suryamitra	 Assess customer's requirement and perform Site Survey for solar PV installation =1 Procurement of PV System Components =2 Installation of Civil and Electrical Parts and components =3 Testing and Commissioning of PV system=4 Operation and Maintenance of PV system =5 All of the above =6
2.8	What is the status of your employment at present?	Employ_status	Unemployed=1 Self-employed/Entrepreneur=2 Working with organisations/ companies=3
2.9	What is the mode of your current employment?	Mode_employment	On company's pay-roll=1 Contractual engagement=2
2.10	How much do you currently earn per month as a Suryamitra?	Current_earn	Less than INR 10,000=1 INR 10,000-12,000=2 INR 12,000-14,000=3 More thanINR 14000=4

3. Aspects of training programme

SI. No	Question	Codes	Response
3.1	How did you come to know about the Suryamitra training program?	Know_about_suryamitra	From training partner=1 From friend=2 From website/ newspaper etc.=3 Others=99(Specify)
3.2	Difficulty level of the training program?	Difficulty_training	Easy =1 Moderate=2 Difficult=3
3.3	Rate the overall training program on a scale of 1-4 (1 is lowest and 4 being highest)	Rate_prog	

4. Outcome and Impact of the Programme

SI. No	Question	Codes	Response
4.1	What impact did the Suryamitra Programme have on you? (Possibility of multiple responses)	Prog_impact	Improved knowledge & skills=1 Increased job opportunities=2 Increased income=3 All of the above=4 Others=99(Specify)
4.2	Has the training helped you in your current employment?	Work_understand	Yes=1 No=2
4.3	Do you have better technical knowhow after being trained in the programme?	Tech_understand	Yes=1 No=2
4.4	Have any new job opportunity/ opportunities opened up for you post this training?	New_job_oppor	Yes=1 No=2
4.5	Do you follow all sorts of safety practices assigned in your workplace?	Safety_pract_work	Yes=1 No=2
4.6	Do you feel that your performance in the sector has improved after the training?	Improved_performance	Yes=1 No=0
4.7	How much has your income increased in monetary terms after the training? (Both fresh placements and old candidates)	Increased_income	Not increased= 1 Up to INR 5000 2 INR 5000-10,000= 3 More than INR 10,000= 4
4.8	What kind of impact did this programme have on your family? (Possibility of multiple responses)	Impact_family	Increased family income=1 Motivated others in the family to join such training=2 Improved your status in the family=3 Improved the quality of life of the family members=4 All of the above=5 Others=99(Specify)

5. Feedback about the Programme

SI. No	Question	Codes	Response
5.1	Rate the success of the programme on a scale of 1-4 on the theoretical & practical content in the curriculum	Rate_content	Needs substantial improvement=1 Could be better=2 Somewhat successful=3 Very successful=4
5.2	Rate the success of the programme on a scale of 1-4 on the role of the training partner	Rate_TP	Needs substantial improvement=1 Could be better=2 Somewhat helpful=3 Very helpful=4
5.3	Do you have any suggestions to improve the programme?	1. 2. 3. 4.	

Annexure 2: In-depth Interview Schedule for ToT

1. Key Information:

SI. No	Question	Codes	Response
1.1	Location of survey	loc_survey	
1.2	District	District	
1.3	State	State	Uttar Pradesh=1 Rajasthan=2 Gujarat=3 Maharashtra=4 West Bengal=5 Assam=6 Tamil Nadu=7 Telangana=8 Delhi=9 Uttarakhand=10 Himachal Pradesh=11
1.4	Date of survey	Date	
1.5	Name of surveyor	name_surveyor	

2. Background information of the trainees

SI. No	Question	Codes	Response
2.1	What is your name?	Name_res_tr	
2.2	What is your gender?	Gender_res_tr	Male=1 Female=2
2.3	What is your age in completed years?	Age_res_tr	Years
2.4	What is the highest education attained by you? (completed class)	Edu_res_tr	ITI diploma =1 Graduation/Bachelor of Engineering =2 Post Graduation/M. Tech =3
2.5	How many years are you associated with solar PV sector including delivering training?	Asso_Suryamitra_tr	Less than 3=1 3 to 5years=2 More than5 years=3
2.6	When did you get trained as a Suryamitra? Mention month and year	Year_Suryamitra_tr	
2.7	What is the status of your employment at present?	Employ_status_tr	Self-employed=1 Working (on payroll) with Training partner/ organisations/ companies =2

2.8	How much do you currently earn per month as a Suryamitra trainer?	Current_earn_tr	INR 10000- 20000=1 INR 20001- 40000=2 INR 40,000-60,000=3 More than INR 60000=4
2.9	In which organisation (TP) are you employed in?	Emp_organisation_tr	

3. Aspects of training programme

SI. No	Question	Codes	Response
3.1	How did you come to know about the Suryamitra training programme?	Know_about_suryamitra	From training partner=1 From friend=2 From website/ newspaper etc.=3 Others=99(Specify)
3.2	What is the difficulty level in ToT according to you?	Difficulty_training	Easy =1 Moderate=2 Difficult=3
3.3	Rate the overall ToT programme on a scale of 1-4 (1 is lowest and 4 being highest)	Rate_prog	

4. Outcome and Impact of the Programme

SI. No	Question	Codes	Response
4.1	What impact did the Suryamitra Programme have on you? (Possibility of multiple responses)	Prog_impact	Improved knowledge & skills=1 Increased job opportunities=2 Increased income=3 All of the above=4 Others=99(Specify)
4.2	Has the training helped you in your current employment?	Work_understand	Yes=1 No=2
4.3	Do you have better technical knowhow after being trained in the programme?	Tech_understand	Yes=1 No=2
4.4	Have any new job opportunity/ opportunities opened up for you post this training?	New_job_oppor	Yes=1 No=2
4.5	Do you feel that your performance in the sector has improved after the TOT?	Improved_performance	Yes= 1 No= 0
4.6	How much has your income increased in monetary terms after the training?	Increased_income	Not increased= 1 Up to INR 5000= 2 INR 5000-10,000= 3 INR 10,000-15,000= 4 More than INR 15,000=5

			Increased family income=1
4.8	What kind of impact did this programme have on your family? (Possibility of multiple responses)	Impact_family	Improved the quality of life of the family members=2
			All of the above=3
			Others=99(Specify)

5. Feedback about the Programme

SI. No	Question	Codes	Response
5.1	Rate the success of the Suryamitra programme on a scale of 1-4 on the theoretical & practical content in the curriculum	Rate_content	Very successful=4 Somewhat successful=3 Could be better=2 Needs substantial improvement=1
5.2	Rate the success of the programme on a scale of 1-4 on the role of the training partner	Rate_TP	Very helpful=4 Somewhat helpful=3 Could be better=2 Needs substantial improvement=1
5.3	Rate the success of the programme on a scale of 1-4 on the capacity building of the trainers	Capacity_building_tr	Very helpful=4 Somewhat helpful=3 Could be better=2 Needs substantial improvement=1
5.4	Do you have any suggestions to improve the training delivery and effectiveness of Suryamitra programme?	1. 2. 3. 4.	

Annexure 3: Glimpses from the field



















Available infrastructure at a training centre in Himachal Pradesh





On-going training Session



Interviewing the trainees and the trainers



Facets of Solar PV Installation

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