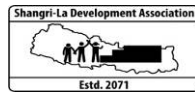




Govinda e.V./ Germany



Shangri-La Development Association/ Nepal



Shangrila Development Association/ Switzerland

School Building Reconstruction and Education Support Project (SBRES)

# Project Completion Report

SDA/GA/SA School Reconstruction Team  
May 22, 2017



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## 1. Meta Information

<b>Project</b>	School Building Reconstruction and Education Support Project (SBRES)
<b>Responsible Construction Team</b>	Deepak Chhetri (School Construction Coordinator GA/SA), Dipesh Shrestha (School Construction Supervisor), Mahesh D. Chaulagain (SDA General Manager Till April 2017), Sagar Thapa (SDA Field Coordinator), Anil Manandhar (Bonafide Engineering), Himanchal Pathak (Finance Controller GA/SA)
<b>Responsible Construction Board</b>	Jay Shankar Upadhyay (Chairperson SDA) , Rocco Umbescheidt (Founding and Advisory Board Chairperson GA/ Advisor SA)
<b>Supporting Organisations</b>	SDA - Shangri-La Development Association, Lalitpur/Makwanpur, Nepal GA - Govinda Association, Aalen, Germany Shangri-La Development Aid Association, Zurich, Switzerland
<b>Location</b>	Kalikatar and Bharta VDCs of Makwanpur district, Nepal
<b>Implementation period</b>	1 <sup>st</sup> September 2015 to 15 <sup>th</sup> May 2017

**Construction formats, management tools etc. are at free disposal provided if SBRES is named.**

Organisations are encouraged to contact for further information:

**Govinda Association / Govinda e.V.**

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## 2. Summary

**Target:** Construction of 4 earthquake-resistant schools for 924 students of technically sound quality that minimise future risk of damage, which are built with the communities so as to develop higher capacity to rebuilt better and safer school in future if required.

**Achieved target:** Construction of 4 earthquake-resistant schools of good quality that minimise future risk of damage, which are built with the communities so as to develop higher capacity to rebuilt better and safer school in future if required, three toilets, two retaining walls, skill & technology transfer and equipment for all schools.

**Relevance** is high. Policies, priorities and needs are addressed. Beneficiaries of school reconstruction belong to the vulnerable groups.

**Efficiency** is good, there is some scope for improvement in planning and implementation.

**Effectiveness:** The project is reaching its objectives in school reconstruction within the time frame of the cooperation contract. The long-term impact is too early to assess.

**Sustainability** is excellent for the schools, especially as SDA-Nepal/ Govinda - Germany and Shangrila-Switzerland are continuously involved in the same area, thus maintenance is facilitated.

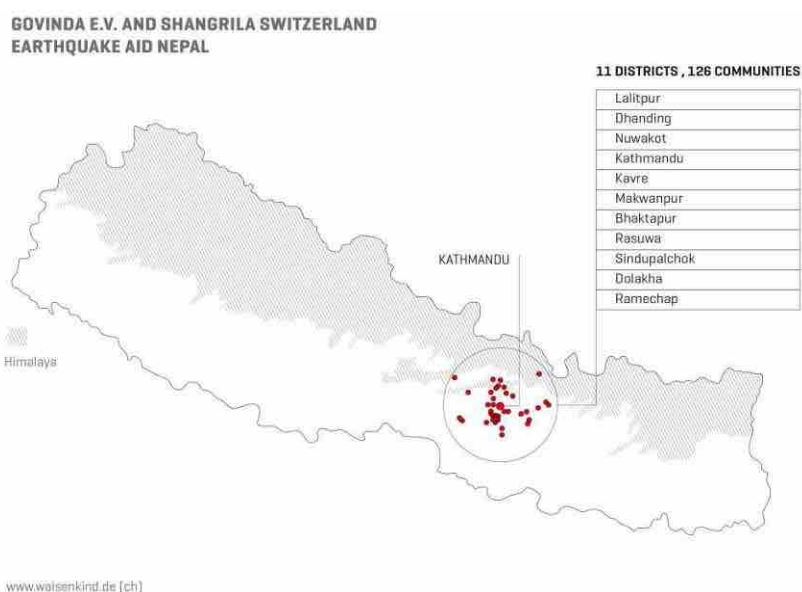
### 3. Introduction

Shangri-La Development Association (SDA) is a team of young energetic professionals, a non-profit non-government organization. The organization was registered in Local administrative body of Nepal Government on 10<sup>th</sup> November 2014 which became partner of GA/SA formally on 1<sup>st</sup> December 2014. It has been working for the improvement of the lives of Chepang community through integrated activities in Health, Education and Agriculture.

After only four months of establishment, on 25 April 2015 at 11:56 local time an earthquake measuring 7.8 on the Richter scale took over 8,000 human lives<sup>1</sup>, made hundreds of thousands people homeless and inflicted substantial damage to infrastructure among which 5003 schools in 14 districts were damaged<sup>2</sup>. A second earthquake with 7.2 on the Richter scale happened on May 12. Aftershocks occurred for months and the risk of landslides was very high. Conditions were aggravated by the political blockade of the border to India and the bureaucratization of assistance by the government.

Immediately after the earthquake the proposal for reconstruction of schools and construction of Literacy home was approved on 8<sup>th</sup> October 2015 from SWC<sup>3</sup> as SBRES project apart from the regular activities in Health, Education and Agriculture. Parallel to this Shangri-La Reconstruction and Development Project (SRDP) was started by our organizations.

Parallel to the establishment of SRDP emergency aid activities were conducted in 11 of the 14 most affected districts of Nepal with 55 tons of relief supplies which reached 126 communities and 36,414 people within one month. Monsoon aid support was given to more than 5,000 people, consisting in temporary accommodation, temporary learning centres for 2,500 schoolchildren, hygiene training for more than 600 people as well as medical care.



Target areas of SRDP for reconstruction were **Makwanpur district** (Kalikatar and Bharta VDCs) and **Lalitpur district**. The choice of the two locations was due to the fact that SOH/SIS is located in Lalitpur district, and SDA's target region the VDCs of Kalikatar and Bharta in Makwanpur district.

**In the Kalikatar and Bharta VDCs of Makwanpur**, only one life was lost, but 313 private houses were damaged (in total there are 796 households in Kalikatar and 693 households in Bharta), **and 13 school building were destroyed**.<sup>4</sup> In Lalitpur district 17,444 private houses were fully destroyed and 8064 private houses were partially damaged, there were 180 human casualties, and 149 of 200 government schools were destroyed<sup>5</sup>.

<sup>1</sup> To be exact, many of those lives were lost due to disregard of building codes and urban planning norms.

<sup>2</sup> My Republica, <http://www.myrepublica.com/news/3543/>

<sup>3</sup> Social Welfare Council

<sup>4</sup> Community Research and Training Center (CRTC): PRA Report of Kalikatar and Bharta in Makwanpur, Nepal, Kathmandu, 2015

<sup>5</sup> Ministry of Home Affairs (MoHA), Government of Nepal: Nepal Earthquake 2015. Disaster Recovery and Reconstruction Information Platform, <http://drportal.gov.np>



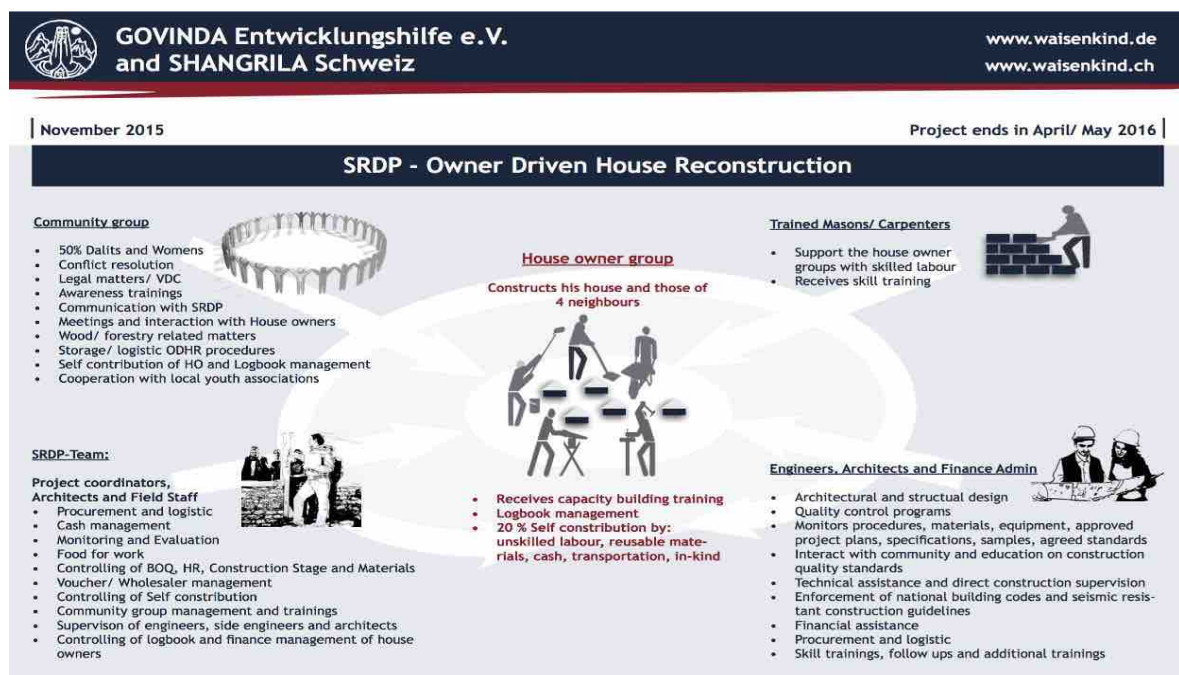
In 2011 Kalikatar VDC's population was 4723 (2384 male, 2339 female), Bharta VDC's 4169 (2143 male, 2026 female)<sup>6</sup>. The VDCs are situated in the hill region, with a majority of Chepang people who mostly live in scattered settlements. This settlement pattern causes walking distances to schools, health posts (one in each VDC), police station (one in Kalikatar village) and retail shops that sell basic goods (several in Kalikatar and Bharta villages) of 1.5 hours on average, along narrow, steep trails. The main occupation is subsistence farming with crops (mainly maize and millet) lasting on average for only six months. Forest resource collection livestock rearing and small scale fishing supplement nutrition, but seasonal migration for wage labour is customary. Full food self-sufficiency is rare. Kalikatar village is connected by an earthen road from via Namtar to Tribhuvan Highway (Chuniya), and by a seasonal road along/through Kalikhola river to Manahari (October to May). The latter road is served by public transport twice a day.

The Tibeto-Burman ethnic group of the Chepang, until a few generations ago semi-nomadic hunters and gatherers, have been called "the poorest of Nepal's poor"<sup>7</sup>. They number around 52,000 and the majority lives in the districts of Dhading, Chitwan, Gorkha and Makwanpur. Adult illiteracy, malnutrition, alcoholism, exploitation and discrimination characterise their living conditions as well as lack of food security and lack of resource ownership and even citizenship certificates<sup>8</sup>. 28 of SRDP Makwanpur's 34 beneficiaries are Chepang (while the few others are Tamang and Dalit).

In Lalitpur district the situation is a completely different one. Infrastructure and accessibility facilitate overall conditions for its 468,132 inhabitants. The diversity of the Kathmandu valley's inhabitants is mirrored by SRDP Lalitpur's group of beneficiaries whose only common denominator is their fragile economic situation. Bahun, Chhetri, ethnic groups (such as Newar, Tamang), Dalit - all are represented. The houses are located in the municipalities of Bajrabarahi, Karyabinayak and Godawari (formerly the VDCs Lele, Chapagaon and Chhampi), on the southern edge of the Kathmandu valley. Contrary to the Makwanpur building sites, all houses have road access in LP.

### First owner Driven Reconstruction in Nepal completed

In August 2016 it was possible to complete the first owner driven reconstruction in Nepal and 104 earthquake resistant houses in SRDP. The ODHR methodology was implemented the first time in Nepal. 126 Masons and Carpenters received certified skill trainings and 431 workers/ board members have been involved to accomplish this challenging tasks under most difficult circumstances in Nepal.



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<sup>6</sup> Central Bureau of Statistics, Government of Nepal: 2011 National Population and Housing Census, Kathmandu 2011

<sup>7</sup> Beine, David / Caughtley, Ross / Shrestha, Dwarika: Chepang - then and now. Live and Change among the Chepang of Nepal, Blurb Books 2012

<sup>8</sup> Bista, Dor Bahadur: People of Nepal, Kathmandu 1996; Maharjan, Keshav Lal / Piya, Luni / Joshi, Niraj Prakash: Annual Subsistence Cycle of the Chepangs in Mid-Hills of Nepal, in: Himalayan Journal of Sociology & Anthropology-Vol. IV, 2010



#### **Lalitpur house design: Brick and RCC**

Initially the design for Lalitpur houses was based on interlocking brick technology with several advantages, but because of the bureaucratic processes in the government, an approval was impossible. All plans were therefore re-developed and a house design by the government was taken.

It has two rooms and a CGI roof. Cement bricks were chosen because they are more environment-friendly (less pollution during production), are bigger in size than red bricks, less costly. Quality tests confirmed this. Four different subtypes of the Lalitpur house design have been developed.



#### **Makwanpur house design: Stone Wood**

Initially the design for Makwanpur houses was based on stone mud mortar concept but subsequently it was realized that the implementation of this design was very critical as the same required lot of stone chiselling, transportation of the stones from the source to construction site and this was further aggravated by the lack of availability of skilled and unskilled manpower in the remote villages of Makwanpur district having serious impact on time and cost factors of the project.





Thus, the initial design was suggested to modify so that the houses can be built with adjustments in design along with compliance with national standards and accordingly the stone wood design was agreed to be implemented which required very low quantity of stone in comparison to initial design, although the quantity of wood was significantly very high. To check the practical availability of wood, the same was checked with house-owners and with the vendors during rainy season (emergency situation) and finally the same got successfully implemented. The initial house design (Mud Mortar) was awarded by the government and included in the countrywide government catalogue.



**After the completion of these 104 earthquake resistant houses, two other earthquake safe buildings have been completed in 2016:**

**The SDA literacy home in Kalikatar/ Makwanpur as one component of SBRES Project  
(Project of SDA/GA/SA)**



House Nr. 105: The Literacy Home - Education and Future Perspectives for Girls in Nepal

**The community hall in Champi/ Lalitpur  
(Project of SOH/ SDA/GA/SA)**



House Nr. 106: The Community Hall – Training and Meetings/ Multiplication of EQ Safe Reconstruction Principles



## 4. The School Building Reconstruction and Education Support Project in Makwanpur

Though the school reconstruction project was proposed right after the earthquake and even before the National Reconstruction Authority (NRA) was established by the government for the reconstruction of earthquake damaged infrastructures; The reconstruction could not start immediately as the situation was inconsistent and the government rules and regulations were changing.

The approval from SWC was obtained with the concept of the management that School will be constructed with Inter-Locking blocks and a new technology would be introduced in the area.

After the earthquake, government published design catalogue on October 2015 which excluded the Interlocking Bricks technology and thus all the efforts invested in designing the drawings of School was lost in vain. Again new design was made and submitted for approval in DUDBC as the design published by Government was not feasible for the land area of the schools in the hills of Kalikatar and Bharta.

The Design was approved from DUDBC<sup>9</sup> on 20<sup>th</sup> September 2016 and the execution of the plan of reconstruction began. The actual physical activity started on October 2016. Initially the material collection for self-contribution took place which consumed a lot of time.

The extensive reconstruction of the schools began only on January 2017. This late execution of the construction activities was result of various circumstances such as the bureaucratic procedure of Government for approval of designs, prolonged procedures, frequent change in regulations, confusion of authority on School reconstruction among departments of Government, Focus on SRDP as roof above the individual in monsoon was immediate need than the community building.

### 16 schools since 1998 in four districts of Nepal

Since 1998, it has been a great experience to work with the people of Nepal to manage the future development and education of the country. With the construction of the four new schools in Makwanpur, since 1998, a total of 16 school buildings have been built in four districts of Nepal for more than 4000 Nepalese children. We were able to support Nepal significantly in reaching Sustainable Development Goal 4: "For all people inclusive, guaranteeing opportunities and high-quality education as well as opportunities for lifelong learning". Since 1998, we have been able to support almost 60,000 people in Nepal and are currently implementing eight projects in three districts. Beside the construction SDA supports all four schools with uniforms, stationary, health check-ups, teaching materials and daily mid-day meals for students to fight malnutrition & to create a better educational environment.

## 5. Management Dimension

As schools were damaged in the working area and the beneficiary children had to study in classes made out of bamboo/woods and CGIs, SDA along with GA/SA decided to reconstruct schools that were damaged by the quake.

The decision for reconstruction of schools was followed by huge amount of paperwork and the follow up of government offices. Initially the existing human resource of the organization was involved in the documentation process as hiring new manpower for same would only increase administrative cost since the time consumed by the task was unknown.

The dynamics in the board level, among partner organizations and in the implementation team made the project successful. The learning from SRDP played crucial role in management, supervision and monitoring. Due to ODHR experience in SRDP, a Community Driver School Reconstruction (CDSR)<sup>10</sup> project was successful in SBRES project.

<sup>9</sup> Department of Urban Development and Building Construction

<sup>10</sup> CDSR- Community Driven School Reconstruction is similar to ODHR but here owner is the community and the reconstruction building is of School

Frequent visit of Board members of SDA and of GA/SA kept the monitoring and supervision intact. The crucial decisions were made in the field regarding the implementation of the project. Daily call system was arranged between the construction coordinator, SDA chairperson and GA/SA Advisory board chairperson for swift, smooth and prompt decisions. This helped to reduce the delays or stoppage of works due to lack of decisions from the authority. The team of reconstruction was made so that the bureaucracy was reduced to minimum.

Though the administrative task in getting approval took time, the management team never compromised with quality and earthquake safety. The management team was always ready even to take critical decision of demolishing the parts where quality seemed to be compromised due to various reasons.

*I felt a bit sad when the already done works had to be redone due to errors and deviations in quality but when the new building was completed, I feel proud of those decisions. The new Building has made us easier to conduct classes and use teaching equipment. Previously classes were disrupted by rain while teaching in TLC.*

*Ram Babu Shah, Principal, Praja Utthan Primary School, Dhushrang*

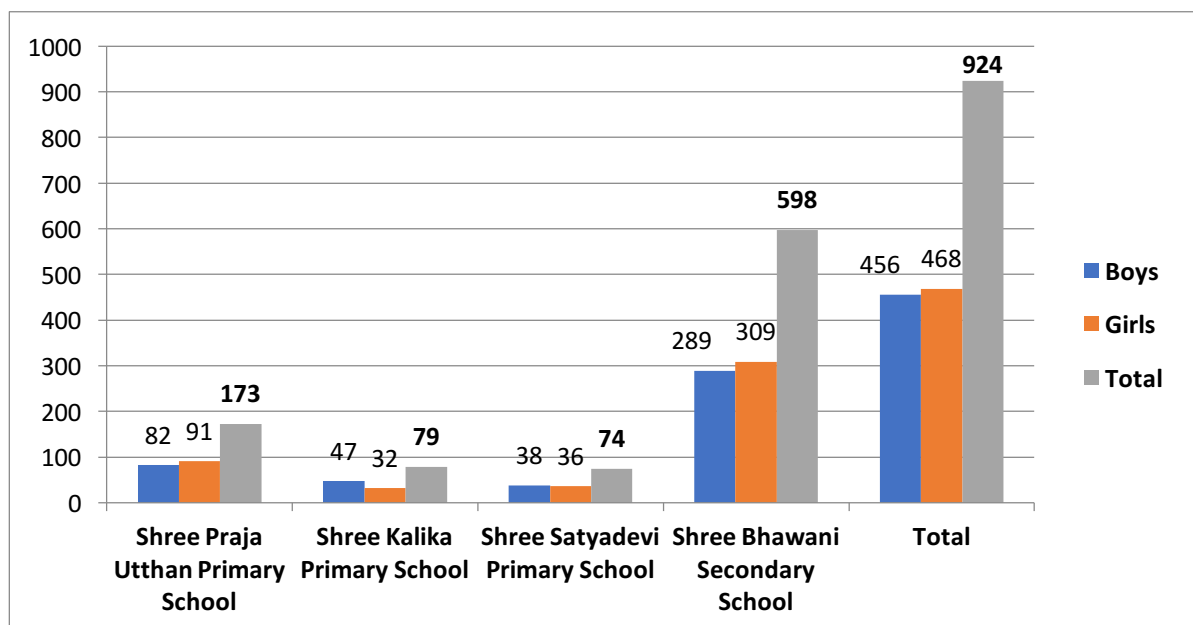
## 5.1 Assessment and Selection

The assessment of the damages in the working clusters of SDA was done right after earthquake in June after which it was found that extensive repair<sup>11</sup> of Shree Praja Utthan Primary School in Kalikatar-9, Dhushrang was required. The other three schools had to be made from the foundation level. All of these four schools were marked by red stickers<sup>12</sup> by the preliminary building assessment team of Government. The schools were selected as they were in the working zone of SDA. The location of School, condition of affected school (incl. details about damage), temporary shelter plan, sanitary condition (toilet, drinking water), type of soil, availability of construction materials, analysis of reusable materials, road access, forest location, support by other organisations, skill / manpower availability, and other remarks were assessed initially. Additionally, photos of the red sticker marked schools were taken.



## 5.2 Overview

Schoolwise Student overview



<sup>11</sup> Extensive repair refers that whole building is to be demolished except the truss structure and walls to be made on same foundation

<sup>12</sup> Red sticker means that the school is not repairable and has to be demolished

### 5.3 Legal issues

After the proposal for the school building reconstruction was approved from SWC, there was requirement that the coordination be done with the local stakeholders and the related department. As a first step a letter of request was obtained from the concerned schools for reconstruction.

Once the letters were obtained, along with the design, the contact was made to Department of Education (DoE), Bhaktapur once the letter of recommendation was achieved from the District Education office, Makwanpur. Department of Education gave approval for extensive repair of Shree Praja Utthan Primary school once the design was checked by the engineer of the same department.

At the time approval was taken for Dhushrang school, the National Reconstruction Authority (NRA) had been formed, so the approval for other 3 schools had to be obtained from NRA. The approval process was prolonged because the design of schools that were made took nearly 1 year for approval from DUDBC.

Approval from DUDBC for the drawing moved the process forward and the new office to be visit was CLPIU<sup>13</sup>. After approval from DUDBC and a letter of recommendation from CLPIU, then the NRA office was visited frequently for the approval of project and the three party agreement.

### 5.4 Human Resource Management

As the approval for the school design had been slowed down by the bureaucratic system implementation started only in October 2016.

Before construction, the stone masonry of Dhushrang was demolished completely and of Kalikatar was completely Demolished. Agreement and understanding has been done for the demolition of Schools in Sarsi and Dekhari after the Local Election and inspection from the Government technicians.

To facilitate implementation the following personnel had been recruited for the project:

#### SDA/GA/SA staff and honorary boards

<b>Construction Coordinator</b>	Deepak Chhetri*
<b>Construction supervisors</b>	Dipesh Shrestha*
<b>Accountants</b>	Samjhana Poudel- Also regular projects
<b>Finance controller</b>	Himanchal Pathak*
<b>Field logistics coordinators</b>	Surendra Limbu, Dev Lal Bal, Ram Kumar Praja, Ramshing Praja, Nirajan Praja
<b>SDA Core Team</b>	Sagar Thapa (SDA), Mahesh D. Chaulagain (SDA)(till April 2017),
<b>Foreign project Supervisors of Govinda – Germany / Shangrila-Switzerland</b>	Carola Peschl, Markus Heindl, Rocco Umbescheidt
<b>Honorary contributions by experts/boards throughout the complete project period:</b>	<p><b>Project Management by Chairpersons, General manager and Project coordinator:</b> Jay Shankar Upadhyay (SDA), Rocco Umbescheidt (GA/SA)</p> <p><b>Construction Experts:</b> Carola Peschl, Yvonne Umbescheidt, Sixten Schoo, Sören Kiessling von Holtum</p> <p><b>Lawyers:</b> Achim Mettang Graphic Design: Yvonne Umbescheidt</p>

People marked with \* were financed outside the SBRES project budget by Govinda-Germany /Shangrila-Switzerland.

#### Engineering Companies and External Contractor

<b>Bonafide Engineering Consultancy and Construction Pvt. Ltd</b>	Anil Manandhar, Amit Subedi, Miyush Maharjan, Kamal Sharma, Dammar Oli, Bikki Shyama, Utsav Pokharel, Samir Pradhan
<b>Palanchowk Bhagawati Engineering Construction Pvt. Ltd</b>	Bindra Lal Shrestha, Lila Shrestha, Ashish Kunwar

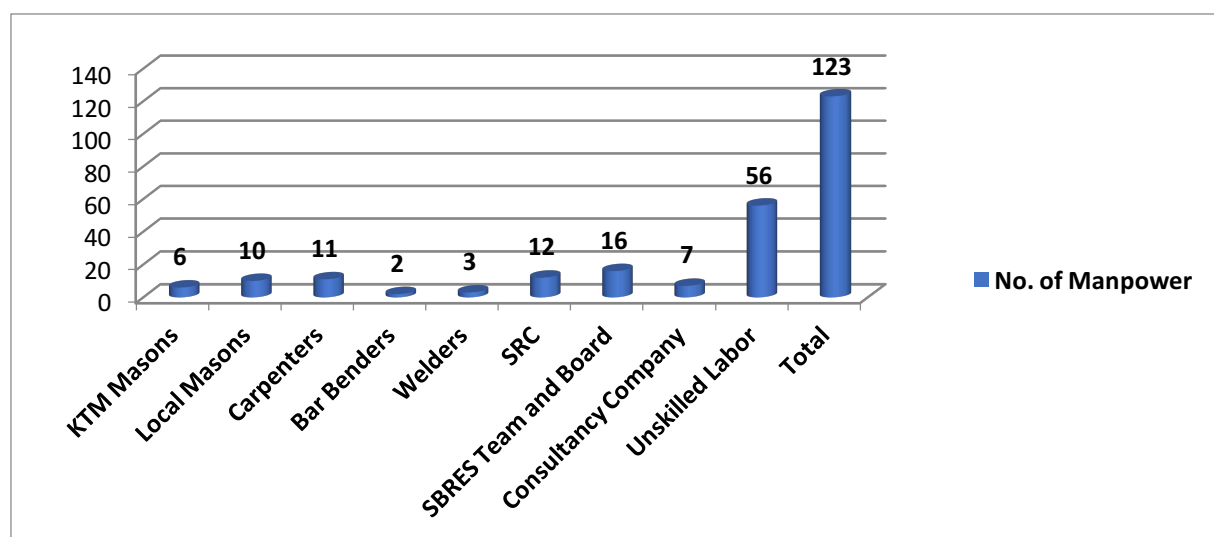
<sup>13</sup> Central Level Project Implementation Unit

**SMC and the Masons for Technology Introduction**

<b>School Reconstruction Coordination Committee</b>	<b>Kalikatar:</b> Bir Bahadur Chepang, Ram Naresh Gosai, Vishnu Prasad Timalaina <b>Sarsi:</b> Aita Singh Praja, Rajkumar Praja, Aatma Raj Moktan <b>Dekhari:</b> Lal Bahadur Thing, Brij Lal Ghalan, Sakuntala Moktan <b>Dhushrang:</b> Jangi Lal Praja, Ganesh Praja, Ram Babu Shah
<b>KTM Masons/ Trainer for Local Masons</b>	Hari Narayan maharaja, Govinda Shrestha, Kasi Lal Maharjan, Maila Maharjan, Baburam Maharjan, Ghanashyam Maharjan, Ghanashyam Desar

**Construction Labourers**

<b>Masons</b>	16
<b>Carpenters</b>	11
<b>Bar benders</b>	2
<b>Welders (roofing work)</b>	4
<b>Unskilled Labourers</b>	56
<b>Total</b>	<b>89</b>

**Human Resource Overview of SBRES**

SBRES project was supported by School, Management Committee (SMC) and . In each school 3 members School Committee(SRC) was formed comprising chairperson of SMC, Member of SMC and Principal of School who actively participated in the reconstruction process.

SMC and SRC meetings, in the planning phase and implementation phase, were conducted regularly as an integral and important part of the construction process. The meetings took place school-wise and topics such as self-contribution, transportation of materials, availability of local materials, weekly plan and participation were discussed.

Labourers were employed on a need-basis, employment times varied between one week and 6.5 months. The number of unskilled labour is high as it includes the community people who contributed for self-contribution also. The operational team can be regarded as of sufficient size and quality to assure proper monitoring of the activities, especially as numbers had been raised as per need.

## 5.5 Monitoring & Project management tools

Construction progress was monitored closely and effectively from management level and Board level on daily basis.

- **Make Progress visible:** A **CONSTRUCTION PROGRESS REPORT** with progress, weekly and biweekly forecast was regularly shared among the team to have overview of the construction progress and efficient and effective management of manpower and materials.



- **Participation at all Levels: Direct Board Supervision/ DAILY CALLS** have been conducted between the construction coordinator to SDA chairperson and between SDA chairperson to GA/SA Advisory Board Chairperson. The daily call was arranged for daily updates as well as swift decision on need basis. The daily calls removed the barriers to construction as a result of decision delays.
- **Avoid knowledge and experience gaps through integrated exchange of experiences: WEEKLY INTEGRATED MEETINGS** between FLCs, Site engineers and construction team in field took place every Friday. The integrated meeting solved the problems raised from all dimension (Technical, Managerial, Social and Financial). They also helped as important management/ team tool create a better interdisciplinary understanding of all actors, to increase the efficiency of the work, to avoid misunderstandings and to generate teamwork. The weekly integrated meeting was also the tool for handover of responsibility as there was change in leaders in field as the work in Lalitpur and kalikatar had to be managed simultaneously.
- **BIWEEKLY CONSTRUCTION SKYPE** was conducted to have transparent overview and to make the decisions valid. The biweekly Skype between SDA and GA/SA team solved the problems from all dimensions.
- **Community Driven School Reconstruction:** Continuous meetings with the SMCs and locals in the field took place throughout the project period.
- **Involvement of Government:** One time visit of the District education officials and frequent visit of the VDC secretary took place in the field for the monitoring/supervision from the local government side.
- **BIWEEKLY CONSTRUCTION SKYPE** was conducted to have transparent overview and to make the decisions valid. The biweekly Skype between SDA and GA/SA team solved the problems from all school construction dimensions.
- **Continuous Field Presence of transparent Supervision structures:** The monitoring system further consisted of **CONSTRUCTION SUPERVISION REPORTS:** after each construction stages a report was filled out for each school by the construction supervisor, topics included where technical execution, labour management, material management, monitoring process, finances (self-contribution, labour payments) and overall recommendations.
- **Systematization of complex time management and working procedures:** An **OPERATIONAL CALENDAR** was kept until end of April and helped the team to break their work down. The intended time frame had been exceeded (all schools were completed by 15 May). The leave plan of the General manager, Construction Coordinator, Construction supervisor and project coordinator as per the operational plan helped to have better monitoring of the construction as well as it was a tool to increase efficiency.
- **Systematization of complex finance processes and training of the field teams: MASTER BOQ AND SEVERAL FINANCE MONITORING TOOLS** have been developed together with dozens of field files. Trainings with the field teams took place at several time points.
- **Make it visible:** A **PICTURE LOG** was maintained for each school and contained photos of the damaged school prior to full demolition, of the construction process in different stages as well as the completed school.



Sarsi School Construction

**REGULAR EC MEETING** in Lalitpur took place for the updates on school construction progress and solving executive issues if any in the field during implementation. The EC meeting in Lalitpur provided the legal base for each activity of construction progress as well as for regular activities.

- 15 Regular SRC Meeting was held to involve, empower, structure and motivate a community driven reconstruction. Apart from this SMC meeting and community meetings were conducted as per need during the planning as well as implementation phase.
- Visualizations in the field, meetings, workshops and at the construction site were specifically used to simplify complex processes/ contents and to make them accessible and visible for all actors in the school constructions.
- A Skill and Technology Transfer Concept was developed to describe the training of the local masons by specialists, both pedagogically and structurally.
- Examinations of the trainees (local masons) with skill checklists were developed to make the progress of the learning process transparent and to design the coaching in a need-oriented manner

## 6. Finance Dimension

SBRES project has been financially sound. Approaching the Community driven reconstruction strategy and the organization itself being involved in procurement and management of resources has led the project to have less administrative cost and be within cost bracket.

### 6.1 Controlling System

The construction team was aware that consistent monitoring and supervision is integral part of project and should go simultaneously for better management of field work and thus the project was facilitated by close financial supervision and monitoring so that the system aligns with the financial plan of the project and for successful implementation of the same, various steps were taken into consideration since inception of the work. The controlling system was implemented in planned & phased manner and customized tools were introduced so that the information delivered is always numerically clear & effective. Some of the important aspects of controlling system are expressed below:

**ONE to ONE COST ESTIMATE/BUDGETING** The project consisted of schools, protection walls & toilets all being located within same geographical area but at different locations. The nature of issues like transportation, availability of skilled manpower and construction materials varied from one construction unit to another construction unit. Hence, to have better financial planning, the cost of different schools was calculated by engineers and accordingly after perusal of the same it was accepted for forwarding the construction work.

**ANALYSIS of CRITICAL ELEMENTS** This was the most challenging work during the planning phase as the operation calendar of project would not have been achieved without solving the issue of critical elements. For identifying critical elements, Master Bill of Quantity (MBoQ) was taken into consideration and detailed strategy for collection of critical materials & management of skilled labourers was kept in top priority. The definition of some of the critical elements varied with respect to different construction units.

**STRATEGY For ACHIEVING SELF-CONTRIBUTION** After identifying the realistic issues of each construction units, strategy for self-contribution was formulated. The participation of community and school was kept in top priority for ensuring the feeling of ownership/awareness and sustainability. Participation to the extent of 20% of total cost of the building structure was expected from the community/school for achieving the philosophy of sustainable social development. The areas where school & community agreed to make contribution was through the collection of materials which were locally available such as collection of stones, aggregates, transportation of sand and manual transportation of procured materials, example bricks and iron rods. The quantity of material to be collected was fixed and further to keep the pace of collection of materials finance flow was started at later stage, so that the community people do not face financial pressure due to their excess contribution towards construction of building & structures. Thus, after achieving nearly 15% of self-contribution finance flow was started.

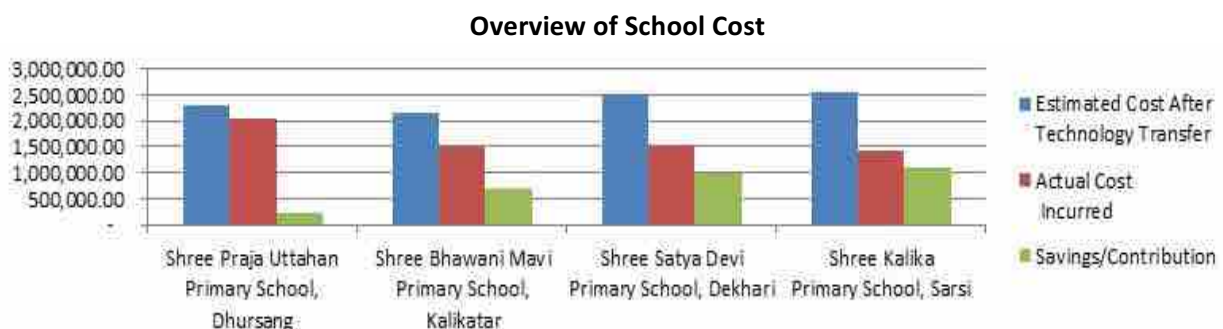
**MODE of PAYMENT & FINANCE CAPPING** This was one of the most important step in finance controlling process. The elements for which expenses would be incurred through staff advances & elements where the expenses would be incurred through bank payments were identified and limit for each school was fixed. Every-time the payment was done the same was compared with the limit of available resources so as to establish early warning system.

**REGULAR FIELD VISIT & INTEGRATED MEETINGS** Regular field visit was one of the key to achieving the financial goals by the project. During every visit the earlier set limits of finance flow and self-contribution were reviewed and necessary decisions for ensuring smooth finance management were taken based on field reviews.

**USE OF FINANCE CONTROLLING TOOLS** Various finance controlling tools were introduced to ensure the management with clear/transparent financial information.

## 6.2 Community Contribution

Community contribution achieved by different schools was worth appreciating and this became possible due to clear strategies in relation to vendor management, logistic management & community participation. The estimated costs, actual costs and savings are reflected below:



The community contribution/savings achieved in Dekhari, Sarsi and Kalikatar was really very good however, contribution/savings in case of Dhursang was relatively less due to geographical complexities and introduction of new technology training to local masons which slowed the work up to some extent.

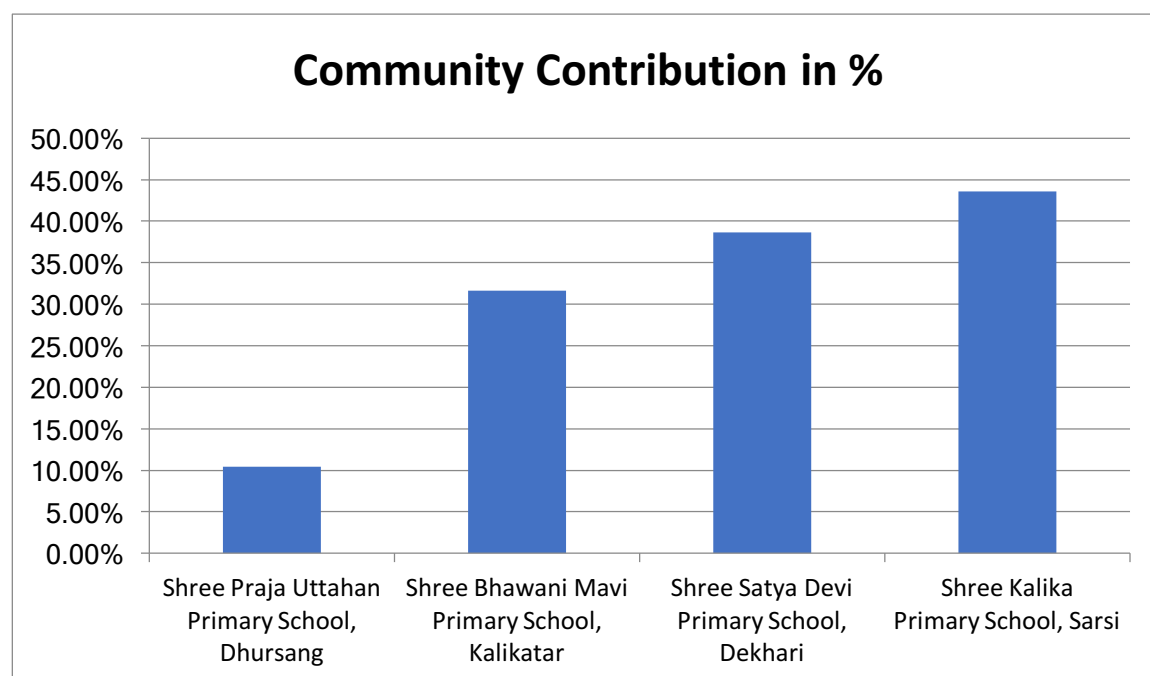
The actual cost of school in Dhushrang is high also because of the management decision to substantially rectify the construction work in which the quality of construction was found out to be compromised

because of various factors. Since the implementing and funding partner were in favour of build back better concept, the decision was taken apart from being critical decision for project implementation and financial burden.

The reason for higher savings in rest of the clusters is due to better labour efficiency, well managed efficient labour hours being used with facility of good breakfasts, and collection of stones, sand, aggregates and sal-wood through efficient management of manpower and strategy to release money in less amount after self-contribution was obtained.

#### Savings Overview

School Name	Amount( NRs)
Total Estimated Cost After Technology Transfer (A)	9,522,110.47
Total Actual Cost Incurred (B)	6,511,497.49
<b>Savings (A-B)</b>	<b>3,010,612.98<sup>14</sup></b>
<b>Average Contribution</b>	<b>31.62%</b>



### 6.3 Finance Management & Expenditures

The school construction project has achieved successfully its financial plan and this was possible because of experience of management and construction team from SRDP. The major reason for financial success of project lies in the strategy of achieving community contribution before introducing active finance flow in the initial stage and through controlled release of finance for collection of materials in the stages later.

For the purpose of ensuring proper finance management and control various process and financial tools were introduced. Some of the process/tools applied for different purposes are mentioned below:

- **ORIENTATION OF FINANCE PROCESS** was done to ensure that financial policy is complied with during the construction process as some human resource were new to the organization.

<sup>14</sup> Savings include the amount excess to estimated cost as a result of self-contribution of community and efficient management. Further the estimated cost was reviewed based on latest field development. The cost of construction was based on the estimates provided by engineers, which was lesser in implementation because of the high management efficiency of the school construction team.



- **FUNDS MOVEMENT REPORT** was prepared always at the time of making every payments. The entry would be updated along with respective school/work to keep the track of finance capping.
- **ADVANCE REQUEST FORM** was implemented to ensure school-wise funds requirement in triplicate, which was different from the normal advance request form of the organization.
- **ADVANCE SETTLEMENT FORM** to ensure there is no diversion of funds.
- **LOGISTIC REPORT** to ensure seamless inventory management.
- **ADVANCE AGEING REPORT** was timely updated so that the old advances are identified and settled in time.
- The cost of material & labourers were updated after finishing collection of materials upto a certain level in **MASTER BILL OF QUANTITY (MBoQ)** and based on the approved costs the work was being carried in the field.
- **PHASE-WISE COST ANALYSIS** the cost of schools was analysed after every 15-20 days which helped in identifying the exact field problem and taking necessary financial decision.
- Systematic formats of **LABOUR RECORDS** were introduced additionally for tracking the labourer combination, labour movement and efficiency of labourers like minimum brick work per day/per person.

## 6.4 Finance Summary / Figures

The school construction project had successfully used existing resources of organization for achieving the project objectives. Since, the project being carried in Makwanpur was not a standalone project, rather it was one of the additional projects of the organization within the same working area, it helped in saving additional expenditures which are normally incurred in standalone projects.

The cost of hiring additional manpower, infrastructure setup, lodging and food of management/visitors/engineers was saved to a very large extent.

The same is explained by figures below:

Description	Amount (NRs)	% Age
Admin Cost	395,146.26	3.73% <sup>15</sup>
Program Costs	10,201,833.51	96.27%
<b>Total</b>	<b>10,596,979.77</b>	<b>100.00%</b>

The school construction project was based upon the philosophy of community participation and self-involvement in the process unlike construction through the contractor. This philosophy has not only ensured community awareness but also saved a lot of financial resources of the organization as the organization had to pay the contractor the local taxes and certain margin for the construction work. This alone has saved around 30 to 35 % direct cost of schools, roughly NRs. 22.80 Lakhs i.e. 35%<sup>16</sup> of NRs. 65.11 lakhs.

Besides these, the self-driven approach with community participation has enriched the knowledge and experience of construction related works of staffs with community and for the community for the sustainable development.

<sup>15</sup> The percentage is based on the resources of SDA in Nepal. If the amount paid for project coordinator and construction supervisor directly by GA/SA is taken into consideration, the percentage would have been admin 9.65 to program 90.35

<sup>16</sup> 15 to 20% supplier margin & 13% Value Added Tax

## 7. Technical Dimension

SBRES project had adopted double check system for quality assurance and earthquake safety. Bonafide Engineering consultancy was hired which provided engineers that stayed in site for technical supervision. Above these site engineers was the Construction Supervisor Dipesh Shrestha who supervised the quality of work done. Also the German Technical team had been regularly providing feedbacks on the issues that came up during the course of implementation. Thus, the project was technically sound as a result of management, finance and technical team working in close coordination.

### 7.1 School design

Identification of construction consultancy companies was initiated during Autumn 2015, and since the initial concept was to construct the schools with interlocking blocks, Ecotech Building Systems Pvt. Ltd was consulted. Afterwards construction and execution plans were designed in close cooperation between Nepalese and German architecture teams while the national building codes were strictly followed.

The design of the school was initially made with interlocking blocks with rigorous input. But as it was not included in building catalogue, the interlocking blocks were replaced by bricks and again new set of design were made. Cross checks were made and a close cooperation of German and Nepalese team finalized the design.

The consultancy company was also given the responsibility of approval from DUDBC. Since the initial consultancy company failed to get approval, Bonafide Engineering Consultancy and Construction company was approached as at this time point Bonafide already had experience in working at Makwanpur through SRDP project. Again the design were crosschecked from German technical team to finalize the drawings of the school.

**The basic requirements for the school design were:**

- Consideration of the National Building code
  - Technically sound materials
  - Realization and cost effectiveness in construction and operation
  - Structure
  - Energetic concept
  - Architectural and functional quality
  - Technical requirements (earthquake resistant technologies and monitoring)
  - Logistics/Procurement and supply of materials
  - Community driven construction project
  - Temperature / circulation
  - Financial limitation
  - Time frame
  - Supervision and monitoring mechanisms
  - Total concept (how coherent is the overall concept).
- Obtaining government approval for the final house design proved much more time-consuming than expected, delayed the beginning of the implementation process by nearly a year and resulted in an immense time pressure regarding the arrival of the new school session.



### 7.2 Supervision

In order to build school according to design, site engineers were appointed in respective site. The role of engineers on site was to inspect proper layout of building, construction of foundation as per design, installation of reinforcement bar according to design, laying brickwork in perfect line and level and proper roof work. Engineers also need to mobilize manpower to give progress on work as per construction schedule and supervise their work for technical accuracy. The construction supervisor,

Dipesh Shrestha was appointed to recheck any technical error from site engineers. This had resulted in less technical errors and a safer buildings. The time and again visit of senior engineers from consultant side was also made to check technical accuracy of the building.

Any changes to be done during the implementation of the project was decided in different levels. Firstly, designs would be changed as per need of site which would be supervised by the construction supervisor. Then this change would be informed to Lalitpur which was informed to German technical team and final decision would be made. The communication was swift and everyone responded promptly to reduce the time consumed in deciding the designs.

**TECHNICAL SUPERVISION / INSPECTION VISITS** by construction coordinator and supervisor were conducted on each construction site once a week or more often as per need. Field visit reports including construction photos and construction stage checklists were assembled after each visit. This part of the monitoring process can be regarded as most central to ensure that quality of the school.

**Our supervisory structure in the technical dimension - secured by multi-stage structures:**

1. Structured training of construction workers (Checklists, Trainings, Skill Transfer Concept, Posters and formats at construction sites)
2. Building engineers of the company (directly and continuously placed at the field site)
3. Field visits of the internal supervisor of the construction company
4. Daily inspection of the construction company by our additional own civil engineers (directly and continuously placed at the field site)
5. Review of all plans and implementation steps by international construction experts with progress reports and field visits
6. Direct and close supervision of all teams by the board members (field visits, daily tracking, weekly recheck of all 4 management dimensions)

Supervision and control of construction projects in Nepal is of central importance. Nepal has had very good regulations and plans for years, but the qualitative implementation and a consequent controlling and the supervision lack a lot.

Habits of skilled workers / homeowners, non-existent skills, ineffective trainings, the inaccessibility of the country, the lack of will to work in rural areas but also the comfort of highly paid engineers and builders are just some of the highly complex backgrounds that must be taken into account in the construction of the project management of a successful reconstruction project.

The fear is very justified that a part of the hundred thousand houses that are to be built in the whole country will not be earthquake-proof because of these reasons and missing supervision / controlling structures. Based on our experiences in 4 reconstruction projects, just over 1000 engineers who have been employed are not enough for the national reconstruction, as measured by the amount of construction sites, the intensity required in the construction supervision, the local conditions and the estimates of renowned seismologists regarding new even stronger earthquakes that Nepal could be in the future.

*"This school is one of the most qualitative and safe building I have seen. If it had been finished completely, we would conduct the election here"*

*-Security officer of Kalikatar for Local Election 2017-*

### 7.3 Skill and Technology Transfer

The constructions have been undertaken with local workers, to bring not only the benefit of constructed schools, but also to involve the local people in the development of their area. To secure a good and earthquake safe construction, SDA was implementing skill & technology transfer concept for the local people. Training have been implemented as an on-job training. After the training, the local masons got the opportunity to take an exam with certification from SDA. The training took place as an one-by-one model with certified, experienced masons from Kathmandu who have been trained and employed in the previous reconstruction projects I-III. The SDA site-engineer & supervisor and an experienced trainer from SDA side, assured the quality of training and the earthquake safety of the buildings.



*“The school with brick and mixture of cement, aggregate and sand is much more stronger than the previous stone wall building. It is a happy moment to see the school and to participate in it.”*

#### 7.3.1 Background:

Local masons are not used to work in brick work. Nobody made any brick houses in Kalikatar and Bharta (the respective VDCs) till now. Most of the houses are wooden huts or a combination of stone and mud walls. Therefore the masons only know about construction techniques with stone or wood. The training shall give them the skills and knowledge to about the needed brick-masonry work.

#### 7.3.2 Skill Transfer Process:

The training took place as an on-job training:

- To start this on-construction training, there has been a **compulsory orientation day**, to clarify the construction standards of SDA and the training condition.
- **Peer Mentoring System:** Each local mason has been accompanied at all times by one trained mason from Kathmandu to give them the best possible guidance
- **Checklists** with the most important skills and a progress column have been utilized
- **Posters** with the building design and the most important EQ Safe Construction methodologies have been placed at every construction site
- **Site-engineer and trainer** overlooked the construction work and the training to give the certainty of best possible construction work and efficiency of the training.
- **Integrative Management:** The construction has been not more time consuming compared to only experienced masons working since the time, material and labor management has been managed in an integrative way
- **The certification** gives proof to the local masons of their gained knowledge after the test pass

The local masons benefited from the newly learned skill-set, which can help them to find work later on. The trained techniques benefit the area with learnt earthquake safe techniques (multiplication).



### 7.3.3 Content of training

#### 1. Skill transformation

- a. Hired masons will work with local masons every day.
- b. Hired masons correct the mistakes done by locals directly on spot
- c. Local masons get supervision by engineers, trainer and hired mason

#### 2. Empower the people and their skills

- a. Local masons get new skills and build up the confidence in brick works
- b. Empower the local masonry market

#### 3. On job training

- a. Local masons work with hired masons for school construction
- b. During this time local masons learn the bricks work, reinforced cement work, Combination of cement mortar for brick work
- c. Curing of brickwork
- d. Cement mortar level between the bricks
- e. Different reinforcement bands in wall construction for earthquake safety

#### 4. Get certificate

- a. After the construction work is completed, they will take a test regarding the bricks work
- b. After passing this test, they will get certificate as skilled mason regarding steel reinforced bricks work.

### 7.3.4 Methodology:

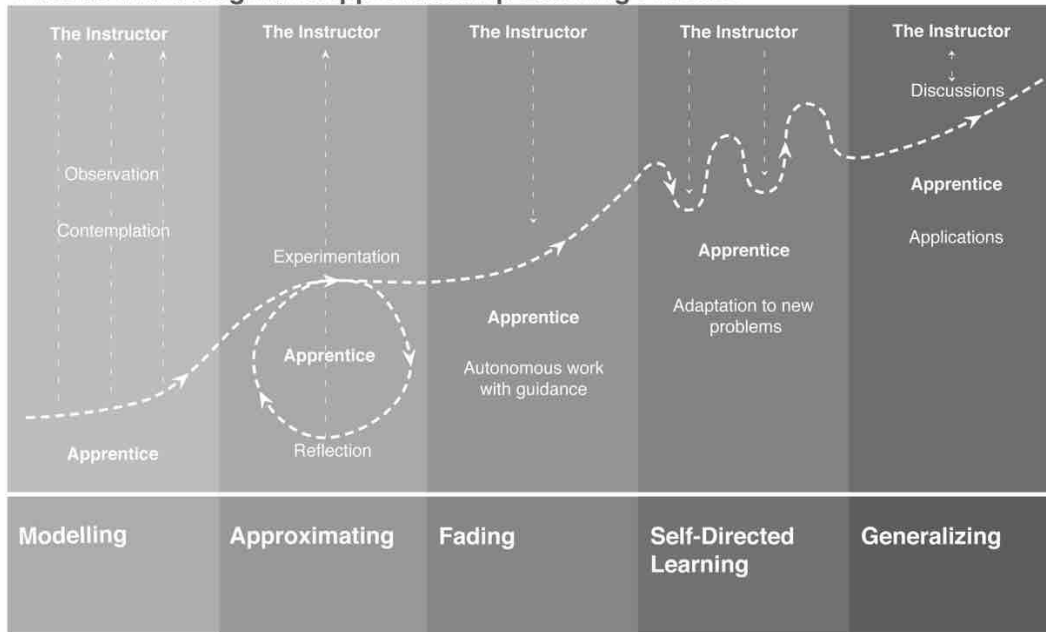
The training has been done close to the internationally accepted trainings method of Cognitive Apprenticeship (CAS). Cognitive apprenticeship describes a way of learning, specifically a teaching relationship between two people. In CAS learning happens through guided experience on cognitive and metacognitive, rather than only physical skills and processes. In initial phases, learning is based on observing and analyzing expert demonstrations. Learning is not a solitary activity. It is dependent on coaching and close communication between an instructor and an apprentice.

Having 15 years of higher vocational training experience with skill trainings in Nepal (Shangri-La Vocational Training Center), Switzerland, Austria and Germany, we adjusted the original CAS model of Collins, Brown and Newman<sup>17</sup> to the construction site reality and added pre-knowledge activation (based on modern research in constructivism) and skill tests:

- To gain an impression of the locals skill-set, a pre-knowledge test and a repetition of the previous day started each day
- Every step has been shown as a model from the experienced mason
- Every step is done by the local mason under surveillance and help from the experienced masons from Kathmandu
- The local masons got then the possibility to work more free, but still under controlling and checking of the experienced masons and supervised by site-engineers
- Reflection about the work and found mistakes or best practice examples helped the masons to understand the importance and the reasons of the trained techniques

<sup>17</sup> Collins, A., Brown, J.S., & Newman, S.E. (1989). Cognitive apprenticeship: Teaching the crafts of reading, writing, and mathematics. In L. B. Resnick (Ed.) *Knowing, learning, and instruction: Essays in honor of Robert Glaser* (pp. 453-494). Hillsdale, NJ: Lawrence Erlbaum Associates.  
Ludwig I., Umbescheidt R. (2014): Dritte Lernortdidaktik in Pflege und Sozialpädagogik – Erfahrungen aus 10 Jahren Umsetzung, Entwicklung & Schulung in Deutschland, Österreich und der Schweiz. *Pädagogik der Gesundheitsberufe* 0 (1), 32-54

### Phases in the Cognitive Apprenticeship Learning Process



Towsley, 2017

Our structured skill transfer process supports the objectives of the Council for Technical Education and Vocational Training in Nepal (CTEVT), who describes the nationwide need in this sector as follows:

*"Though skill needs assessment, quality assurance system or accreditation system, timely production of high quality instructors and managers and licensing system managers, are the things the national bodies like council for technical education and vocational training should mostly shoulder the responsibility of. (...) A steady supply of trained manpower, their optimum use, desirable quality consciousness among the employees is until this time less cared and less organized. Probably this matter could have been streamlined by the trade department. They too appear to be working with short cited vision but if not carefully handled the situation could become worst in the coming days. That neither helps the job providers nor the job seekers in real sense. .... The mutual trust between the employer and employee can only help the business to prosper but things are in opposite gears. This asks for a very well knit built-in system between trade training or skill developing agencies, employing agencies and quality regulating bodies which unfortunately has not emerged as organized sector yet in Nepal."*<sup>18</sup>

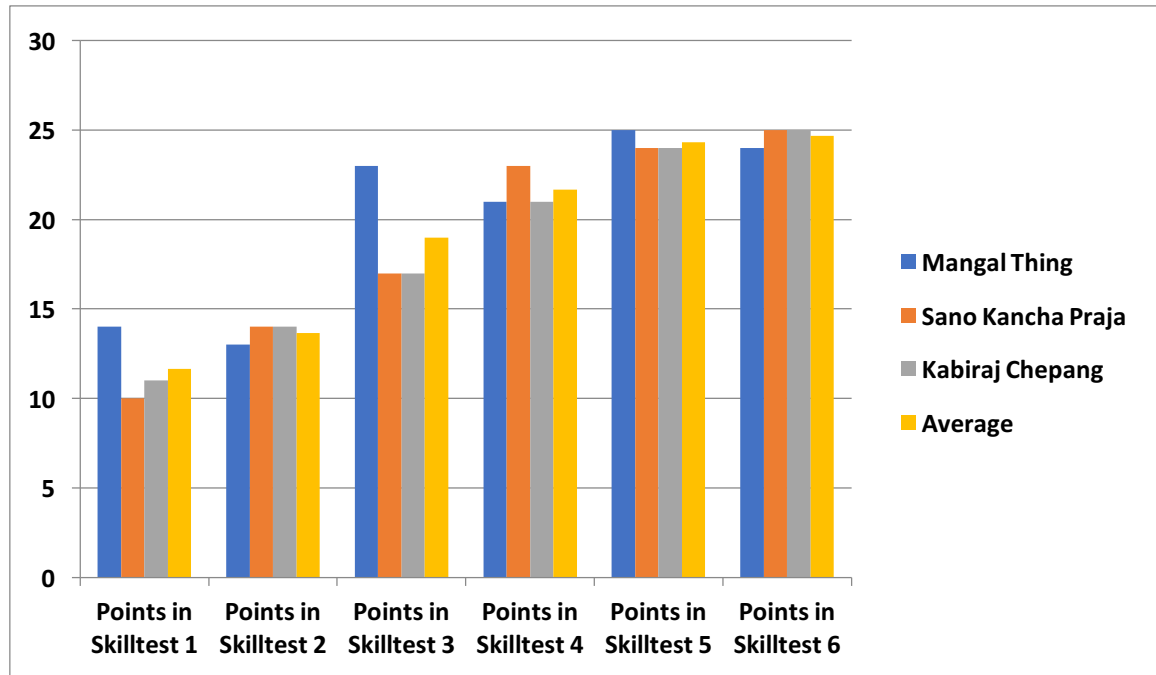


The training was done with integration of knowledge from two levels. The local masons would do the construction activities under supervision of highly skilled masons of KTM, site engineers, construction coordinator and the construction supervisor. The feedback was provided from all level and the task was shown by doing by the KTM masons. In this way one-to-one training was done.

The trainee was taken test regularly (both theoretical-by asking how questions and practical-by doing the task) and their result was recorded in a file. The recording of the test result helped the trainees to improve in their next steps. Even with the training too, the quality of the building was maintained.

<sup>18</sup> <http://ctevt.org.np/files/Research%20Journal%202013.pdf>

### Skill Test Results Numerical



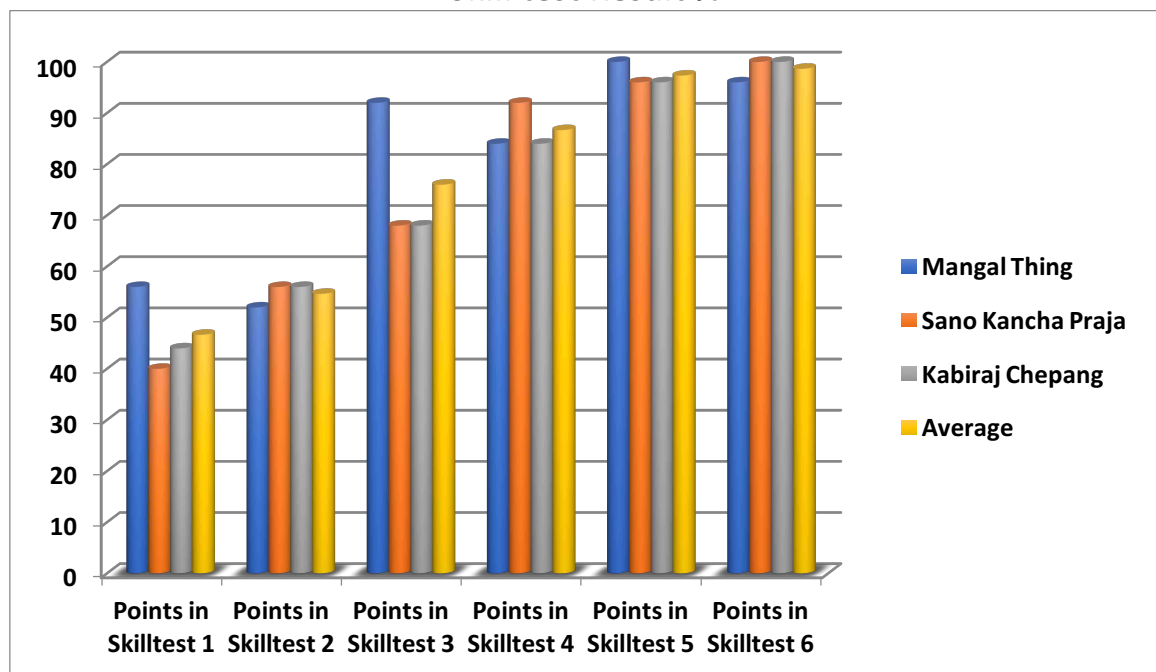
The skill test taken on interval of fixed days showed that there was progression in the skill of the local masons. The reduction in some test is also because some tasks of iron was not done such as binding of rods.

*"The trainee were good in stone masonry but during and after the training, they became more efficient and skilled in brick masonry too. "*

*Amit Jung Subedi, Bonafide Engineering*

The training was conducted while constructing the schools. As the trainee had basic knowledge of construction and stone masonry, it was easier to train them but initial they had a lot of problems. But with continuous input from the masons from KTM and engineers, their skills increased. The chart of result in number and percentage includes the test results but not of all, as during construction, some test results could not be recorded due to pressure of construction to be completed.

### Skill test Result %



*"I had not worked with bricks before. I worked in SRDP too for the houses in stone masonry. But now after training, I have confidence that I can work well with bricks and bar bending. The dais (Brothers) of KTM have taught me well and now I can work with only instruction of engineers too."*

*Mangal Thing, Trainee-Skill and Technology transfer*



*"It was pleasure to come and work in place like this. Constructing schools for children made me proud and satisfied. We did our best in constructing the schools and it feels good to teach others to do the work. I wish all the best for future of the organization."*

*Govinda Shrestha, Trainer/KTM mason-Skill and Technology Transfer*

## 8. Social Dimension

### ODHR – Owner Driven Housing Reconstruction

ODHR as we practised it, in the first successfully completed reconstruction in Nepal after the Earthquakes of 2015 (SRDP and BRSP project) is a habitat solution that is participatory and sustainable, that promotes social cohesion, and increases self-reliance. It had been successfully implemented in post-disaster areas in Pakistan, Haiti, India, Sri Lanka etc.

Part of ODHR is a long start-up period marked by assessments and participatory planning. Compared to other housing projects there are overall lower costs for one house, but higher expenditures because of supervision and assessments.

#### Three Principles were followed closely:

- participatory process of decision making
- adequate technical support (design, approvals, training, technical assistance, supervision)
- adequate financial assistance

A Complete Graphic of ODHR in SRDP is presented on Page 5.

### CDSR – Community Driven School Reconstruction

The decision to imply a self-contribution scheme was an important developmental factor, which is widely practised in Nepal and was part of previous 12 Shangrila/ Govinda school constructions for more than 4000 children in four districts in Nepal. We have a long experience in realizing school constructions with the local communities. Beside an increased sense of ownership to involve the community closely to the whole process (CDSR), resulting in a higher sense of ownership than in standard reconstruction projects where the local community is merely a passive recipient, so that the project costs decreased as well. The involvement and self-contribution of community, is an often underestimated and important factor in development cooperation.





The local implementation, the participation, the integration of existing knowledge and the sense of ownership are increasing immensely. We have seen dozens of unfinished projects, or projects that are not maintained/ utilized in Nepal after the construction. They speak a clear language when the right balance is not found to involve the local community actively, or fast, and often simpler and/ or more expensive ways are gone. Projects are then often designed at desks, and the lost resources for Nepal are immense.

Thus, the project had to be tailored to meet the social and cultural context, especially regarding the situation in Makwanpur (high illiteracy rate, low awareness levels, high poverty, an extremely underprivileged target group). For transportation cash was paid out. In Makwanpur most materials



(stones, wood, mud, bricks, sand) were procured and transported by the Community members themselves.

The involvement of the community, SMC and SRC made it much more easier in planning the procurement and construction of the schools. In the regular meetings, decisions regarding material collection, transportation and working time (time for cultivation was pre-decided) were discussed.

The SMC and SRC meeting with community made the payment to be as per the trend in the community so that it was social yet not overpriced. Some work which were given in contract basis in the community itself were negotiated so that it would be justifiable for both parties.

The self-contribution is shown in Chapter 6.

Male and female were equally addressed by the project. Labour payment for men and women were the same as decided by the boards, while at the same time women were not permitted to carry very heavy loads. The involvement in decision making from the community was also equally addressed.

There was a special focus on women's needs / *practical gender needs* regarding flanking measures:

- **Sufficient Sanitary Systems**

Girls leave the schools often, when toilet systems are not existing.

- **SDA Literacy Home:**

Girls break the attendance of the school early due to the long school routes in the region. According to a study by the Nepalese government, 63% of women are married before they reach the age of 18, 7% already before the 10th. In rural areas like Makwanpur, scriptures and customs are more than laws and women are rarely equal to men. Most marriages are arranged, widows are expelled, and many women are left alone by men who migrate abroad. In addition to the ethical aspects and tragic destinies associated with this, a large number of studies prove:

Education of girls is driving their own development and that of the whole country. They marry later when they go to school and develop more self-confidence in order to defend themselves for example

against a children's marriage. The birth rate is declining with increasing educational attainment and the health status in the whole family is increasing. Girls' incomes increase by 15-25% with each completed school year, and even more, they reinvest 70% of their salary in the family. Children's weddings are reduced by 70%.

There are studies showing that a doubling of the girls in the advanced level, accompanied by an increase in economic growth of 30%. Many project examples that we have observed in Nepal in more than 18 years confirm this. Already in the projects in West Nepal (Jumla / Mughu) we have increasingly focused the involvement of women.

“Shangri-La is different than other organizations. Its working style is different and in favour of people even though people completely don't understand it. School construction has finished, which is strong and good, and regular programme of mid-day meal is helping to increase attendance of children.”

Rajkumar Praja, SMC Member, kalika Primary School, Sarsi



## 9. Flanking measures

### 9.1 Toilets

The construction of toilets (for 3 schools) started when the school construction was near completion. As sanitation is a crucial element and school is the place where children learn about it, the construction was included as a part of school construction.

The construction of toilet used the structure that was flexible. The toilet consisted of lower part of brick work and upper half of waterproof ply so that if the school wanted for expansion, it would be easier. But while adopting this method too, earthquake safety was taken highly in consideration.

Toilet in Dhushrang school was made out of bricks as there was excess amount of bricks available.

### 9.2 Desk and Benches

After the finishing work of the school is completed, desk and benches will be supported to each school as per the requirement. Since school is not only the building but also the infrastructure to make it learning friendly, the support of desk and benches have been included in this project.

### 9.3 Gabion and Retaining Walls

The area of land was not sufficient to construct school in Dekhari. So, the land was improved by providing gabion wall in front and retaining wall for the support of slope land on backside of school. By this proper setback is also maintained. The area of land in Sarsi was widened by cutting slope part adjacent to land.

Gabion wall is constructed with stone and gabion wire and the retaining wall has been constructed with stone and cement with a concrete band on the top. These walls were made as additional safety of the building that was made.

The retaining wall is to reduce the load of the land behind the school and the gabion wall is to support the load of the foundation of the school.



## 9.4 Education Materials

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Once the school construction is completed, educational materials such as alphabetical posters, whiteboards, teaching materials and other visualization posters will be provided to the schools.

## 9.5 Child Friendly Painting/ Classrooms

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The internal part of the classroom has been painted in a child friendly manner. The upper part is painted with distemper colour and the lower part till 4 feet has been painted with waterproof colour so that the colour does not get stains and adds brightness to the classroom.

The decision of the colouring was done taking in consideration the public building painting guideline of the government and the suggestion of the teachers of the school. As the schools in Sarsi and Dekhari are only till grade 3 and that of Dhushrang and kalikatar is for primary level, the painting had to be child friendly as these small kids are prone to making the wall dirty.

The outer part of the school was neither plastered nor painted so that the people could see the technology that has been introduced and learn where the bands have to be constructed for earthquake safety. The exposure of the technology made the schools live example of the brick masonry work.

## 10. Sustainability

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To ensure ownership community had been involved in all planning stages and played a major role in the implementation process through their self-contribution in kind and labour.

Maintenance is a crucial part of sustainability of the structures and requires not only a sense of ownership, but technical skills, financial resources, access to tools and follow-up inspections. As the local masons were trained during the construction, the maintenance is expected to be easier if needed in future.

The handing over of the designs of the schools to the SMC will make it easier to the community to have knowledge on how the buildings were made and to multiply the structure if desired.

A thorough maintenance check from the engineering companies took place once the construction was completed. The engineering company and the external contractor for roof work are responsible for a liability period of 6 months for maintaining the houses.

Nevertheless, the main responsibility for the School is of the SMC and community, which is confirmed and described in a "memorandum of understanding (MoU)", passed to the beneficiaries during handover of the schools.

Due to the fact that SDA is active in Makwanpur together with Govinda- Germany and Shangrila-Switzerland there is no real phasing out of SBRES project. There will always be monitoring and supervision of the buildings.

## 11. Lessons learned

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### 11.1 The importance of team work

It cannot be emphasised enough how important team related issues were. Teamwork can be regarded as one of the major success factors. Good communication, respectful cooperation, commitment and team-building measures contributed to this.

### **11.2 The time factor**

The time factor is another very important issue. Time pressure can easily be caused because situations arise that prevent people from work - in our case the local elections.

Another example for a situation that added to the time pressure was when the management structures, whom we practised and evaluated already in SRDP haven't been implemented in November- December 2016. After the reasons for the time/ finance loss have been assessed and proper structures (as described in Chapter 5,6 and 7) have been implemented with high field presence of the leaders, the progress went rapidly forward.

Acquiring government approvals for reconstruction proved to be extremely time-consuming. In addition regulations may change and thus require designs to be re-done for 1.5 years with a load of extra and night work for engineers, team and board members.

### **11.3 Community participation**

The principle of OWNING the reconstruction process proved difficult for the beneficiaries in the previous SRDP. A proper implementation of board decisions and leadership has avoided this problem in the school reconstruction, so that we achieved a very successful community participation. The high self-contribution is just one of the great results in this regard.

### **11.4 Monitoring tools/formats and their implementation**

Monitoring tools and formats, especially regarding finances, but also for procurement, construction supervision, self-contribution etc. are essential for any construction project. Correct implementation has to be assured and staff have been trained in their use. The tools' and formats' have been utilized much better than the previous SRDP project. The management of a large building project in four rural areas without roads and technologies, with these financial results and administration costs is unique.

### **11.5 Supervision and quality control**

Close supervision and technical advice is essential to ensure quality construction. Construction experts demonstration and support concerning construction details especially regarding earthquake safety have been proved fruitful not only to the masons but to the engineers as well. Regular monitoring/supervision visits of all construction sites by experts (architects/carpenters) are necessary on a weekly basis at minimum - more often at critical points. Maintaining field visit reports (including photos of construction details) and construction stage checklists is an important part of the supervision.

## 12. Acronyms

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GA	Govinda Association (Germany)
SDA	Shangri-La Development Association
SA	Shangrila Development Association (Switzerland)
SBRES	Shangri-La School Building Reconstruction and Education Support project
NRA	National Reconstruction Authority
CLPIU	Central Level Programme Implementation Unit
DoE	Department of Education
VDC	Village development Committee
HO	House owner
LP	Lalitpur
MP	Makwanpur
ODHR	Owner Driven Housing Reconstruction
CDSR	Community Driven School reconstruction
SC	self-contribution
MBoQ	Master Bill of Quantity
BoQ	Bill of Quantity
FLC	field logistic coordinator
MoU	Memorandum of Understanding
SE	site engineer
SOH	Shangri-La Orphanage Home
SIS	Shangri-La International School
SRDP	Shangri-La Reconstruction and Development Project
SWC	Social Welfare Council
DUDBC	Department of Urban Development and Building Construction
TLC	Temporary learning Centre
RCC	Reinforced Cement Concrete
CGI	Corrugated galvanised iron
SMC	School Management Committee
SRC	School Reconstruction Committee
EC	Executive Committee
EQ	Earthquake
CAS	Cognitive Apprentice Ship
CTEVT	Council for Technical Education and Vocational center
SVTC	Shangri-La Vocational training Centre
KTM	Kathmandu



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## 14. Appendix

### 14.1 School Construction Report

SDA School Construction Progress Report 00.00.17

#### General Contents

- Review and Explanation of Time Shift (Finishing of SRDP 1<sup>st</sup> Priority/ Family Houses to have safe shelters/ NRA Approval Process/ Changing of the engineering company/ Brick companies in KTM and bandha)
- Skill and Technology Transfer (Explanation of Brick technology/ Explanation of Mason Training Concept/Certificate etc.)
- Supervision and Controlling System (Explanation on all four dimensions)
- Involvement of the community
- Involvement of Government officials in the field (please add some words....)

#### Status Report

Nr. No. of Students (recent)	Sarsi 79	Dekhari 74	Dushrang 173	Kalikatar 598
Recent construction works (Completed)	• • •	• • •	• • •	• • •
Construction works in next week (Forecast)	• • •	• • •	• • •	• •
Construction works in two weeks days (forecast)	•	•	•	•
% of Materials transported to the C-site	• Bricks: .....% • Cement: .....% • Sand: .....% • Stone: .....% • Aggregates: .....% • Rebars: .....% • Wood: .....%	• Bricks: .....% • Cement: .....% • Sand: .....% • Stone for Gabion wall: .....% • Stone for foundation and retaining wall: .....% • Aggregates: .....% • Rebars: .....% • Wood: .....%	• Bricks: .....% • Cement: .....% • Sand: .....% • Aggregates: .....% • Rebars: .....% • Wood: .....%	• Bricks: .....% • Cement: .....% • Sand: .....% • Aggregates: .....% • Rebars: .....% • Wood: .....%
		• Aggregates: .....% • Rebars: .....% • Wood: .....%		
Remarks regarding Community involvement	•	•	•	•
HR	• No. of SE: • No. of FLC: • No. of SM (local people with fixed Jobs, a.e. Store keeper/ SMC members..): • No. of involved Community People (all a.e. also transportation): • Total:	• No. of SE: • No. of FLC: • No. of SM (local people with fixed Jobs, a.e. Store keeper/ SMC members..): • No. of involved Community People (all a.e. also transportation): • Total:	• No. of SE: • No. of FLC: • No. of SM (local people with fixed Jobs, a.e. Store keeper/ SMC members..): • No. of involved Community People (all a.e. also transportation): • Total:	• No. of SE: • No. of FLC: • No. of SM (local people with fixed Jobs, a.e. Store keeper/ SMC members..): • No. of involved Community People (all a.e. also transportation): • Total:
Planned Completion Time Point	•	•	•	•
German Report to Foundation (Rocco/ Ingrid)	•	•	•	•

**Core Team:** Construction supervisor (Deepak)-1, General Manager (MDC)-1, Supervisor engineer (Dipesh)-1, Samjhana/Himanchal (Finance-2), Field Coordinator (Supervisory role)-1, Markus-1 is involved in management team/ Anil and Amit from KTM from Engineer side-2, Two EC/AB Members: Jay/ Rocco **Total: 10**

#### Other points:

1. Community involvement
  -
2. Government official's involvement
  -
3. Skill transfer impacts
  -
4. Supervision/monitoring Status
  -

## 14.2 Skill Transfer Test Form

(File available in Nepali Language in SDA Office)

## 14.3 Finance

<b>Shangri-La Development Association</b> <b>School Construction Project, Makwanpur</b> <b>Financial Position as at May 15, 2017</b>		
Description		Amount (NRs)
<b><u>A. Sources of Funds</u></b>		
Grants Received		12,741,507.01
Payables		1,827,769.19
<b>Total (A)</b>		<b>14,569,276.20</b>
<b><u>B. Application of funds</u></b>		
<b><u>Application as Expenses</u></b>		
<b>A. Administrative Costs</b>		
Travel Expenses	53,989.90	
Salary of Supervisor & Field Logistic Coordinators	227,666.36	
Field Meeting & Other Expenses	<u>113,490.00</u>	395,146.26
<b>Subtotal (A)</b>		<b>395,146.26</b>
<b><u>B. Program Costs</u></b>		
<b>B1. School Construction</b>		
Design, Drawings & Construction Supervision	1,718,113.00	1,718,113.00
Logistic Management for Engineers & Field Co-ordinators in field		229,795.00
Technology Transfer Cost		949,956.59
<b>Direct Cost incurred for School</b>		
Shree Praja Uttahan Primary School, Dhursang	2,046,075.73	
Shree Satya Devi Primary School, Dekhari	1,549,089.24	
Shree Kalika Primary School, Sarsi	1,435,748.55	
Shree Bhawani Mavi Primary School, Kalikatar	<u>1,480,583.97</u>	6,511,497.49
<b>B2. Toilet</b>		
Construction Design & Supervision by Engineers		
<b>Direct cost incurred for toilet</b>		90,427.00
Shree Praja Uttahan Primary School, Dhursang	120,183.71	
Shree Satya Devi Primary School, Dekhari	105,810.61	
Shree Kalika Primary School, Sarsi	<u>274,983.24</u>	500,977.56
<b>B3. Protection Walls</b>		
Gabion Wire Wall	104,148.32	
Retaining Wall	<u>96,918.56</u>	201,066.88
<b>C. Bank Balance</b>		3,972,296.43
<b>Subtotal (B)</b>		<b>14,174,129.94</b>
<b>Total (A+B)</b>		<b>14,569,276.20</b>

*Note:*

*Our financial status is balance of NRs. 39.72 lakhs from which further work of furniture support and retention wall at the back side of TLC of Dekhari school is pending.*

## 14.4 Impressions

School Pictures reports and pictures on our website: <http://www.waisenkind.ch/hp2/index.php?nr=B3>

**Dhushrang School**



**Sarsi School**



**Dekhari School**





**Kalikatar School**



**Flanking Measures**

**Retaining/ Gabbion Wall**



Classroom with Whiteboard(new) and benches(old-which will be replaced within this month)  
and Toilet





**Project Area – Construction sites in Rural Areas without Road Access**



**For the Future of Nepal**



**This project was realized, suffered, learned from SDA - the first generation of SOH and future of Nepal**







- Nepal will rise again – Change does not begin anywhere other than with you -