

EXPLORING THE IMPORTANCE OF SCHOOL GARDEN THROUGH
PARTICIPATORY ACTION RESEARCH APPROACH

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DECLARATION

I hereby declare that this dissertation has not been submitted earlier for the candidature of any other degree to any university.

August 31, 2021

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DEDICATION

This work is proudly dedicated to aspiring students and researchers interested to work in the area of participatory action research.

Master of Sustainable Development dissertation of *Bineeta Baral* entitled '*Exploring the Importance of School Garden through Participatory Action Research Approach*' was presented on August 31, 2021.

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ABSTRACT

An abstract of the dissertation of *Bineeta Baral* for the degree of *Master of Sustainable Development* was presented on August 31, 2021 at the School of Education, Kathmandu University.

Title: *Exploring the Importance of School Garden through Participatory Action Research Approach*

Abstract Approved

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Schools around the world have used gardens as an alternative teaching approach connecting classroom-based teaching and learning to outdoor work. There has been a considerable rise in interest to establish school gardens in Nepal. Evidence of the importance of the school garden is found in policy-level interventions as well as the introduction of several programs to promote school gardening. Though the policy and other research programs appreciate the idea of the school garden, there has been very limited research on the perception and appreciation of school gardens among teachers and students. This study addresses that gap.

The meaning-making is evidenced from a Participatory Action Research (PAR) project in a community school of mid-hills of Nepal. The study explores the perception and engagement of teachers and students in connecting teaching and learning with school gardens. For this purpose, the study addresses the question, “How do the teachers and

students describe the importance of school gardens in teaching and learning activities?” To get an in-depth understanding, the PAR methodology was followed by fourteen members of the PAR committee who were involved in planning the school garden. Focus Group Discussion, semi-structured interview, plan, observation and reflection meetings were major data collection tools of the study. It was to ensure sustainability and ownership of the stakeholders.

The study revealed that students and teachers are motivated to set up school gardens primarily for two reasons (1) beautifying the school, and (2) utilizing school gardens to connect teaching and learning. In an implementation, subjects with vocational nature such as Occupation, Business, and Technology (OBT) utilized school gardens as a laboratory. However, connecting other mainstream subjects with gardening activities was quite time-consuming and was possible only with personal initiation from a specific teacher. School gardens provided an opportunity to deeply understand and analyze perceptions of teachers and students on various themes such as school garden in pedagogy that emerged from setting up the school garden to taking steps to ensure its sustainability. Furthermore, school gardens created a conducive environment for community engagement with parents, community members, and local administrative bodies. The study showed that while teachers and students enthusiastically appreciated the concept of integrating the school garden for teaching and learning purposes, to some extent, the lack of guidelines to integrate the courses with the school garden hindered the connection. Also, resource constraints, particularly the lack of sufficient land-area and water resources for school gardens were some of the obstacles to setting up a school garden. The findings of this

study are useful for policymakers and school gardening practitioners to decide what works and doesn't work for school gardening in public schools of Nepal.

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ACRONYMS

ECD	Early Childhood Development
FAO	Food and Agricultural Organization
NTNC	Nepal Trust for Nature Conservation
PABSON	Private and Boarding Schools Association of Nepal
PAR	Participatory Action Research
SEE	Secondary Education Examination
SENSE	Nepal and School Environment Conservation Education Network Nepal
WASH	Water, Sanitation and Hygiene
WCN	Wildlife Conservation Nepal
WHO	World Health Organization
WWF	World Wide Fund for Nature

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CHAPTER I

INTRODUCTION

This chapter provides an introduction to the thesis by explaining the background of the study, introducing the research questions, and elucidating the significance of the study and overall summary of the chapter.

With the increasing trend of the integrated curriculum into school education, the application of curriculum in real life becomes more and more important. The school garden provides interdisciplinary activities to encourage students' creativity to surpass beyond academic achievements while leaving room for themselves. Students like to observe, discover, improve, experiment, and learn. Students use the surrounding natural resources to think creatively and enrich their learning experiences. The school garden keeps students away from the traditional classrooms. It enables students to combine curriculum subjects with practical outdoor activities. It provides students with hands-on learning opportunities to participate in experiential learning. Further, the students will have fun while doing the gardening activities.

Since the beginning of the education system in Nepal, the concept of school gardens has been linked to the school curriculum. In 1956, the purpose of the school garden was to teach students how to grow fruits and vegetables and livestock farming. Today, the purpose of establishing a school garden is not only to learn how to grow fruits and vegetables but also to form a green club team, where students focus on team building and environmental awareness. While school gardens are strongly promoted as effective school improvement measures in Nepal, their successful implementation largely depends

on the views of teachers and students. Only when teachers and students understand and feel the importance of school gardens there is any chance of establishing, utilizing, and sustaining the school gardens to improve the quality of education.

Background of the Study

Before the existence of the formal school system of Nepal in 1951, traditionally, there were religious schools that imparted religious skills and values to the selected group of people especially Brahmins and the sons of elites (Sharma, 1990). In 1853, Durbar school was established with a motive to teach western education for members of the Rana family (Wright, 1877). Though in 1858, the Department of Education was established, it was only privileged to Ranas families (Sharma, 1990). Later in 1885, Durbar school was opened to the public but was largely accessible to the elite group of the Nepali community (Sharma, 1990). In 1901, Prime minister Dev Shamsar declared free and universal primary education in Nepal (Acharya, 1957). As a result, around 200 Bhasa Pathsala were established to teach the Nepali language (Sharma, 1990). After the overthrow of Rana rule in 1950, today's education system formally started with a purpose to make a democracy real success by providing education for all. Thus, in 1952, the Government of Nepal established an Education Board to supervise and expand the existing educational facilities. The National Education Planning Commission prepared the report titled *Education in Nepal* to access the existing education facilities and to prepare a scheme for national universal education in Nepal.

The Constitution of Nepal 2072 promulgated in 2015 has the provision of free and compulsory education up to the basic level and free education up to the secondary level from the State. Even with these provisions, non-government (privately owned) schools

play a significant role in the education sector both at the basic and secondary level, even though these schools charge fees for the education that they provide. In general, the quality of education delivered by government schools is criticized. It is strongly felt that there is a need to improve the educational practices in both government and private schools of Nepal.

As part of the initiatives to improve the quality of education in government schools of Nepal, Nepal Government has come up with policies, plans, and guidelines to encourage the establishment of gardens in schools. While the idea of integrating school gardens as part of educating children is not new in Nepal, recently there has been a significant rise in interest to establish school gardens.

The Rationale for the School Garden

While many new initiatives are sprouting, school gardens have long been understood as gateways for teaching students in a practical learning environment. During the 1900s, John Dewey, an educational theorist often wrote of the importance of a school garden (Habib & Doherty, 2007). Dewey believed that gardens provide students with experience with the natural world and in the field of geography & “in the widest sense”. He believed that student involvement with a school garden provided a connection that might otherwise be missing from traditional education. Besides, the school garden brings students and communities together: to garden, to cook, and to learn from each other. As early as 1909, Montessori identified that children’s gardens could be used beyond the standard curriculum to help children to develop patience, enhance moral education, increase responsibility and improve appreciation for nature and relationship skills (Montessori, 2004).

In addition, the school garden is an outdoor classroom moving beyond the traditional textbook to incorporate both physical and hands-on learning. The school gardens are a flexible teaching tool that can be introduced by the individual teacher in their teaching course. Teachers don't require the experience or have pre-knowledge of the school garden to incorporate in their teaching and learning activities. Thus, this study is designed to establish the school garden and link it to the teaching and learning activities.

Statement of the Problem

School gardens have been utilized for teaching disciplinary subjects and connecting the classroom curriculum with the actual world. It is used as a pedagogical facility for teaching specific subjects such as mathematics, science, and nutrition. The gardens are the platform for students to participate in experiential and active learning. Besides, school gardens are valuable in teaching life skills to students as well as developing a sense of environmental protection and sustainability.

The significant benefits of school gardens for the students have led to the policy formation for school garden development. In Nepal, National Education System Plan 1971-76 which was promulgated almost 50 years ago had already envisioned setting up a school garden in every educational institute. Recently, the Government of Nepal has envisioned one school one garden concept. Although school gardens are well appreciated in plans, policies, and programs, and there is a gradual rise in the number of schools establishing school gardens, there is still limited school garden research. Among the few school gardening research that is conducted in Nepal, many focus on increasing awareness about fruits and vegetables, sustainable agriculture, and nutrition and food choices. Also, these researches are implemented in the school with the purpose to develop their own

school garden book rather than integrating it into the existing curriculum. Garden is treated as an extra hour work or out of the curriculum, and extracurricular setting. conducted by designing the 23 weeks curriculum which is conducted as an extracurricular activity (Schreinemachers et al., 2017). However, there is no such study conducted that is integrated into the existing curriculum.

Thus, this study is conducted to expand the knowledge in the experiential knowledge of establishing the school garden integrating into the existing curriculum and within the school hour. This study focuses on understanding how teachers and students perceive school gardens. It is important to understand the perception of teachers and students in connection to the school garden to fully utilize their benefits for educational purposes. Teachers and students need to fully appreciate and accept that school gardening is one of the methods of educating students. In this study, a participatory action research approach has been followed to understand the perception of teachers and students towards the school garden. Also, it explores the ways they connect classroom-based learning to the school garden.

Purpose of the Study

This study aims to understand the students' and the teachers' perception of establishing, maintaining, and utilizing school gardens for educational purposes in the selected school using the Participatory Action Research (PAR) approach. Moreover, the study tries to record the experiences of the teachers, students, researchers, and community people experiences while establishing the school garden.

Research Question

The following research questions have been formed to guide this research to a well-defined focus area:

1. How do students and teachers describe the importance of the school garden in teaching and learning activities?
2. What makes teachers and students interested to set up and keep the school garden operational?
3. What are the challenges and issues faced in setting up school gardens and how do the school, teachers, and students overcome these challenges?

Significance of the Study

While researchers have sufficiently indicated the importance of school gardens and plans and policies in Nepal have strongly focused on promoting the setting up of school gardens, a successful establishment and utilization of school gardens largely depends on the perception and motivation of teachers and students. It is important to understand the motivation factors among teachers and students that ensure school gardens are established, maintained, and utilized for classroom activities. It is also important to understand the challenges in setting up school gardens as well as the challenges faced in keeping the school gardens operational.

The research has mainly two layers of significance: policy contribution and professional contribution.

This study provides a clearer understanding regarding the perception of teachers and students towards school gardens. This would aid policy makers in creating or amending existing policies to encourage not only the establishment of school gardens but

ensure the continuity of school gardens. The establishment of school gardens does not ensure that it is utilized for pedagogical activities. This study provides information to policy makers regarding the gaps in connecting school gardens to teaching and learning activities so that this can be addressed in the policies. Additionally, this study elucidates the challenges and issues that rise when establishing and running the school gardens which would also guide policy makers in amending policies to address these challenges and issues.

For professionals, such as school administration, headteachers, teachers, etc., this study provides clearer and prior information regarding challenges and issues that could come to the surface while setting up and operating school gardens. This would help in better planning as well as guiding the professionals to smoothly establish and operate school gardens.

To summarize, this research will be useful in the streamlined, smooth, successful, and functional setup and running of school gardens so that it enhances the quality of teaching and learning, particularly in community schools of Nepal.

Limitation of the Study

This research work using the participatory action research approach was based on the study of a single school located in a Hilly region of Nepal. The findings of this research work are based on the characteristics and challenges presented by the scenarios of the particular research area. This research is conducted in one of the government schools located in a mountainous region of Nepal. The experiences collected in this school might not represent the same in the other schools.

Two participatory research cycles were completed during the research. These research findings could have been much more comprehensive and refined with the increasing number of PAR cycles.

Chapter Summary

In this chapter, I attempted to introduce the need for a school garden in teaching and learning activities. In doing so, I began the chapter with the benefits of the school garden and the rationale for the school garden. Further, I framed the research problem to contextual perspective on the need for a school garden in Nepal. Likewise, this chapter covered framing the research problem, purpose of the study, research questions, significance of the study, and chapter summary. In the next chapter, I have further conceptualized the need for the school garden in teaching and learning across literatures.

CHAPTER II

LITERATURE REVIEW

This chapter is crafted for conceptualizing the school garden and its usages in teaching and learning activities. It reviews the school garden scopes in academics as well as stewardship for the environment. Further, this chapter includes the role of the school gardens in increasing the nutritional habits among students. In addition to that, this chapter discusses the school garden programs in Nepal and reviews the policy on school gardens in Nepal.

School gardens have a long history with the varying purposes of their establishment and operation in schools. As diverse is the purpose of school gardens, so has been the diversity in researches about school gardens. Graham (2002) has identified three leading areas of research relating to the school garden. The first area is the use of school gardens for fulfilling academic purposes. The second area is the use of school gardens for raising ecological awareness and developing a sense of environmental stewardship among students. The third area is examining the effects of school gardens on nutritional habits among students. The opening of the literature review is done with reviews of studies on these three dominant areas of research with a focus on the school garden. Next, the literature review covers school gardening practices in Nepal which indicates a considerable rise in interest to develop school gardens. Thereafter, the policies regarding school gardens in Nepal are reviewed tracing back the history of the school garden in terms of policies. And then the research gaps are discussed. Lastly, the summary of the literature review is presented to end the chapter.

School Garden and Academics

One of the major applications of school gardens is the utilization of school gardens for enhancing the teaching and learning activities in school. This is probably the most dominant reason for the establishment of school gardens and hence studies regarding the academic role of school gardens have a larger volume of research.

One of the larger purposes of school gardening is utilizing school gardens for teaching purposes by linking academic instructions with school gardens. One of the areas of researches pertaining to school gardens is identifying the purposes of setting up school gardens. According to the study done by Graham and Zindenberg-Cherr (2005) involving principals of the public school of California, one of the dominant reasons for the establishment of school gardens was to enrich the academic experience and enhance the academic instructions. School gardening was particularly used for teaching science, environmental studies, and nutrition. One of the takeaways of the research was that the establishment of school gardens does not automatically enhance, enrich or play a part in fulfilling academic goals. The principals strongly emphasized that there is a necessity of connecting school gardening activities with regular teaching and learning activities. In doing so, there is a need of developing materials and resources that help in integrating school gardens and regular teaching and learning activities.

Another area of research activities related to school gardens in academics is to examine the effects of a school garden in addressing academic goals. Several researches indicate that involving students in school gardening activities enhances the academic achievements of the students. Klemmer et al. (2005) studied the effects of integrating school gardening as part of a science course. The study showed that students who

participated in integrated school gardening and regular classes scored higher in tests in comparison to students who did not participate in garden-based learning activities. Similar studies done by Smith and Motsenbocke (2005) found enhancement in science test scores in classes where gardening activities and hands-on classroom activities were conducted once a week. Likewise, a study done by Powell and Wells (2002) also found that the test scores of students improved as much as 24% when the students participated in experiential science lessons over regular classes. A study by Chawla, et al, (2014) found that school children believed that school gardening were having a positive impact on their school work. A study done by Ozer (2006) explored additional benefits that school gardens can provide. The study showed that school gardening improved the visual-spatial skills and also physical strength of students, opportunities which were not available in regular classes.

Studies have also focused on finding out how much school gardens are integrated into the school curriculum and the perception of school teachers regarding the success of school gardens. DeMarco et al. (1999) surveyed teachers from 322 elementary schools in the United States. The study found that school gardens were incorporated into most educational subject areas. In particular, the study showed that school gardening activities were integrated into the subjects like science (92.4%), environmental education (83.1%), mathematics (68.6%), and language arts (67.8%). The same study also showed that 60.6 % of teachers fully perceived that school gardens were very successful whereas 35.2% of teachers perceived them as somewhat successful for enhancing teaching activities. Likewise, a survey conducted by Skelly and Bradley (2000) among 71 elementary school teachers in Florida found that 84% of the teachers viewed positively that the school

gardens improved learning. In general, the students spent an average of one hour per week in the garden, and that the garden was used for 10% or less of the total class time.

Williams and Dixon (2013) conducted exploratory research on the impact of garden-based learning on academic outcomes in schools. This review of research between 1990 and 2010 revealed that 50% of the studies were quantitative, 27% mixed-methods, and 23% were qualitative. Also, the study revealed that Science was the most common subject that links school gardens in teaching and learning. It was followed closely by language, arts, and math. Moreover, science had the highest proportion (93%) of positive effects, followed by math (80%) and language arts (72%).

The literature review reveals that school gardening has been effectively used for enhancing, enriching, and fulfilling academic goals by integrating school gardening with regular classes. Moreover, principals and teachers overwhelmingly believe that school gardening renders significant positive impacts on teaching and learning activities.

School Garden and Stewardship for Environment

School gardening activities and ecological mindfulness are closely related to each other. School gardening activities promote a sense of environmental stewardship among students. Moore (1995) found that children who were exposed to the natural environment especially in primary grades develop a sense of sustainable development and environmental protection. Moore further argues that school garden provides an opportunity for large-scale reorientation of public education towards developing a strong base for sustainable development. Moore believes that these values toward sustainable development should be instilled in children through activities such as gardening which then fully takes root in the society and persist even in future generations. By doing so, they

may fully take root in society and persevere in the generations to come. In line with Moore, Louv (2005) in his book *Last Child in the Woods* argues that a close relationship builds between humans and the environment if humans have opportunities to experience outdoors at a young age. Recreation limited to indoor deprives children of outdoor experience. Rampant urbanization and industrialization have led to a severe lack of open spaces such as fields, parks, and forests for children to enjoy and interact which deprives the younger generation to develop a relationship with the environment.

In 2005, a nationwide phone survey conducted by Lohr and Pearson-Mims (2005) with adults in large urban areas revealed that growing up next to and interacting with the natural world helped develop a sense of responsibility for protecting the natural world. The study found that childhood experiences with nature such as picking vegetables and living next to a garden had positive influences on their adult lives. The strongest influence came from active gardening during childhood which later developed into strong values toward protecting nature.

According to experiences derived from the project Earthworks (2004), the participating students developed an appreciation towards living creatures and protectors of the environment. In a similar line, Heffernan (1997) suggested gardens as a practical and effective way to connect children with nature, teach hands-on science and environmental education and also beautify barren school grounds. Also, a study conducted by Waliczek and Zajicek (1999) showed that elementary school and junior high school students gained more positive attitudes about environmental issues after participating in school gardening activities. A similar study conducted by Skelly and Zajicek (1998) established gardening

as an effective method to increase environmental consciousness among elementary school children.

In summary, the literature review strongly establishes that if children at a young age are involved in school gardening activities, they develop an everlasting behavior of preserving and protecting nature.

School Garden and Nutritional Habits

Another aspect of school gardening is to help children learn better nutritional habits and develop positive attitudes towards fruit and vegetable consumption. School gardens are an interactive way to integrate a healthy lifestyle into the classroom setting. Ozer (2006) has mentioned that an edible garden promotes the consumption of vegetables. It also provides an opportunity for students to be familiar with vegetables and fruits as they grow them themselves. Additionally, Ozer mentioned that school gardens provide students with knowledge and examples of how to live a healthy lifestyle through relevant conversations stimulated by gardening programs. To effectively improve student nutrition, teachers must encourage a positive attitude towards fresh produce through hands on growing and eating experiences.

A pilot study conducted by Morris et al. (2001) based on a pre/post design reported that first-grade students in a school with a vegetable garden were more likely to taste vegetables than students in a control school. Likewise, pre/post evaluation of 338 youth from school garden programs developed as part of community initiatives indicated that there were increases in consumption of fruits and vegetables and also physical activity among the participants (Twiss et al., 2003). Similarly, a study conducted by Lineberger (1999) found that children with gardening experiences demonstrated more positive

attitudes toward fruit and vegetable snacks. A study by Graham et al. (2005) also showed that school gardens can positively impact food choices by improving the preferences of children towards vegetables and also knowledge about nutrition (Graham et al., 2005). These studies showed that there was a positive attitude towards the consumption of fruits and vegetables encouraged by participation in school gardening activities.

In summary, the studies indicate that school gardening activities provide opportunities for children to be familiar with fruits and vegetables which encourages them to develop a preference towards the consumption of vegetables and fruits.

School Garden Programs in Nepal

In recent times, there seems to be a strong rise in interest in the establishment of school gardens in Nepal. Some of the gardens are established with the sole initiative of individual schools while others are established in collaboration with government agencies or national and international organizations. Many such gardening programs are the subject of research works pertinent to school gardening.

One of such programs run in Nepal is *Vegetables Go to School*. It is a new multidisciplinary, school-based project developed by a team from the Nepal government and international researchers from World Vegetable Center, Swiss Tropical and Public Health Institute, and Freiburg University, and funded by the Swiss Agency for Development and Cooperation. The project aims to address malnutrition among Nepalese children through a comprehensive school garden program with an emphasis on gardening, and Water, Sanitation and Hygiene (WASH). It started in 2013 by establishing a school garden program in a pilot school with a motive to gather scientific evidence on the benefits and impact of the program in improving students' knowledge, attitude, and behavior in

healthy eating and lifestyle habits. It was also to facilitate the program's linkages with the local community and to scale up the program as a national school garden program. The outputs of Vegetable *go to school* projects was a 23-weeks curriculum, a crop calendar for school vegetable gardening in the context of Nepal. In addition to that, a cartoon book was developed to link the gardening activities and the WASH program. However, this was an additional curriculum and not integrated into the school curriculum.

Likewise, ICIMOD working with the Nepal Trust for Nature Conservation (NTNC) and the Private and Boarding Schools Association of Nepal (PABSON) jointly launched *Herbal Garden in School* initiatives in 2010 on the occasion of the International Year of Biodiversity. It aimed to help students, teachers, and families learn about, and recognize the importance of the herbal plants that are part of their everyday life. The fifteen schools in the Kathmandu Valley took part where the team of students and teachers selected and planted medicinal and culinary herbal plants, prepared plant profiles, wrote poems and stories, prepared posters, and tried out recipes. During this process, the children were encouraged to visit gardens in other schools and to exchange their ideas with each other. In addition to that, the students communicated with elderly people in the villages and inquired about the traditional way of using those plants. There were seven winners from fifteen participants (ICIMOD, 2012). Though this program created awareness of medical herbs for the students, it was only a one-time event.

Similarly, Wildlife Conservation Nepal (WCN) has launched its School Garden Program called *Karesa Bari Nepal* in 7 Eco-Smart Circle member schools of Kathmandu. This program is a joint initiative of Nepal Prakriti Pathshala (WCN education program) and Haver TilMaver (HtM), Denmark. It prioritizes experiential education, integrating

several subject areas and extending its influence to the whole school, the family, and the community. It's a program that trains the schools to use the schoolyard as a classroom, to reconnect students with the natural world where students learn about their food, and to teach them valuable gardening and agriculture concepts and skills that integrate with several subjects such as math, science, art, health, physical education, and social studies (WCN, 2017).

Several programs have been launched in Nepal to promote school gardening. These programs in addition to aiding school gardening have also integrated research activities.

Research in School Garden Practises of Nepal

Research in the School Garden of Nepal has largely focused on the implications of a school garden in teaching and learning, health and hygiene, nutritional awareness, and transformation to healthy eating habits.

A study by Bhattarai et al. (2015) explored the effect of school vegetable gardening on knowledge, willingness, and consumption of vegetables in mid-hills of Nepal among grade 6 and 7 students. It revealed that school gardens were useful in increasing awareness and preference towards the consumption of nutrient-dense vegetables. Also, the study concluded that the school gardening programs should be run alongside home gardening for promoting healthy eating habits.

A study by Schreinemachers et al. (2017) among 10 to 15-year-old schoolchildren showed that interventions using the school garden over a year increased awareness regarding vegetables, fruit, and sustainable agriculture. There was also a marked increase in stated preferences towards healthier eating habits. However, the study also revealed that

these intermediary improvements did not lead to the actual realization of increased consumption of fruits and vegetables among children.

A study by Acharya (2019) explored on use of a school garden for teaching chemistry. First, the study investigated on beliefs of basic level science teachers' regarding activity-based learning. Then the study investigated changes to the beliefs after integrating activity-based learning in school gardens for six months. This study is unique in terms that it focuses on teachers rather than students and also explores the changes in pedagogical style. In this study pH levels of different vegetables in the school garden were measured by involving teachers and students. The study found that the teaching method in the schools of Nepal is very much based on rote-learning that focuses on reproducing the textbook exercises. School gardens could provide a way for students to engage meaningfully in learning activities beyond the classroom. Garden-based activities led to enthusiasm and curiosity among students which are the fundamentals to develop effective learning. The study also revealed that activity-based learning involving school gardens was successful in changing the dogmatic belief of teachers promoting rote-learning, which hinders enthusiasm and creativity among students.

Another study by Acharya et al (2020) was based on focus group discussions and observations. It involved sixth and seventh-grade students, science teachers, and parents. They demonstrated the school garden serves as a support structure in rendering activity-based methods for active and meaningful engagement of students for teaching and learning purposes. The study showed that school gardens had positive effects on the understanding of scientific concepts for students.

A study by Shrestha et al. (2020) within the framework of the project *Vegetables got to School: Improving Nutrition through Agricultural Diversification* investigated the impacts of a joint school garden, nutrition, water, sanitation and hygiene (WASH) interventions in Dolakha and Ramechhap districts. The objective of the research was to assess the effect of such intervention on the health of school children in a resource-constrained setting. The study found that there was an increase in fruit and vegetable consumption, improvements in hygiene behaviors, and health status of school children.

Policy Review on School Garden in Nepal

It is difficult to trace back the history of school garden practices in Nepal. However, the report prepared by The National Education Planning Commission titled *Education in Nepal* as early as 1956 had already encompassed the plan of developing school gardens. This plan included teaching vegetable and fruit gardening, land preparation, and livestock farming from Grade I and Grade II. The plan appreciates that students at the primary level should participate in projects and be active in those activities, utilizing materials of learning from multiple sources.

The content of this plan formulated as early as 1956 is not only appreciable for the foundation of the concept of school gardening in Nepal but is also appreciable for the philosophy of education that it had envisioned. Provided such an excellent foundation for educational development in Nepal, it is sad to see the current Nepalese education system being criticized for being book-centric. It was exactly the thing that the plan had feared.

Another systemic education plan titled *National Education System Plan for 1971-76* was promulgated in 1971. This plan also envisioned the concept of the school garden and suggested educational institutes to maintain a garden. Also, it suggested that in

institutions where vocational agriculture is taught, there should be two *ropanis* (0.102 hectares approximately) of farmland for hilly regions and two *bighas* (1.55 hectares approximately) in the case of the Terai region. The plan made a provision that the local *Panchayat* and administration would help in acquiring the necessary land.

This plan, although vaguely, had addressed one of the issues of setting up a school garden, which is the availability of land. Not every educational institute has enough land and hence it is of prime importance that enough land is managed for each school. Further, the specification of the minimum area of the land required for the school garden could provide a clearer picture in planning the school garden.

Recent policy intervention includes the *Green School Program Implementation Guidelines 2075*. It was published in 2018 by the Ministry of Education, Science and Technology in partnership with WWF (World Wide Fund for Nature) Nepal and SENSE Nepal. The guidelines envision building one garden in each school and a green belt around the school. The guideline justifies the necessity of such an initiative for maintaining ecological balance, achieving sustainable goals, mitigating the effects of environmental pollution in biodiversity, and developing an environment-friendly attitude through education among students and the public. The eight-part guideline has set objectives of developing the school as a “Living Laboratory” and utilizing it for pedagogical purposes. Further, the guideline has set an objective of developing the school as a model learning center for the local community and providing knowledge regarding food and nutrition to the students.

For the effective implementation of the program, the guideline has envisioned the formation of a steering committee at the federal level, coordination and invigilation

committee at the regional level, program implementation facilitation committee at the district level, program implementation committee at the local level (municipality/rural municipality) and program implementation and management committee at the school level. The guideline also envisions the establishment of Eco-clubs with executive members chosen among students and a separate fund.

This guideline provides a structure necessary for setting up and implementation of the school garden. The focus of the guideline is on what is to be done, rather than how things are to be done. Though the guidelines have impressive plans, there is no such academic research through participatory action research to support its implementation and also to understand the teachers' and students' perspectives on establishing the school garden.

Research Gap

In consideration of the reviews regarding school garden practices and policies in Nepal, it is conspicuous that there is a vigorous interest to establish school gardens. The interests are driven by the usefulness of school gardens in pedagogy and for improvements in nutritional behavior among school children. The focus of the studies has been overwhelmingly towards investigating and analyzing the impact of a school garden in the aforementioned sectors. However, there has been very limited research to understand how teachers and students perceive the importance of school gardens for teaching and learning purposes. Many questions need answers based on collective evidence. Do teachers and students truly appreciate the importance of school gardens as a pedagogical facility? Or, do they take it as just a facility for specific vocational courses? How motivated are the teachers and students to set up and continue school gardens? How do the school, teachers,

and students manage time and resources in setting up the school garden? The current researches have not addressed these questions. It shows a big research gap in how school gardens are perceived by teachers and students.

Chapter Summary

In this chapter, I reviewed the importance of school gardens in academics as well as to create stewardship for nature. The literatures revealed how the school garden could be connected within the academics and to increase the nutritional habits among the students. Further, the review on school garden programs in Nepal as well as policy on school gardens in Nepal showed the gap needed for the exploration of the school garden in teaching and learning activities.

CHAPTER III

METHODOLOGY

In this chapter, I outline the methodology I used for my research. I conducted this study from a qualitative research perspective using participatory action research. The chapter begins with a general discussion of qualitative methodology and participatory action research. I discuss the aspects of PAR that made it an appropriate methodology for exploring the importance of the school garden in teaching and learning activities. Information about the selection of PAR committee members, ethical considerations, and how I collected and analyzed the data produced in the study are also discussed.

Participatory Action Research

I choose Participatory Action Research following the suggestions of the Rupantaran Project report. Under the NORHED fund, the project is a joint venture between Tribhuvan University, Nepal, Kathmandu University, Nepal, and Norwegian University of Life Science, Norway. In my professional role as a research assistant in the project, I visited the school and the community with Ph.D. researchers from the same project. The school (in which we did this research) decided to contextualize its pedagogies connecting school teaching and learning with school gardening. As I was a master's student in Sustainable Development, the idea was the area of my interest. It is to this end, the school invited me to carry a PAR project on school gardening.

Participatory Action Research (PAR) is one option in qualitative research methodology. The purpose of qualitative methodology is to describe and understand, rather than to predict and control (Streubert & Carpenter, 1995). Qualitative methods

focus on the whole of the human experience and the meanings are ascribed from the individuals living the experience. Thus, it looks for a broader understanding and deeper insight into complex human behaviors (Lincoln, 1992; Mason, 2006). As Wuest (1995) mentioned such research endeavors look for “multiple realities based on subjective experience and circumstance” (p. 30).

Qualitative research integrates the methods and techniques of observing, documenting, analyzing, and interpreting characteristics, patterns, attributes, and meanings of human phenomena under study (Gillis & Jackson, 2002). PAR is an extension of this trend. PAR postulates that the researcher/observer not only impacts the phenomenon being researched (as they bring their values to the research process), but also that there are multiple realities present in the data due to the collaborative aspect of knowledge creation associated with PAR (Baum, 2006).

PAR originated in the late 1960s to address issues with disadvantaged members of society (as cited in Jacobs, 2016). Since that time, PAR has been used within various fields and disciplines. One of the fields is the field of education. According to Pine (2008), one of the central tenets of PAR is its participatory nature to include all stakeholders in all aspects of the research process. Participatory action research can thus be seen as a collective, self-reflective inquiry (Brydon-Miller et al., 2011; Cook, 2012; Streubert & Carpenter, 2011), undertaken by participants in social situations to improve the rationality and justice of their own social practice (Kemmis & McTaggart, 1990). One of the obvious intentions and differences with participatory action research is that the action or change happens in reality and not as an experiment or to see if the proposed or implemented solution is working. PAR emphasizes the connection of research with action

in a real-world setting, resulting in the cogeneration of knowledge between researchers and participants.

In education, PAR has been used as a methodology to improve curriculum and professional development, educational programs, system planning, and policy development. As a collective, self-reflective inquiry to improve a situation in a community (Maguire, 1987), PAR offers a radical alternative to knowledge development.

Research Site, Research Context, and Co-researchers

The research site is a public school located in Kavrepalanchowk district, around 55 kilometers southeast of Kathmandu Valley. Though the school is located in Namobuddha municipality, it's in a small village of the mid-hill region, around seven kilometers uphill from Bhakundebesi. The school is a higher secondary school with 198 students (119 females; 79 males) and 17 teachers (4 females and 13 males). The people in this community predominately work in the agriculture sector. 78.7% of mothers and 45.9% of fathers of the school students are involved in subsidiary farming (Rupantaran Baseline Report).

As discussed earlier, this research site is the action school of the NORHED Rupantaran project. There are two objectives of this project. The first objective is to improve the quality of teaching and learning at the basic education level in Nepal through innovative, transformative, and contextualized pedagogical approaches. The second objective is to build the motivation and capacity of headteachers, teachers, and students to improve health and livelihood prospects at the local level. It also aims to build capacity at the higher education level to enable Tribhuvan University and Kathmandu University to

take a leading role in establishing dynamic networks that focus on the development of innovative, transformative, and contextualized programs to improve teaching and learning.

The five-year-long (2016- 2021) project works in five different schools of Dapcha, where one school is an action school while the remaining are reference schools. This project works on the action school and later the learnings and findings of this action school are actualized in the reference schools. Thus, this study is a part of the comprehensive study. There were other researchers as well who worked in different research areas such as teacher's professional development, contextualized curriculum, and STEAM education. The researchers had a collective goal to document the changes that occurred in the schools and the communities.

In this research, the co-researchers were the students' representatives from Grade 4 to 8, school teachers, and the local people from the community. In the PAR committee, there was one student representative from Grade 4 to 8, Eco-club members, teachers, headteacher, and vice-principal. The eco-club coordinator was from grade 8 and she was also the grade 8 student representative to the PAR committee. There were two eco-club members from grade 7, and both students were the class representatives for the PAR committee. Altogether there were six students on the PAR committee. One of the PAR committee representatives of teachers was the founding president of the Eco-club. He was teaching the course Occupation, Business, and Technology (OBT). The headteacher and vice-principal were also members of the PAR committee. Likewise, another teacher teaching the OBT course, and one female teacher was on the PAR committee. Thus, altogether, there were five teachers on the PAR committee. One of the student's mother who was nearby the school was the parents' representative for the PAR committee. Later

the PAR committee invited one local farmer as a PAR member. Thus, in the PAR committee, there were fourteen members including the researcher from the University.

In this research, the PAR committee planned to prepare two kinds of gardens in the school. First, the committee planned to plant the flower seedlings in front of the classrooms and school stage area. PAR committee dreamt to make the school look beautiful with green plants and blossoming flowers. This particular activity would be referred to as a flower garden while the second would be a kitchen garden. The PAR committee planned to build a kitchen garden with the seeds and seedlings of the vegetables. The committee dreamt to connect the learnings of the kitchen garden to the school curriculum.

PAR Cycles

Participatory Action Research is a cyclic process. The PAR cycles usually revolve around four simple steps: plan, observation, action, and reflection (Kindon et al., 2007). In this research, two PAR cycles are conducted as shown in the figure below.

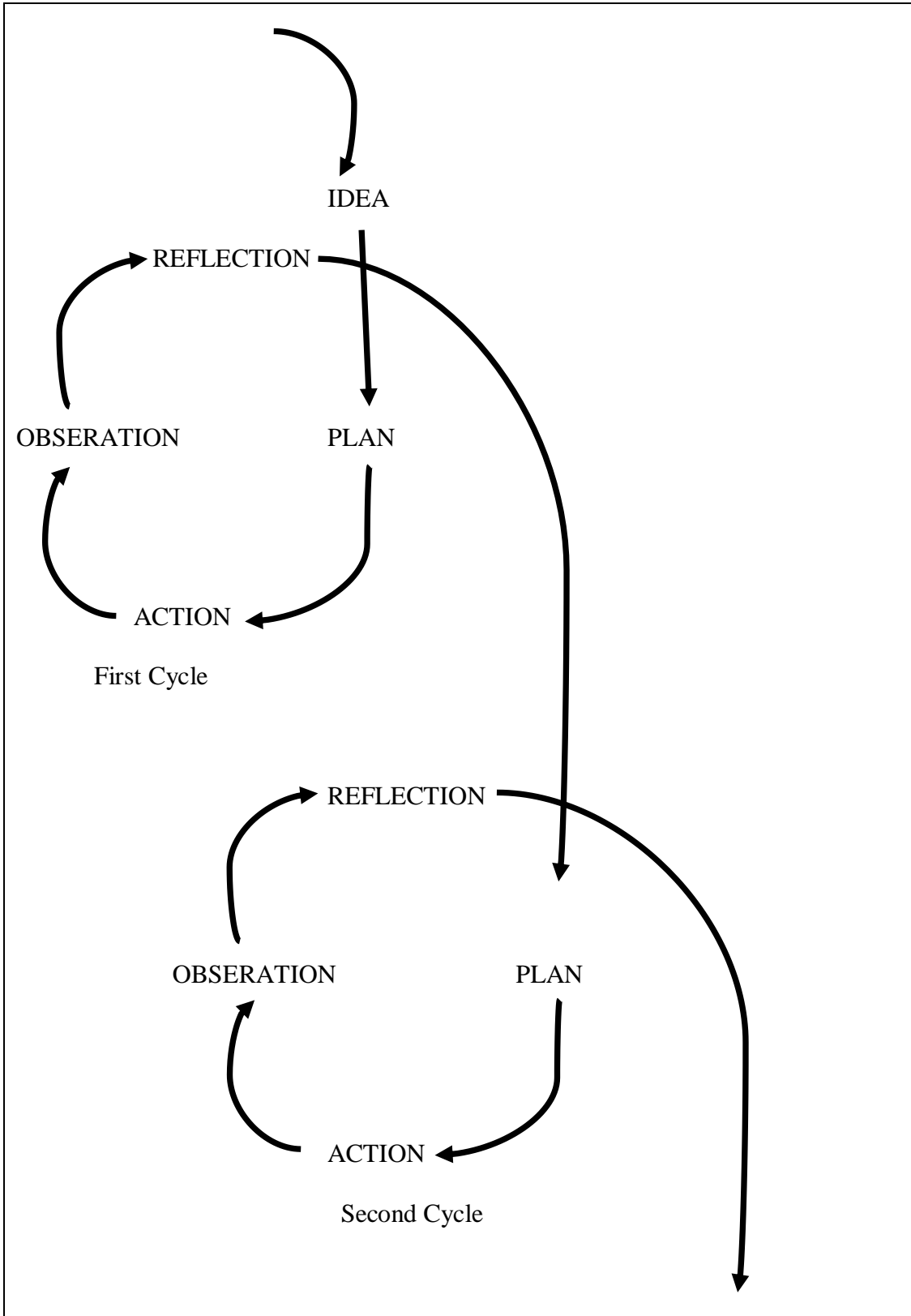


Figure 1: Participatory Action Research cycles

The first cycle started from 6 June to 5 September 2018. The first cycle made PAR committee formation, planning of the resources to set up the school garden, and the implementation of the school garden. The following table illustrates the activities conducted with the time frame in the first cycle.

Table 3. 1

The first cycle

Time Frame	Activities Conducted
6 June 2018	Introductory meeting with Eco club of the action school.
7 June 2018	The Eco-club coordinator and I informed students, teachers, and parents about building the school garden through PAR and to choose their representatives.
8 June 2018	PAR committee formation, Focus Group Discussion (FGD) The discussion on how to build the school garden and resource mapping checklist
26 July 2018	Visual mapping
29 July 2018	PAR committee planed the pre-visit to the example garden.
1 August 2018	The PAR committee observed how different flowers and vegetation were grown on the farm during the field trip to HARIYO farm. After that, they had a semi-structured interview with the expert.
3 August 2018	PAR committee bought the school garden tools with the fund provided by the NORHED Rupantaran project
8 August 2018	PAR committee invited the whole school to be part of the school garden

- 9 August 2018 Grade 4, 5, and 6 planted the saplings using their OBT class of 40 mins
- 10 August 2018 Grade 7 utilized their OBT class to plant saplings in the school ground.
Visited a nearby sample flower garden.
- 12 August 2018 PAR meeting to reflect the garden plantation activities
A teacher wanted to utilize his class activity in the school garden.
Planned to hire a hand tractor to plough kitchen garden.
- 13 August 2018 Grade 8 students utilized mathematics class to measure the kitchen land area and prepared small plots of 7 meters by 6 meters.
Grade 8 utilized OBT class to prepare the school garden
Hired hand tractor to plough kitchen garden.
- 30 August 2018 PAR Committee reflected the smooth work of the previous plantation and planned on how to start again on the kitchen garden work.
- 4 September 2018 Grade 4 to Grade 8 utilized their OBT class to prepare kitchen land plots and make the seed plantation.
- 5 September 2018 PAR committee felt a need to prepare the fence around the flowers
Prepared the fence with the rope and cleanliness around the school was done.
-

Similarly, the second cycle started from 6 December 2018 to June 2019. The second cycle passed through the growth, destruction, and rebuilding of the school garden. The following table illustrates the activities conducted with the time frame in the second cycle.

Table 3. 2
The second cycle

Time Frame	Activities Conducted
6 Dec 2018	The PAR committee observed how the small sprouts were coming up from the kitchen garden and how ropes that were used to make the fence were lost.
7 Dec 2018	PAR committee meeting was arranged.
10 Dec 2018	PAR committee along with the students from Grade 4 to 8 reflected their activities conducted in the previous cycle.
12 Dec 2018	PAR committee observed the remaining surviving plants and planned to protect them as well as plan to prepare the garden for the next academic year.
13 Dec 2018	The PAR committee nurtured the remaining plants. Students from grades 4 to 8 made drawings.
14 Dec 2018	The printed photos and drawings of the school garden were hung up on the school walls.
28 and 29 April 2019	Interaction program with the academic experts to build the school garden for that academic year.
June 2019	The school leased the land (0.76 hectares i.e. 15 ropani) for 5 years

with the funds from the municipality.

Data Collection Method

“PAR was developed as a means for improving and informing social, economic, and cultural practice” which “in principle is a group of activities” whereby individuals with differing power, status, and influence, collaborate with a thematic concern (McTaggart, 1991, p.169). Following the description, we collected evidence in collaboration. During the first PAR cycle, one introductory meeting and one focus group discussion were conducted. The meeting was a pre-organized introductory meeting by Ph.D. students and headteacher of the school. This meeting was held in the principal office. In this introductory meeting, I was introduced to the Eco club members. There were three students and one teacher. The teacher was a founding president, and one of the female students was an Eco club coordinator. Likewise, one male and one female student were eco-club members. With the consent of the meeting participants, I audio audio-taped the interview and also prepared the meeting minutes in English (See Appendix A).

Focus groups are in-depth, qualitative interviews with a small group of selected people brought together to discuss a specific topic (Casey & Krueger, 2000). All the members of the PAR committee stood in a circle formation on the ground nearby the rented land of the school. I facilitated the FGD with a preliminary set of questionnaires (see Appendix B). The committee members discussed the ways to prepare the school garden. Additionally, resource mapping was prepared by developing a checklist of the tools needed for the school garden. I prepared the list of the tools for the school garden

in my field notebook. With the consent of the PAR committee members, I audio-taped the FGDs and took some pictures (see Appendix C).

Likewise, one visual mapping (see Appendix D), one informal interview, one field observation, and one semi-structured interview were conducted. During the visual mapping, only ten members of the PAR committee were present on that day. The committee members drew their school garden imaginary images in their chart papers followed by the small visit around the school compound.

I visited the agriculture department of Namobuddha Nagarpalika (municipality) at Bakundebesi to conduct an informal interview with one of the official representatives. I prepared a set of questionnaires for the interview (see Appendix E). I audio-taped the interview with verbal consent.

During the field observation, the PAR committee members visited an example garden HARIYO farm. I prepared the field notes for the field visit. The photographs and short video clips of the visit were recorded (see Appendix F).

Similarly, four plan meetings, eight actions, and three observation and reflections meetings were conducted in the first cycle. The actions were recorded through the photographs (see Appendix G). It was followed by one plan meeting, two field observations (see Appendix H), and three observation and reflection meetings in the second PAR cycle.

During the planning meeting and reflection meetings in both the cycles, I audiotaped the meetings and prepared the meeting notes. Similarly, during field observation, I prepared the field notes.

Data Analysis and Meaning Making

This section outlines the data analysis conducted as part of the dissertation rather than the data analysis done by the co-researchers of the school garden project. While I offered to involve the co-researchers in the dissertation data analysis process, their limited availability made it virtually impossible for them to work on this process. I have, however, checked in with them periodically throughout the data analysis process to elicit their thoughts and opinions.

The data of my study consisted of the results from the focus group discussion, observation notes, semi-structured interviews, and reflection and plan meetings made from interactions. The approach I used to guide my analysis and transform the raw data into a coherent new structure is in the thematic framework. At first, I carefully read Braun and Clarke's (2006) suggestion that it is the first qualitative method that should be learned as 'it provides core skills that will be useful for conducting many other kinds of analysis' (p.78). They follow the six steps guide framework to make the thematic analysis of the data. At first, to become familiar with the data. In this step, I read and re-read all the data collected many times. In the second step, I generated codes of the coresearchers perspectives from the data. The second step was to generate initial codes. In the third step, I searched for the themes. In the fourth step, I reviewed the themes. Similarly, I defined and named the themes in the fifth step. The last step was to produce the report on that particular theme. Therefore, data from the reflection meetings, semi-structured interviews, and focus groups discussion were analyzed and sorted according to the larger categories and themes that developed.

The meetings were all transcribed in English though the conversation was in the Nepali language. The texts were studied to find the themes for the research. The themes in all the meetings and FGDs were identified with the six-step framework as mentioned above.

Quality Standards

I kept in mind the importance of maintaining a quality standard in my research study. I understand that the quality standard is the measurement that would provide weight to my overall research from both data collection to writing the text.

Creswell (2009) emphasizes that validation in qualitative research means making sure coresearchers' lived experiences are accurately represented. In this dissertation, although I conducted all semi-structured interviews, observations, and focus group discussions personally, several steps were taken to represent co-researchers' experiences accurately and to ensure the integrity, trustworthiness, authenticity, and credibility of this dissertation. These steps included the extensive nature of the data collection process, prolonged engagement with coresearchers in the field, and incorporation of multiple data types (triangulation). Also, the study has ensured, after-the-fact member checking, reflexivity (clarification of researcher bias), and inclusion of disconfirming evidence. Reliability of the coding process was ascertained by providing the coresearchers with a summary of findings to verify their credibility.

As suggested by Hammersley and Atkinson (2007) I engaged in the field with an open mind considering the emergence of new ideas and phenomena. To maintain authenticity, I reported the experience and sharing of the PAR committee in such a way that their voices have been fairly represented without distorting the context and meaning.

Therefore, I maintained and preserved all the transcripts, notes, audiotapes, photographs, and video clips to enhance the authenticity of the research.

A central tenet of participatory action research is to remain accountable to communities by involving them in all aspects of research. Further, PAR is context-specific and not generalizable. Thus, I included a rich description in this dissertation. Readers can evaluate for themselves the applicability of findings to their particular situation.

Research Ethics

As this research was the part of Rupanataran Project, overall research activities were under the ethical guidelines of the Rupantaran Project of Kathmandu University. Thus, I did not prepare the written ethical documents. However, I always asked for their oral ethical approval before recording the meetings and all the study activities. After their approval, I made audio recordings, photographs, and videos as well as their opinions and statements in this study.

Involving people in research and recording their activity and opinions through photographs and recordings is a sensitive process. Although all participants said they were happy to be named, the dissertation has ensured anonymity by using pseudonyms for all participants. It was my responsibility as a researcher to protect my coresearchers. LeCompte and Schensul (1999) point out that all researchers are bound by professional ethics to protect people from possible harm. Furthermore, I have tried to ensure that no particular people or group feel discriminated against or overprotected in terms of age, gender, language, culture, ethnicity, and disability.

Chapter Summary

In this chapter, I discussed the philosophical grounds of Participatory Action Research. Further, I discussed the research site, context, and co-researchers of my study. I illustrated my PAR cycles in a pictorial form; it consists of two cycles. After that, I discussed the data collection method followed by data analysis and meaning making. All the stages of methodology are supported by philosophical reasonings which have become my strength of maintaining quality standards of my research.

CHAPTER IV

SETTING UP SCHOOL GARDEN

This chapter constitutes the documentation of the processes in setting up the school garden in a narrative format followed by my analysis of different stages. The fieldwork was accomplished through Participatory Action Research which included not only teachers and students but also me as co-researcher. Though the field work encompassed a year-long action and reflections, many of my active fieldwork studies were done in six months. The fieldwork was divided into two cycles based on the phases of development of the garden. The first cycle started on 6 June and continued until 5 September 2018. In this cycle, a school garden was built following the different stages of Participatory Action Research i.e., plan, action, observation, and reflection. PAR is iterative with the cycle going through several iterations, each of which allows for the betterment of earlier actions which is also the power of PAR (James et al., 2007). The first cycle led to the initial setup of the school garden. The second cycle started on 6 December 2018 and continued until June 2019. The second cycle passed through the growth and unfortunate destruction of the school garden followed by the rebuilding.

First PAR Cycle: A seed to Sprout

The first cycle of development of the school garden which led to the initial set-up of the garden was conducted duly following the four steps in the PAR cycle i.e., plan, observation, action, and reflection. The Plan phase involved the formation of a PAR committee that conducted several meetings to plan the setting up of the garden. Field visits were also conducted to provide a better understanding of school gardens for the

participants. The plans were executed duly followed by observations of the execution and results achieved. Reflection meetings were conducted to discuss the actions and to plan further actions. Each of these phases of the PAR cycles is discussed hereafter.

Plan: Birth of a seed

“Well Planned is Half Done”

The need to plan any activity is important because it determines the way forward to action and also determines the quality of execution of the action. In this case, the plan meetings are important to discuss the process and the resources that are required to set up the school garden. Four plan meetings were conducted during the first cycle.

During the first plan meeting, I was invited by the school and Ph.D. students of the Rupantaran project to assist the setup of the school garden and to explore the importance of the school garden in teaching and learning activities. The scheduled introductory meeting was held on 6 June 2018 between me and Eco club members of the action school. The meeting was attended by one male teacher as a founding president of Eco club, a female student as an Eco club coordinator, and one male and one female student as Eco club members. This day marked the beginning of my dissertation fieldwork.

I facilitated the meeting. The meeting started with the introduction of each attendee. I inquired about the gardening idea of the students in the Eco-club. A teacher-member of the Eco club shared his experience of the planting of flowers around the school on the occasion of World Environment Day (WED). He further explained that the school students and teachers dreamed to set up the school garden to make the school green and vibrant. Also, he shared the school’s dream to connect the school garden in

teaching and learning activities. After that, I shared the idea of setting up the school garden by engaging the teachers, students, and community people. I presented the idea of Participatory Action Research (PAR) to the attendees. PAR is collaborative action and reflections on environmental issues where it involves people who are concerned about or affected by the issue (Kindon et al., 2007). After hearing the concept of PAR, Eco club members showed interest to invite the teachers, the students, and the community people to set up the school garden and to explore the importance of the school garden in teaching and learning activities. I and Eco club members decided to include the students from Grade 4 to Grade 8 since the students below grade 4 were very small to work in the field. Similarly, the students of grade 9 and grade 10 were more focused on their SEE (Secondary Education Examination) examination preparation and had more coursework. Thus, I and Eco club members came up with the conclusion of the formation of the PAR committee to prepare the school garden by inviting the students, teachers, and the community people.

The second plan meeting was conducted on 8 June 2018 where I facilitated the focus group discussion. At first, I shared how I was invited to assist in the setup of the school garden by the school. Also, I shared about the cyclical nature of PAR. I explained that this research approach invites PAR members to be the coresearchers of this school garden research project. I further mentioned that the PAR project facilitates learning collaboratively and reflectively. After that, I invited the eco-club coordinator Samana to share the idea of the school garden. Samana then mentioned that the eco-club was excited to set up the school garden. Sumit, the Eco club founding president added, “Eco-club members are very much excited to make the school ground colorful with beautiful

flowers and greenery as well as the eco-club members are excited about outdoor teaching and learning activities” (FGD, PAR Committee, 8 June, 2018). The headteacher mentioned, “the school has rented land from April 2018 to prepare the kitchen garden where the practical classes will be offered to the students and if possible, the school will try to integrate a vegetable garden with the course Occupation, Business and Technology (OBT)” (FGD, PAR Committee, 8 June, 2018). Sumit, the founding president of Eco-club stated, “the school needs to categorize school garden in two different sectors: first sector, a flower garden, and the second sector as kitchen garden” (FGD, PAR Committee, 8 June, 2018). He further expressed his idea that the school could prepare the flower garden in front of the classes and stage area. Likewise, they could initiate the kitchen garden in the rented area. This idea was agreed upon by the PAR committee.

The male teacher Hari raised the question, “how the school garden soil preparation and planting would be divided among the students?” (FGD, PAR Committee, 8 June, 2018). The headteacher said, “let's divide the work between the different school ‘sports houses’ so that the students may have a competition with each other to prepare a better garden” (FGD, PAR Committee, 8 June, 2018). Immediately, Hari as an OBT course teacher expressed, “it would be easier to have a grade-wise activity so that I can manage some classes of my course in the fieldwork” (FGD, PAR Committee, 8 June, 2018). The remaining members agreed on the grade-wise work division. Thus, the PAR committee decided to have a grade-wise work division to prepare the school garden.

Bishal, a student representative from grade 6 raised the question, “The school lack tools for gardening, and on top of that the most of the among those tools, there was rarely any tool in the working condition” (FGD, PAR Committee, 8 June, 2018).

The Eco-club member as well as the class representative of grade 7, Kanchi smiled and expressed, “I will borrow the tools from my mother and will use during the garden activity and take them back after school” (FGD, PAR Committee, 8 June, 2018).

The Eco-club coordinator Samana sadly expressed, “my home is far away almost an hour of walking distance and it would be very difficult for me to carry all the tools and books together” (FGD, PAR Committee, 8 June, 2018). Sanumaya, a representative of grade 5 shared her idea “I think we can collect money from the students of each class and buy the necessary tools and use them during school gardening” (FGD, PAR Committee, 8 June, 2018). Sumit appreciated the idea of Sanumaya and said “I would be happy to contribute some amount from my side to buy the gardening tools” (FGD, PAR Committee, 8 June, 2018). There, I added that there was a fund from the Rupanataran project to buy the necessary tools for the school garden.

Thus, the PAR committee agreed to buy the tools from the money collected through students, teachers, and available funds from research projects.

Then, I raised the question on other requirements for gardening besides tools. Kanchi again expressed that the other important resources were seedlings and manure. She added, “I will ask my mother to contribute the organic manure and seedlings to the school” (FGD, PAR Committee, 8 June, 2018). Parents’ representative Harimaya added, “I will contribute some manure from my home to the school garden” (FGD, PAR Committee, 8 June, 2018).

In this way, PAR members agreed on the collection of manure, and seedlings from the students and teachers.

David, a representative from grade 5 commented “What about the water that is needed during the planting of seedlings” (FGD, PAR Committee, 8 June, 2018). Sumit sir stated that “there is a rainwater harvesting project going on in the school, and the water could be used in the garden from the rainwater harvesting tank” (FGD, PAR Committee, 8 June, 2018). The preparation of the tank would be completed in a month. PAR committee allocated a meeting for July since the school had a month's vacation.

Thus, the plan to collect the necessary resources to set up the school garden was concluded. During this phase, PAR committee members were more focused on making a plan for the arrangement of the necessary resources for setting up the school garden. The challenge to set up the school garden in this school was to collect the necessary resources. The other challenge was how to arrange the time for the students to do the activities to set up the school garden.

During these two plan meetings, the students and teachers described the importance of the school garden as a practical experience for the course OBT. This course had a syllabus about agriculture and how to do business through agriculture. The importance of the school garden was not limited to teaching and learning activities but also the beautification of the school's physical environment with the green trees and colorful flower seedlings.

The third plan meeting was on 29 July 2018 where the PAR committee met during the lunch hour to plan the visit to HARIYO farm. The headteacher purposed to visit the farm on Saturday but Sumit sir denied the proposal and claimed that the visit must take during the school day because the students would get free time during the weekend to clean themselves and their clothes. All the students agreed with him and

finally it was agreed to visit HARIYO farm after two days. The headteacher purposed to the PAR team to add a few more students from Grade 10 as they were school captains. They could be supportive to protect the school garden. The PAR team agreed on the headteacher's proposal. Sumit sir took the responsibility to inform parents of those students who were visiting the garden. We all agreed to meet at the Naubise bus stop sharp at 8 am. Sumit sir and headteacher were responsible to inform the parents and other additional students.

The third plan meeting showed the interest to learn more about the school garden by planning a visit to the example garden. In addition to that, the headteacher wanted to incorporate the students other than the research group students so that in the future, it would be easy to look after the garden and make it sustainable.

At the fourth plan meeting of 12 August 2018, a math teacher of grade 8 approached the committee and shared his idea on how he wanted to utilize his geometry and measurement class. He wanted to prepare the kitchen garden plots by measuring length and breadth. He wanted to teach students practically to measure these areas by the measurement tape. The PAR team welcomed him to be part of the school garden building process.

Insights 1: Motivation and Readiness

The discussions made during the planning phase provide insights into how teachers, students, and also the school administration perceive the idea of the school garden. It also gives an idea of the motivation and readiness of the school to set up the school gardens.

The administrative staff Budhha dai started to share his ideas on the flowering garden; “I have bellflower in my house near the entrance, it looks beautiful with its vibrant red color, so I think its better to have those kinds of flowers near our school gate” (FGD, PAR Committee, 8 June, 2018). Likewise, Sumit stated, “I would be happy to contribute some amount from my side to buy the gardening tools” (FGD, PAR Committee, 8 June, 2018). This shows that teachers and students and also the school administration and general staff demonstrated enthusiasm in developing a school garden, the drive to which is: to enhance the aesthetics of the school by developing a flower garden and increasing greenery and to utilize the school gardens as a practical lab for course subjects.

Connecting school garden in teaching and learning activities. This shows that teachers, as well as the school administration, found it more natural and obvious that subjects of vocational nature such as OBT (Occupation, Business and Technology) could utilize school gardens for teaching and learning. The school administration was more convinced to establish a school garden for such a purpose. For other mainstream subjects such as maths and science, the individual interest of the concerned subject teachers was of value.

There was a need of restructuring the mainstream courses to connect them to the school garden. In addition, students could learn various skills such as organizational skills, collaboration skills, resource and time management skills, communication skills, etc. in the process of establishing school gardens. However, we observed little or no realization regarding teaching and learning of these soft skills. Furthermore, the school administration did not want to allocate the predefined school times for gardening

activities. These were the challenges to integrating school gardening activities with teaching and learning.

Similarly, the students dreamed to learn outside of the classroom's four walls. They were bored of traditional learning styles and wanted to explore the different methods of learning while playing around in the school garden. The student observed the need for the school garden as an outdoor learning facility. They were bored of the regular classroom activities and they wanted to experience the

School gardening needs resources such as land, plants, fertilizers, tools, and water. As, Bishal raised the question, “The school lack tools for gardening, and on top of that the most of the among those tools, there was rarely any tool in the working condition” (FGD, PAR Committee, 8 June, 2018), this shows that the availability of resources for school gardening was insufficient. The vice-principal suggested, “We can announce the morning assembly. We can invite the students and teachers to be part of the school garden by contributing the organic manure and seedlings to the school garden from their home” (FGD, PAR Committee, 8 June, 2018). Another teacher was willing to contribute to buying the school gardening tools to establish the school garden. During the plan meetings, it was observed that teachers and students were excited to voluntarily provide some of these resources, mostly the ones which were locally available such as manure and gardening tools. Furthermore, the school was ready to rent land for establishing kitchen gardens which were likely to be too supportive for vocational courses such as OBT (Occupation, Business, and Technology).

Action: Sprouts Grows into Roots stem, Leaves, and Flowers

The second phase of the PAR cycle was the action in which the planned activities were implemented. The activities were conducted over several days, which are discussed hereafter.

The first activities were made on 7 June 2018 where I and Eco club members went to each class from Grade 4 to 8 and explained the concept of building a school garden by using participatory action research (PAR) approaches. Thus, we requested the students of each class to choose the PAR representative for their respective classes. We explained that the representative from the class would be responsible for attending PAR meetings and focus group discussions. In those meetings, they would represent their classmate's collective idea of the school garden. Likewise, the representatives would also be responsible to share PAR meeting discussions with their classmates.

Similarly, we (Eco-club members and I) requested teachers to choose the PAR representative among them. Thus, teachers chose the headteacher, the vice-principal, Eco-club founder teacher, and one male and one female teacher, who were teaching the course Occupation, Business and Technology (OBT).

The headteacher asked a nearby house member to be part of the PAR committee as a parent's representative. Thus, there was one students' mother on this committee.

During the initial phase, the school showed interest to include diverse stakeholders in the school garden setup process. The inclusion of parents, students, and teachers showed that the shared ownership was important to set up the school garden and to sustain it.

The second action on 8 June 2018 formed a PAR committee with thirteen members, five teachers, six students, one support staff, and one students' mother.

The third action was on 29 July 2018. It was a visit to the agriculture department of Namobuddha Nagarpalika (municipality) at Bakundebesi, where I met one of the official representatives. After that, I shared the idea of the school garden and asked whether there was an example of a garden to visit and learn. Additionally, I requested if there were any necessary information and resources available to set up the school garden that the office could provide. In response to my question, the representative made an excuse that due to the new government with the federal system, the staff at the agricultural body was transferred from one place to another. He mentioned that he was a completely new person in the office. He could not offer much help. After that, I along with Ph.D. students went to the farm to arrange the visit for the PAR committee. One of the farm representatives suggested informing two days earlier about the visit. The participation fee was around 5000 Nepali rupees, including snacks and tea.

The fourth action was on 5 August 2018 where PAR committee member Budadai bought some gardening tools. Though the plan was to collect money from students and teachers to buy the necessary tools, the NORHED project's available fund was utilized to buy those tools.

The fifth action was on 8 Aug 2018 where the PAR committee requested the students to donate with a small bag of organic manure and flower seedling from home.

The sixth action was on 9 Aug 2018 where Grade 4, 5, and 6 students made flower seedling bed planting in the flower garden. Similarly, on 10 Aug 2018, Grade 7 students made flower seedling beds planting in the flower garden. In addition to that,

some of the students from Grade 6,7,8,9 and 10 along with the OBT teachers and I went to make a quick visit to a small flower garden in one of the local offices of this village.

The seventh action was on 13 August 2018, where early in the morning, the hand tractor arrived and finished ploughing the rented land in approximately 3 hours. The PAR committee paid that cost with the Rupantaran project fund. After the lunch break, grade 8 students utilized their mathematics class to make the 7-meter length and 6-meter breadth plots in the kitchen garden. After the mathematics class, they again utilized their OBT classes to build the flower garden and plant the flowers seedlings on the remaining parts of the school grounds. With these plantings, the school grounds were full of flower seedlings in the flower garden.

The eighth action was on 4 September 2018. The school bought organic manure from one of the neighbors. I coordinated with Hari sir and Sumit sir to take the grade 4, 5, 6, 7, and 8 students in the kitchen garden. The students from each class utilized their forty minutes of OBT classes on sowing seeds and planting in the kitchen garden.

In this case, we invited students, teachers, and community people to set up the garden. It was good that we had such so much manpower to set up the garden but at the same time, it was a great challenge to mobilize this manpower in the right direction. In addition to that, it was also a challenge to collect the resources needed to set up the garden. Though there was a positive attitude towards the setup of the school garden and its integration in teaching and learning activities, the school lacked the funds to collect the necessary resources.

Though there were four plan meetings, the eight actions were implemented. It happened because the activities emerged in the flow. Though there was a willingness of

contributing the money from teachers and students, it was not easy to collect money. Nobody took the initiative to collect the money. Thus, the Rupantaran fund was utilized. This shows that though teachers and students were interested to integrate the school garden in their teaching and learning activities, it was very difficult to arrange the funding to set up the school garden.

Though the teachers and students started to set up the school garden to integrate it with the OBT course, as time passed, the mathematics teacher also integrated the school garden into his teachings.

Insights 2: Perceptions towards a School Garden

While conducting several activities leading to the set-up of the school garden, several insights into the perception of teachers and students regarding school gardens were observed which are discussed hereafter.

There are leadership issues, resource constraints, and connecting with teaching and learning. During the leadership issues, for every action to happen successfully, it is important to have a focal person, someone who is responsible for coordinating the activities and implementing them successfully. A vacancy in leadership was seen as indicated by reluctance on part of teachers to coordinate the collection of small donations. While the reluctance could be understood since the financial matter could defame the teachers, it was an indicator of reluctance for volunteering extra activities.

Sometimes I doubt that things are not converted in the actions. Though one of the teachers excitedly mentioned to contribute financially, nobody took any initiation to provide any kind of fund for the school garden (Reflective Journal entry, 9 August, 2018).

The resource constraints were conspicuous in the action phase which was realized even in the planning phase. Most of the activities were funded as part of the Rupantaran project fund. The school lacked the resources to fund these activities. Hari and Sumit mentioned that “the school already rented the land for the school gardening but can not afford to buy other needed materials for the school gardening” (FGD, PAR Committee, 8 June, 2018).

While connecting the school garden with teaching and learning, OBT and mathematics teachers connected their teaching with the school garden. Since OBT was vocational, it was thought to be a natural choice for connecting with garden-based activities. Teaching mathematics using the school garden was done through the initiation of mathematics teachers. During the Focus Group Discussion, the mathematic teacher approached and mentioned that “I want to incorporate a mathematic practical class of geometry and measurement, by teaching the students to create a garden plot of certain breadth and length size” (FGD, PAR Committee, 8 June, 2018). The students were also gaining soft skills such as organizational skills, team-working skills, and communication skills. However, this was being realized implicitly.

Observation and Reflection

Observation of the effect of action and reflection for further improved actions is the strength of PAR. In the first cycle, three meetings were conducted in which the participants shared their observations and also reflected on improved future actions.

The first observation sharing and reflection meeting were conducted on 12 Aug 2018, where the PAR committee shared their experiences of planting the school garden. I started the meeting by sharing my experiences in gardening activities. I enjoyed working

with the students to plant different seedlings. I further shared that most of the students enjoyed the gardening activities. It was an enjoyable moment for me as well as for the students. The students were excited to be out of the classroom to plant the seedlings that they brought from their homes.

Sanumaya shared her experience that, “I met a child from ECD grade who was gazing at the flower garden with enthusiasm while he was on his way to the toilet. The child was curious to learn what they were doing and so I explained to him that the school was preparing the garden and he should not break the plants” (Observation and Reflections Meeting, 12 August 2018). After hearing this, the child said that he would water the plant every day.

Hari sir shared that in Grade 4 and 5, “Only one of the students had experienced working in the field while other students had observed their parents and other siblings working in the field” (Observation and Reflections Meeting, 12 August 2018). Thus, it was interesting to them.

Further, Hari sir explained that in Grade 6, “The students divided into three groups by themselves to planting in the flower garden. They identified their areas in front of their classroom and stage areas. The students were very active and participated with full energy. First, the students cleaned the ground outside their classroom, and then around the school stage area. After that, the boys collected the topsoil and bricks from other parts of the ground. The girls made fences using brick. While digging the land they found plastics so they collected them in the dustbins. The soil was so dry and sandy and it needed a large amount of organic manure” (Observation and Reflections Meeting, 12 August 2018).

The headteacher shared her observations, “Grade 6 students were working, the lunch break started and all other students from different grades joined the students to carry the bricks and mud and even helped in digging the land. I am so amused to see Early Childhood Development (ECD) class to grade 12 students being involved even in their lunchtime” (Observation and Reflections Meeting, 12 August 2018). Even the accountant from the administrative department of the school took part in preparing the school garden.

Hari sir further mentioned, “Some students are mischief and don’t work at all” (Observation and Reflections Meeting, 12 August 2018). After that, I added my observations that some of the boys hardly did any work and only observed while their friends were involved in gardening. When their friends asked them to join the work, they replied that they didn’t want to make their hands dirty. With curiosity, I asked all the students that how many of them worked in the field at home. Surprisingly, almost everyone said, they worked. After that, I asked the boys. They replied that they were working almost every day in the field at home. On the one hand, it was a kind of burden to these students who would work regularly in the field at their homes. Many students were forced to do that work. On the other hand, the other students were actively involved in making the garden and enjoying the moments.

Sumit sir shared the idea, “PAR committee could involve these students (with prior experiences) by including them as an expert for the garden so that they won’t feel left out” (Observation and Reflections Meeting, 12 August 2018). Hari sir agreed on it and added, “PAR committee can ask these students about the ways to put manure and water. In this way, those students are likely to have a sense of responsibility towards the

school garden” (Observation and Reflections Meeting, 12 August 2018). PAR committee liked his idea since the committee didn’t want to miss out on any students.

David mentioned “Some of the students representing grade 5, 6, 7, 8, 9, and 10 along with Hari sir, and Sumit sir went to visit the small flower garden” (Observation and Reflections Meeting, 12 August 2018). Hari sir added, “I took some seedlings from there to prepare a beautiful flower garden at my home” (Observation and Reflections Meeting, 12 August 2018).

During this meeting, a math teacher of grade 8 approached the committee and shared “I am thinking of utilizing my geometry and measurement class. I want to prepare the kitchen garden plots by measuring length and breadth. I want to teach students practically to measure these areas with the measurement tape” (Observation and Reflections Meeting, 12 August 2018). The PAR team welcomed him to be a part of the school garden building process.

Sumit sir was so amazed to see the students of grade 7 who worked sincerely and in a collaborative manner. He mentioned “There were none of the students who were fooling around and being mischief. The students worked in a group, dividing the work by themselves. They started to work in front of the library to build the flower garden. There, the land was concrete but still students managed to remove that concrete area and put some topsoil on the land. They made the flower garden by planting flower seedlings” (Observation and Reflections Meeting, 12 August 2018).

I added that while Grade 7 students were preparing the garden, one of the teachers brought the students of grade 6 and asked them to play football as his class activity. I was so surprised by this act. The vice-principal stated, “The teacher didn’t like the idea of the

school garden and for him the garden was a ridiculous idea to have a garden in the school which doesn't have enough land for the students to play" (Observation and Reflections Meeting, 12 August 2018).

His logic was also fine. Although there was not sufficient land for gardening, the school could manage to grow the plants with the fence around it. By doing so, the students could play and the fence could protect these plants.

PAR committee was happy to know about the smooth planting of seedlings with Grade 4, 5, 6, and 7. In addition, the committee came to know that a small flower garden existed near the school where the school could request the seedlings of the needed flowers.

After that, the PAR committee went to the rented land, and found out the soil in the land was not soft and it was very hard to plant any seed or seedlings. It would be very difficult for the students to dig and plant. Thus, the PAR committee decided to hire a hand tractor to do the plowing at the kitchen garden.

The second observation and reflection meeting was held on 30 Aug 2018 during lunch hour. The committee discussed on the smooth gardening process that happened previously and was hopeful that building the kitchen garden will also go smoothly though it is a little late to grow the seeds and seedlings in the kitchen garden. PAR committee decided to resume the work of the kitchen garden section from the next week. The committee decided to purchase the organic manure from nearby the neighbor's house since there was not enough manure for the kitchen garden left. Previously collected manure was utilized in the garden.

Kanchi mentioned “I observed grade 3, students were watering the new seedlings in front of their classes. I saw three girls and one boy were watering these plants from their water bottles” (Observation and Reflections Meeting, 30 August 2018). Hari sir and Sumit sir said that they want to utilize their OBT classes to plant seeds and seedlings in the kitchen garden. PAR committee members discussed on how to start the kitchen garden work as the monsoon was over. It would be difficult to raise seedlings and sow seeds.

The third observation and reflection meeting was conducted on 5 Sep 2018 where the PAR committee met to share their observations and reflect on the kitchen garden activities. Hari sir, Sumit sir and I informed the PAR committee that the planting went smoothly. Grade 10 students helped to prepare the land plots for Grade 4 and 5. Kanchi and David expressed, “Our classmates from Grade 7 enjoyed the kitchen garden activities more than the flower garden activities” (Observation and Reflections Meeting, 5 September 2018). In contradiction to this, Sanumaya from Grade 4 and Malish from Grade 5 expressed their classmates enjoyed the flower garden activity.

The PAR committee felt the need for some kind of fence around the flower seedlings to protect them from the students. The plants were being damaged while playing games. Thus, the PAR committee had arranged the rope to prepare the fence around the flower garden. The students from Grade 9 and 10 volunteered to prepare the fence. Additionally, they volunteered to clean their school garden. They picked up plastics and cleaned the classes as well.

Insights 3: Sustainability and Ownership of School Garden

The observations and reflections made during several meetings provide several insights regarding the perception of teachers and students on sustainability and ownership of school gardens. The students, teachers and even supporting staff of the school were self-motivated to engage in gardening activities. They worked with enthusiasm and even were ready to voluntarily collect resources for the school garden. The overwhelming reflection from the PAR committee members was that the school gardening activity created a positive environment. School gardens were able to create an active learning environment. OBT teachers found it useful in conducting the classes. The mathematics teacher also utilized the school garden to conduct his classes. Furthermore, collaboration, team-building, and resource management were also learned by students. Some teachers were inspired to build gardens in the home. It was also observed that some students who had to do intensive field works at home were less interested to engage in the school garden.

School gardens could also be utilized for teaching soft skills such as collaboration, team-building, etc. to students. It could also be further promoted to inspire teachers and students to build gardens at home too. It was also reflected that students who had expert knowledge on fields were not interested in getting involved directly and hence they could be involved as experts. The school had limited resources required for setting up the school garden. The primary constraint was the land. The flower garden was built in front of classes. The area was utilized as a playing ground which now and then caused damages to the school garden. In addition, lack of resources such as water, and manure were also the constraints.

The PAR committee reflected on the necessity of renting land for building the school garden. Also, not everything was manageable by teachers and students. For example, the rented land was hard to be tilled by hand and hence machine tiller had to be rented. It was felt that there should be either a dedicated budget or funding from external sources for building and running school gardens. Due to the limitation of water, the timing of gardening should match with the monsoon season.

Some faculty members were not keen on the idea of building a school garden by limiting the playing area of children. It was also observed that ropes used for fencing the flower gardens were stolen.

The PAR committee strongly felt the need of arranging land for school gardening purposes that would not conflict with the existing use of school space. It was also reflected that those teachers and students had to feel ownership of the garden, else incidents such as loss of rope would be repeated.

Second PAR Cycle: Dormancy to Death

The second cycle of PAR was driven by the motive to sustain the garden. This was motivated by the improvement ideas generated during the observation and reflection meeting in the first PAR cycle. The second PAR cycle starts with an observation followed by planning and actions.

Observation of a Nightmare

Field observation was conducted on 6 Dec 2018 where PAR committee members were devastated to observe the destruction of the school garden due to the construction work at school. The school already had a very small land for the garden. On top of that, it was constructing a big building, where it had a very small space available to put the

building materials. One part of the school ground was dug to construct the new building of the school and another part was full of the construction materials.

On 7 Dec 2018, a PAR committee meeting was arranged but only ten members were present. The headteacher and vice-principal were busy with the administrative process of the construction of the new building and could not attend the meeting. The student's mother didn't show up after the focus group discussion. I expressed my observations that when I was moving around in the school ground, students and teachers approached me and said that they were very upset to see the garden being destroyed. Though they were not much involved, they could understand how I might have felt about the destruction of the flower garden. The students, teachers, and the community people were feeling sorry. The OBT teachers expressed, "The school was more excited to construct the new building and thought that the flower garden could be built after the construction" (PAR Meeting, 7 December 2018). Sanumaya, David, Kanchi, Samana, and Bishal expressed that they were helpless to protect the flower garden but they were determined to build the flower garden as soon as the new building construction will complete.

On 10 Dec 2018, the PAR committee set up a meeting with each class from grade 4 to grade 8 on the kitchen garden premise. The students from each grade mentioned that the construction materials for the new building destroyed the most of plants around the school garden. On one hand, students mentioned that they were scolded by teachers when they visited the kitchen garden to observe the plants' growth. On the other hand, teachers mentioned that all the carrots and radish were plugged out and taken away by the mischief boys. Thus, the teachers didn't allow any students to make any visits in their

absence. As I said that this garden did not belong to me, it was the schools' property and it was the responsibility of each student, teacher, and community people. PAR committee commented and agreed that the school was too busy building the new building. Thus, the flower garden and kitchen garden were neglected and destroyed.

Further, teachers expressed that the students were interested in building the school garden again. Hari sir said, "If we could have done in time and had one specific person to look after then the garden would have been more productive. Teachers are very busy with so many classes to prepare" (PAR Meeting, 10 December 2018). Sumit sir added that though the school garden was destroyed, it was a valuable lesson for them. "We could not arrange the water as planned and there was not much rain so we could not grow the crops as we initially planned" (PAR Meeting, 10 December 2018). This was a great lesson for the next round of school gardening. Students wanted to do more of the gardening. Also, the teachers wanted to be more engaged in the next academic year. "We should look for the fund to rent more land for the school" (PAR Meeting, 10 December 2018).

Insights 4: Motivation During a Nightmare

The teachers and students were still motivated to continue with the school garden even when much of the garden was damaged. However, it was also observed that teachers and parents found it difficult to arrange a time for school garden activities due to their general school activities.

The concern regarding the damage of the school garden from students indicates that students were developing stewardship for the environment. The teachers were also realizing that the school garden was for teaching and learning activities and even some damages to the garden were part of the learning.

The sustainability of the garden was very much dependent on the availability of resources. Land and water seemed to be the major constraints. The limited land available with the school meant that most of the land was utilized as the playground and construction of the building. It would limit the land area that could be used for gardening purposes.

One of the observations made was the necessity of a focal person who could provide time in the management of the garden. Since most teachers were involved in the day-to-day class activities, they could not spare much time for gardening activities.

Plan: A ray of hope

Only one plan meeting was conducted during the second cycle on 12 Dec 20. At first, the PAR committee made a quick tour of the school ground garden and the kitchen garden premise. The committee observed that the kitchen garden was dead. There was only *Rajmas* seed remaining. In the flowered ground, only a few plants survived. Thus, the PAR committee made a plan to nurture the remaining alive plants.

Additionally, Sumit sir expressed, “PAR committee could share their gardening activities by pictures and drawings on the school annual function day (PAR Meeting, 12 December 2018). Thus, the PAR committee decided to make a display of Garden activities in the photo story by printing the photos of the garden activities and framing them. Additionally, the students from grades 4 to 8 could make drawings of the garden they would like to build again on the school premises.

The teachers expressed their opinion to meet some experts from the academic area to learn more on the school garden building process and the ways to link those activities in their course work.

Insights 5: Learning Attitude Matters

One of the motivations to develop a school garden was the opportunity to demonstrate the activities to the community and parents. Opportunities like annual function days could be utilized for these purposes.

The teachers and students wanted to learn from experts regarding the school garden building process as well as connecting the school garden with the course work. This willingness was quite important to fulfilling the objectives of building the school garden.

Action: Sunshine after a nightmare

Based on the learning from the first PAR cycle and observations and planning in the second PAR cycle, several activities were conducted to nurture and sustain the school garden.

The first activity was conducted on 13 Dec 2018. PAR committee nurtured the remaining flower seedlings in the flower garden. After these, the whole school was invited by the PAR committee to volunteer in cleaning the school ground and backyard of the school. In addition, PAR, committee plucked the *rajma* seeds to keep them as seedlings to plant in the next academic year's kitchen garden. Hari sir took the responsibility to keep the seeds safely to use in the kitchen garden during the next academic year. The other activity was to make drawings of the school garden. Thus, the PAR committee and students from Grade 4 to 8 prepared the drawings of their future school garden to make the display at the school annual function day.

The second activity was conducted on 14 Dec 2018 where all the printed photos and drawings of the school garden were hung up on the school walls. The parents and

other community members were excited to see these activities. They enquired about the school garden and asked whether this activity would be continuing in school. PAR committee and students promised the parents and other members of the community to continue the school garden activity in the next academic year of the school.

The third set of activities was conducted on 28th and 29th April 2019. Parbat Dhungana, an assistant professor of Master in Sustainable Development went for the observation of the school garden process and provided his insights on how the school could build the school garden for the academic year. The teachers and students interacted with the expert from the University to plan the kitchen garden for that academic year. They discussed the raised bed concept for the school garden. Raised bed gardening is a form of the garden in which the soil is enclosed in three- to four-foot-wide containment units. Those units are mentioned as beds. They are usually made of wood, rock, or concrete and can be of any length or shape. The soil is raised above the surrounding soil, where students could work in these raised beds by standing. This would allow students to work neatly.

The fourth set of actions is continual request and negotiation with the local administrative body. The school managed to have the financial support of the municipality. The school leased the land (0.76 hectares i.e 15 Ropani) for 5 years with the funds from the municipality. The municipality and the ward office also showed their interest to work with the teachers and students of the Action School. The ward office dreams to build on Agro-based activities for the community people.

Insights 6: Birth of a Fresh idea

The action taken in the second PAR cycle was much more refined and well-planned which could also address issues like the availability of sufficient land for school gardening.

The demonstration of school gardening activities to parents and community members was quite appreciated with encouragement to continue it. This created a bond between parents and the school. The support from the municipality and ward office by providing funding for renting land for the school gardening activities and their interest to work together created a connection between different agencies. This coordinative effort was one of the larger gains of school gardening activity.

Teachers and students keenly interacted with experts regarding school gardening activities. It was important that teachers also got an opportunity to enhance their school.

Teachers and students learned to manage and negotiate the resource needed for the school, especially from the municipality. In our case, the school got support from the municipality to rent the land.

CHAPTER V

KEY FINDINGS, REFLECTION, AND DISCUSSIONS

The purpose of this research has been to understand how teachers and students perceive the school garden. Using PAR as a research method, this research explores how teachers and students engage, utilize, and connect teachings and learning with school gardens through various stages of development of the school garden. PAR has provided an opportunity to deeply understand and analyze perceptions of teachers and students on various themes that emerged from setting up the school garden to taking steps to ensure its sustainability. The insights gained during this study are discussed hereafter.

School Garden in Pedagogy

During the process of setting up of school garden and working on its sustainability, it was observed that the school garden was useful in teaching and learning activities. School gardens provided an opportunity to provide education beyond the classroom in an environment that brought enthusiasm among students. While some of the teachings were explicit, students also got an opportunity to learn soft skills implicitly.

Vocationally oriented subject such as Occupation, Business, and Technology (OBT) was the natural choice of school to integrate school garden with teaching and learning. Kitchen gardens were utilized as a laboratory facility for teaching OBT.

Besides the vocation-oriented courses, mathematics teachers utilized the school garden for teaching geometry and measurements. This was the result of a personal initiative from the teacher. We observed that to connect courses with school gardens, there is a need for guidelines that guide subject teachers to integrate a school garden with

teaching purposes. Without these guidelines, school teachers find it difficult to manage time for school gardening and connect it to regular classes.

While much focus is given to explicitly connecting courses with school gardening, students also get an opportunity to learn soft skills. Students learn to work in teams collaboratively. They learn to divide tasks, resolve conflicts and manage time. Besides, students develop an attitude of stewardship for the environment while developing school gardens. Students also develop an attitude of voluntarism.

The learning was also not limited to schools. Some teachers expressed their interest in establishing gardens at home as well. School gardens also provided an opportunity to enhance the creativity of students in events like annual functions. In this study, the students drew plans and designs of their future school garden and displayed them for parents to see.

Motivation to set up and Continue School Garden

Several motivation factors created a positive environment in setting up and continuing the school garden. Initially, the teachers and students were motivated to create a school garden for two reasons. First, they were interested to make their school beautiful by maintaining greenery in the school area. It was the reason that the flower garden was set up in front of the classes. Second, they were eager to connect teaching and learning activities with the school garden. Thus, there was a kitchen garden.

The school garden was taken as a laboratory for a vocational course like Occupation, Business, and Technology (OBT). The idea of gardening-lab motivated school managers and administrators to establish the school garden. The teachers and

students demonstrated their work on the annual function day. The opportunity to display their work to parents and the community motivated them to continue the school garden.

The process of building school gardens also provided an opportunity for teachers and students to be involved in field visits and interact with experts. This activity-based learning and the opportunity to interact with experts also motivated the teachers and the students to continue the school garden.

Collaboration and Teamwork

School gardens provided a common mission for school administration, teachers, students, and even working staff. This mission was accomplished with collaboration and teamwork among different stakeholders who had their own set of roles and expertise. Just like a connective tissue connects bones and ligaments, the school garden provided a common mission that connected all the stakeholders. The school garden acted as a bridge that connected and brought all the stakeholders closer. The activity-based tasks reduced the distance between teachers and students. We could observe the students and the teachers working together with deep engagement and fun.

Community Engagement

A successful and effective school can only be possible through a collective effort of the school, community, parents, and local administrative bodies. The school garden provided an opportunity where different stakeholders could contribute to improve the school. The contribution enhanced their feeling of ownership towards the school. The community and parents provided different resources such as plant seedlings, manure, etc. for the school garden. While it seems a small act, it created an environment of

engagement with the school. Parents and the community were interested to see the results of their contribution. This made the school more responsive to the communities.

The municipality's allocation of funds for establishing a school garden is a big achievement in terms of community engagement. The municipality was also interested in being involved with the school on agro-based activities. This further made the school more responsible for quality education.

Resource Limitations and Conflicts

School gardening required several resources such as land, water, fertilizers, plant seedlings, fencing materials, etc. Out of these, the land was one of the largest constraints. In the case of our school, the limited amount of land owned by the government was used for school gardening purposes. This land was also used by children to play. This created an environment of conflict. It also resulted in damage to the garden while children play. This was the reason that some teachers did not appreciate the concept of school gardening in the abandoned land. Besides, this land was also used for storing materials for the construction of a new school building. Limited resources were the prime reason for the conflicts. It is to this end; the study suggests that other aspiring schools need to manage sufficient resources for effective implementation of school gardening as pedagogical resources. Though the school rented the land for a year, they could not utilize the land in a year-round time. Thus, the criticism towards the school administration by some of few teachers and community people.

However, the land issue was solved when the ward office of the municipality rented land for the school. But still, there were questions about the distance of this land and school area. It was five minutes walk from school for adults. Some teachers

complained that the course period was only of forty minutes and they couldn't manage the time. While some of the teachers showed concern for small children, they wouldn't be able to travel and enjoy the garden activities because of their distance.

Challenges

There were several challenges faced during the establishment of the school garden. At first, there was hesitation of some teachers to establish the school garden where there was already a small area to the playground. The second challenge was that the teachers were strict with the students and did not allow the students to play in the school garden. The third challenge was that the school administration prioritized the school building construction and neglected the school garden by destroying it. The third challenge was to manage funds for the next academic school garden. There was the availability of the fund to rent the land with the local ward office but the school needed more funds to continue the school garden. The school had no internal source, and therefore, it had to look for external sources. It would question the sustainability of school gardening.

Sustainable Development Goals

The school garden is not only an activity to integrate into teaching and learning activities but also a platform where students and teachers reflect their environment protection activity, green areas for the school. It's a platform that links local action with global thinking of environment protection. While establishing the school garden, students also learned the waste management system. The students collected the papers and plastics in the dustbin. Also, they made a plan to separate the degradable and nondegradable waste. They also made a plan to make a pit to utilize the degradable

waste to make manure for their school garden. Though the plan was not well implemented, the engagement made students aware of waste management.

The other thing the garden taught was about sustainability. It was easy to establish the school garden compared to the functionality and continuity of the school garden. During the process of establishing the school garden, most of the teachers, students, and community people came together to provide a helping hand. But as the days passed by, most of the teachers and students showed less interest. Even the administration of the school did not give much priority to the school garden during the construction of the new building. In this school, it was a great challenge for the school garden to keep going.

CHAPTER VI

CONCLUSION, IMPLICATION AND FUTURE RESEARCH

The teachers and students enjoyed the school garden activity during their class hours. The students were bored to read inside four walls of the class. For a change, the school garden activity allowed them to learn in the outdoor environment. The collaboration, teamwork, and decision-making during the establishing school empowered the students. The sense of ownership of the school garden activity was also felt among the students. The teachers were also happy to integrate their class activity with the outdoor activity. The teachers experienced that it was easier to explain the theoretical courses by demonstrating them into practical lessons. The teachers felt the student's boredom in the lectures of the classroom but the students enjoyed outdoor activities. Thus, the school garden was a useful tool for teaching and learning activities. Based on the teachers' and students' experience, it can be concluded that the school garden is a useful tool to integrate into their coursework. However, in the present condition, there are some functional and structural challenges to establishing and continuing the school garden.

The challenges that occurred during the establishing of the school garden were of varied nature. Some teachers were unlikely to show interest to integrate the school garden into their class activities. Also, not every student would enjoy the outdoor school activity as some students were already bored with fieldworks while helping their parents to do plantation and harvesting activities.

The other challenges are of the necessary resources like seed, water, gardening tools, manure. To manage these necessary resources, the school needs funds. With very limited funds or no funds for activities like school gardens, the school is dependent on external funds. The other main challenges are the land areas. Particularly in hilly regions, the schools have small plots of land. Most land is covered by the school buildings and the remaining land is used as a playground for the students.

Despite these challenges, the teachers and students were motivated to keep one green school garden in the school to learn and play. The school garden provided not only green areas but also fruits and vegetables to advocate for healthy eating habits. Also, those gardens not only gave students practical classes but also allowed more exposure visits about school gardens. Besides all the visual changes of the school garden, it also provided some unseen and unmeasurable changes such as soft skills. During the process of establishing the school garden, the students developed the skills of collaboration, teamwork, leadership, and problem-solving. During the student's life, these skills are as important as the core curriculum.

While there is no doubt about the usefulness of a school garden, it seems that the successful implementation of the school garden is dependent on how teachers and students perceive the school garden and engage them with it. Without proper motivation and appreciation of school gardens, it cannot be expected that the benefits of school gardens can be acquired. It is important to understand the motivational factors that encourage the setting up of the school garden as well as sustaining it. It is also important to know how teachers connect school gardening activities with teaching and learning and the gaps that exist in doing so. It is also essential to understand the limitations on

resources as well as conflicts that arise to provide a way forward to streamlining school gardening. Through a Participatory Action Research Approach, this study provided in-depth documentation of involvement and engagement of teachers and students in several phases of school gardening starting from planning, implementation, observation, and reflection to improving the actions based on the previous cycle of implementation.

Policy and Practical Implications

This research has identified both strengths and challenges to connecting teaching and learning with school gardening from the students' and the teachers' perception to establishing, maintaining, and utilizing school gardens for educational purposes. The major contribution of this work could be in the policy formation process since it provides key insights from the perspective of teachers and students regarding the connection of teaching and learning to school gardening.

Future Research

The study explores the students' and the teachers' perceptions of establishing, maintaining, and utilizing school gardens for educational purposes in the mid-hill regions. A similar kind of study could be conducted in the plain area and mountain area to find out the motivation and challenges from the teachers' and students' perspectives. In addition, to better understand the implications of these results, further studies could address more pedagogical aspects to integrate with the school garden.

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APPENDIXES

Appendix A

Introductory Meeting Minutes

Meeting Minute of 6 June 2018

Attendees:

Founding president

Eco club coordinator

Male eco-club member

Female eco-club member,

The researcher

I facilitated the meeting. The meeting started with the introduction of each attendee. I queried about the school garden idea of Eco club. The male member of the Eco club shared his experience of the plantation of flowers around the school on the occasion of World Environment Day (WED). He further shared “We all the students of the school dream to build the school garden, making the school green and clean”. While the founding president was a bit pessimistic about the school garden, “There is no fence and gate, I think the nearby community people will graze their animals in the school ground and it will be very hard to raise the garden and also the students from Early Child Development (ECD) to grade 4 are very small and mischief in behavior, they might destroy all the plants of the school garden”.

Despite all these challenges, I concluded the remark that Eco club dreamt to make school green and clean. All the attendees agreed and now the question was how to build

the school garden. I raised the idea of preparing the school garden by engaging the teachers, students, and community people. I shared the idea of Participatory Action. After hearing the concept of PAR, the Eco club was interested to invite the teachers, the students, and the community people to the building of the school garden. I and Eco club decided to include the students from Grade 4 to Grade 8 since the students below grade 4 are very small to work in the field. Similarly, the students of grade 9 and grade 10 are more focused on their SLC examination preparation and have more course work. Thus, I and the Eco-club came up with the idea of the formation of a PAR committee to prepare the school garden by inviting the students, teachers, and the community people.

Appendix B

Focus Group Discussion Topic Guidelines

Introduction

Good Morning. My name is Bineeta Baral from Kathmandu University. I am a student from Master in Sustainable Development and here I am invited to research school gardens through participatory action research. I would like to thank you all for coming. Today we are here to discuss the idea of the school garden.

Present the purpose

The purpose is to get your perceptions on the school garden and how to set up the garden by connecting it with teaching and learning. I am not here to share information or to give you my opinions. Your perceptions are what matter. There are no right or wrong or desirable or undesirable answers. You can disagree with each other, and you can change your mind. I would like you to feel comfortable saying what you really think and how you really feel.

Discuss procedure

Our Ph.D. student will take the photographs and I will audio record this discussion on my mobile phone so that I do not miss anything you have to say. As you know everything is confidential. No one will know who said what. I want this to be a group discussion, so feel free to respond to me and to other members of the group without waiting to be called on. However, I would appreciate it if only one person did

talk at a time. The discussion will last approximately one hour. There is a lot I want to discuss, so at times I may move us along a bit.

Participant introduction

Now, let's start by everyone sharing our name, what we teach, which class you represent if you are a student.

Rapport building

I shared about the cyclical nature of PAR. I explained that this research approach invites PAR members to be the coresearchers of this school garden research project. I further mentioned that the PAR project facilitates learning collaboratively and reflectively. After that, I invited the eco-club coordinator Samana to share the idea of the school garden.

Set of Questions for moderator

1. Why is the school garden important to the students and teachers?
2. When exactly the school is planning to set up the school garden?
3. In which area, the school is planning to set up the school garden?
4. How the school is planning to prepare the school garden?
5. What are the resources needed for the school?
6. How the school is thinking to collect those resources to set up the school garden?
7. How can the school manage the time to set up the school garden?
8. How would the school utilize the manpower to nurture the school garden?

Appendix C



Figure 1: PAR committee focus group discussion on 8 Sep 2018 at the action school

Appendix D



Figure 2: PAR committee conducted visual mapping

Appendix E

Informal Interview Questionnaire

1. Do you have any information on the school garden?
2. How can this department help school set up the school garden?
3. Is there any expert who can visit the school?
4. What resources could this department provide to the school?
5. Is there any example garden to visit for the students and teachers from the school?

Appendix F



Figure 3: PAR committee visited Hasera farm

Appendix G





Figure 4: PAR committee in the actions of building the school garden

Appendix H



Figure 5: PAR committee observed the destructions of the school garden