Miller Center
for Social Entrepreneurship

Gham Power

Gham Power Toolbook for SuperKrishak Development

Prepared by Miller Center Lewis Family Fellows:
Morgan Billington & Maggie Walter

EXECUTIVE SUMMARY

Gham Power is a renewable-energy-focused social enterprise based in Kathmandu, Nepal, that primarily serves rural communities. As Gham has continued to scale over recent years, its mission has expanded beyond solar-oriented solutions to include other technological agricultural solutions. Agricultural apps, which are mobile phone-based, help farmers to use their land more effectively and improve their yields and incomes. Previously, Gham's primary platform for farmer engagement was Facebook. Nepali farmers are currently struggling to align their skillsets with a rapidly shifting climate, and are subsequently in need of access to more modern, sustainable farming practices. In an effort to further empower vulnerable Nepali farming communities to thrive, Gham has developed the SuperKrishak – an agricultural app designed to provide key agricultural services to farmers, including agricultural news, quizzes, and a chatbot feature. As Gham has developed their app, they have struggled to a) transition previous Facebook group users to the app and to b) build a strong app-user base.

In order to better understand the barriers to accessibility and issues with usability of the SuperKrishak, we designed and administered a digital survey and conducted a series of interviews and focus groups. Our digital survey revealed why several groups, including (i) Facebook group members, (ii) non-Facebook group members, and (iii) non-SuperKrishak users were not downloading or engaging with the SuperKrishak. Moreover, this quantitative survey data helped us to identify app usage statistics, user ratings, and key user-interface problems. Our focus groups and individual interviews provided actionable recommendations for overall app and feature development which contributed to more-broadly liked features and thus strengthened the app-user base.

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Through our action research project, we became aware of unanticipated barriers to accessibility and issues with usability from conversations with both app and non-app users. The lack of reliable cell service and internet connectivity, as well as lack of prior knowledge about the existence of the SuperKrishak were two massive barriers to access that we identified. Moreover, those farmers who know about and are able to access the app need relevant agricultural information specific to location, climate and season. Gham should address these issues by making app features non-internet dependent, and by mimicking those features offered by successful Indian agricultural apps, such as DeHaat Kisan. Examples of such features include: cropping- irrigation- and fertilizer-calendars, marketplaces, satellite imagery, and question and answer features.

Our final deliverables support the above recommendations in a variety of ways. Firstly, our Toolbook for SuperKrishak App Development provides an in-depth analysis of our agricultural app research findings, as well as our interview and focus group transcriptions to provide Gham with actionable recommendations for existing and new app features. Our social impact assessment analysis and graphics of survey results quantify the results of our digital survey according to key user statistics and feedback. Our future scaling checklist provides Gham with advice on tangible, long-term steps that the enterprise can take on a macro level to continue to scale their app. Finally, our documentation of research methodology will help Gham replicate our research methods and processes in the future.

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RESEARCH METHODS

We began our research for Gham by conducting a comprehensive literature review of digital agricultural services that focused specifically on mobile applications in agriculture, information and communication technologies (ICT), and smart-grid systems within the context of Nepal. This preliminary research was useful because it provided us with a strong foundational understanding of digital agriculture services in Nepal. We documented our findings in an annotated bibliography linked here (also found in our appendices). Following our literature review, we began researching different Indian, African, Indonesian, and Nepali agricultural apps. The purpose of this research was to critically examine both the technical and marketing strategies implemented by these digital agricultural apps to determine which strategies were successful and which tended to fail. Beyond technical and marketing strategies, our analysis of these apps included app layout, content, features, and investors/partners. We identified India as being a leader in the digital agricultural realm due to its highly successful apps – DeHaat Kisan and Kisan Ka App from Krishi Network. As we compiled our findings from this stage of our research, we realized that we had an abundance of information. In order to synthesize our findings, we developed this document which summarizes our key agricultural app research findings, and this document which is lengthier and includes all of our agricultural app research.

Prior to departing for Nepal in July, we worked with Jonifa and Wandana to create two separate concise lists of questions for our in-person focus groups and individual interviews. Through the development of these questions and consequently our interview processes, we were able to determine what barriers were preventing farmers from utilizing the SuperKrishak, which app features were most widely used and liked, current limitations of the SuperKrishak, the ways in which the app has altered app-users' standard of living, and how familiar (or unfamiliar) Nepali communities were with the SuperKrishak overall. Our interview and focus group transcriptions can be found here, and our key findings can be accessed here.

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We also worked with the Gham Team to develop a digital survey for four main groups: Gham Facebook Group users, non Gham Facebook users, SuperKrishak-app users, and non-SuperKrishak-app users. Our digital survey was sent out in both Nepali and English, and the survey questions that we developed can be viewed here. Whereas our focus group and individual interviews prioritized collection of qualitative data to document farmers' lived experiences while using the SuperKrishak, our digital survey was more quantitatively-oriented, and included questions to assess user statistics, feedback, ratings, and problems faced by users. Our digital survey was particularly helpful because it identified discrepancies between our four groups of respondents, provided estimates of what percentage of respondents had downloaded the SuperKrishak, as well as reasons why farmers weren't downloading the app. Based on our agricultural app research findings and our focus group and individual interviews, we created a Toolbook for SuperKrishak App Development, which can be found in this document on pages 5-12.

Upon our return to the US, we determined which factors and variables to integrate into our Social Impact Assessment analysis and graphics. In order to quantify the social impact of the SuperKrishak app on farmers' livelihoods, we presented our data from our digital survey in digestible graphics. The statistics that we chose to include in our social impact assessment according to demographic data such as age and profession were: frequency of SuperKrishak usage, app retention rate, respondent opinion of overall app effectiveness, respondent opinion of app features. With the support of the Miller Center's graphic designer, Ricardo Cortez, we put together a set of infographics that displayed the findings of our digital survey according to our social impact assessment criteria. Finally, we created a scaling checklist for Gham to provide the enterprise with recommendations on tangible, future steps. This checklist is listed in order of priority and includes eight key recommendations. It can be found on pages 17 and 18.

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SUPERKRISHAK TOOLBOOK

FOR APP DEVELOPMENT

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**Gham Power**

ABOUT THIS TOOLBOOK

This toolbook includes an analysis of the strengths and weaknesses of the SuperKrishak app and provides recommendations for existing and new app features. It was designed to directly support Gham's app-scaling process. Utilized in conjunction with our social impact assessment graphics, this toolbook can serve as a foundation for future app development.

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STRENGTHS
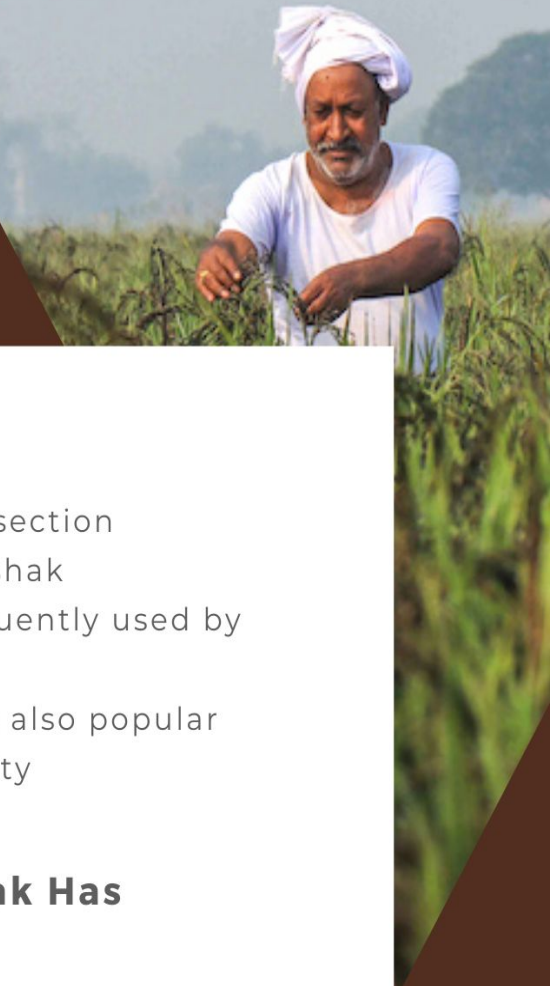
Popular App Features

- Many farmers like the article section available within the SuperKrishak
  - This feature was most frequently used by app users
- Daily agricultural quizzes are also popular within the app-user community

Specific Ways SuperKrishak Has Benefitted Users

- Market prices available on the app are helpful and have allowed farmers to save money
- Weather updates and information are helpful to farmers in making decisions for their farm such as what to grow
- Farmers have been able to implement the content that Gham includes in their agricultural articles
- Crop diseases that Gham posts on the app help farmers troubleshoot their own crops

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WEAKNESSES
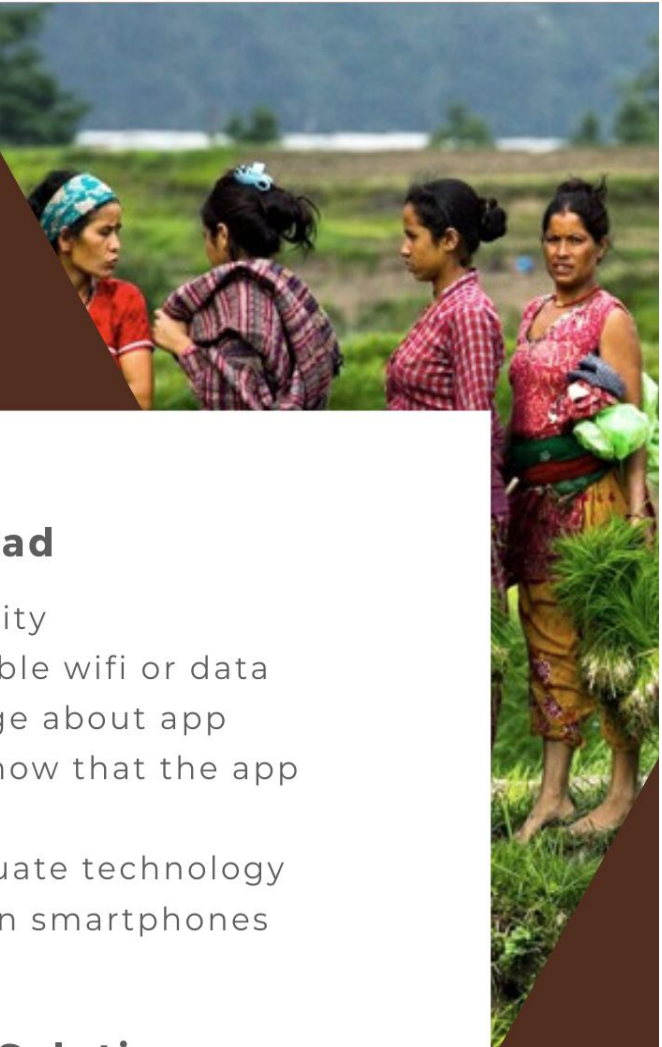
Barriers to App Download

- Lack of internet connectivity
  - Inability to access reliable wifi or data
- Lack of previous knowledge about app
  - Many farmers do not know that the app even exists
- Lack of smartphone/adequate technology
  - Some farmers don't own smartphones

Key App Problems and Solutions

<u>Problem:</u> network issues in remote areas (poor mobile data, wifi is expensive), therefore the majority of farmers have burner phones
<u>Solution:</u> make app features available offline & compatible with burner phones
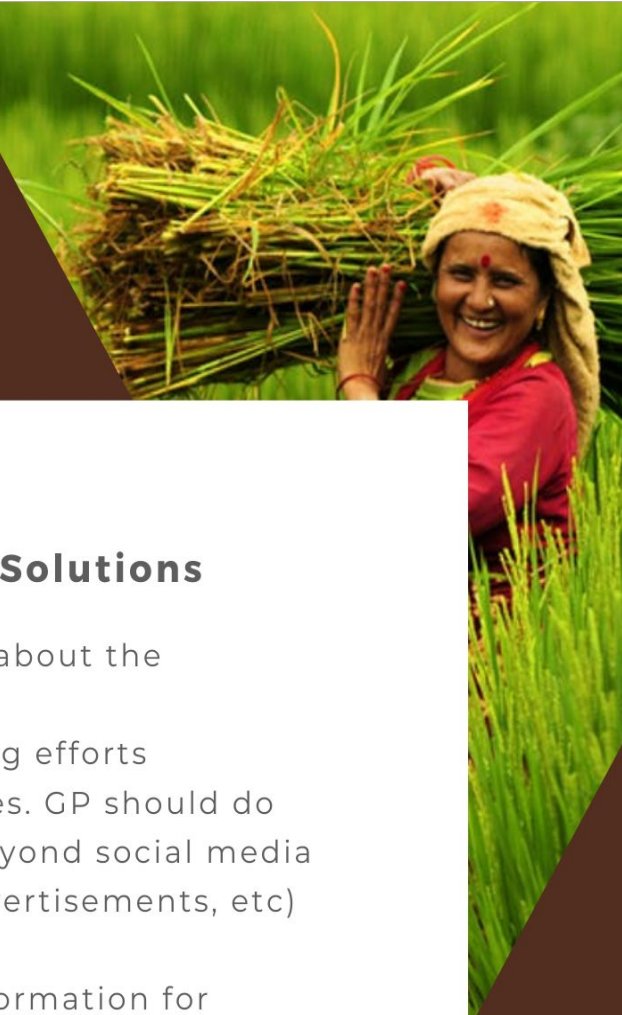
<u>Problem:</u> issues with pest and disease management
<u>Solution:</u> development of photo feature where farmers can submit images for troubleshooting

Key App Problems and Solutions

<u>Problem:</u> lack of knowledge about the SuperKrishak App
<u>Solution:</u> increased marketing efforts particularly in other provinces. GP should do more marketing outreach beyond social media (i.e., brochures, billboard advertisements, etc)

<u>Problem:</u> lack of relevant information for farmers in different regions and climates
<u>Solution:</u> classification of agricultural information by location, by climate zone, and by season

<u>Problem:</u> lack of frequent app updates available for farmers
<u>Solution:</u> more regular (daily) notifications from the app

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Recommendations for

EXISTING APP FEATURES

Changes to Agricultural Article Section
- Post daily articles (Geo Krishi updates their content daily, Gham Power should mirror this practice in order to boost user engagement)
- Article ideas (as suggested by users)
  - Training on urban rooftop farming
  - Training specifically for urban farmers
  - Vegetable waste composting
  - Post-harvest processes → specifically post-harvest process for storing and transportation would be beneficial for farmers

Offline or Non-Internet Dependent Features
- Have features of the app that can work without needing internet connection, or features that can be downloaded and saved for later
  - Ncell specifically for data in Nepal offers poor coverage (nothing beyond 3g)

Further Development of Chatbot Feature
- Create a photo feature where farmers can send in a photo/video and get the personalized agri advisory and troubleshooting advice as an aspect of the chatbot feature

Improvement of Quiz Feature
- Make it clear what the correct answer is (from the user's end), so that farmers are able to take note of how the answer they chose compares to other answer options

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NEW APP FEATURES

Three-Tiered Farming "Workbook" Feature

Cropping Calendar
- Provide specific cropping calendars by region and by season with recommendations for farmers
- Include information about when certain crops are more favorable to grow versus when others are

Goal - Inform and educate farmers about the various crops that they can and should produce in their specific region based on the time of year, maximizing the potential crops that can grow in specific regions.

Fertilizer Dose Feature
- Advise farmers of proper fertilizer amounts to be utilized based on factors such as: crops, seasons, amount of irrigation needed, etc

Goal - Allow farmers to use the correct amount of fertilizer when harvesting their crops, leading to better growth and taste of crops, as well as less over- or under-usage of fertilizer.

Irrigation Requirements Feature
- Advise farmers on water requirements for crops based on season, climate, and region

Goal - Allow farmers to maximize the efficiency of their water usage as well as limit the wasting of water, thus maximizing their energy savings

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Recommendations for

NEW APP
FEATURES

Marketplace Feature
- Enables farmers buy and sell their goods and crops directly from each other with the help of an assistant/farming expert

<u>Goal</u> - To maximize the incomes of farmers and other app users so that they do not risk losing some of their total profits through resellers

Question and Answer Feature
- Enables farmers to post specific questions and get answers from agricultural experts / other certified members of the community
- Potential to include the feature of having farmers send in recorded voice messages

<u>Goal</u> - To improve the accuracy and timeliness of troubleshooting issues for users

Satellite Imagery Feature
- Farmers can take photos of their plots of land and it can be scanned using AI to determine if the soil if healthy
- This feature could also provide weekly biotic stress reports through the mapping of farmers' plots/land via satellite imagery

<u>Goal</u> - To improve fertility and longevity of farmers' plots

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SOCIAL IMPACT ASSESSMENT

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SUPERKRISHAK DIGITAL SURVEY

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PARTICIPANT DEMOGRAPHICS

9% are < 20
53% are 20-29
25% are 30-39
13% are 40+

— AGE —

43% are students
38% are farmers
7% are in business

— PROFESSION —

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DIGITAL SURVEY FINDINGS

67% of respondents use app daily

33% of respondents use app sometimes

— USER STATISTICS —

100% of respondents find app to be useful

75% of respondents like all app features

Retention rate: 84% of respondents have not uninstalled the app

— USER FEEDBACK —

SUPERKRISHAK DEVELOPMENT

56% of respondents rated the app interface a 5/5

46% of respondents rated their first impression of the app a 5/5

USER EXPERIENCE

13% of respondents did not have access to desired or relevant features

4% of respondents found the app confusing and hard to use

4% of respondents found the app to be visually unappealing

* **76% of respondents didn't face any problems**

PROBLEMS FACED BY USERS

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Future Scaling Checklist

The scaling checklist below is designed to provide Gham with recommendations on tangible, future steps, in order of priority. Therefore, those items appearing at the top of this checklist are, from our perspective, what Gham as an enterprise must initially focus on in further scaling the SuperKrishak app. This scaling checklist directly supports Gham's mission – to empower vulnerable Nepali communities to thrive through technological agricultural solutions.

We would also like to preface our scaling checklist by noting that in order to successfully scale the SuperKrishak and hence, follow our checklist, Gham must first work to secure more app funding. Similar to the steps that other successful agricultural apps have taken, Gham must increase outside investors and partnerships. We suggest that Gham consider connecting with DeHaat Kisan's investors including AgFunder, Sequoia and RTP Global. Moreover, looking for funding opportunities from European governments, other MicroFinance Institutions, and the United Nations Capital Development Fund will also contribute to Gham's app scaling efforts.

1. **Increased SuperKirshak Marketing and Advertising**
   a. Increasing marketing efforts (both digital and non-digital) in various Nepali provinces (beyond just Province 1 and Province 3, if possible)
   b. Creating more handout flyers to promote app, as well as a distribution plan
   c. Looking into advertising the SuperKrishak app on larger-scale bulletin boards
   d. More marketing on Facebook, LinkedIn, and Youtu\be Channel (more of these
      types of promotional videos)
2. **Improvement of Existing App Features**
   a. Quiz feature
      i. Updating this feature to make it clear from the users end what the correct
         answer is on quiz questions
   b. Article feature
      i. Posting daily articles on more diverse topics (i.e. urban rooftop farming, training specifically for urban farmers, vegetable waste composting, etc)
   c. Chatbot feature
      i. i. Further development of the chatbot feature to include a place where
      ii. farmers can send in images/videos and receive personalized agri-advising

Future Scaling Checklist Cont.

3. Development of New App Features

    a.   Non-internet dependent features

    b.   Three-tiered farming workbook feature

        i.   Can include a Cropping Calendar, updated Fertilizer Dose Feature, and Irrigation Requirements Feature

    c.   Marketplace feature

        i.   Allow farmers to buy and sell their crops from one another; could be added onto the daily market rates feature

    d.   Satellite Imagery feature/Q&A feature

        i.   Implementation of AI technology to assess general plot health, as well as a question and answer feature where farmers can search through a user database to see if their questions have already been answered before

4. Hiring of New Gham Intern/Expansion of Marketing and App Team

    a.   Hiring a new intern to replace Jonifa after her departure from Gham

    b.   Expanding the marketing team so that more support is available in the expansion
of SuperKrishak marketing efforts

5. Collaboration with New Miller Center Fellows

    a.   Continue to partner and work with the Miller Center and their fellows via the accelerator program and the Miller Center Lewis Family Fellowship

    b.   Collaborating with future fellows, who can come during the summer of 2023 and continue the work that we have started (we are happy to work with them to help them understand what we did and why/how we did it)

6. Implementation of Second Digital Survey

    a.   To compare our baseline results/findings to future findings

    b.   Ideally creating a schedule for an annual or biannual digital survey so that farmer
feedback is being recorded and implemented more regularly into app development

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6. Scheduling of Additional Farmer Interviews and Focus Groups

a. Again, this will be useful to compare baseline results/findings to future findings
b. Scheduling additional farmer interviews and focus groups to better understand
    those issues that farmers are presently facing so that app development is responsive and appropriate to these needs/issues

7. Additional research of Nepali and Asian/African Agricultural Apps

a. DeHaat Kisan, Krishi Network, and Htwet Toe are great ag apps from India and Indonesia that Gham should continue to monitor in order to get new ideas and inspirations for further app development

Conclusions and Inspirations

We are confident that Gham has the tenacity to massively scale the SuperKrishak app, and are excited to watch as this technological agricultural solution becomes even more impactful. That being said, the success, and subsequent future growth of the SuperKrishak will not happen overnight. Rather, it will require regular examination of the efficacy of both older and newer app features, periodic assessment of overall app-user experience, drawing inspiration from other successful agricultural apps, and further expansion of the Gham team itself. Without substantial and secure funding, none of the above can occur reliably. Therefore, it is vital that Gham work to expand its network of investors and stakeholders as drastically as possible. Coupling this with the integration of user and non-user feedback (i.e. via the replication of our research project) will set Gham up to have a strong foothold in the agricultural app realm within Nepal, and potentially throughout the rest of Asia.

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APPENDICES

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