FarmBase: Supporting Agricultural Accreditation

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ABSTRACT

The farm environmental accreditation process is a time consuming, costly and document-laden endeavour. *FarmBase* enables efficient management and auditing by providing agribusiness and environmental data in an integrated system.

Keywords

Document management, accreditation, capstone

1. INTRODUCTION

Ian Brown Consulting has been using word documents and Excel spreadsheets to undertake the process of environmental auditing of farms that are using, or wanting to use the irrigation waters supplied by the irrigation companies in North Otago and South Canterbury. This is a time consuming and document-laden endeavour. The following document outlines the technical and developmental processes involved in developing our solution: *FarmBase*.

The application will create, store and be able to edit the core farm data.
The application will be able to create farm management plans.
The application will be able to audit against farm management plans.
The application will help create action plans based on audits.
The application will be able to display audited data in a way that farmers and the community can easily understand.
The application will be accessible via the web via a mobile device for on the farm use. This will require 3G or Wi-Fi connectivity
The application will be accessible to all levels of computer literacy.
The application will handle the different user rights of auditors, farmers and the community accordingly in relation to viewing audit data.
The application will generate and provide relevant reports on request

In developing *FarmBase,* we used the agile, iterative methodology. In this methodology development is split into three main iterations.. Our first iteration consisted of building an understanding on the system our client wanted to build and creating a project proposal and a wireframe model to suit. This gave us some great feedback on how to proceed with the design and interaction into the second iteration.

The second iteration had us taking the proposal and feedback from paper based testing and creating a stable development platform to begin building towards the minimum viable product. Though before any sort of development could begin, we needed to define the function requirements for such a system. The process involved in developing these robust functional requirements involved creating user profiles, cases and stories to help build a picture on what tasks various user groups would want to undertake in the system. The results of this process can be found in section 4.3. Once the functional requirement we developed. Work on the system began, focusing on one functional requirement at a time. For the MVP we focused on the function requirements surrounding data management and auditing. On the 13th of July we went to the North Otago Irrigation Company's offices in Oamaru and presented our MVP to Ian and various other interested parties.

Once MVP had been deployed and our client had given us feedback on the system, we began iteration 3. The first step of iteration 3 was taking a step back and evaluating what we wanted to deliver at the end of the year. It was shortly decided amongst the group and the client that we could not do this with the current system of vanilla PHP and HTML. So a Yii framework was adopted.
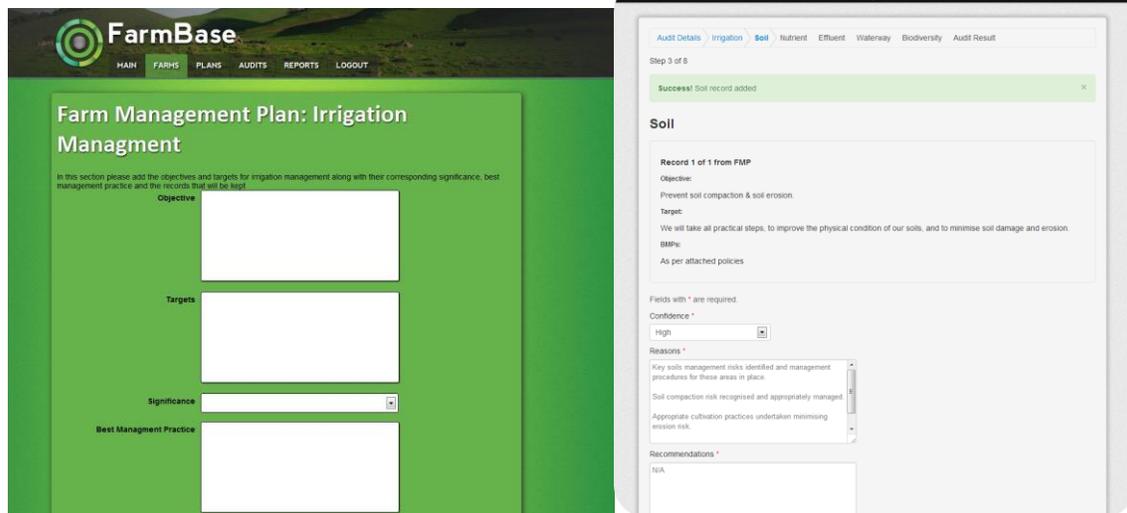
Figure 1: *FarmBase* **implemented in Yii.**

2. Technical Highlights

2.1 Wizard Forms

Our first technical highlight is the multi-step wizard forms. Our application had a number of large forms for inserting data and after doing research into how to deal with large web forms it became apparent that we would need to split our forms up somehow to make them more user-friendly. There were several ways we could do this including splitting the forms across tabs, splitting sections using collapsible/expandable regions or splitting the form into multiple steps. In the end we chose to do the forms as a step-by-step wizard as this was better if the forms contained more than two steps and certain steps were dependent on previous steps being completed. We discovered an extension for Yii which provided the wizard functionality but had to adapt it to suit our application so that it could insert data across multiple tables in the database.

2.2 Dynamic form validation

Our second technical highlight is the dynamic form validation used on the farm creation form. Farms could have many different types of irrigation and agriculture but we only wanted to validate the form inputs for the types that the user had selected. Yii provided the validation for forms but no easy way of providing dynamic validation. In the end we were able to solve this problem by showing/hiding certain form fields using jQuery and by writing our own custom validation rules to only validate inputs for types that were ticked on the form.

2.3 I/UX Design

Our third technical highlight is the UI/UX design of our website. Creating a clean, simple and professional looking website for our client was important to our team, especially as two of our members were skilled in the area of UI/UX design. We started our design process through mock-ups using myBalsamiq and constantly improved upon designs through client and peer feedback. Carson designed the logo from scratch and Adam, who is a skilled photographer, provided the images for the site. We also used the Twitter Bootstrap CSS framework which not only provided user friendly input widgets but also helped bring all of the elements of the site together into one coherent design.

2.4 Database Design

Our fourth technical highlight is our database design. Designing the database was one of the first and most important technical tasks we undertook. The challenge was in converting the old document based audit system into a relational database that would interface with our application and provide all of the required functionality. Our database design went through many iterations to reach a stage where we confident it would satisfy our client's requirements. We designed it in such a way that it interfaces well with Yii and complies with Yii conventions.

2.5 Audit Wizard

Our fifth technical highlight is the audit wizard. Our client wanted audit results to be automatically calculated at the end of the audit wizard and provided us with the criteria for calculating this. We implemented an algorithm to calculate these results based on the number of high, medium and low confidence ratings, which further simplified the audit process.