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Building Resilience: Incentivizing Agricultural Water Conservation in Utah Amid Climate Uncertainty and Prior Appropriation Water Rights

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Data Management Plan

Our team will build on the infrastructure and protocols established during grant writing for the data sharing and collaborative work of this project. We will set up a shared drive (Box) and collaboration workspace (Microsoft Teams). Following publication of results, or within 12 months of completion of project activities (whichever comes first), the datasets and accompanying metadata including code and computer programs will be made publicly available using a library-based data repository such as *digitalcommons@USU*.

Expected Data Types

We will generate data in our digital labs through data processing and model runs. This data will include numerical and categorical data on such as private farmers' willingness-to-accept payments and marginal costs of agricultural water conservation.

We already have significant amounts of geospatial data from an ongoing USDA-NIFA grant. This data includes land use and land cover including crop type, vegetation index, climate (precipitation and weather), topography, economics (property values and type, historical records of ownership and zoning), and agricultural statistics data (census). Much of this data has already been compiled by federal and state agencies. This data is stored on the project's shared drive (Box). Additional spatial data such as irrigation water rights (priority date, point of diversion, water quota, etc.), irrigation methods, and river runoff will be collected and processed.

All data will be manually double checked for errors and processed using statistical software.

Data Format

Spatially explicit data will be saved in a geodatabase. Data from model runs will be exported and saved as the network Common Data Form (NetCDF), text, tab delimited, or image files and also saved in Excel. Both raw and processed data will be stored to facilitate error checking.

Meta-data describing the goals of the project, location of research sites, methods or means of collection, collection dates and all appropriate units will be generated for all data type to facilitate data sharing.

Data Storage and Preservation

Data produced by the project including computer programs will be stored in the cloud using Box (a cloud-based file storage system). Climate model experiments will be also stored in the archiving resource of the Center for High Performance Computing's (CHPC) where the experiments will be conducted. All data and code will be preserved for (at least) 10 years from the end of the project. In the (highly) unlikely event that Box cease to exist in that time frame, suitable alternatives will be utilized.

Output from models will be also saved digitally in the cloud of Box on a daily basis. This data will be transcribed to the appropriate electronic format (e.g. Excel, Word, image files, etc.) on a weekly basis.

Notebooks from stakeholder meetings and interactions will be scanned to pdf format within two days of the meeting and transcribed to the appropriate electronic format such as Word. All notebooks will be stored in a locked cabinet. Computer data is backed up daily on Box (or other cloud-based storage system).

Reminders to double check data entry and backup data at the end of each week will be emailed to students working on the project. Students will be reminded of data quality and control procedures at monthly lab meetings.

At the end of the project, the project PD and Co-PD will work with USU librarians to store data and metadata in the USU long-term repository Digital Commons, which uses a metadata scheme based on Dublin Core. Data will be placed under an embargo preventing public access until the date of publication.

Data Sharing and Public Access

Once published, any raw data from non-human subjects (text, tab delimited or image files) and corresponding metadata will be made publicly available through the USU Digital Commons, which provides a search interface for public access to datasets of USU researchers, and other public repositories appropriate to the published location. Data embargo periods will vary depending on the speed at which the data can be analyzed and published.

Roles and Responsibilities

All students and staff on the project are responsible for digitizing and or manually entering and backing up data on a daily basis and adhering to the data management plan.

Each PD/Co-PD on the project is responsible for reminding students and staff under their direct supervision on a regular basis of the importance of maintaining the data management plan. Each PD/Co-PD on the project is also responsible for double checking that the data management plan is indeed being adhered to by all students and staff.

Man Li, the lead PD on this project, will be responsible for collecting data from the Co-PD and working with the USU librarians to make it available on Digital Commons and or other sources after publication.

Monitoring and Reporting

The PD and Co-PD will meet annually to discuss compliance, adequacy, and any necessary revisions to the data management plan.

The PD will be responsible for collecting annual and final progress reports from the Co-PD and submitting them to the USU Agricultural Experiment Station Director for submission to USDA NIFA.