

SolCAP Logic Models

The SolCAP project is described by research, education, and extension logic models. All three activities will lead to impact in translational genomics, defined as converting discoveries from genome sequencing projects in the laboratory into applied outcomes in crop improvement. All activities involve a broad spectrum of faculty, staff, and end users, and have the potential to more rapidly build a knowledge continuum. These models serve as the basis to identify the actions that will lead to desired outcomes; delineate broad stakeholder involvement; express important fundamental project initiatives; identify actions that will lead to desired results; and delineate outcomes over the four year project timeline. These models also create a framework of reference points for the project to remain on task and move collaboratively forward.

Problem/Need: Characterization of sequence variation and DNA markers for elite germplasm in Solanaceae is incomplete, as is an understanding of their use in breeding Solanaceae crops. SolCAP will focus on defining DNA sequence variation (markers) linked to trait variation in elite materials; load results into usable databases; communicate efforts using a variety of highly accessible formats targeted at specific communities of interest; and affect production and consumer choice in the long run.

Project Inputs, Outputs, and Outcomes: Resource allocations are well-placed to reach stated outcomes/impacts. Research activities will move seamlessly from the lab to the field where breeders are well positioned to apply the results. As a result of this project, Solanaceae breeding will more fully utilize genotype-assisted selection, with sequence variants being identified in candidate genes that are important to product quality and consumer choice. Significant research results will be broadly shared, explained, and posted in a variety of formats that can be easily understood and used. Education and extension will target plant breeders, graduate students, agricultural professionals, and extension specialists through project portals (e-Extension website of tools and resources). We believe this approach will facilitate amplification of project impact to producer and grower communities, and be reflected in broader consumer choices. The inputs, outputs and outcomes are clearly delineated and stated as measurable objectives.

SolCAP RESEARCH Logic Model						
SITUATION: Characterization of sequence variation and DNA markers for elite germplasm in Solanaceae is incomplete and knowledge of genetic variation in relevant breeding material is lacking; thus limiting MAS, breeding, variety improvement, advances in crop production, and consumer choices.			PRIORITIES: Define markers linked to trait variations in elite materials; load results into usable databases; communicate efforts; and affect production and consumer choice.			
INPUTS	OUTPUTS		OUTCOMES - IMPACT			
			Short		Medium	Long
Project Leaders from five Universities: MSU, OSU, Cornell, UCD	Identify and catalog sequence variation for key metabolic pathways	Define effective implementation strategies for genomics-assisted vegetable improvement	Identification of genetic markers that are polymorphic in breeding populations	Breeding programs have increased knowledge of patterns of variation in germplasm (market classes and regional adaptation)	The use of genome-assisted breeding information will increase	Tomato and potato varieties are improved for quality, yield, pests, processing, nutrition and stress
Funding Sources: USDA/NRI; ARS; UC Discovery; commodity boards: NPC, CTR, MAFFA	Create a genotyping platform that is accessible to potato and tomato breeding programs	Enhance existing databases and tools to create centralized and breeder-friendly resources for genotypic and phenotypic analysis	New descriptions of how variation is distributed within and between breeding programs	Updated Germplasm collections (NPGS)	Changes in breeder attitudes about value of technology and needs of users is documented	Rural economies are strengthened through increased crop production options
Research Facilities (existing core facilities)	Establish cooperator guide for phenotypic data collection	Small grant program to leverage resources	Databases and breeder friendly access portal at MSU and SGN	Genomics community has provided plant breeding community valuable new information	The number of crop varieties in which breeders are employing genome-assisted methods increases	Consumer satisfaction is increased as new Solanaceae varieties become available in markets
Industry Cooperators			Published articles in peer reviewed journals	Plant breeders become familiar with marker-assisted breeding and databases	Breeding programs implement genome assisted breeding	
National Plant Germplasm System	Integrate phenotypic data with high throughput genotyping to provide a framework for mapping					
Stakeholder & Scientific Advisory Boards						
ASSUMPTIONS: - More research/data are needed on genotyping of Solanaceae crops. - Because of crop DNA similarities, resources can be efficiently leveraged. - When the translation of science and information sharing takes place at multiple levels, producers and consumers will be affected positively.			EXTERNAL FACTORS: - Newer technologies make possible advancements through our knowledge of trait variations. - SGN currently not used by breeders. - Few practical markers available for MAS in Solanaceae crops. - High throughput genotyping not yet available.			
Evaluation: Focus - Collect Data - Analyze and Interpret - Report						
What do you want to know? - What new data is now available as a result of this project? - How are project results being publicized to broader communities of interest? - What level of reception is data receiving: is it useful; valued; shared?			How will you know it? - Ask project researchers (qualitative data collection). - Find out what has been or is in process of being written/published or reported (qualitative data collection). - Stakeholders within communities of interest (survey tools to be developed).			

