REPORT TO THE TWENTY-FOURTH LEGISLATURE

REGULAR SESSION OF 2007

RELATING TO DIVERSIFIED AGRICULTURE INDUSTRY: CO-EXISTENCE OF ORGANIC, CONVENTIONAL, AND BIOTECHNOLOGY FARMING METHODS

Prepared by

THE STATE OF HAWAII
DEPARTMENT OF AGRICULTURE
PLANT INDUSTRY DIVISION

In response to Senate Concurrent Resolution 208, Session Laws of Hawaii 2005

Honolulu, Hawaii
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RELATING TO DIVERSIFIED AGRICULTURE INDUSTRY:
CO-EXISTENCE OF ORGANIC, CONVENTIONAL, AND
BIOTECHNOLOGY FARMING METHODS

OVERVIEW FROM THE HAWAII DEPARTMENT OF AGRICULTURE

Agriculture is an important contributor to the State's overall economic health. In order to sustain the growth of agriculture, the industry must continue to evolve and expand its markets. Successful diversification of agriculture in Hawaii requires that farmers be given the opportunity to makes choices regarding crops and production methods used to be competitive in chosen markets. Each farmer must make the most productive use of resources to attain success.

In response to concern that production systems in agriculture may not be compatible (i.e., conventional farming versus organic farming), the 2005 Legislature requested that a dialogue be established between the sectors to promote understanding; and that a process be developed to provide a framework of successful co-existence. The goal of this effort is the mutual success and prosperity for agricultural producers including organic, conventional, and biotech farmers in Hawaii.

Organic, conventional, and biotech farmers were asked to define agriculture practices that benefit our economy, environment, and community while mitigating negative consequences to the same. They also identified areas of common ground that would need to be addressed to allow the industry to forge a strong voice for agriculture and work together to preserve and develop Hawaii's agricultural industry. As such, the dialogue allowed farmers to understand the methods and challenges of other farming practices and to identify issues that all farmers face.

The attached report, "Exploring Coexistence: Preliminary Best Management Practices for Diverse Farming Practices," was submitted by the Hawaii Farm Bureau Federation to the department.

Hawaii Farm Bureau Federation convened a series of seven meetings over the course of the past year with the intent of creating a framework for dialogue and agreement on "Best Management Practices," that adequately support the state's varied commercial agricultural producers, namely organic, conventional, and biotechnology-derived operations. Best Management Practices, (BMP's) are voluntary, beneficial guidelines that are intended to mitigate risk to potentially competitive neighboring growers, while concurrently enhancing market-based economic opportunities.

The first three subject areas undertaken by the group were 1) maintaining and securing seed supply; 2) biological drift management; and 3) chemical contamination.

As the meetings progressed, common themes consistently repeated in discussions. As such, it is critical that these findings be given significant consideration:

- Communication between stakeholders is critical
- Grower-to-Grower dialogue and discussion of planting intentions can mitigate risk and possible confrontation
- Effective educational outlets and resources are needed for growers, and may benefit the larger community as well.

The findings of the report will be taken to public meetings for further input later this year. However, in the interim, the department strongly recommends that this dialogue continue and there be expanded discussions on agriculture viability and growth. Because a fragmented agricultural sector will only weaken all farmers' chances of sustainability, we strongly suggest that future discussions also continue with the agreed upon framework that guided the best management practices:

- The achievement of a balance wherein farmers may engage in any farming practice or farming culture with minimal incursion, influence or detriment to and from other farming practices;

- The establishment and continuation of a methodology for addressing new issues and solutions in order to maintain this balance;

- The recognition that all farmers of all farming cultures require and deserve equal opportunity to technology, legislation, education and funding that enhances their economic stability; and

- That State institutions understand and recognize the need for equal opportunity of all farming cultures in their deliberations, procedures and enactments.

A National Perspective:

The National Association of State Departments of Agriculture (NASDA) and the Pew Initiative on Food and Biotechnology, in their findings, have stated

"It is a basic principle in the U.S. that farmers should be able to produce commodities by any method they prefer and to market them in any market available, assuming they meet all safety and marketing standards. In recent years, market access problems have arisen such that growers of conventional and organic crops have at times not been able to meet the specifications required by their markets, due to unintended commingling with genetically engineered (GE) plant material. While the problems to date have involved financial losses to conventional and organic growers, many expect that the growers of GE crops with high-value output traits will soon face similar challenges in meeting stringent market specifications.

The need to segregate crops by production methods is a relatively new development in agriculture. Strict, though varying, rules regarding GE crops in international markets are a key driver of the issue. The lack of standardized, internationally accepted marketing standards, testing methodologies, and protocols pose a significant challenge to the smooth and efficient operation of both domestic and international agricultural marketing chains. At the same time, they provide a marketing opportunity for producers and marketers who can successfully navigate the maze of standards and regulations.

Oftentimes policymakers, particularly state agricultural officials, are challenged to "pick sides" among GE, conventional, and organic production methods. In reality, however, all of these production methods provide key opportunities for U.S. farmers and are critical to the long-term viability of our rural communities. In fact, the rapid adoption rates in the U.S, of both organic and GE production methods over the past decade could suggest that some synergy does exist. Some of the growth in demand for organic foods is certainly driven by consumers who seek to avoid products derived from GE crops. In turn, U.S, growers of GE crops have been able to operate free of mandatory labeling (which has significantly suppressed GE crop adoption rates in other countries) at least in part because of the existence of a robust domestic organic market. So at the macro level, coexistence between organic, conventional, and GE crops is taking place.

At ground level, however, farmers continue to periodically have loads of grain rejected because they do not meet market specifications. The question is, how can growers of conventional, organic, and GE crops coexist peacefully in today's marketplace? How can we ensure as few problems as possible for all producers, so that they all effectively and efficiently market their crops?

Exploring Coexistence:
Preliminary Best Management Practices for Diverse Farming Practices

Report to the
Hawaii Department of Agriculture

Submitted by
Hawaii Farm Bureau Federation
December 2006

TABLE OF CONTENTS

SECTION 1 – EXECUTIVE SUMMARY

The Hawaii Farm Bureau Federation sponsored and hosted the Coexistence of Farming Practices meetings, as mandated by the 2005 Hawaii State Legislature (Appendix 1). The purpose of the meetings was to initiate discussions and identify common ground among farmers in Hawaii who use conventional, organic, and biotech farming practices. A diverse range of agricultural producers took part in these discussions, some of who practice more than one method on their respective farms.

Participants engaged in a seven-meeting process in which they shared their practices and learned about the regulations that affect agriculture. Participating farmers worked together to create recommendations for best management practices (BMPs) on how to farm using their method of choice without impeding the agricultural practices and business of other farmers. The results of these discussions are detailed in this report.

The participants identified and categorized BMPs into three subject areas: Seed Supply, Biological Drift Management and Chemical Contamination. A general structure was developed within each of these areas, covering communication, education and governance, as well as practices unique to each topic.

<u>Improved Communication</u>

- Communication between stakeholders is critical.
- Farmers can alleviate some problems by discussing agricultural practices with neighbors.
- If voluntary neighbor communications are not effective, then reporting agricultural practices to a third-party governing body will be necessary. The third-party body may make information about these practices widely available.

<u>Improved Education</u>

- Good education about agricultural BMPs is essential.
- The educational needs of farmers vary greatly based on crop and operation size.
- Without education, liability for misconduct in agricultural production is a significant concern that exacerbates potential disagreements among neighbors.
- Education must also include consumers and the general public.

<u>Third-Party Governance</u>

- Best management practices will only improve the agricultural industry if they are enforced. A third-party body should be employed to encourage effective communications, supply education, and mediate compliance with best management practices.

The recommended best management practices were agreed to by all participants. Participants were also given the opportunity to submit alternative BMPs if they felt their views were not adequately represented by a recommended BMP. Alternative BMPs were not discussed by or agreed to by the group.

Hawaii Farm Bureau Federation firmly believes that farmers must work together on issues critical to the agriculture industry. The development of these recommended best management practices is a first step in an ongoing dialogue about managing vital resources with wisdom, respect for one another and commitment to future generations.

SECTION 2 – INTRODUCTION

2.1 Umbrella Statement

The participants adopted a broad statement of purpose illustrating the goals they set to achieve in this project.

> **We, the united farmers of Hawaii, understand that agriculture is not just a career path; it is a necessity to humanity's existence and evolution. In this spirit, we have come together to consider the status of local agriculture in the context of current global circumstances.**
>
> **Our intention is to make a statement of commitment to pono, responsible agricultural practices that are aligned and in harmony with the needs and desires of our varied individual farmers, humankind and the environment that sustains us all. To that end, the true and lasting success for a farmer and his community begins with responsible stewardship and respect for the land; the aina.**
>
> **Our commitment to responsible respect for each other and the land will result in clean water, clean air, viable soil and environmental health while providing healthy, nutritious food. Through our ecological sensitivity and mutual respect will grow sustainable, economic success for individual farmers and health for our communities and state now and into the future.**
>
> **Agricultural collaboration starts with us, but ends with humanity.**

2.2 Framework for the Best Management Practices (BMPs)

After significant discussion, the group agreed on a framework to guide the development of best management practices. The framework includes:

- The achievement of a balance wherein farmers may engage in any farming practice or farming culture with minimum incursion, influence or detriment to and from other farming practices;
- The establishment and continuation of a methodology for addressing new issues and solutions in order to maintain this balance;
- The recognition that all farmers of all farming cultures require and deserve equal opportunity to technology, legislation, education and funding that enhances their economic stability; and
- That State institutions understand and recognize the need for equal opportunity of all farming cultures in their deliberations, procedures and enactments.

SECTION 3 – BEST MANAGEMENT PRACTICES

3.1 Seed Supply

3.1.1 Rationale

General crop production practices for all seed crops -- including the growing, harvesting, processing, transport and use of storage equipment -- are possible points of seed contamination or co-mingling. All seed producers need to practice good crop husbandry, follow strict cleaning procedures, and maintain accurate records to avoid inadvertent contamination or co-mingling of seed crops.

Maintaining high levels of seed varietal purity and biodiversity is vital as many sources of seed have diminished over the years. Identifying BMPs for preserving the integrity of these seed banks and germplasm repositories is important for all growers.

Varietal integrity is essential to marketing and industry expansion. New, unique varieties appeal to consumers who might not have appreciated a crop before, thereby expanding the market. Variety selection is essential to ensure suitability of various crops to Hawaii's different microclimates and soil conditions. Well adapted varieties lead to better food security. Farmers need increased availability for distinct varieties obtained from seed producers and from careful and thoughtful on-farm seed selection. Farmers need best management practices that ensure new plantings will be of the intended variety through knowledge of genetics and pollen flow in their neighborhood.

Food producers in Hawaii include the whole range between commercial agricultural producers and subsistence farmers. Farmers have a traditional right to save and collect nonpatented seed from their growing environment. In this way, crop seeds or plants available in the farmers' growing regions are included in their seed supply. Farmers can engage in plant and seed selection as appropriate to their crop and region. The group continues to grapple with questions about where the responsibility and resources for preserving seed purity rest. For example, local seed stock that remains free of unintended patented or foreign genes is a challenging issue. At the same time, plant breeders have the legal right to create and sell patented seed.

There also continues to be challenging issues in the area of defining seed purity. The group discussed recommendations for supporting the integrity of existing, locally adapted seed stock. We support efforts by all parties to ensure that locally available seed stock remains pure. Many group members defined purity as that which is a reasonable goal in an agricultural seed production environment, recognizing that 100% purity, or "zero" presence of any unintended, unspecified, or non-targeted material, is scientifically impossible. However, other group members recognize that both certification and market requirements affecting organic and other international markets demand zero tolerance, thereby creating the potential for economic and market losses.

3.1.2 Governance

Form a review board of stakeholders with equal representation by conventional, organic and biotech farmers. The review board will meet quarterly or as necessary to:

- Develop seed production protocols to protect important Hawaii crops (i.e. coffee, banana, etc.).
- Track trends and issues in conventional, organic and biotech crop developments and regulatory changes that may impact Hawaii growers' efforts to maintain seed purity protection practices.
- Review crops to provide data, information, agricultural practices and market concerns for the Hawaii Department of Agriculture (HDOA) to consider in developing Hawaii performance standards for future biotechnology permits.
- Mediate and recommend solutions between growers prior to planting sexually compatible crops.

3.1.3 Information Access

The U.S. Department of Agriculture currently hosts a biotech information portal with links to all sides of the issue that can provide information for grower discussions.

3.1.4 Communication

Prior to planting a crop of the same species or a crop that is sexually compatible, growers should inform and consult with neighboring growers and commodity groups within the pollen and seed transfer ranges.

3.1.5 Separation Practices

All seed producers must separate conventional, organic and biotech crops at all known points of possible co-mingling (see appendix 2 for table of Points of Vulnerability in the Seed Production Process), and monitor field workers as possible pollen and seed transporters.

3.1.6 Advocacy

Advocate for resources dedicated to research on organic methodology and on seed production that promotes organic and conventional breeding of seed.

Note: Alternative Seed Supply - Best Management Practices are presented in sections 5.1 and 6.1.

3.2 Biological Drift Management

3.2.1 Rationale

The group determined that there are three main biological drift categories: biological drift associated with pollen, pathogens and insects.

Pollen drift is a biological issue when sexually compatible species with divergent genetic backgrounds are planted in a proximity that makes their unintended mating a possibility. An important example in Hawaii would be between genetically modified (GM) and non-GM crops like papaya and corn. There are also other pollen drift issues exclusive of GM crops associated with seed and crop purity.

The other biological drift categories include pathogen and insect drift. This could be an issue between neighboring farmers when pathogens or insects from a farmer's crop also impact their neighbors in a negative manner.

In an effort to alleviate the current issues associated with biological drift, it is recommended that farmers use measures to enable them to use the cultivation method of their choice without impacting their neighbors. These measures should be robust and broad enough to handle future issues that may develop in the agricultural sector of Hawaii.

The following recommendations are just a starting point. The committee believes that there are specific areas that need to be addressed on a crop-by-crop basis by appropriate experts from the agricultural community in Hawaii to establish a set of standards for each crop and a long-term environment for coexistence.

3.2.2 Specific Issues to Address:

1. Pollen: GMO and non-GMO crops
2. Pollen, Pathogen, Insect: seed / crop purity
3. Pollen, Pathogen, Insect: Hawaii-specific environment/wind
4. Pollen, Pathogen, Insect: Insect pollinators, and byproducts like honey
5. Address the changing landscape of agriculture in Hawaii over time: water/land/resources
6. Other issues may be identified in future conversations.

3.2.3 Communication

Communication between stakeholders is critical. We recommend that neighboring farmers communicate with each other about their cultivation methods and crops so that any potential issues can be addressed before they become a problem. If for some reason this is not possible, perhaps a third part organization (like the Hawaii Farm Bureau Federation) could facilitate communications. These communications are critical to the development of appropriate measures to ensure the needs of each farmer.

3.2.4 Development of Appropriate Separation Schemes

Crops may be separated to prevent cross-pollination. These separation schemes are based on the biology of each crop, and include scientifically determined separation distances, planting sexually compatible species at different times (temporal separation), and using crop-specific methods to control flowering and pollen release. Farmers can work with university researchers and other experts to develop crop-specific needs to address on-farm issues. This BMP applies to large and small-scale farms (inclusive of community and urban garden centers), and ultimately enables farmers to produce marketable crops.

3.2.5 Agricultural Practices

Farmers should be aware of agricultural practices that prevent cross-contamination. In addition to the separation schemes described in Section 02.02, education should be provided to ensure that farmers are aware of specific needs to control volunteers and other post-harvest measures that are required for their production methods. Farmers should also use integrated pest management (IPM) methodologies within all farming methods to control negative and positive insect populations. Farmers should also practice good agricultural methods to minimize weeds so that pathogens and insects do not prosper in surrounding non-cropping areas.

3.2.6 Governance

Should issues arise between farmers, a "CoExistence Board" made up of experts from the University of Hawaii, HDOA, USDA, and EPA should be formed to govern over disagreements. Organic, conventional and biotech farmers would serve on this board to deal with issues that have no other means of solution.

Note: Alternative Biological Drift Management - Best Management Practices are presented in sections 5.2 and 6.2.

3.3 Chemical Contamination

3.3.1 Rationale

The use of agricultural chemicals should be incorporated with other sound management practices. Farmers should choose methods that will manage pests (insects, weeds, plant diseases and vertebrates) cost-effectively while causing the least possible harm to people and the environment. Accurate pest identification and knowledge of biological developmental processes and behaviors are critical to effective control. To control pests with chemicals, users are required by law to comply with all the instructions and directions supplied by the manufacturer.

A primary aim of applicators of agricultural chemicals should be to minimize the possibility of spray drift as much as possible, and to apply the chemicals in the most efficient and effective manner. Both of these aims are met when applicators use principles of 'good agricultural practice' to maximize the amount of chemical reaching the target (intended site of application) and to minimize the amount of chemical being wasted on 'non-target' sites. For assistance in developing a Chemical Contamination BMP contact your local CTAHR Extension Agent, USDA/NRCS, or the HDOA.

The application of chemical pesticides and fertilizers can spread (by air and in ground water) past the targeted area into neighboring areas. Excessive or unintended application of chemicals can cause harm to people, animals, beneficial insects and the environment. In order to minimize risk to others, farmers who use chemical pesticides and fertilizers should (1) communicate with their neighbors, (2) accurately map their farms, (3) use integrated pest management (IPM) methodologies and follow approved methods of chemical application, and (4) endure the consequences of not following the above guidelines. The main chemical contamination issues addressed in this BMP are ***chemical drift*** (by air) and ***runoff mitigation*** (in ground water).

3.3.2 Chemical Drift

3.3.2.1 Communication

Farmers should agree upon a chemical application schedule with their neighbors. In the event that first-party communication with neighbors is not effective, farmers may need to report their chemical application schedules with a third-party governing agency, such as the EPA or the DOA pesticide branch. Farmers who do not communicate chemical application schedules with neighbors or a governing agency, and cause chemical disturbance to neighbors, may be liable for damages (see 03.01.04 – Liability and Consequences).

3.3.2.2 Farm Mapping

Accidental chemical drift can be avoided with knowledge of the areas surrounding the farm. Farmers should identify their property boundaries (e.g. crop fields, orchards, pastures, buildings, roads, uncultivated areas, windbreaks, hedgerows, ponds, streams, drainage ditches, dirt roads,

and paved areas). Farmers should identify sensitive areas (e.g. houses, schools, wildlife, sensitive crops, etc) surrounding their property, and avoid chemical application where drift into these sensitive areas can occur.

3.3.2.3 Integrated Pest Management (IPM) and Chemical Application

Controlling pests can be done by using IPM practices, a comprehensive approach to controlling insects, weeds, and plant pathogens. Windbreaks can be used around areas where chemicals are applied. A 300-foot buffer next to sensitive areas should be maintained. Farmers should properly calibrate chemical application equipment to avoid over-spraying. Farmers can also use low-drift nozzles and/or lower pressure on chemical spray equipment to limit drift. Farmers should also apply pesticide during light wind and lower temperatures, and avoid application when bees are pollinating to avoid accidental drift.

3.3.2.4 Liability and Consequences

In the event that farmers do not try (1) to communicate and agree upon an appropriate chemical application time with neighbors, (2) to identify and avoid chemical application around sensitive areas surrounding their property, and (3) to use agricultural practices to avoid excessive chemical application, they may be liable for chemical contamination of neighboring areas. Neighbors can initiate recourse by contacting the National Pesticide Information Center (NPIC) at 1-800-858-7378 or http://npic.orst.edu. Organic growers can notify the HOFA Certification Coordinator or office as soon as the grower is aware of prohibited material drift onto certified acreage.

3.3.3 Runoff Mitigation

3.3.3.1 Communication

Runoff can result in contamination of common water supplies, and can affect the quality of drinking water, well or rainwater catchments systems, septic tanks and cesspools, underground or above ground storage tanks (containing oil, diesel fuel, gasoline), stockpiles of animal waste, storage of chemicals, and maintenance shops. Farmers should use Best Land Management Practices to minimize chemical runoff into common water supplies. Farmers should develop a pollution risk assessment plan for the following agricultural properties: land, nutrients, pests, irrigation, livestock and pastures. Farmers should also have a plan for the storage and disposal plan for chemicals and fuel. Farmers should work with the National Resource Conservation Service (NRCS), the Soil and Water Conservation District (SWCD), and the University of Hawaii CTAHR to develop a conservation plan that effectively protects the agricultural properties mentioned above.

3.3.3.2 Farm Mapping

By mapping farm property, farmers can minimize applying chemicals that will affect neighboring areas by water runoff. Because water flows naturally from a higher area to lower-lying areas, mapping properties is essential to ensure that chemical application will not affect surrounding areas.

3.3.3.3 Integrated Pest Management (IPM) and Chemical Application

Farmers can employ agricultural practices to reduce the need for chemical pesticides and fertilizers, and therefore minimize chemical runoff. Farmers can rotate crops, use no-till practices, use crop covers, and use soil analysis to maintain a balance of minerals and elements. Farmers can also use compost to increase organic matter in the soil to reduce soil compaction and leaching, and use contour strips and windbreaks as buffers.

3.3.3.4 Liability and Consequences

Farmers who do not use the above methods to communicate with their neighbors, map their farms to avoid unnecessary or over-spraying that can spread to neighboring farms, and use integrated pest management to best control agricultural challenges may be liable for unintentional or irresponsible spread of chemicals to neighboring areas. Neighbors can initiate recourse as stated in 03.01.04.

SECTION 4 - RECOMMENDED NEXT STEPS

This committee believes continued discussion, education and partnership in developing recommendations, guidelines and BMPs are necessary to ensure successful diversity within Hawaii's professional and commercial agricultural community. It is further anticipated that these recommendations and agreed-upon principles also benefit many others who are not economically invested or dependent upon commercial crop production. Therefore, this committee recommends the following:

- Continued support and investment in an ongoing coexistence committee, as defined and described previously, that is tasked with identifying areas of concern to professional agriculture farmers and farm operators, and issuing as guidelines and recommendations that may best maximize opportunity and benefit commercial growers, while minimizing potential conflict.

- A committee begins negotiation with possible third-party resources (i.e., UH CTAHR, HDOA, HDOH, USDA, HOFA, HFBF) to implement agreed-upon recommendations.

- Establish timetable, criteria and scope for continued agricultural industry discussion on next set of BMPs. Topics to include, but not be exclusive to:
    - Address farmer-to-citizen relations issue (community neighbors, not just farmer neighbors).
    - Address the issue of preserving the traditional seed supply.
    - Review prioritized list of topics for additional BMPs and develop resources and time-table to address them.
    - Evaluate impact of BMPs and lessons learned from application of BMPs to inform future practice.
    - Conduct a full and candid discussion about liability.
    - Provide significant educational opportunities for individual/backyard/home gardeners to become aware of variety preservation and chemical usage.
    - Seek understanding of the role, responsibilities and membership of the Institutional Biosafety Committee at UH Manoa as they pertain to agricultural concerns.
    - Continue to explore ways to utilize traditional local agricultural practices to inform the development of future BMPs.

Note: Alternatives BMPs are individual viewpoints that have not been discussed or agreed to by the group, but have been submitted to provide alternative opinions.

SECTION 5 – ALTERNATIVE BMP #1

5.1 Seed Supply

5.1.1 Rationale

Coexistence between genetically modified organisms (GMO) and non-GMO crops is not biologically possible. While seed producers can attempt to avoid inadvertent contamination of their seed crops, it has proven impossible to keep contamination from occurring in the agricultural communities. Of the major deregulated GMO crops in the United States (corn, soy, cotton and canola), all have shown contamination, or adventitious presence, in the seed supply of conventional and organic counterparts. In August 2006, in the midwestern US, long grain rice crops were shown to be contaminated with a GMO rice, LLRICE601. This rice was not deregulated by the USDA until November 24, 2006. This rice was **never** planted commercially, yet the **contamination was widespread.** The USDA's actions on this incident were unprecedented. They have implemented "approval by contamination", an after-the-fact approval. Due to lost markets, rice farmers in six states have filed class action lawsuits against Bayer Crop Science, the developer and patent holder of LLRICE601.

5.1.2 Governance

Form a review board of stakeholders with equal representation by organic, conventional, and biotech farmers. Also included will be the Department of Health and an ecologist. The review board will meet quarterly or as necessary to:

- Make recommendations to the HDOA on introductions of new GMO agricultural crops in the State of Hawaii. This would include the possibility of prohibiting the planting of certain crops in order to protect Hawaii food crops that are at risk of contamination. The prohibition would also include field trials of these important crops. (See above paragraph describing rice contamination which most likely occurred from field trials.)
- Work with growers organizations to achieve consensus on whether to introduce a new GMO crop into our Hawaiian growing environment.
- Make available to farmers information from around the globe on GMO contamination, market loss, testing costs, loss of seed lines, and loss of choice when their industry is considering an introduction of a GMO crop into our state.

5.1.3 Communication

As pollen and seeds are unable to follow communication guidelines, and farmers cannot completely control them, the best practice to prevent unintended GMO contamination is to not plant any GMO versions of agricultural crops in our islands. It is not sound science to expect farmer–to-farmer discussions to prevent pollen flow, and due to the normal constraints of farming (weather, labor and timing), it is not always possible to have these important discussions.

5.1.4 Separation Practices

- As the recent examples of the unintended GMO contamination of long rice and bent grass have shown, separation practices cannot prevent gene flow. The best practice to prevent seeds of important Hawaii crops from being contaminated is to not grow GMO crops outside of the greenhouse.
- All growers of GMO crops must notify conventional and organic producers in their area of intent to grow these crops, possibly through their local cooperative extension agents.

5.2 Biological Drift Management

5.2.1 Rationale

USDA APHIS recognizes, and has expressed numerous times, that deregulated (legal to plant) GMO crops will eventually cross-contaminate their conventional and organic counterparts. They are not concerned with the development of appropriate separation schemes for deregulated crops. To most organic and conventional farmers, this is not seen as regulation or protection of their crops.

It is questionable whether it is possible for the Hawaii Farm Bureau Federation to do an objective job of facilitating and preparing any communication as it is constrained by its membership in the American Farm Bureau Federation. AFBF sets strong guidelines for their member states. In 2002, the Kona County chapter of the Farm Bureau, in their solidarity with the Kona Coffee industry, tried to support a moratorium on GMO coffee in Hawaii County and was forced to withdraw its support, as it was not in line with national guidelines.

5.2.2 Communication

Facilitation of communication will not control the movement of pollen and seeds in our agricultural environment. It is not sound science to expect farmer-to-farmer discussions to prevent pollen flow. The best practice to prevent transgenes from drifting is to not plant them in our islands until it can be proven that the inevitable contamination will cause no economic, environmental or health harm.

5.2.3 Development of Appropriate Separation Schemes

The HDOA withhold concurrency on field trials or notifications of any crop that can cross with an existing agricultural industry or food crop in Hawaii. This will prevent accidental contamination from occurring.

5.2.4 Agricultural Practices

Farmers must be educated about the risks and benefits of planting GMO crops in Hawaii.

5.2.5 Governance

Create a statewide roundtable of stakeholders which would include GMO, conventional and organic farmers, a representative from the Department of Health, an ecologist, a representative from the Agriculture and Environment committees of both the Hawaii State House and Senate, and a representative from the Environmental Center of the University of Hawaii at Manoa.

This roundtable would look at:

1. An analysis of the health, environmental, economic and cultural risks and benefits associated with the growing of GMO and non-GMO agricultural crops in the state.
2. How the State can protect farmers who choose not to grow GMO crops.
3. Create a working plan to protect the seed supply of conventional, organic and GMO farmers and home gardeners. This will contribute to Hawaii's food security and future agriculture sustainability.

Note: Alternatives BMPs are individual viewpoints that have not been discussed or agreed to by the group, but have been submitted to provide alternative opinions.

SECTION 6 – ALTERNATIVE BMP #2

6.1 Seed Supply

6.1.1 Governance

A coexistence advisory panel with equal representation by conventional, organic and biotech farmers and a trained USDA certified mediator should be established. The advisory panel may meet quarterly or as necessary to:

- Develop commercial or professional seed production guidelines and recommendations to protect important Hawaii crops (i.e. coffee, banana, etc.).
- Track trends and issues in conventional, organic and biotech crop developments and regulatory changes that may impact Hawaii growers' efforts to maintain seed purity protection practices.
- The coexistence panel may choose to work with or partner with commodity groups or professional trade associations to further develop and explore these and future BMPs.
- This coexistence advisory panel should be tasked with facilitating better education and communication between commercial and professional growers.

6.1.2 Information Access

The HDOA is encouraged to provide increased education and assistance to interested parties seeking information regarding access to all seed sources.

6.1.3 Communication

Prior to planting a sexually compatible crop, growers should make every effort to inform and consult with neighboring growers and commodity groups in an effort to minimize potential biological drift.

6.1.4 Separation Practices

All seed producers are encouraged to separate conventional, organic and biotech crops at all known points of possible seed co-mingling or pollen movement.

6.1.5 Advocacy

Not relevant to Best Management Practices.

6.2 Biological Drift Management

6.2.1 Communication

Communication between stakeholders is critical. It is recommended that neighboring farmers communicate with each other about their cultivation methods, utilization of BMPs and crops so that any potential issues can be addressed. If for some reason this is not possible, perhaps a third party organization (like the Hawaii Farm Bureau Federation) or the USDA certified mediation board could facilitate communications. This panel believes communication is a critical component to ensure successful coexistence among Hawaii's diverse agricultural sectors.

6.2.2 Development of Appropriate Separation Schemes

Crops may be separated to prevent cross-pollination. Separation of crops is routinely based on the biology of each crop, and traditionally includes scientifically determined (geographic isolation) separation distances, planting sexually compatible species at different times (temporal separation), and the use of other crop-specific methods to control flowering and pollen release. Commercial and professional farmers, or farm managers, are encouraged work with credible and identifiable experts and other resources (i.e., university researchers and other experts) to develop crop-specific recommendations and guidelines that address on-farm issues. The coexistence advisory panel, or similar entity as previously proposed and discussed, in conjunction with organizations such as the University of Hawaii CTAHR and the Hawaii Farm Bureau Federation is encouraged to identify and make available to both public and private interests, "links" or contact information to organizations, and other resources that may provide additional guidance in these areas.

6.2.3 Agricultural Practices

Farmers should be aware of agricultural practices that prevent unintended pollen movement. This panel recommends increased education and resources be provided by the HDOA, UH CTAHR and other appropriate resources so that professional and commercial farmers and/or farm operators are better aware of specific tools and options that best manage, and/or minimize potential for unintended pollen movement. Farmers are encouraged to use integrated pest management (IPM) methodologies, including judicious use of chemicals, within all farming methods to control negative and positive weed and insect populations. Farmers should also practice good agricultural methods to minimize weeds so that pathogens and insects do not prosper in surrounding non-cropping areas.

6.2.4 Governance

Unresolved conflicts or concerns among professional and/or commercial farmers and farm operators may be brought before the coexistence panel, or appropriate other entities, for further mediated discussion. This conflict-resolution process shall be limited to matters where economic interests are quantifiable and/or concerned.

SECTION 7- APPENDICES

Appendix 1 – Hawaii State Legislation

THE SENATE

TWENTY-THIRD LEGISLATURE, 2005

STATE OF HAWAII

S.C.R. NO. 208 S.D. 1 H.D. 1

SENATE CONCURRENT RESOLUTION

urging the legislature and administration to support and encourage Hawaii's AGRICULTURal community's efforts toward successful co-existence among its sectors and to recognize the economic, human, and environmental benefits of such co-existence in a diversified agriculture industry.

WHEREAS, agriculture is Hawaii's second-largest export industry and one of the largest contributors to the State's economic health; and

WHEREAS, the long-term prosperity of Hawaii's agricultural community depends significantly upon diversity in research, production, and farming practices; and

WHEREAS, Hawaii's agriculture industry continues to evolve and expand, occupying vacant agricultural lands and providing employment in rural Hawaii; and

WHEREAS, having diversification in Hawaii's agriculture industry -- including organic, conventional, and biotech farming and agricultural research -- is generating significant opportunities for economic growth in both export and import markets; and

WHEREAS, successful diversification mandates that farmers be given the opportunity to choose which farming practices will best ensure the most productive use of their resources to reach their target markets in accordance with their personal preferences; and

WHEREAS, the long-term development of diversified, sustainable tropical and subtropical agriculture in Hawaii and elsewhere requires the continuing advancement of technological and scientific knowledge to achieve the best farming practices in all sectors of agriculture; and

WHEREAS, such knowledge and cooperation within Hawaii's papaya industry resulted in an identity preservation protocol with the Department of Agriculture that allowed more than eight hundred acres of non-transgenic papaya to coexist next to transgenic papaya and to meet certification requirements in the Japanese marketplace; and

WHEREAS, having public and private research, and the transfer of knowledge and technology in many new areas of agriculture, have and will continue to provide substantial benefits to human health and the environment and are therefore critical to the well being of Hawaii's people, as well as to billions of others in developing nations around the world; and

WHEREAS, organizations such as the College of Tropical Agriculture and Human Resources of the University of Hawaii, the Hawaii Department of Agriculture, Hawaii Agriculture Research Center, Maui County Farm Bureau, Hawaii Crop Improvement Association, and genetically modified organism free, organic, and conventional farmers are seeking to establish a broad-based dialogue on agricultural biotech as a result of community interest in agricultural research; and

WHEREAS, the benefits to the State's economy, human health, and environment derived from a diversified agriculture industry and knowledge-based agriculture research and technologies are of interest to all Hawaii's people; now, therefore,

BE IT RESOLVED by the Senate of the Twenty-third Legislature of the State of Hawaii, Regular Session of 2005, the House of Representatives concurring, that the Legislature: supports the agricultural community's efforts to promote choice of farming methods, practices, and crops; recognizes the economic value to the State of a diversified agricultural industry supported by mutually supportive co-existence among its sectors; and

appreciates the value and importance of agricultural research for the benefit not only of Hawaii's farming community, but to farmers and peoples around the world; and

BE IT FURTHER RESOLVED that the Department of Agriculture and the various and diverse agricultural interests, parties, producers, and agricultural stakeholders in Hawaii are requested to establish a dialogue and process to develop a framework of successful co-existence, with the goal of mutual success and prosperity for agricultural producers including organic, conventional, and biotechnology; and

BE IT FURTHER RESOLVED that this dialogue be founded in fact and demonstrable science and that it result in a report to the Legislature and appropriate agencies about best practices and management plans to ensure success and co-existence among Hawaii's diverse agricultural interests; and

BE IT FURTHER RESOLVED that the agricultural community is strongly encouraged to participate in community dialogues and communicate with the greater community on issues relating to agriculture; and

BE IT FURTHER RESOLVED that the Departments of Agriculture and Business, Economic Development, and Tourism and the College of Tropical Agriculture and Human Resources of the University of Hawaii, whenever possible, are requested to assist and facilitate this process; and

BE IT FURTHER RESOLVED that the Hawaii Farm Bureau Federation is requested to bring the stakeholders together in a meaningful process toward co-existence and report its findings and recommendations, based upon its meetings with stakeholders, to the Department of Agriculture; and

BE IT FURTHER RESOLVED that, after the Hawaii Farm Bureau Federation reports its findings and recommendations, the Department of Agriculture is requested to hold a public meeting to allow the public an opportunity to comment on the findings and recommendations; and

BE IT FURTHER RESOLVED that the Department of Agriculture is requested to report to the Legislature about best practices and management plans to ensure success and co-existence among Hawaii's diverse agricultural interests; and

BE IT FURTHER RESOLVED that the Department of Agriculture is requested to report its findings and recommendations, including any proposed legislation, to the Legislature no later than twenty days prior to the convening of the Regular Session of 2006; and

BE IT FURTHER RESOLVED that certified copies of this Concurrent Resolution be transmitted to the Governor, the Chairperson of the Board of Agriculture, the Director of Business, Economic Development, and Tourism, the Dean of the College of Tropical Agriculture and Human Resources of the University of Hawaii, the Hawaii Agriculture Research Center, the Hawaii Farm Bureau Federation, the Hawaii Organic Farmers Association, and the Hawaii Crop Improvement Association.

Report Title:

Diversified Ag Industry

Appendix 2 –

Table 4-3 Points of Vulnerability in the Seed Production Process

VARIETY DEVELOPMENT
Seed packaging and preparation
☐ Spillage
☐ Seed mixing
☐ Mislabeling of seed
Planting breeding nursery
Maintaining crop
☐ Cultivating
☐ Spraying
Making controlled pollinations
☐ Pollinations made by hand
☐ Pollinations made by wind
☐ Pollen movement
Harvesting breeding nursery
☐ Seed on plants not harvested
☐ Disposal of unwanted grain
☐ Disposal of unwanted plants
☐ Cleanout of machine used for gleaning field
☐ Disposal of seed gleaned from field
☐ Spilled grain
☐ Volunteer plants emerge in field the following year
Transporting grain to shelling facility
Shelling/threshing and seed processing
☐ Accidental mixing of seed
☐ Mixing during shelling
☐ Mislabeling of seed during seed processing
☐ Improper discarding of seed
Field testing of new varieties
☐ Seed packaging and preparation
☐ Planting field test
☐ Crop maintenance
• Cultivating
• Spraying
☐ Field testing on land rented from farmers
• Farmers could accidentally harvest test plots
• Seed may be spilled
☐ Pollen movement
☐ Harvest
• Cleanout of machine used for harvesting
• Disposal of harvested seed
☐ Volunteer plants emerge the following year
Discarding seed of varieties that are not productive
☐ Seed may be mixed with other varieties
☐ Seed may accidentally grow (resulting in pollen movement)

TRANSFORMATION
Bombardment
Regeneration
Maturation
☐ Pollen movement
☐ Physical mixing

BACKCROSSING
Seed packaging and preparation
☐ Spillage
☐ Seed mixing
☐ Mislabeling of seed
Planting breeding nursery
Maintaining crop
☐ Cultivating
☐ Spraying
Making controlled pollinations
☐ Pollinations made by hand
☐ Pollinations made by wind
☐ Pollen movement
Harvesting breeding nursery
☐ Seed on plants not harvested
☐ Disposal of unwanted grain
☐ Disposal of unwanted plants
☐ Cleanout of machine used for gleaning field
☐ Disposal of seed gleaned from field
☐ Spilled grain
☐ Volunteer plants emerge in field the following year
Transporting grain to shelling facility
Shelling/threshing and seed processing
☐ Accidental mixing of seed
☐ Mixing during shelling
☐ Mislabeling of seed during seed processing
☐ Improper discarding of seed
Field testing new varieties
☐ Seed packaging and preparation
☐ Planting field test
☐ Crop maintenance
• Cultivating
• Spraying
☐ Field testing on land rented from farmers
• Farmers could accidentally harvest test plots
• Seed may be spilled
☐ Pollen movement
☐ Harvest
• Cleanout of machine used for harvesting
• Disposal of harvested seed
☐ Volunteer plants emerge the following year
Discarding seed of varieties that are not productive
☐ Seed may be mixed with other varieties
☐ Seed may accidentally grow (resulting in pollen movement)

BREEDER SEED PRODUCTION
Seed packaging and preparation
Planting breeding nursery
Maintaining crop
Making controlled pollinations
Harvesting breeding nursery
Transporting grain to shelling facility
Shelling/threshing
Seed processing and conditioning

FOUNDATION SEED PRODUCTION
Seed packaging
Seed planting
Crop maintenance
Pollen movement
Harvest
Transportation
Drying
Shelling
Conditioning
Storage

COMMERCIAL SEED PRODUCTION
Seed packaging
Seed planting
Crop maintenance
Pollen movement
Harvest
Transportation
Drying
Shelling
Conditioning
Storage

Source: Union of Concerned Scientists; www.ucsusa.org/food_and_environment/genetic_engineering/pharmaceutical-and-industrial-crops-a-growing-concern.html; c. December 15, 2005.

Appendix 3 - Meeting Synopsis

Phase 1 - September 9, 2005, Plant Quarantine Station, Honolulu

Farmers using organic, conventional, and biotech methods convened to share detailed information about each type of farming. The six specific topics discussed included (1) the definition of each of the three growing methods, (2) challenges of each method, (3) benefits of each method, (4) marketing and business challenges of each method, (5) marketing and business benefits of each method, and (6) marketing projections for each method. Each of the six conversations ended by identifying the common ground shared by farmers of all methods. Farmers were able to meet face-to-face and initiate a more trust-based working relationship.

Phase 2 - October 27, 2005, College of Tropical Agriculture and Human Resources (CTAHR), University of Hawaii – Manoa (UHM), Honolulu

Two speakers were invited to discuss the policies and regulations for biotech and organic farming methods. Dr. John Turner was the presenter on Biotechnology Risk Assessment and Regulations. He is the Director of the Policy Coordination Division, Biotechnology Regulatory Services, United States Department of Agriculture – Animal and Plant Health Inspection Services (APHIS), located in Riverdale, Maryland. Keith Jones was the presenter on Organic Policies and Regulations. He is the Director of Program Development, National Organic Program, United States Department of Agriculture, located in Washington, D.C.

A third speaker, Albert Louie, was the presenter on topics that affect all farmers in Hawaii, Seed Certification and Food Safety. He is the Seed Certification Director and Food Safety Coordinator, Quality Assurance Division, Hawaii State Department of Agriculture.

Phase 3 – January 20, 2006, Plant Quarantine Station, Honolulu

Mae Nakahata, Vice-president of the Hawaii Farm Bureau Federation, was a presenter on the best management practices (BMPs) for the coexistence of agricultural practices incorporated in other states and nations.

After Ms. Nakahata's presentation, the group discussed a working definition of "coexistence." While the group did not arrive at an agreement on a definition, they did agree on a framework for the design of the BMPs. This framework is represented in the body of the report.

The group also discussed the criteria that would be used to create the BMPs. The group decided that each BMP should consider (in no specific order):

- the economic viability of fellow farmers
- the safety and protection of the environment
- the accountability of each farmer
- the needs of the farmer
- the needs of the community.

The group identified the important farming topics that would be used to create BMPs, including:

- Contamination
- Varietal preservation
- Varietal development
- Crop-specific buffer zones
- Disease control
- Pest & weed control
- Invasive species
- Research
- Education to consumers about Hawaii's diverse agriculture
- Liability
- Legislation
- Legislative appropriations (funding for agriculture)
- Regulations
- Niche markets
- Testing
- Water quality
- Marketing and Distribution
- Neighbor Relations and Communications

The group divided into smaller subgroups. Each subgroup would research and address one or more of the topics mentioned above. The first three groups include the Biological Drift Mitigation group (focusing on pollen, pathogen, and insect drift), the Seed Supply group (focusing on preserving pure seed supplies), and the Chemical Drift and Runoff Mitigation group (focusing on minimizing drift of chemical fertilizers and pesticides). Each group consisted of at least one farmer who used biotech, conventional, and organic practices. These subgroups would discuss their respective topics and report back on their BMP drafts at the next meeting.

Phase 4 – March 1, 2006, Plant Quarantine Station, Honolulu

The group decided to state the following goal for the coexistence process: **To define and promote agricultural practices that benefits our economy, environment and community while mitigating negative consequences for the same**.

Each of the three subgroups (Biological Drift Mitigation, Seed Supply, and Chemical Drift and Runoff Mitigation) reported back on the BMPs each group drafted since the January 20th meeting. Each draft consisted of a rationale for why the BMP was needed and an outline of recommendations for each topic. The main topics of Biological drift, Seed Supply, and Chemical drift sometimes included more specific subcategories, including communication, cultural practices, separation schemes, and liability/governance.

The group also refined the list of possible BMP topics and voted on which topics were most important to them. The group created the following prioritized BMP topic list:

Prioritized BMP Topic List

Priority	Topic	Votes
1	Invasive Species	11
2	Water	10
3	Land Availability/Management	6
	Agricultural Regulations	
4	Neighbor Relations	5
	Diverse Variety Preservation & Development (Seed Bank)	
5	Food Nutrition	4
6	Workforce Development & Access	3
	Marketing HI's Agriculture (Consumer Education)	
7	Product Distribution	2
	Food Safety (Safe Processing Methods, Safe Production Methods, Market Demands, Self-Regulation)	
8	Valuing Diversity and Growing Methods (Organic Market Increase)	2
9	Labeling & Point-of-Origin Issues	1
	Legislative Appropriations for Agriculture	
10	Food Security (Production of Enough Food within the State, Preserving Integrity of Shipping Capsule)	0
	Certification (organic, testing, GMO, pesticides, HACCP)	

Finally, the group discussed some issues that were important to address in order to continue with the process. The group thought that voting may not be necessary. Instead, the group thought that for each BMP drafted, a minority report could be included that addressed opinions different from those defined in the BMP. Additionally, in the process of drafting the BMPs, participants thought that they may not have the expertise to finish the BMPs and that other professionals should be recruited to contribute crop-specific information. Also, this six-meeting process may not be enough to finish BMPs, but should be extended so that the conversation would be maintained as new issues arise in the future.

<u>Phase 5 - June 20, 2006, College of Tropical Agriculture and Human Resources (CTAHR), University of Hawaii – Manoa (UHM), Honolulu</u>

Two speakers were invited to discuss the liability issues of biological drift, chemical drift, and seed supply purity. These two speakers were Joe Mendelson, Legal Director, Center of Food Safety, and Drew Kershen, Professor, Oklahoma University School of Law.

The group continued to share and revise their BMP drafts for the remainder of the session.

Phase 6 – August 24, 2006, College of Tropical Agriculture and Human Resources (CTAHR), University of Hawaii – Manoa (UHM), Honolulu

In this meeting, the participants worked on final revisions to the BMP drafts they had been working on in the previous months. The group completed Biological Drift Management and Chemical Contamination.

Phase 7 – December 4, 2006, Plant Quarantine Station, Honolulu

The participants finalized worked on Seed Supply, the umbrella statement, next recommendations and the executive summary.

Appendix 4 - Participants

Routh Bolomet
Melanie Bondera
Kimberly Clark
Una Greenway
Grant Hamachi
Adolf Helm
Ken Kamiya
Paul Koehler
Doug MacCluer
Vince Mina
Loren Mochida
Myrone Murakami
Dean Okimoto
Roy Oyama
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Al Santoro
Richard Speigel
Sarah Styan
Warren Watanabe