FROM THE GROUND UP

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AGRONOMY NEWS

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DRY BEAN PRODUCTION DOWN IN 1992

The Colorado Department of Agriculture and the USDA Crop Reporting Service forecast that Colorado bean production will be down 19%, and U.S. production down 30% from 1991. Yield levels in Colorado remain favorable at 18 cwt per acre, even though plant development was slowed by cooler and wetter weather during the growing season.

Total Colorado production for 1992 is projected at 2.7 million cwt, while U.S. production at 23 million cwt. Production in the U.S. is projected to be lower due to fewer acres planted and lower yields per acre. The net impact of these figures has been a price increase for dry beans since late August. These statistics follow the long term trends in which planted acreage is lower when prices are low during planting, and acreage is higher when prices are high at planting.

Based on this trend and if prices continue to firm up, planted acreage should be up in 1993. If these trends continue to hold true, growers and dealers should contract their certified bean seed early for 1993 as the demand for the better varieties will be high. ▫Brick

FACT AND FICTION ABOUT FERTILIZER

In order to help you sort out fact from myth, the following is a list of myths that have come up regarding fertilizers.

Myth: Liquid fertilizers are more available than dry fertilizers.
Fact: The availability and efficiency of both materials are equal.

Comments:
Availability and efficiency often are confused. **Availability** means the amount of nutrients in a fertilizer usable by a crop.

Due to popular demand, From the Ground Up will publish an index of all previous issues by topic and title in an upcoming newsletter.

Hopefully, this will make it easier to reference pertinent subjects.

By definition, all fertilizers are 100% available. A liquid 9-18-9 has 9% nitrogen, 18% P_2O_5, and 9% K_2O. The availability of the individual materials to plants is 100%. The same goes for a dry fertilizer like 18-46-0.

Efficiency is the percentage of nutrients applied as fertilizer and taken up by plants the year it is applied. The figure for nitrogen is 50-70%; for phosphorus, it is 10-30%. These efficiency figures do not vary between liquid and dry fertilizers.

Myth: Polyphosphates are better than orthophosphates.
Fact: Poly and orthophosphates are equally available and effective.

Comment:
Polyphosphates are orthophosphate molecules connected in chains. In the soil, they convert to orthophosphates.

Myth: Anhydrous ammonia makes soil hard.
Fact: Studies have shown that anhydrous ammonia has no effect on soil structure or bulk density and does not make soils hard.

Comment:
Anhydrous ammonia kills bacteria and fungi in a zone very near the injection point in soil. Within a few days, as the free ammonia is converted to other forms of nitrogen, soil microorganisms repopulate the injection zone and make use of the new nitrogen supply in the soil.

Myth: Nutrients from some products are better; therefore, less can be applied with equal success.
Fact: A pound of available nutrients is a pound and is equally effective, regardless of the source.

Comment:
Plants must contain a minimum amount of nutrients to survive. For example, a 40-bu wheat crop will contain about 90 lbs of nitrogen in the grain, stems, and leaves. If wheat cannot find that much nitrogen in the soil, it will not produce 40 bushels.

Myth: Fertilizers made with white phosphoric acid are better than those made with green or black acid.
Fact: For crop production purposes, the color makes no difference.

Comment:
The white acid is made by a heating process that eliminates iron, aluminum, and manganese from the acid. This is much more expensive than making green acid, which still

contains these elements. The elements can cause problems in liquid fertilizer formulation but have no effect on nutrient availability.

Myth: "Nutrient-release" agents or additives can free up or make available nutrients fixed in the soil.
Fact: There are no nutrient-release agents on the market that "free up" nutrients fixed in the soil.

Myth: Acid-based fertilizer is more effective than conventional fertilizer.
Fact: Acid-based fertilizer is made by adding sulfuric acid to conventional fertilizer materials. A pound of nutrients from an acid source is equal to a pound from other sources

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Comment:
If the pH of a calcareous soil could be lowered by the acid, in theory phosphorous could be made more available. Research, however, has shown the rate of acid applied with acid fertilizer is so small that it has no measurable effect on the pH of calcareous soil.

The American Society of Agronomy meetings will be held on November 1-5 in Minneapolis MN this year. Most of our Specialists will be attending.

Myth: Crops and crop varieties have been developed that need chemical fertilizer for top yield.
Fact: Today's crops and varieties will produce top yields if adequate nutrients from non-fertilizer sources are available in the soil.

Comment:
Over the years, cropping and erosion, in some cases, have removed large amounts of nutrients from soil. So in most cases, today's crops have a smaller supply of nutrients to draw on from soil and must depend on supplies from other sources, such as fertilizers.

Today's crops are genetically developed to have a higher yield potential. To reach this potential, a larger total supply of nutrients is needed. ▫Follett

QUINOA MAY TRULY BE A "HIGH ALTITUDE" CROP

Quinoa, the Incan grain that has gained popularity with the health and gourmet food industries, may truly become a high altitude grain if NASA (National Aeronautics and Space Administration) has its way. Quinoa provides the world's most perfect protein, a healthy mixture of minerals and fats and relatively low carbohydrate content which appears perfect for humans in space. The "greens", similar to spinach, could add to the diet as well.

A NASA representative recently contacted me about growing quinoa on the proposed space station. It seems that food shipments to space would be prohibitively expensive and NASA plans to provide hydroponic systems so astronauts can produce their own food. Quinoa may have some additional benefits: in its native Andean environments, quinoa grows where few crops can be grown because of low temperature (quinoa tolerates light frost at anytime in its life cycle) and high levels of ultraviolet light. The astronauts may have to be concerned with growing quinoa hydroponically because quinoa is still basically a desert plant and does poorly in saturated conditions. Plenty of "soil" aeration should help. The Colorado quinoa project may need to help NASA develop a saponin-free

quinoa so they won't need to wash the grain before eating it. On the other hand, quinoa saponin washes easily and is used in South America for shampoo and soap. While Colorado farmers may not benefit directly from quinoa in space, it would be nice to have advertisement for Colorado quinoa flying around the world like clockwork. Think what the Space Program did for certain breakfast drinks back in the 60's!

Getting back to earth, quinoa markets may be increasing dramatically with interest in quinoa starch and saponin. Currently, the Europeans are showing a marked interest in quinoa starch for use in synthetic creams, fine paper manufacture, and insecticidal carriers. Quinoa starch appears to be unique (with the exception of amaranth starch) being 1.5 microns in length. A micron is 0.000396 inches, so this is small! Wheat starch, on the other hand, is about 20 microns. This information may also be useful to processors of biodegradable plastics who rely on a starch base. Current biodegradable plastics tend to feel more like paper than plastic. A finer starch should provide a "slick" feel to the material, much like fine paper is slicker than low grade paper. ▫Johnson

Will quinoa become a common household item like Tang?

REGULATIONS DRAFTED FOR BULK STORAGE AND MIXING/LOADING AREAS

Senate Bill 90-126, the Agricultural Chemicals and Groundwater Protection Act, was enacted to protect groundwater and the environment from impairment or degradation due to the improper use of agricultural chemicals while allowing for their proper and correct use. One requirement of the Act is the creation of rules and regulations for agricultural chemical bulk storage facilities and mixing/loading areas where at least 55,000 pounds of finished product are handled annually. These rules and regulations are designed to prevent spills and leaks from contaminating groundwater.

The Colorado Agricultural Commission created an advisory committee to assist in the implementation of Senate Bill 90-126, consisting of agricultural chemical users and the public. A work group including members of the advisory committee developed a draft of potential rules and regulations. The committee reviewed and revised the work group draft and requested the potential regulations be presented at statewide meetings for input.

Colorado State University Cooperative Extension and the Colorado Department of Agriculture are planning a series of public meetings in response to the Senate Bill 90-126 advisory committee request. The objective of these meetings is to present the current draft of the rules and regulations, answer questions, and receive feedback on the draft. The feedback will be received by the advisory committee and incorporated, as appropriate, into the next draft. Final adoption of these rules will occur after formal public hearings, probably in early 1994.

Highlights of the draft rules and regulations include:

- Bulk storage of agricultural chemicals must be in an impervious secondary containment structure capable of containing a discharge.

- Capacity of secondary containment must be 125% of the volume of the largest tank in the containment structure.
- Mixing/loading of agricultural chemicals shall be performed on an impervious pad capable of containing a discharge.
- Capacity of a mixing/loading pad is 150% of the volume of the largest container (up to 1200 gallons) using the pad. Pads serving containers holding more than 1200 gallons need only be designed to the 1200 gallon container standard.
- Discharges to secondary containment or mixing/loading pads must be promptly recovered.
- Secondary containment structures and mixing/loading pads must be maintained as impervious over their service life.
- Chemigation systems in compliance with the Colorado Chemigation Act shall be exempt from mixing/loading pad regulations. Tanks storing agricultural chemicals at a chemigation site will be covered by secondary containment regulations if the annual 55,000 pound handling limit is exceeded.

The Colorado Department of Agriculture is looking for opportunities to present the draft rules for agricultural chemical bulk storage facilities and mixing/loading areas to interested farm groups during this upcoming winter season.

Your county probably has groups that will be directly affected by these new regulations. Personnel from Colorado State University Cooperative Extension and the Colorado Department of Agriculture are looking for opportunities to present the draft rules and regulations to interested groups during this upcoming winter season. This could be accomplished at an annual meeting, board of directors meeting, or special meeting called for that purpose. A meeting format could be 45 to 90 minutes depending on the level of detail and audience participation. Contact Mitchell Yergert at the Colorado Department of Agriculture (303/239-4140) or Lloyd Walker, Colorado State University Cooperative Extension (303/491-6172) to schedule a presentation. ▫Waskom

DO YOU WANT TO CERTIFY SEED?

From indications, there will be more acres planted to certified seed this fall than in the past several years. Some of this increased acreage will consist of foundation or registered seed fields and this could give farmers the opportunity to get started in the seed business. Prospective seed growers need to know the mechanism of certification, how it works, and what it takes to qualify. The questions that need to be asked about seed certification are discussed as follows:

Does it make a difference what the previous crop in a certified field is? If the previous crop, ie., wheat, is the same as the certified production field, it must have been planted to the same variety as the certified seed crop. For registered seed production, the restriction is two years between different varieties. Fallow counts just as a crop the previous year.

Do you have proof of the source of seed planted? To apply for certification, the grower must retain a certified seed tag or bulk sales certificate and return it with the application. The grade of seed planted must be foundation or registered.

What should you do with the seed crop after harvest? Growers must think about marketing the seed. Cleaning and testing the seed through

official channels is necessary before the process is complete. Marketing, that is advertising and promotion, is a part of the certified seed process. Each individual must develop a customer base and actively promote his product to make the business a success. An option might include contract growing or wholesaling to established seedsmen.

Are you aware of the costs of producing certified seed? Field inspection charges are $3.50 and $6.00/acre for dryland and irrigated fields. Other costs are CSGA membership fees, seed tests, and seed tags or bulk sales certificates. Additional costs include field rouging, seed conditioning, cleanout losses, costs of additional equipment, and sales costs.

What is the first step that you should take? The first step in seed certification of small grains is submitting a completed Form A, Declaration of Certifiable Seed Fields for Fall Planted Crops. This form alerts our office of your intentions and supplies information needed to initiate the certification process. This form is automatically sent to past seed growers and foundation seed buyers in January and the completed form is returned to CSGA by March 15. For those who don't get Form A in the mail, you can get one from most county Extension offices or it can be obtained from our office by calling 303/491-6202.

Good potential seed producers are needed. However, certified seed production is not for everyone and prospective growers should know up front that extra time, money, and management are involved. ▫Stanelle

The Colorado Seed Growers Association and Colorado Seedsmen's Association will hold their combined annual meetings in Estes Park, December 3-5:

<u>Seed certification meetings:</u>
Thurs., Dec. 3

<u>Educational program (focus on health and safety):</u>
Fri., Dec. 4,

<u>Seedsmen's Association meetings:</u>
Sat., Dec. 5.

All Extension personnel are welcome to attend. Registration information will be sent in a few weeks or more information can be obtained from the CSGA office.

FEEDLOT MANURE CALIBRATION

It is just as necessary to know how much nitrogen is being applied per acre with manure as it is to know the rate of commercial fertilizer, pesticide, fungicide, or insecticide being applied.

The first step fulfilling this requirement is to know the nutrient content of feedlot manure. An analysis performed by a qualified laboratory will provide this information. To make calculations easier, the laboratory should report results in (1) pounds per acre of fertilizer nutrients per ton "as is" on the sample indicating percent moisture and (2) percent fertilizer nutrients on a dry matter basis.

<u>To calibrate your solid manure spreader</u>:

(1) Place a 10 foot X 10 foot plastic sheet on the ground an adequate distance from the field border.

(2) Spread manure.

(3) Weigh contents.

(4) Repeat procedure.

(5) Average Weight X 0.22 =Tons\acre

▫Croissant

LIME REQUIREMENT

Eastern Colorado soils are considered calcareous where the pH is greater than 7.0. However, there are some very sandy irrigated sites where the top several inches of soil will have a pH below 7.0. These "acidic" surface soils are occurring more frequently but should not cause alarm. Several inches below the surface, the situation

changes to basic conditions and lime is neither needed or beneficial. The Colorado State University Soil Testing Laboratory automatically runs a lime test on soil samples when the soil pH is below 6.0. This occurs on only a very small percent of the samples. If this occurs, then the SMP buffer test is used to determine lime requirement.

Specific areas in mountain soils are acidic and improved crop growth may occur when very acid soils are limed. The addition of lime depends on the crop to be grown and the soil type. Corn production can be enhanced if soils are limed up to pH 6.0 whereas legume growth responds well if soils are limed to pH 6.5. Besides raising the pH, liming can decrease Al^{+3} and Mn^{+2} toxicity, change nutrient availability, and improve microorganism activity.

The effectiveness of liming will depend on the calcium carbonate equivalent (CCE) of the material to be added to the soil. The acid neutralizing capacity (CCE) of an agricultural liming material is expressed as a weight of % of pure calcium carbonate ($CaCO_3$) in the following manner:

CCE(%) = (equivalent wt $CaCO_3$ / equivalent wt substance) X 100

For example if magnesium carbonate ($MgCO_3$) is to be applied, the CCE value would be:

CCE = ((100/2) / (82/2)) X 100 = 119%

Therefore less $MgCO_3$ would have to be used relative to calcium carbonate.

Applying lime depends on its purity, fineness, and reactivity with the soil. The material should also be well mixed with the soil. Fineness is related to surface area. The finer the material, the greater the reactivity as given in the following table:

Mesh Size (openings/linear in.)	Effectiveness rating
<60	100
20-60	60
8-20	20
>8	0

Some materials may react with the soil better than others. Calcite ($CaCO_3$) reacts to a larger extent than dolomite [$Ca,Mg(CO_3)_2$].

Combining CCE and effectiveness results in the neutralizing index (NI):

NI = CCE X effectiveness.

If the CCE = 90% and the effectiveness is 60, the neutralizing index would be:

NI = 0.9 X 60 = 54

If the lime requirement was 5.6 T/A and NI = 54%, the actual lime requirement is as follows:

5.6T X (1/0.54) = 10.37 T/A

The actual liming rate would be 10.37 T/A.

The SMP method to obtain a buffer pH for lime requirement is a test easily done on a routine basis. The application of lime will depend on its chemical characteristics and mesh size. Acid soils must be evaluated each year to assure the optimum pH level. ▫Self

Where trade names are used, no discrimination is intended, and no endorsement by the Cooperative Extension Service is implied.

Sincerely,

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