

What Farmers Think About Fertilizers

A Staff Report

NPFI-sponsored study shows farmers have a healthy respect for commercial fertilizer. But they know surprisingly little about its true value and most profitable use. And two out of three regard it as a substitute for their first choice—manure

"Many messages are sent, but only a few are received."

WITH THIS OBSERVATION, the National Plant Food Institute underscores an important finding in its recent survey of farmers' attitudes toward fertilizer. Farmers know and understand much less about fertilizer use than was previously supposed, the survey shows; many communications about fertilizer analyses and amounts are therefore incomplete from the farmer's viewpoint, and cannot be fully effective in influencing his thoughts and actions.

The extensive survey on farmers' attitudes was conducted for NPFI by National Analysts, Inc. The NPFI's observation on the failure of messages to reach their target appears in its staff analysis of National Analysts' findings, and relates specifically to that part of the study dealing with farmers' knowledge about analysis, grade, or ratio. But it might well serve as a succinct summary of the entire study's findings. For failure to get some general or specific message across to farmers can in almost every case be blamed for the disturbing fact that farmers now use less than half as much fertilizer as they should for best economic returns.

The gap between recommendation and practice was in one sense the driving force behind the NPFI-NA survey. NPFI felt strongly that closing the gap would be of immense benefit to farmers as well as the fertilizer industry. It was determined to discover why such an uneconomic situation could persist.

Aware that the fertilizer industry knew too little about its ultimate customer, and convinced that it would

have to understand his desires and needs before it could get its ideas—however sound—understood and accepted by him, NPFI set about learning:

- What kind of person is the farmer?
- What does he think about commercial fertilizer?
- Where does he get his information, and which information sources does he consider practical?
- With whom does he discuss his fertilizer problems?
- What specific subjects does he discuss?
- How does he decide how much and what kind to use?

The NPFI-NA consumer research study was designed to build statistically reliable answers to these and other questions. Its aim was to provide enough information about farmers and their attitudes toward fertilizer use to enable NPFI and its industry members to approach intelligently and realistically their marketing problems.

The volumes of tabular data and comments which resulted from the survey will doubtless provide material for detailed study for years to come. Major general conclusions, however, have already been drawn. A grasp of some of the highlights, on both a national and a regional basis, should assist those who make and sell fertilizer in their planning for the future. Here are some of the survey's most important findings.

Prestige, but Still a Substitute

Commercial fertilizer enjoys a good reputation among farmers, the survey shows, but it is still looked upon by many as only a substitute for manure.

Large use of fertilizer evidently carries prestige, for among several farming practices (crop rotation, fertilization, heavy use of machinery, and the like), farmers gave the highest score to use of more fertilizer per acre as the most important practice contributing to the success of a good farmer. This was followed closely by better crop rotation methods.

Interesting regional patterns developed here—in the Northeast fertilizer use got the highest rating, but the personal attribute implied in "he works harder and longer" was only a nose behind; southern farmers agree that fertilizer use is most important, but attention to soil erosion problems, use of more machinery, and having more fertile land to begin with are valued more highly than hard work; in the North Central region, better use of fertilizer and better crop rotation methods win hands down over all other practices that contribute to a man's reputation as a good farmer; and western farmers rate having more fertile land to begin with above more extensive use of fertilizer.

The high score fertilizer received in the identification of good farming practices must be discounted in some measure because the interviewees knew the subject of the interview was fertilizer. However, this question was asked early in the interview; answers were therefore not so biased as they might have been had the question been asked later.

Despite the high regard farmers have for fertilizer, only 11% of those interviewed were using it at recommended rates—high level users, the study calls them. Medium level users number 25%, low level users were 27% of the total, and 37% of the total

used no fertilizer at all on their most important crop.

Some 65% of the total farmers interviewed say they would prefer animal manure if they had a choice of unlimited amounts of either. Table I breaks down answers to this question by levels of use and by region.

The reasons most farmers give for preferring manure are:

- It conditions the soil.
 - It lasts longer in the soil.
- Nonusers of commercial fertilizer prefer manure because, they say:
- It's cheaper.
 - "I know results from experience."

Tables II and III show the breakdown, by region, of different reasons for preferring commercial fertilizer, and the advantages of commercial fertilizer cited by those preferring manure.

Farmers who preferred commercial fertilizer were asked to name its chief disadvantages. A third of them said it had no disadvantages, and a third said "cost."

Among other answers most frequently given are:

- It is difficult to apply.
- It requires moisture.
- It is harmful to the soil.

Need for moisture is most frequently given by nonusers, and "difficult to apply" is the most frequent answer of users. "Harmful to the soil" is the reason most often given by medium-level users, giving a clue as to why these farmers do not go far enough with fertilizer even though they say they favor its use. The feeling among nonusers that fertilizer needs plenty of moisture before it is effective indicates that more research needs to be conducted on the economics of fertilizer use in drought years. And research data already available need wider dissemination.

Farmers seem to be quite receptive to the idea of using fertilizer on pasture and grazing land. Only 9% said it was a bad idea. Some two-thirds gave it an unqualified endorsement, 25% said they "did not know" or "it depends." They were similarly receptive to the use of fertilizer on forage crops. NA points out that the number of affirmative responses here is undoubtedly high because of the subject of the interview, but that results do indicate a favorable response rather than an unfavorable one.

How much fertilizer would a farmer use if he had plenty of ready cash? Many farmers answered this question by naming amounts only slightly above their present usage levels. However, when per-acre figures named here are

averaged for all farmers interviewed, and compared with the average of figures they gave for current usage rates, the difference is quite respectable. It indicates a large potential increase in total tonnage for the country as a whole. As NPFI points out, even a slight increase in actual per-acre usage, multiplied by all the acres of farm land in the U. S., would mean a substantial increase in tonnage for the entire fertilizer industry. Half of the total high-level users named an amount in excess of 450 pounds per acre, but half of the total nonusers named amounts from 250 pounds per acre down to "none." In the Northeast, many more farmers than in any other region said they would use 450 pounds or more. Even 27% of the Northeast's nonusers said they would use this amount, whereas only 5% of southern nonusers, 4% of western nonusers, and 2% of north central nonusers said they would use as much as 450 pounds per acre if they had ready cash.

Says NA, efforts to increase availability and use of credit would be effective, if a simultaneous effort were made to raise farmers' standards for optimum use of fertilizer. This probably means, however, going back several steps to educate most farmers to the maximum economic benefits to be obtained from fertilizer use. The study shows clearly that only a small percentage of farmers know what three elements their soils need in most abundance, nor do they understand the meaning of analysis. Table IV shows the percentage of farmers who correctly identified the three elements.

Table V shows the percentage of farmers who said they did not know what elements their soil needs. These percentages are surprisingly high in every area, but it is especially surprising that such a large proportion of southern farmers said they did not know what elements their soil needs, since the South has the longest history of commercial fertilizer use. NA suggests that fertilizer firms in that area should give greater attention to dissemination of basic information about the soil and its needs, even among present users of fertilizer. But doubtless every fertilizer company, throughout the country, would find it helpful to heed this advice.

Of the three elements, nitrogen was the most frequently named, reflecting probably the vast amount of publicity it has received in recent years, and, perhaps, the attention-getting ability of anhydrous ammonia. Phosphate was the second most often named nutrient, and potash was the least often named.

When asked to identify the correct analysis (out of four given) to use

on a soil deficient in potash and on one deficient in nitrogen, only 41% of all farmers correctly named both analyses. NA says 8 to 10% could be expected to answer both questions correctly on the basis of chance alone. Thus probably only a little better than 30% actually knew how to select the correct analysis. Of the farmers who were correct for only one analysis, more were correct in naming the anal-

The Problem

Farm use of fertilizers rose sharply during the decade before 1950. It has continued to grow in the years since. Nevertheless, relatively few farmers today use as much fertilizer as research shows they should use for maximum profit; many still use none at all; the average farmer uses less than half the amount recommended by his state agricultural college or experiment station.

The potential market for commercial fertilizers is thus at least twice today's actual market. The fertilizer industry, for its part, is ready and eager to produce much more fertilizer than farmers are now using. Without even expanding present capacity it could satisfy a much larger demand.

Yet despite all its efforts to close the gap between actual and optimal use, industry draws little satisfaction from the rate at which the gap is closing. Its commendable efforts to promote more profitable use of its products, including the enlightened research and educational programs it has conducted both on its own and through its trade associations, have had some measure of success. But the gap between recommendation and practice remains.

For years now, each time the industry has considered some new approach to its sales problems, it has had to ask itself "How will the farmer react?" Almost always the answer has been another question, "Who knows?" The disturbing truth was that the man whose good will and confidence were needed most was the one man about whom the industry knew least. Essentially everyone was convinced of the profit-producing potential of fertilizers except the farmer himself. And the farmer controlled the purse strings.

How the Study Was Conducted

National Analysts surveyed nearly 2000 farmers, through personal interviews. Discussion was directed through a 30-page questionnaire, on which interviewers recorded farmers' replies.

A representative sample of farmers, excluding sharecroppers, was drawn from each of four regions—Northeast, South, North Central, and West. Farmers who operated on less than 100 acres were excluded from the sample. Although 54% of the total number of farms listed in the U. S. Census were thus eliminated, the remainder represented 92% of total U. S. farm acreage.

The questionnaire, composed mainly of multiple choice, pre-coded, and open-end type questions, was the result of joint work by National Analysts, the NPMI staff, and a special industry committee. Questions were thoroughly pretested with farmers to make sure they would produce useful results.

Interviews were conducted in the summer of 1957 but covered farmers' fertilizer practice in 1956.

Each farmer in the sample was graded as to level of use by NPMI and industry agronomists well acquainted with local farming conditions. They took into account the kind of crops grown, local soil conditions, amount and kind of commercial fertilizer used, amount of organic fertilizer used, and rotation and irrigation practices. A farmer's use of fertilizer was graded high if it came close to the standards for most economical operation for his type of crop and soil compared to the best practice of agronomy. Use was classified as medium if it was substantial but well under the level indicated as most economical. Low level use was described as meager and very inadequate for the farmer's type of crop and soil. A farmer was rated a nonuser of fertilizer if he used no commercial fertilizer on his most important or second most important crop.

Information on the completed questionnaire was coded and transferred to IBM cards for tabulation.

ysis for a soil deficient in nitrogen (12%) than for a soil deficient in potash (4%). High level users were more likely to give the correct answers than were others—but only slightly more than half of them were correct on both questions.

Sharp regional differences showed up in this question. The proportion of all farmers in each region who gave both analyses correctly is: North Central—50%; Northeast—36%; South—31%; West—23%. Here's the breakdown for correct answers to both questions, in each region, for high-level users and nonusers:

	High-Level Users	Nonusers
North Central	67%	28%
South	51%	17%
Northeast	48%	16%
West	60%	13%

When it is considered that the chance of answering both questions correctly by guessing is 8 to 10%, these proportions show very little real knowledge on the part of nonusers in the West, South, and Northeast.

Despite their lack of understanding about fertilizer analysis, farmers showed a surprising ability to pick out the better buy of two fertilizers, but their reasons were often on other than strictly a money basis. They were asked "If the price of a 3-12-12 mixture is \$50 per ton and the price of 6-24-24 is \$80 per ton, which is the best buy?" Slightly more than half of the nonusers and over a fourth of all farmers said they did not know. About half of them could have been expected to name the better buy correctly on the basis of chance alone.

Again regional differences showed up in their replies. In the Northeast 72% of the farmers named 6-24-24 as the better buy, while 71% in the North Central states were correct. In the South the figure was 64% and in the West, 44%. Among high-level users, correct answers were given by 96% of north central farmers, 91% of northeastern farmers, 72% of southern farmers, and 64% of western farmers.

The reason given most frequently for naming 6-24-24 was "more value, less money." But 23% of the farmers chose 6-24-24 because they needed more of some specific element, reflecting again the lack of understanding of analysis. "Less bulky, easier to handle, less labor" was the reason given for choosing 6-24-24 by 13% of all farmers and 19% of all high-level users.

Among those who named 3-12-12 as the better buy, 13% of all farmers (17% of high-level users) said it was

because their soil didn't require the higher analysis; 12% of all farmers (22% of low-level users) said it was better for soil and crops; and 8% (18% of medium-level users) said 6-24-24 would be too strong and would burn the crop.

Who or what influences farmers to use fertilizer: county agents, experiment stations, dealers, neighbors, newspapers, magazines, radio or TV, soil tests, demonstration plots, experimentation, credit? All have influence. All are considered to have some practical value as sources of information.

Farmers interviewed were asked to look at a list of information sources and tell which, if any, were likely to give them practical information about fertilizing. Table VI shows which sources farmers cited most frequently, with the county agent at the top of the list. The local dealer finished fourth. Farmers gave the county agent 73 out of a possible 100 in the South, 77 in the West and Northeast, and 70 in the North Central area. Local dealers received ratings as follows:

Northeast	26
South	22
North Central	30
West	18

Neighbors were most highly regarded in the West and given the lowest score in the Northeast.

Evidently farmers are interested in—and talk about—fertilizer use, for more than half of them report having had at least one discussion about fertilizer. Table VII shows the percentage of farmers, by different levels of fertilizer use, who reported one or more discussions about fertilizer. The subjects of discussion were most often analysis, amount, and price, and this pattern varied but little from region to region.

What type of person a farmer discussed fertilizer with seems to have had little bearing on whether or not he used fertilizer. Users and nonusers alike discussed fertilizer most frequently with the local dealer and next most frequently with the county agent. Tables VIII and IX show the percentage of discussions and types of discussants for users and nonusers.

Discussions and reading about fertilizer, taken along with farmers' low level of understanding about fertilizer, show how confused they are about plant food. Over half of the farmers who do not use commercial fertilizer and two-thirds of those who use it said they had read about fertilizing the crop they considered their most important one. Table X gives the figures. Degree of exposure to articles on fertilizer seems to have

some slight relationship to level of use, but it does not seem to be critical. Table XI can be taken to show that this reading material was not meaningful to many farmers; otherwise more nonusers surely would have been influenced to become users.

Again, viewing the low level of fertilizer knowledge against the backdrop of farmers' discussion and reading leads to the conclusion that farmers are confused and concerned about fertilizer use. Perhaps they are even repelled by the "mumbo-jumbo" surrounding it. As NA puts it, the present practice of stringing up three numbers as a way of grading fertilizer has about the same communication value as a message sent in code. This conclusion is further borne out by these figures:

Of fertilizer users,

- 24% said their reading was helpful, and led to specific action
- 30% said reading was helpful, but led to no specific action
- 26% said reading was not helpful, or had no effect.

Of nonusers,

- 10% said their reading was helpful, and led to specific action
- 17% said their reading was helpful, but led to no specific action
- 71% said their reading was not helpful, or had no effect.

Farmers have a lively interest in soil tests, demonstration plots, and experimentation with fertilizer. About a third of farmers not now using fertilizer and about half of those who do use it report having had soil tests made. About half of present users (including low-level users) say they followed test recommendations completely. About a fourth of all farmers say they have visited a demonstration plot, about a third report reading about one.

Farmers are generally interested in demonstration plots and think they are a good idea, but they believe demonstrations would be more convincing if plots were large and on poor land. About a third of all farmers have done some plot-testing or experimentation on their own land and in general felt it was helpful—although it seldom led to specific action. Evidently they need help in designing experiments that will produce results meaningful for them, and in translating those results into profitable action.

Nonusers who have had no soil tests gave as their reason: that it was not necessary (39%); their own negligence (31%); or that they know their own soil (10%).

Over half of the farmers who use fertilizer said they followed soil test

recommendations completely. Even among those who do not use fertilizer, 13% said they followed test recommendations completely—a virtual impossibility. Over half of the low-level fertilizer users, too, said they followed soil test recommendations completely—also most unlikely to be true. Here again, the generally low level of knowledge as to the meaning of analysis affects the likelihood of a farmer's attempting to carry out recommendations of the soil test, his ability to do so, and his evaluation of his own effort. But another explanation may be at bottom of this difficulty—the way soil test results are reported to the farmer. Are they in the most readable, understandable form? The soil test report is a message that may be scrambled at both ends—sending and receiving.

The Role of Credit

Only about 6% of the farmers borrowed money to pay for their fertilizer at the time of delivery. High-level users in greater proportions than low-level users paid some time after delivery or borrowed the money to pay for it after delivery. This difference between high- and low-level users in their use of credit probably reflects their credit standing as well as their inclination to use credit.

Almost two-thirds of the farmers indicated they would borrow money, if necessary, to buy fertilizer. The breakdown:

Certainly would borrow	38%
Probably would borrow	23%
Probably would not borrow	12%
Certainly would not borrow	28%

The higher his level of use the more likely a farmer is to say he would borrow money to buy fertilizer. And the higher his level of use the more likely he is to give his reason for borrowing in terms of greater necessity. Nearly half of those who would borrow say farming is not possible or practical without fertilizer.

Those who said they certainly or probably would not borrow money gave as their reasons:

- Return does not justify the expense or risk 55%
- Do not believe in borrowing 29%
- Do not believe in using commercial fertilizer 11%

These reasons were about the same in each region except that nearly half of all farmers in the Northeast said they do not believe in borrowing. In the West, 23% of the farmers say they do not believe in using commercial fertilizer.

What leads a farmer to use a particular analysis of fertilizer? Interviewees gave two big reasons: their own judgment (trial and error) and soil test recommendations. Tables XII and XIII break down the reasons given, by level of use and by region.

The amount a farmer decides to apply is dictated by about the same reasons, except that his own judgment seems to play a bigger role in the decision as to amount than it does in the decision on analysis.

When nonusers were asked why they did not use fertilizer, their reasons ranked as shown in Table XIV.

The amount of fertilizer a farmer uses seems to be conditioned more by a fear of using too much than by promise of economic rewards. Farmers not now using fertilizer were asked what effects they would expect from using 500 pounds of fertilizer per acre. Their answers are in Table XV. Table XVI shows the answers of those who use fertilizer when asked what effects they would expect if they were to use twice as much fertilizer as they now do.

Plans for Action

These and many other facts about farmers and their feelings toward fertilizer use have already emerged from the NPMI study. They indicate that farmers know much less about commercial fertilizers than the industry had previously supposed. And they show that all too often farmers fail to relate fertilizer usage directly to dollar returns. Yet return on investment should be the most potent argument in commercial fertilizer's favor.

All this new knowledge about the farmer and his feelings toward fertilizer use will be valueless, unless it can be put to work for the benefit of both the farmer and the fertilizer industry. Much of the task of applying the information in the direct marketing of fertilizers must rest on manufacturers, mixers, distributors, and dealers. The tremendous educational job which the survey indicates must be done can be shared by these industrial groups with their professional and trade associations, mass media, and the agricultural colleges and government agencies.

The National Plant Food Institute has already indicated in what direction it will move. NPMI feels that the study generally confirms the soundness of principles upon which its past programs have been based, but it acknowledges that some shifts in emphasis are in order.

Close cooperation between the institute and state colleges of agriculture, already a basic part of its edu-

Table I: Percentage Who Prefer Animal Manure

REGION	TOTAL	LEVEL OF USE			
		HIGH	MEDIUM	LOW	NONE
Northeast	61%	57%	58%	64%	66%
South	60%	48%	55%	60%	68%
North Central	67%	45%	60%	66%	78%
West	71%	56%	72%	76%	71%

Table II: Those Preferring Commercial Fertilizer Gave These Reasons

COMMERCIAL FERTILIZER IS:	NORTH-		NORTH CENTRAL	WEST
	EAST	SOUTH		
Easier, quicker to apply	44%	50%	52%	40%
Soil needs can be supplied accurately	53%	44%	50%	27%
Increases yield	24%	16%	13%	17%
Gives plants a quicker start	9%	14%	10%	15%

Table III: Those Preferring Animal Manure Cited These Advantages of Commercial Fertilizer

COMMERCIAL FERTILIZER IS:	NORTH-		NORTH CENTRAL	WEST
	EAST	SOUTH		
Easier, quicker to apply	44%	55%	50%	59%
Soil needs can be supplied accurately	27%	22%	27%	14%
Increases yield	16%	14%	17%	10%
Gives plants a quicker start	42%	27%	24%	28%

Table IV: Farmers Who Say Their Soil Needs Three Elements

REGION	TOTAL	LEVEL OF USE			
		HIGH	MEDIUM	LOW	NONE
Northeast	35%	46%	43%	32%	23%
North Central	31%	56%	50%	32%	12%
South	21%	43%	26%	22%	7%
West	10%	36%	12%	10%	6%

Table V: Farmers Who Say They Do Not Know What Elements Their Soil Needs

REGION	TOTAL	LEVEL OF USE			
		HIGH	MEDIUM	LOW	NONE
South	26%	10%	18%	20%	42%
West	17%	1%	1%	3%	30%
North Central	12%	4%	8%	7%	22%
Northeast	11%	7%	6%	7%	22%

Table VIII: Percentage of Discussions with These Discussants Reported by Farmers Who Used Fertilizer

DISCUSSANT	NATIONAL TOTAL	NORTH-		NORTH CENTRAL	WEST
		EAST	SOUTH		
Local dealer	34%	31%	25%	39%	35%
County agent	17%	18%	27%	12%	13%
Neighbor, friend, other farmer	15%	9%	12%	17%	15%
Soil conservation man	8%	9%	11%	7%	6%

Table IX: Percentage of Discussions with These Discussants Reported by Farmers Who Did Not Use Fertilizer

DISCUSSANT	NATIONAL TOTAL	NORTH-		NORTH CENTRAL	WEST
		EAST	SOUTH		
Local dealer	27%	40%	15%	32%	26%
County agent	20%	14%	30%	14%	21%
Neighbor, friend, other farmer	16%	7%	12%	19%	17%
Soil conservation man	10%	16%	16%	3%	14%

cational program, will be continued and intensified. NPFI intends to make results of the NA study available to the colleges, and will assist them in programs they initiate as a result of the study. Its growing field organization will seek to strengthen NPFI's ties with colleges and other local educational agencies, as well as with the industry.

Since the survey indicates that the average farmer's knowledge about fertilizer is much lower than had been previously suspected, and that much of the educational and promotional information now beamed toward farmers is therefore not readily grasped, one of the chief aims of the cooperative educational program will be to develop simple and effective informational materials. For maximum understanding and acceptance by farmers, informational materials will be made simple, clear, and concise. Wherever possible they will be tailored to fit local conditions, and in all cases they will have the approval and support of state agricultural colleges.

Much greater emphasis will be given to interpreting fertilizer information in terms of dollar returns on investment. For the survey shows that farmers tend to look upon commercial fertilizer as a means of increasing crop yields, but do not directly relate fertilizer usage to dollar returns—even though two of their

Table VI: Farmers Naming Each Source as Likely to Give Them Practical Information

SOURCE OF INFORMATION	RATING ^a
County agent	72
Agricultural college publications	38
Farm magazines	30
Local dealers	26
Neighbors	20
Manufacturers' salesmen	5
Radio and television	4
Newspapers	2
Others	4

^a Percent of highest possible rating.

Table VII: Farmers Who Used Fertilizer and Reported One or More Discussions

REGION	TOTAL	LEVEL OF USE		
		HIGH	MEDIUM	LOW
North-east	55%	55%	54%	56%
South	53%	52%	58%	42%
North Central	63%	54%	72%	60%
West	70%	64%	66%	78%

Table XI: Farmers Who Recalled Reading About Fertilizing Their Selected Crop, and Reported Reading About These Subjects

SUBJECT OF READING	USERS	NON-USERS
Expected results of use, advantage of use	44%	59%
Analysis or element to use	23%	8%
Amount to use	19%	5%
Method of application	14%	7%
How to diagnose crop and soil needs	11%	6%

chief worries are "production costs and income."

The institute's expanding mass media efforts, also, will be directed toward localizing information, presenting information in simple, practical form which can be interpreted in terms of the farmer's own operations, and persuading farmers to use other available "action-producing" sources of help, county agents, for example, in attacking their fertilizer problems.

Promotion of soil testing will be intensified, in view of its proved influence on both the kind and amount of fertilizer used by farmers. Fertilizer demonstrations, also proved effective—especially for influencing low-level and nonusers—will similarly receive increasing support. NPMI has also decided to encourage authorities at agricultural colleges to review administration of their soil test procedures and recommendations, to improve the acceptability of results and recommendations.

Because the average educational level of even the highest-level users is surprisingly low, basic education and the supplying of basic knowledge are now the overriding needs. For the long range, the institute feels, the surest method of correcting the educational deficiency is to concentrate on today's younger farmers, and on the youth who will be the farmers of tomorrow.

Younger farmers, besides being more willing to consider new ideas from any source, are more likely to attend vo-ag classes, short courses, and other formal instruction. Today's young people generally are receiving more schooling than did their elders, and receive in addition greater benefits from such organizations as 4-H Clubs and Future Farmers of America. NPMI will continue its well-established program of furnishing teaching aids and other educational materials for use by schools, colleges, and youth organizations.

With basic information and better

Table X: Farmers Who Reported Reading About Fertilizing

REGION	TOTAL	LEVEL OF USE			
		HIGH	MEDIUM	LOW	NONE
Northeast	69%	80%	71%	58%	62%
South	57%	67%	54%	54%	54%
North Central	71%	78%	74%	67%	59%
West	64%	52%	70%	63%	48%

Table XII: Farmers in Each Region Who Said They Used Trial and Error or Their Own Judgment

REGION	TOTAL	LEVEL OF USE		
		HIGH	MEDIUM	LOW
Northeast	28%	17%	33%	26%
South	31%	25%	33%	33%
North Central	32%	36%	29%	34%
West	21%	40%	15%	17%

Table XIII: Farmers in Each Region Who Gave Soil Test Recommendation as the Reason for Their Choice of Analysis

REGION	TOTAL	LEVEL OF USE		
		HIGH	MEDIUM	LOW
Northeast	19%	36%	17%	11%
South	21%	31%	18%	17%
North Central	29%	28%	31%	27%
West	21%	32%	18%	17%

Table XIV: Reasons for Not Using Fertilizer

	NORTH-EAST	SOUTH	NORTH CENTRAL	WEST	TOTAL
Not enough money	50%	35%	31%	27%	33%
Not necessary	34%	26%	28%	38%	29%
Weather conditions not suitable for its use	2%	41%	23%	16%	27%
Prefer organics	19%	12%	24%	11%	18%

Table XV: Type of Effects Expected from Using 500 Pounds of Fertilizer, by Farmers Not Now Using It^a

	NORTHEAST	SOUTH	NORTH CENTRAL	WEST
Good effects	90%	18%	24%	27%
Bad effects	7%	51%	48%	58%
Provisional effects and don't know	17%	39%	39%	24%

^a Some farmers answered in terms of both good and bad effects. These answers were coded both as "good" and "bad" so these percentages contain multiple responses.

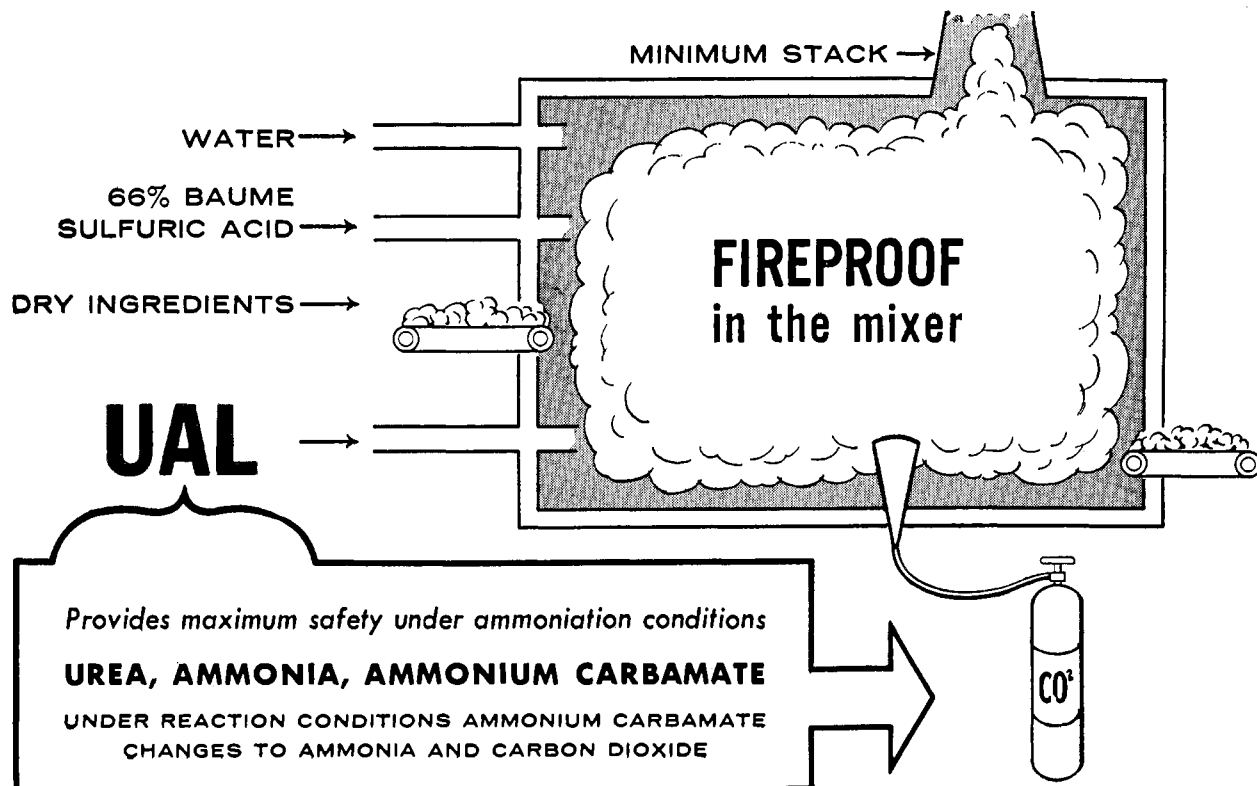
Table XVI: Type of Effects Expected if Farmers Were to Use Twice as Much Fertilizer as They Now Do^a

	NORTHEAST	SOUTH	NORTH CENTRAL	WEST
Good effects	33%	33%	28%	23%
Bad effects	61%	36%	62%	76%
Provisional effects and don't know	37%	44%	32%	23%

^a Some farmers answered in terms of both good and bad effects. These answers were coded both as "good" and "bad" so these percentages contain multiple responses.

education the primary needs for success, local adaptation and localized effort for maximum impact are keynotes of the NPMI's programs for achieving it. No accurate yardstick for measuring the degree of achieve-

ment is possible. But if action based on the NPMI-NA study is worth its salt, the next several years should bring a decided narrowing of the gap between fertilizer recommendation and practice.



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- Gives mixed goods better "feel"—minimizes caking, segregation and dusting.
- Suitable for either batch or continuous mixing.
- Prompt, dependable delivery enables you to schedule your production with confidence.



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