

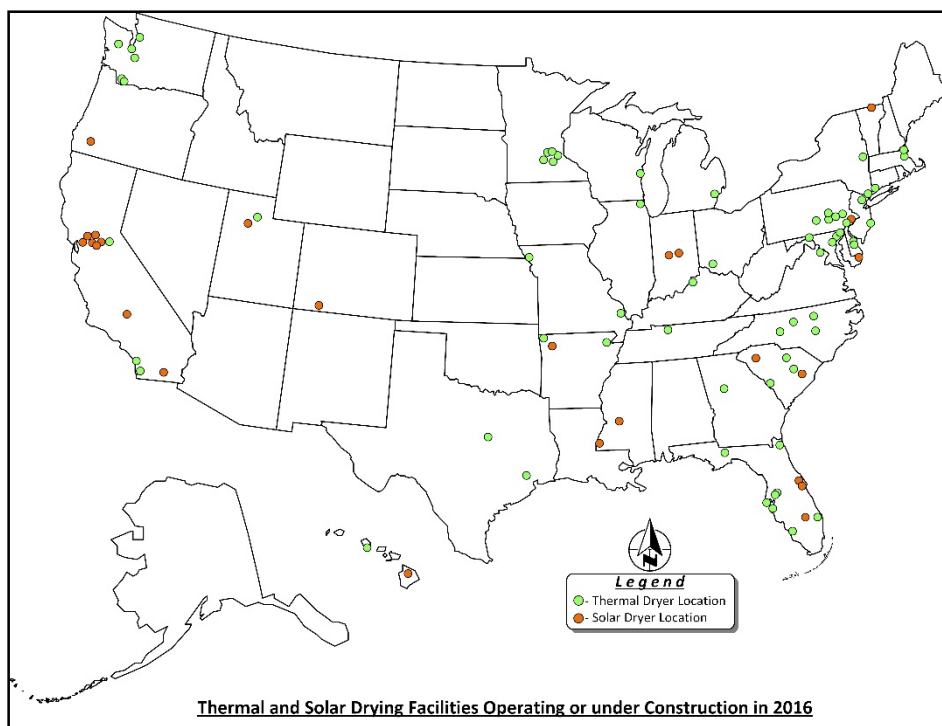
DRYER SURVEY FACT SHEET

In 2016, the WEF RBC Bioenergy Technology Subcommittee, Thermal Drying Taskforce conducted a survey of 84 facilities thought to be using thermal (59 facilities) or solar drying (25 facilities) of biosolids, with 13 responding. This fact sheet provides key take-aways from the survey results, related to dried product marketing.

Dryer Size and Type

A large portion of respondents tended to be large utilities, averaging more than 50 dry tons per day (dtpd). The high percentage of large utilities probably explains the high use of rotary drum systems, which offer greater throughput capacity than the belt and paddle systems noted by other respondents.

Although drying appears to be more common with large utilities, approximately one-third of the respondents average less than 20 dtpd. Belt dryer and paddle dryer use appeared to be split evenly amongst the smaller utilities.



Product Use

Overall, the respondents indicated that their product is being sold primarily as a bulk fertilizer agent with the consumer providing transportation for the product. The value of the product covered a broad range, with approximately 50% of respondents indicating a value of \$1 to \$20/ton for the product, and 30% indicating they receive greater than \$20/ton. Typically, a set price is used for the sale of product, with only three respondents indicating they have a variable price. One respondent reported their product is used as a specialty fertilizer.

Only one respondent indicated they don't sell any product, rather, they pay to dispose. One additional respondent indicated they sell product, but have had to pay for disposal. Approximately 85% of respondents indicated they have a backup option to manage excess product.

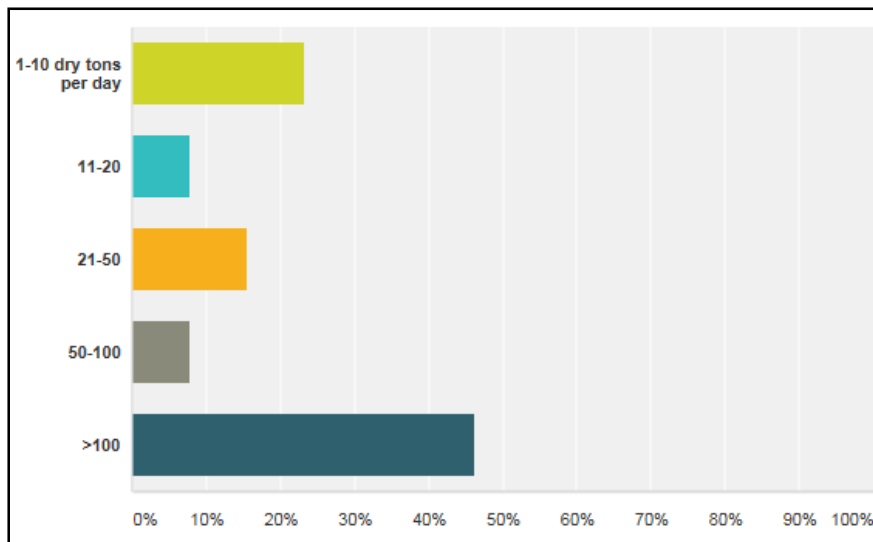
Only one respondent indicated they bag some of their product, but also distribute in bulk form. Approximately 75% of the respondents indicated bulk distribution is the only method used.

Product Aesthetics

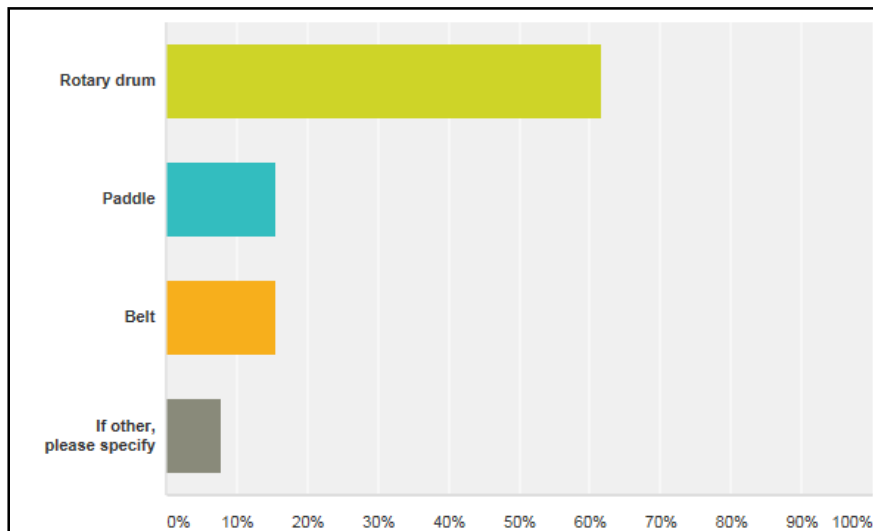
All but one respondent, presumably the one paying to dispose, indicated product aesthetics had a medium to high importance to dried product consumers. None indicated that a consumer had refused to accept product. Approximately 70% of respondents indicated that they maintain a high level of quality control, while the remainder rely on meeting the regulatory requirements as their means of quality control. None thought increased quality control efforts would improve the ability to distribute. Three of the respondents indicated they had incidents related to biosolids quality that led to suspension of product distribution for a period of time.

SURVEY RESULTS

What is your average annual biosolids production rate?



What type of drying system do you use?

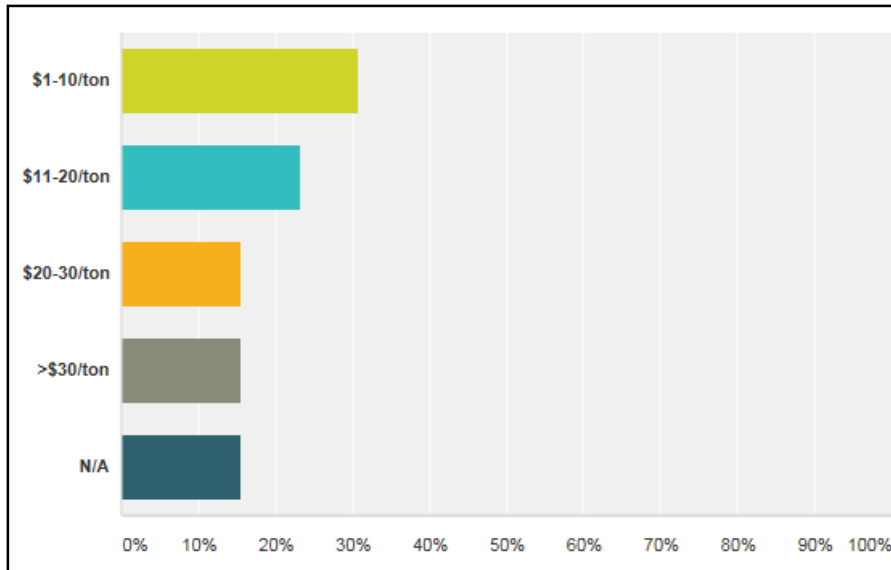


What is the primary use of your product?

Answer Choices	Responses
▼ Bulk fertilizer for general agriculture	92.31%
▼ Specialty fertilizer	7.69%
▼ Blending with other soil amendments	0.00%
▼ If other, please specify	0.00%

Do you sell your product? YES, 92.31% | NO, 7.69%

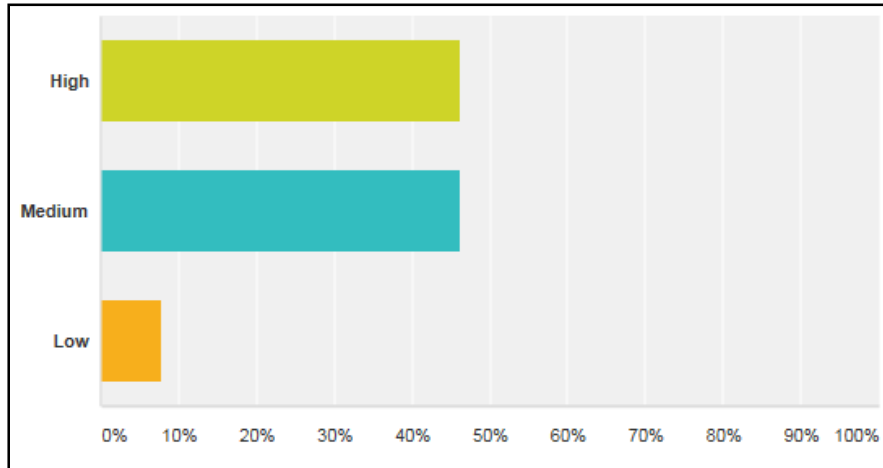
If you sell the product in bulk, what is the cost to the consumer?



Is your product sold in bags or bulk?

Answer Choices	Responses
▼ Bags	0.00%
▼ Bulk	76.92%
▼ Both	7.69%
▼ Not sold, give away	0.00%
▼ Disposed at a cost	15.38%

How important are the aesthetics of your product to your consumers (product shape, dust, odor, trash, etc.)?



Has a consumer ever refused product, or indicated future deliveries will not be accepted unless the product improves? YES, 0% | NO, 100%

What level of effort do you as a producer of biosolids products invest in Quality Control (QC) of your biosolids?

Answer Choices	Response
▼ Maintain a rigid QC program that regularly inspects and analyzes product more than required by regulations	69.23%
▼ Occasionally conduct analyses beyond what is required for regulatory requirements	0.00%
▼ Meet regulatory requirements	30.77%

Do you think increasing your QC regimen would improve your ability to distribute product?

YES, 0% | NO, 100%

What parameters do you analyze for in your final product?

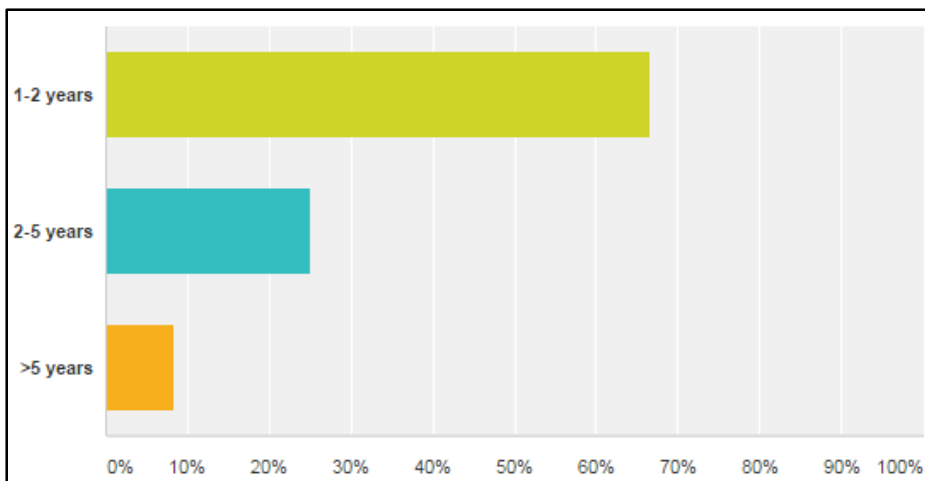
Answer Choices	Responses
▼ Total solids concentration	100.00%
▼ Metals	100.00%
▼ Fecal coliform	92.31%
▼ Pathogens (salmonella, helminth ova, or others besides fecal coliform)	53.85%
▼ Nutrients	100.00%
▼ Dust	23.08%
▼ Product temperature	53.85%
▼ Odor	7.69%
▼ Organic compounds	61.54%

Have you had any incidents related to biosolids quality that caused you to suspend distribution for any length of time? YES, 23.08% | NO, 76.92%

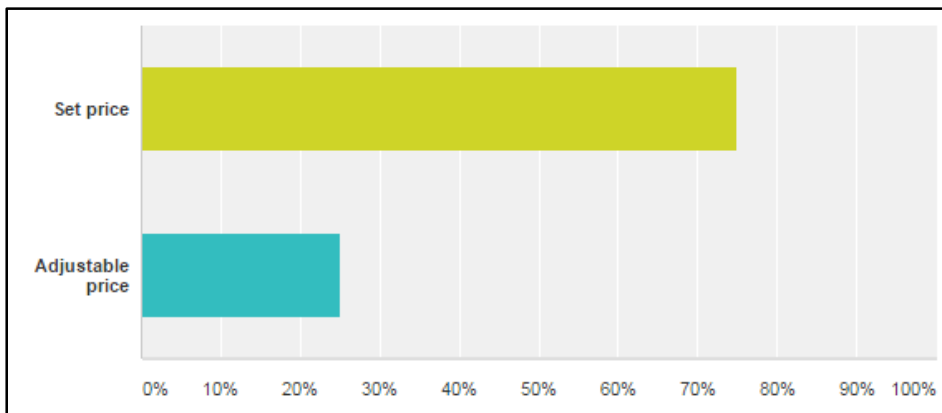
Do you advertise for customers or rely on other means?

Answer Choices	Responses
Advertise via Website	27.27%
Advertise via Print	18.18%
Advertise via Radio/TV	9.09%
Advertise via Flyers with billings	9.09%
Advertise via Other means	9.09%
Staff identify users	54.55%
Word of mouth	45.45%

How long did it take to build the market you currently have?



Agricultural markets are diversified and some pay higher prices for fertilizer than others. Does your marketing program have a set price per ton or does your program adjust prices for different markets?

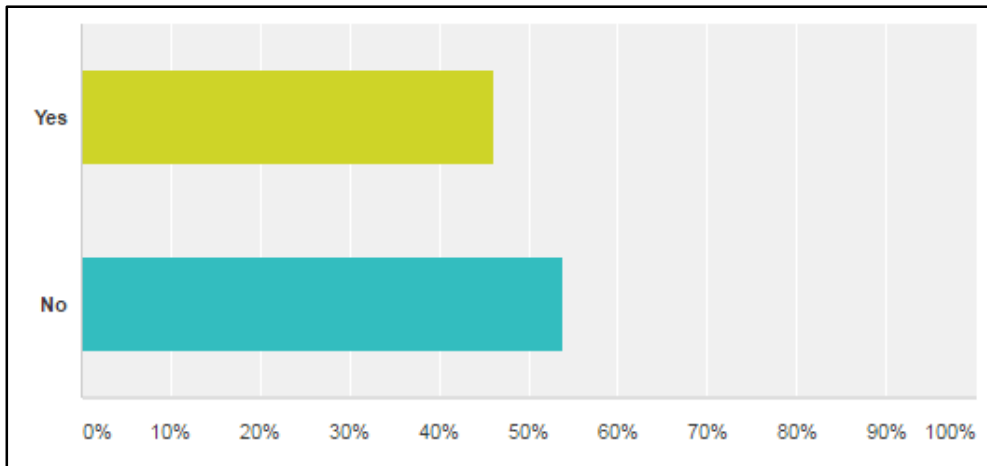


Has your organization set up standard operating procedures to ensure the quality of the fertilizer and the safety of the workers? YES, 92.31% | NO, 7.69%

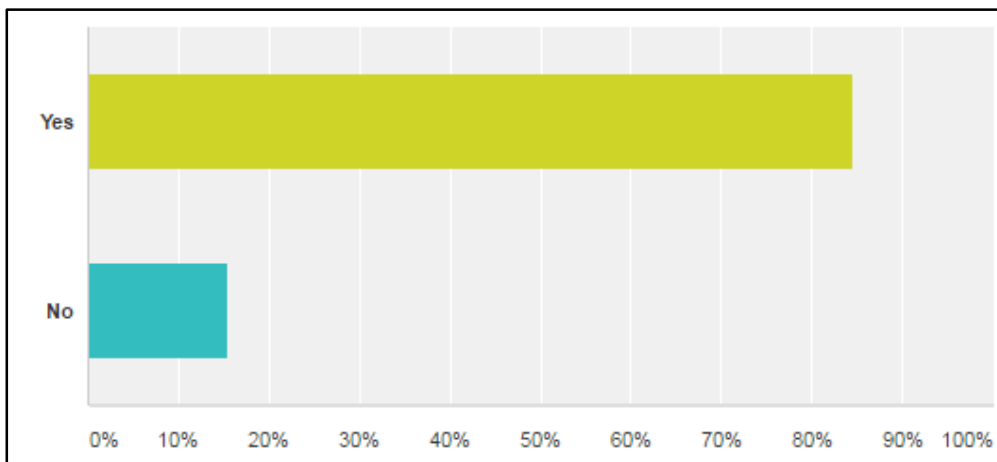
Do you transport product for the customer or does the customer?

Answer Choices	Responses
Utility provides transport	23.08%
Customer provides transport	76.92%

Do you use oil conditioning for dust control?



Does your organization have a backup option to take excess product?



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Resource	Link
<u>Drying of Wastewater Solids</u> WEF, 2014	http://www.wrrfdata.org/NBP/DryerFS/DryingWWsolids.html
<u>Design of Municipal Wastewater Treatment Plants, Vol. 3: Solids Processing and Management</u> , WEF Manual of Practice No. 8, WEF and ASCE/EWRI, 5th Ed., 2010	https://www.e-wef.org/Home/ProductDetails/tabid/192/productid/5306/Default.aspx
<u>Operation of Municipal Wastewater Treatment Plants</u> , WEF Manual of Practice No. 11, WEF Press, 2017	https://www.e-wef.org/Store/ProductDetails.aspx?productId=50665547
<u>Solids Process Design and Management</u> , WEF, 2012	http://www.e-wef.org/OnlineStore/ProductDetail/tabid/55/productid/18173/Default.aspx
Biosolids Resources	http://www.biosolids.org , and http://www.biosolidsresources.org