

DYNAMIC HAY EXPORT GROWTH LED BY CHINA

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ABSTRACT

Western hay exports have increased rapidly in recent years, and are on pace to exceed 4.7 Metric Tons (MT) in 2016, a record high export volume from western ports. Western exports of hay are likely to exceed \$1.5 billion in 2016. Hay export share is significantly less than other field-crop commodities, with less than 5% of US alfalfa production and less than 3% of grass hay exported. But in recent years the equivalent of about 15% of alfalfa and more than 44% of grass hays produced in the seven western states have been exported, according to US Dept. of Commerce and USDA figures. These are the major exporting states. The increase in exports was driven partly by lower US prices and partly by increased demand by importers in spite of a strong US dollar. Japan remains the largest market for US hay, most of which is grass hay, including timothy from the Pacific Northwest and Bermuda, kleingrass and sudangrass from the Southwest. However, China has emerged as the largest export market for alfalfa, having grown from near zero eight years ago to approximately 1.5 million MT in 2016. The Middle East, which is undergoing major agricultural changes due to water challenges has also grown as an export destination. Export of hay is likely to be a permanent component of the western hay industry, as the livestock industry in Asia expands and scarce land and water limit production in Asia and the Middle East.

INTRODUCTION

Export of hay has a small share of production compared to many agricultural commodities (such as wheat, corn, rice, wine, almonds or even milk). Less than 4% of the US alfalfa is currently exported. However, export of hay from western states is important and on the rise again in 2015-16 (Figure 1), driven by

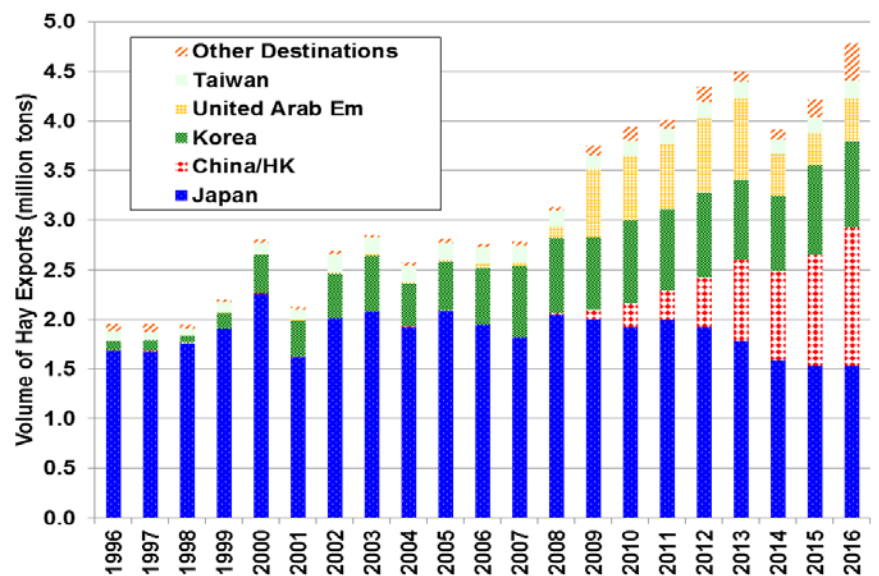


Figure 1. Volume of US Hay Exports from Western Ports¹ by Top 5 Destination Countries, 1998-2016². Over 99% of all hay exports are from western ports (CA, WA, OR). Total export volumes for 2016 are authors' estimations using most recent monthly data from U.S. Department of Commerce and applying share values of monthly exports for previous two years.

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stronger foreign demand, weaker domestic demand and relatively low US prices for hay. This increase occurred in spite of a strong US dollar, limitations on GMO alfalfa exports, and in spite of a softening of global milk price (especially in China) which makes purchases of foreign hay more difficult for buyers.

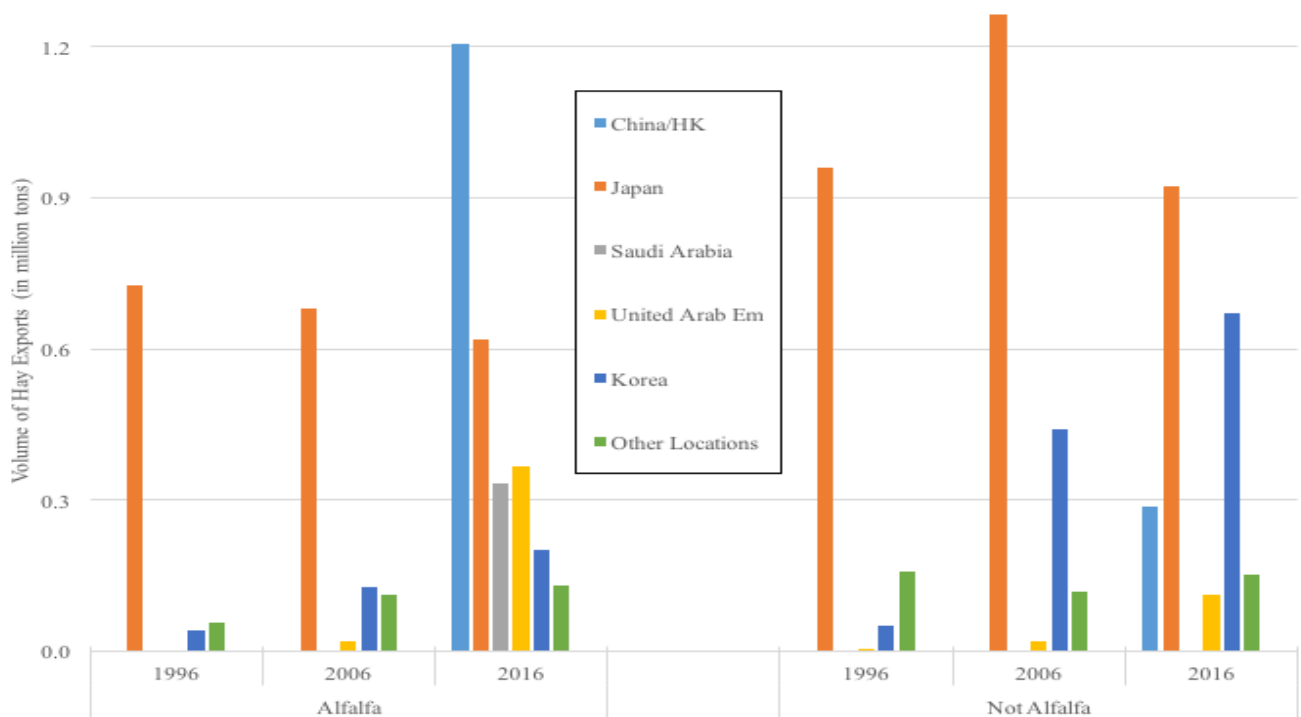


Figure 2. Changes in volume of alfalfa and non-alfalfa (grass) hay exports. 1996, 2006, and 2016. Total export volumes for 2016 are authors' estimations using most recent monthly data from U.S. Department of Commerce and applying share values of monthly exports for previous two years. Note: Industry contacts have indicated that the grass hay exports to China may have been mislabeled as grass, but are really alfalfa since China does not allow imports of US grass hay. Thus total alfalfa exports to China are likely to be close to 1.5 million MT.

LONG-TERM EXPORT VOLUMES HAVE INCREASED

Nearly 4.8 million metric tons of hay (alfalfa and grass-type hays) will be likely exported from western ports in 2016, a record high number (Figure 1). Exports to Japan of grass and alfalfa hays have occurred since the 1980s, but the dramatic increase of exports as a major market for western hay is a relatively new phenomenon, with major increases coming in the mid-2000s. Exports in 2016 were up 13% from the same period last year (Figure 1), and overall 2016 exports increased about 73% compared with 2006. The peak of 4.5 million tons of hay exported in 2013 was followed by a decrease in 2014-15, due to higher hay prices, the US dock slowdown, and other factors (such as the testing for GMOs). This maximum will be exceeded in 2016, if our current projections hold (Figure 1). Much of this increase has come from increases in demand from China which was miniscule in 2006, and dominate, at least for the alfalfa component, in 2016 (Figure 2). The rapid increase in exports to China was especially important and can be

seen in Figure 3 – indicating the rapid rise of alfalfa hay exports from about 1.4% as in 2008 to 47.1% in 2016 (Figure 3 – note that the actual amount may be well over 50% in 2016 due to the mislabeling of grass hays shipped to China which are really alfalfa).

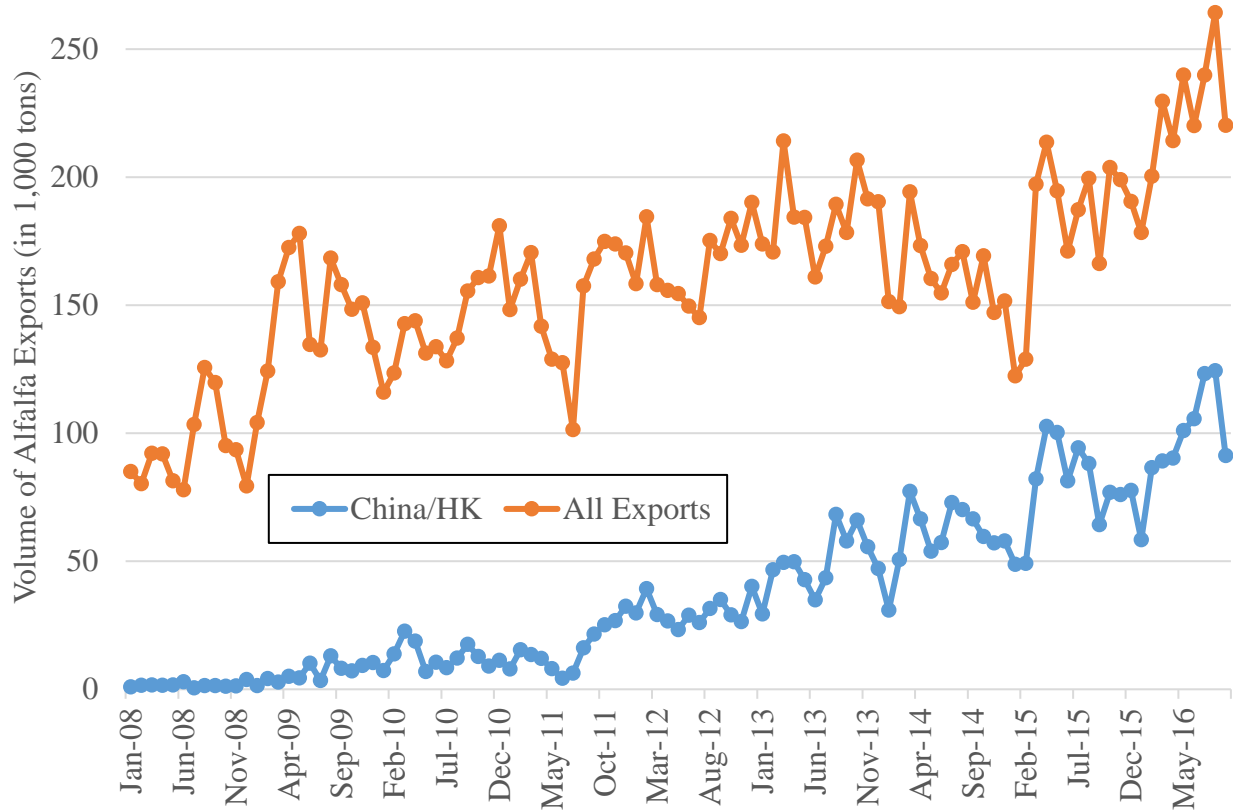


Figure 3. Volume of monthly U.S. alfalfa hay exports to China/Hong Kong and all destinations, January 2008 to September 2016. Source: U.S. Department of Commerce. Total export volumes for 2016 are authors’ estimations using most recent monthly data from U.S. Department of Commerce and applying share values of monthly exports for previous two years. **Note:** Industry contacts have indicated that the much of the grass hay exports reported as shipped to China may have been mislabeled as grass, but are really alfalfa since China does not allow imports of US grass hay. Thus total alfalfa exports to China may be underestimated in this figure and have been estimated to total 1.5 million MT in 2016.

VALUE OF HAY EXPORTS NOW NEARLY \$1.5 BILLION

The value of west-coast exports has increased along with the volume, and is projected to be about \$1.49 billion in 2016 (Figure 4). This includes approximately \$870 million for alfalfa hay, and a little over \$600 million for grassy-type hays in 2016. The growth in value for alfalfa was 360% and for grassy hays 78 percent increase in the past 10 years (Figure 4). Japan was once the primary market for US-grown hay, with about 90% of the alfalfa and >85% of the non-alfalfa hay demand in 1996 (Figure 5), but this has changed significantly in 2016, with China, Korea,

UAE and Saudi Arabia a more important role (Figure 5). 2015, an increase of 24% in one year - exports to China have increased 5 fold since 2010.

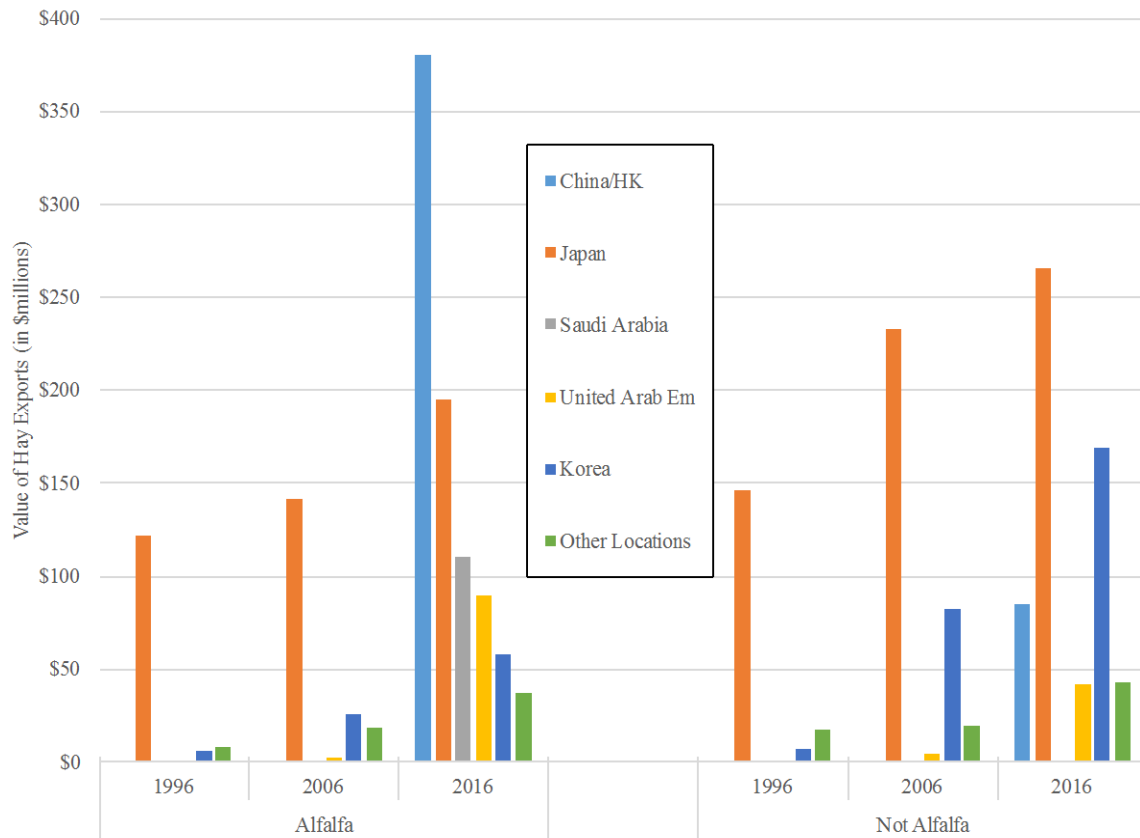


Figure 4: Changes in value of alfalfa and non-alfalfa grass hay exports, 1996, 2006 and 2016. Values for 2016 are authors’ estimations using most recent available monthly export data for 2016 and applying share values of monthly exports for previous two years. Source for data is U.S. Department of Commerce. **Note:** Industry contacts have indicated that the much of the grass hay exports to China may have been mislabeled as grass, but are really alfalfa since China does not allow imports of US grass hay. Thus total alfalfa exports to China may be underestimated in this figure and are likely closer to total \$440 million in 2016.

WHO IS BUYING US HAY?

This Importance of China. Exports of hay to China were near zero ten years ago, and have increased over 400 fold since that time to about 1.5 million tons (Figure 2, Figure 3). The difficulties with testing for traces of GMO hay, and the port strike which occurred in 2014 did not seem to have as important an impact in 2015-16, although some difficulties were seen. The Peoples Republic of China (PRC) had embarked upon a period of rapid expansion of dairy production for the past 10- 15 years, driven both by internal demand by consumers and a domestic milk adulteration scandal. Profitability was also a major factor for Chinese

entrepreneurs, since during many parts of the period 2005-2015, milk prices in China were a good 50% higher than in other parts of the world. This was accompanied by government encouragement of dairy enterprises. Government policy then encouraged expansion of larger dairies since control of milk quality was more difficult on smaller dairies. High quality alfalfa hay fits in well with the plans of high-volume large dairy farms. However, expansion of dairies in the eastern provinces of China have been (and still are) limited by lack of forage availability, particularly high-quality alfalfa hay, but also to some degree corn silage.

Commonly-available local Chinese forage crops included wild-grown ‘sheep grass’ which is harvested and sold, but often with very low quality. Alfalfa is grown in many parts of China, but typically on smaller acreage, and since summer rains are common, often quality is less than Western US-grown hays. There are now larger acreages being developed, and technology has improved greatly in 10 years. Considerable scope for larger-scale production of alfalfa exists in the western and northern Chinese provinces, but there are limitations of weather (cold winters with winterkill), water supply, summer rains which can ruin harvests, technology (compression technology, transport, adapted varieties), and distance from markets. It may seem strange, but the shipping costs for high-quality hay from the US to China are frequently less than overland shipping costs from interior China to the dairy-production regions. This is due of course partially to the imbalance of trade and the over-availability of empty containers going west to Asia. Given the rate of expansion of dairy cows in the PRC and the limitations of domestic production, many knowledgeable experts believe that the rapid growth of Chinese markets is not a flash-in-the pan, but a demand that will be in place for decades to come.

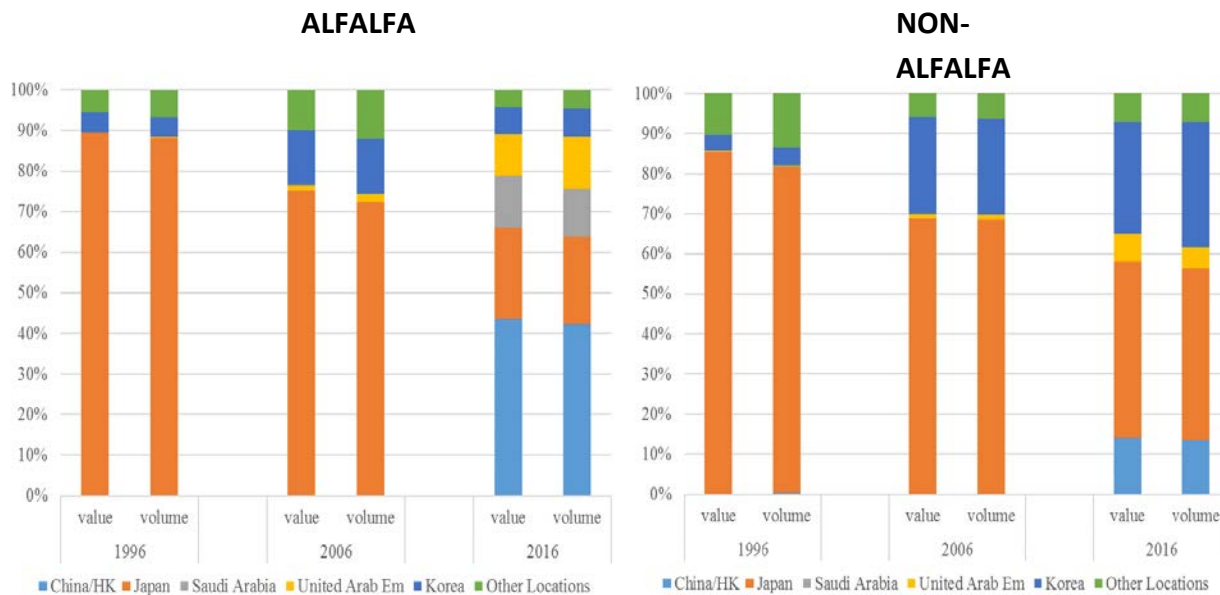


Figure 5. Share of Value and Volume of U.S. Alfalfa and Non-Alfalfa Hay Exports to Major Destination Countries, 1996, 2006 and 2016. Values for 2016 are authors’ estimations using most recent available monthly export data for 2016 and applying share value of monthly exports for previous two years. Note: As in other graphs, the non-alfalfa (grass) hay shipped to China has been likely mis-labeled and is really alfalfa. Thus China’s share of alfalfa hay exports is likely over 50% of total.

Korea imports growing. South Korea has been an increasingly important market, especially for grass hays (about 89% of the total shipped to Korea). Korean imports grew by 20% for all hay, and 13% for alfalfa from 2014 to 2015, and grew again in 2016.

Japan imports still large but declining. Japan has been the main market for grass and alfalfa hays shipped to Asia, and is still the largest market for US hays (Figure 1). However, it's relative importance has declined in recent years (Figure 5). Export volumes to Japan in 2016 were 9% below what they were in 2006 (Figure 2). Japan imports a large quantity of grassy hays (60% of imports to that country).

UAE market has emerged. The exports to the United Arab Emirates, similar to China, were nearly non-existent in 1996, barely on the radar screen in 2006, but increased rapidly from 2006 to 2016, so that UAE accounted for 13 % and 5% of the alfalfa and grassy hay export market, respectively in 2016. The UAE demand has been going up and down over the past 10 years, and declined 24% in 2015 vs. 2014, largely due to large inventory and purchases in 2012-13, but demand picked up again in 2016. UAE is a smaller nation that made a decision in the mid-2000s to stop allowing irrigation of alfalfa or other hays, and so instantaneously created an import market for hay. UAE is a smaller country than China or Saudi Arabia, and so supplies are subject to short-term over- and under-supply conditions which have been observed over the past 4 years.

Emerging Saudi Market? US hay exports to Saudi Arabia showed signs of a potential emerging export market in 2015-16, at least for alfalfa hay, but it is still in its infancy. Expectations of increased purchases by the Saudis have been high since announcements by the Royal Family a number of years ago to curtail domestic production of alfalfa and wheat due to lack of water and the depleted aquifers in the Arabian Peninsula. However, such restrictions for forage crops have been slow in implementation, and demand for US forage crops has been mostly unaffected until 2015. Saudi Arabia, with a population of over 30 million, has large dairy facilities and significant alfalfa production. The largest dairy in the world is in Saudi Arabia with 75,000 cows and 30,000 ha of crop production, and the kingdom has some of the highest production per cow of any nation, requiring quality feeds. Curtailment of domestic Saudi alfalfa production could create an import demand for more than 3 million tons/year, but it is uncertain when this will occur, or how much participation from the US is likely. Saudi companies have recently purchased land in the US and other countries for hay production for export to the kingdom. Other countries in Europe (primarily Spain, France and Italy) and north Africa (Sudan, Egypt, Morocco) or South America (Brazil, Argentina) may be in a more favorable position to export to Saudi Arabia and UAE, so any growth in demand from that country will only partially be met by US production.

HOW MUCH OF OUR HAY IS GOING FOR EXPORT?

In spite of this dramatic increase in demand for hay from foreign buyers, hay exports remain a relatively minor component of the US market for hay (Table 1). Alfalfa hay exports rose to about 4.75% of the total US hay supply in 2016, and grassy hays rose to just under 3% of US production. At least compared with many commodities (e.g. wheat at 40 %, corn 15%, milk 20%), hay exports are a small component nationally.

Table 1. Percentage of US and Western States Alfalfa and Non-Alfalfa Hays exported

	Alfalfa			Grassy Hays		
	<u>1996</u>	<u>2006</u>	<u>2016</u>	<u>1996</u>	<u>2006</u>	<u>2016</u>
Share of US Production	1.15%	1.47%	4.75%	1.84%	2.90%	2.94%
Share of 7 Western State's Production	4.6%	4.7%	15.3%	26.9%	34.6%	44.2%

Data from US Dept. of Commerce and USDA- NASS. Percentages for 2016 are authors' estimations using most recent available monthly export data for 2016 and applying share value of monthly exports for previous two years. Note: As in previous figures, the estimation of grass hay exported to China is likely to have been mislabeled in the Commerce summaries. Thus the percentage of grass hay exported is likely smaller than this estimate, and the % alfalfa larger.

However, in the seven western states (which produce most of the hay for export), an equivalent about 15.3% of the alfalfa is exported and 44.2% of the grass hays are exported (Table 1 – note the problem with mislabeling grass hays to China). The grass hays consist primarily of timothy hay from the Pacific Northwest, and sudangrass, kleingrass and bermudagrass from the Southwest. In specific regions of the West such as the Columbia Basin of Washington-Oregon and the Imperial Valley and Palo Verde Valleys of Southern California, the percentage of hay produced that is exported is significantly higher than this amount. In terms of production, grasses consist of only 21% of western hay production, but nearly 50% of the exports.

ISN'T SHIPPING OF HAY JUST SHIPPING OUR WATER OVERSEAS?

This has been a frequent refrain of agricultural critics. Detailed discussion is beyond the scope of this article, but readers should be aware that all exports represent the 'virtual' movement of resources (including capital, water, soil and labor) from one country to another. Exports are economically feasible if use of this aggregate of resources, valued at the prices in the local economy, allows an export price that is globally competitive. Many crops participate in national and world markets (including major commodities produced in California). A discussion of 'virtual' water should include a more comprehensive view of resource pricing and exports in the form of crops and livestock commodities, as well as a discussion of the resources, including water, imported into the California and the United States in the form of feed and foods as well as manufactured goods. Please see discussion on a blog: "Is Shipping Water to China in Alfalfa Hay Immoral?" <http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=8825> and Hay Exports: Further Twists and Turns <http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=12770>

DOMESTIC DAIRIES STILL THE MOST IMPORTANT MARKET FOR ALFALFA.

In spite of a reduction in the amount of alfalfa in the ration of dairy cows (estimated at below 8 lbs./day in California in 2015, CDFA), and the increases in hay exports, domestic dairies are still the primary market for alfalfa hay. Corn silage, small grain forage, corn grain, soy and canola

meals, and byproducts (e.g. almond hulls) have become a larger component of rations in recent years, but alfalfa remains very important. (We note the recent California drought suppressed corn silage and alfalfa usage, but it is too soon to know if this reduction was temporary.) The exact percentage is unknown, but is likely that over 65% alfalfa in California goes for dairy production, and it may be closer to 75%. California also attracts between 600,000 and 1 million tons of hay from neighboring states, some of which is for dairies, and some for export or horses (or minor uses like beef and sheep). Due to the movement of hay from all over the West, it is challenging to determine exactly the origin of the hay for exports or even for dairy production from any given state. Domestic horses are also a very large market for alfalfa and grassy hays, and according to some estimates are likely to be more important than exports (Hoyt, 2014, California Alfalfa Symposium proceedings).

SUMMARY

It is clear that western hay exports are here to stay—having transitioned from a very minor component to a more important market factor, albeit so far limited to the 10-20% of production in the West. It is unlikely that hay exports will take over the demand from domestic dairies in the near future – currently nearly 50% of US milk production comes from the 12 western states (from Colorado west) after a rapid western expansion (the percentage was 17% in 1970). But export demand has been a welcome relief for hay producers when the price of alfalfa hay takes a nose dive, as it has in the past 1 ½ years. The demand from both dairies and exporters for higher quality hay has increased the influence of quality on price. The western (primarily California) drought and the changes in land use (rapid increases in orchards and vines) has had a major effect on alfalfa acreage – we are now in an era of the lowest alfalfa acreage since the 1940s - but the rise in export demand has had an important influence on western alfalfa markets and is likely to continue to do so in the future.

REFERENCES

Putnam et al. 2013-2016. Hay Exports. Follow on-line postings of hay export data to the UC Cooperative Extension Alfalfa & Forage News Blog. <http://ucanr.edu/blogs/alfalfa/index.cfm>

Putnam, D.H. 2012. Is Shipping Water to china in Alfalfa Hay Immoral? UC Cooperative Extension Alfalfa & Forage News Blog. <http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=8825>

Putnam, D.H. 2014. Exporting Water through hay-Further Twists and Turns. UC Cooperative Extension Alfalfa & Forage News Blog. <http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=12770>