



HONEY FRAUD: A Major Threat to the Future of Beekeeping

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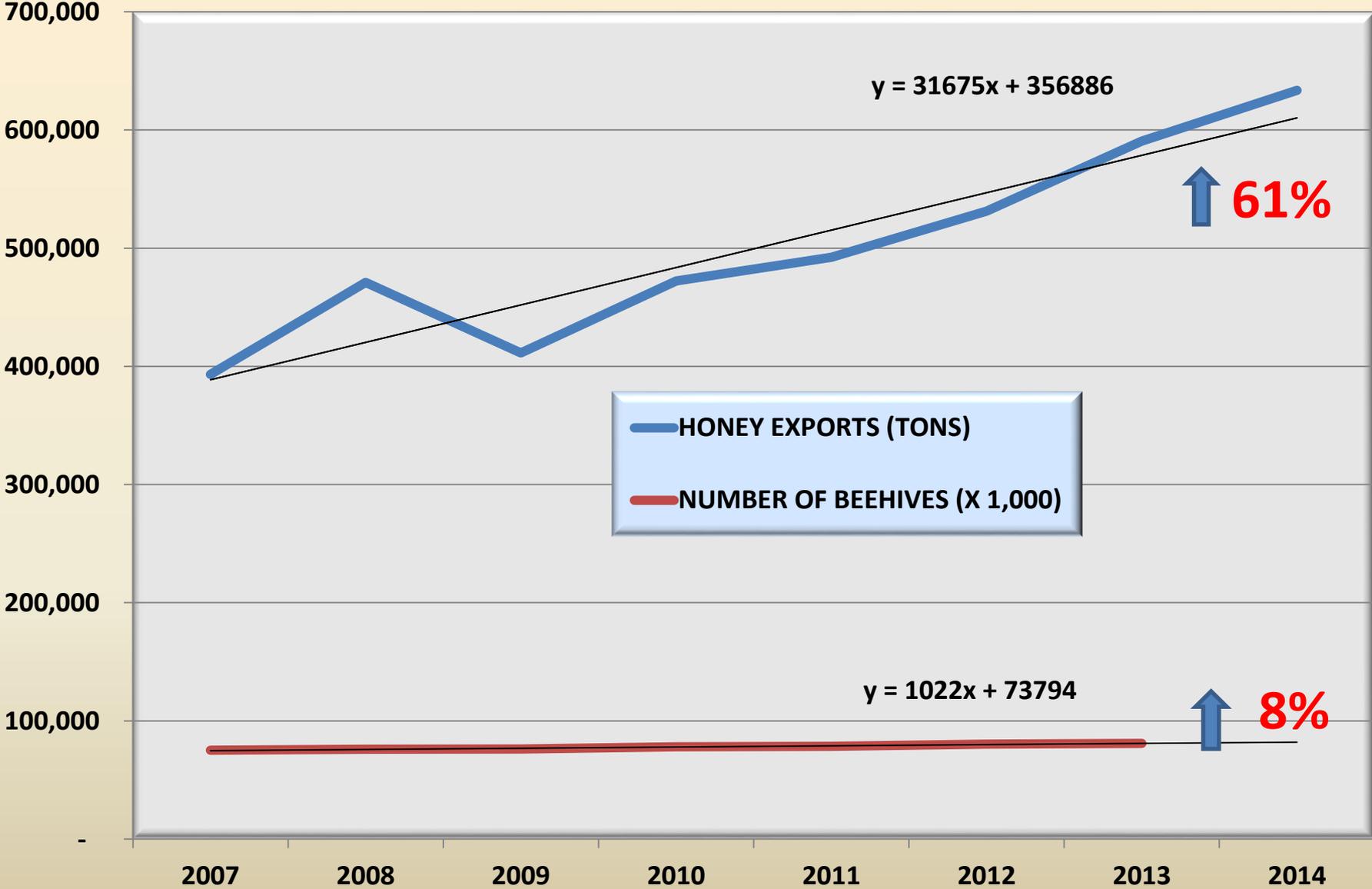


PART I: **WORLD HONEY PRODUCTION AND HONEY EXPORTS**

HONEY PRICES

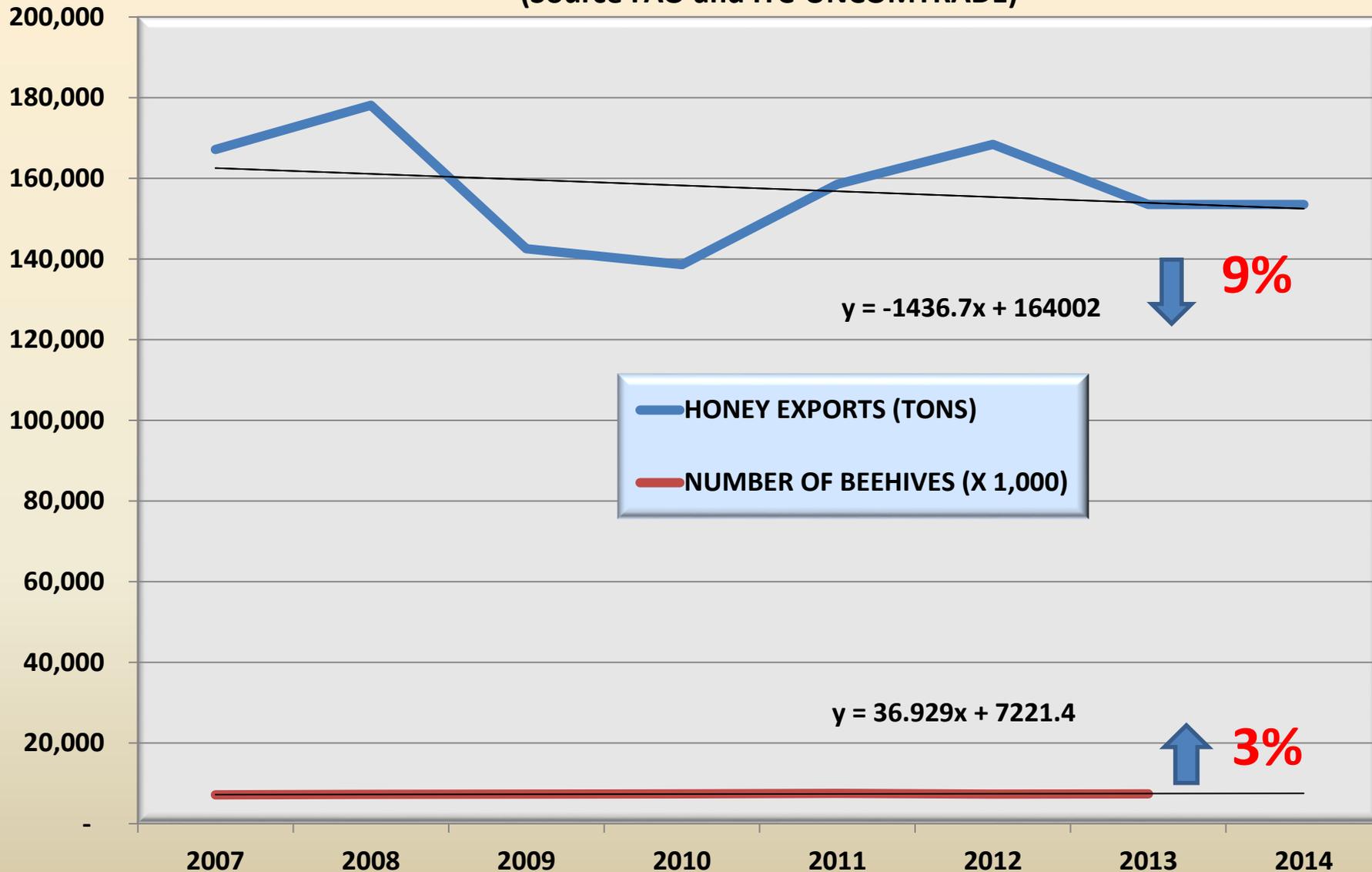
Since January 2015 bulk honey prices have been showing a continuous decrease in the international market, which has caused a loss of ca. 600 million dollars/year to honest beekeepers around the world.

EVOLUTION OF WORLD NUMBER OF BEEHIVES AND HONEY EXPORTS (Source FAO and ITC-UNCOMTRADE)



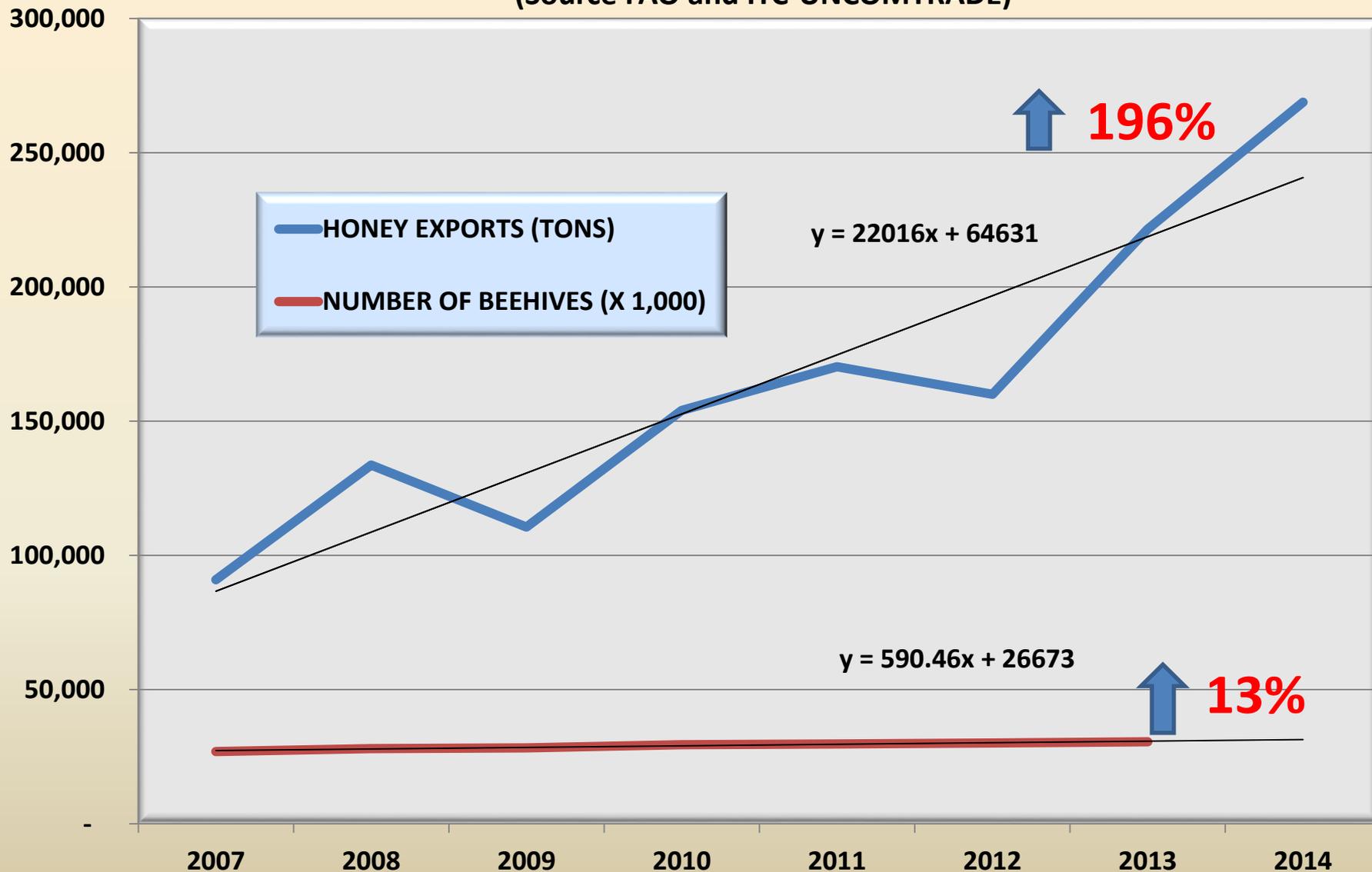
EVOLUTION OF THE NUMBER OF BEEHIVES AND HONEY EXPORTS OF THE MAIN SEVEN AMERICAN EXPORT COUNTRIES

(Source FAO and ITC-UNCOMTRADE)

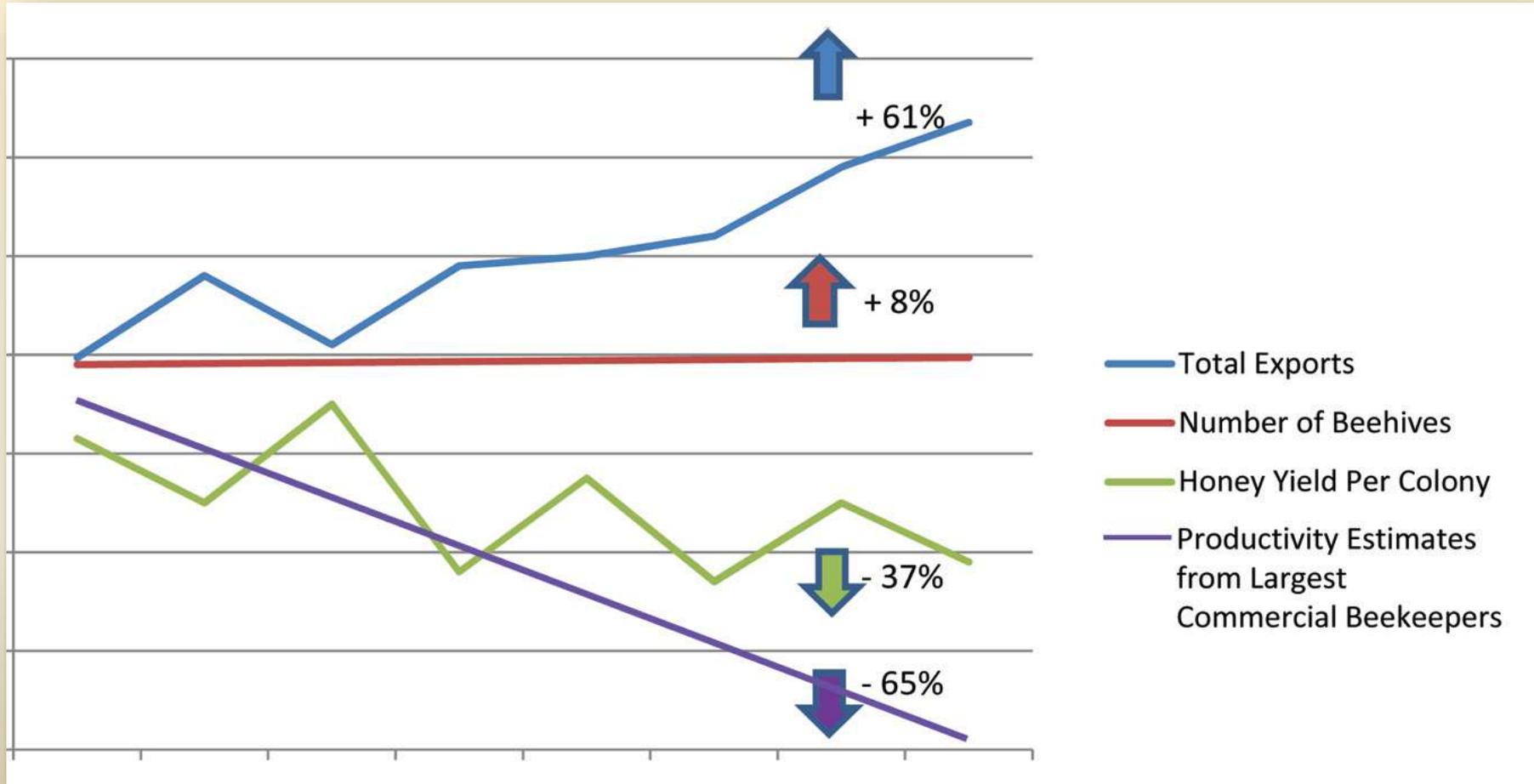


EVOLUTION OF THE NUMBER OF BEEHIVES AND HONEY EXPORTS OF THE 7 MAIN EASTERN EXPORT COUNTRIES

(Source FAO and ITC-UNCOMTRADE)



Three Variables: Honey Exports, Bee Hives, Productivity per Hive (Phipps, 2017)



CONCLUSIONS OF PART I

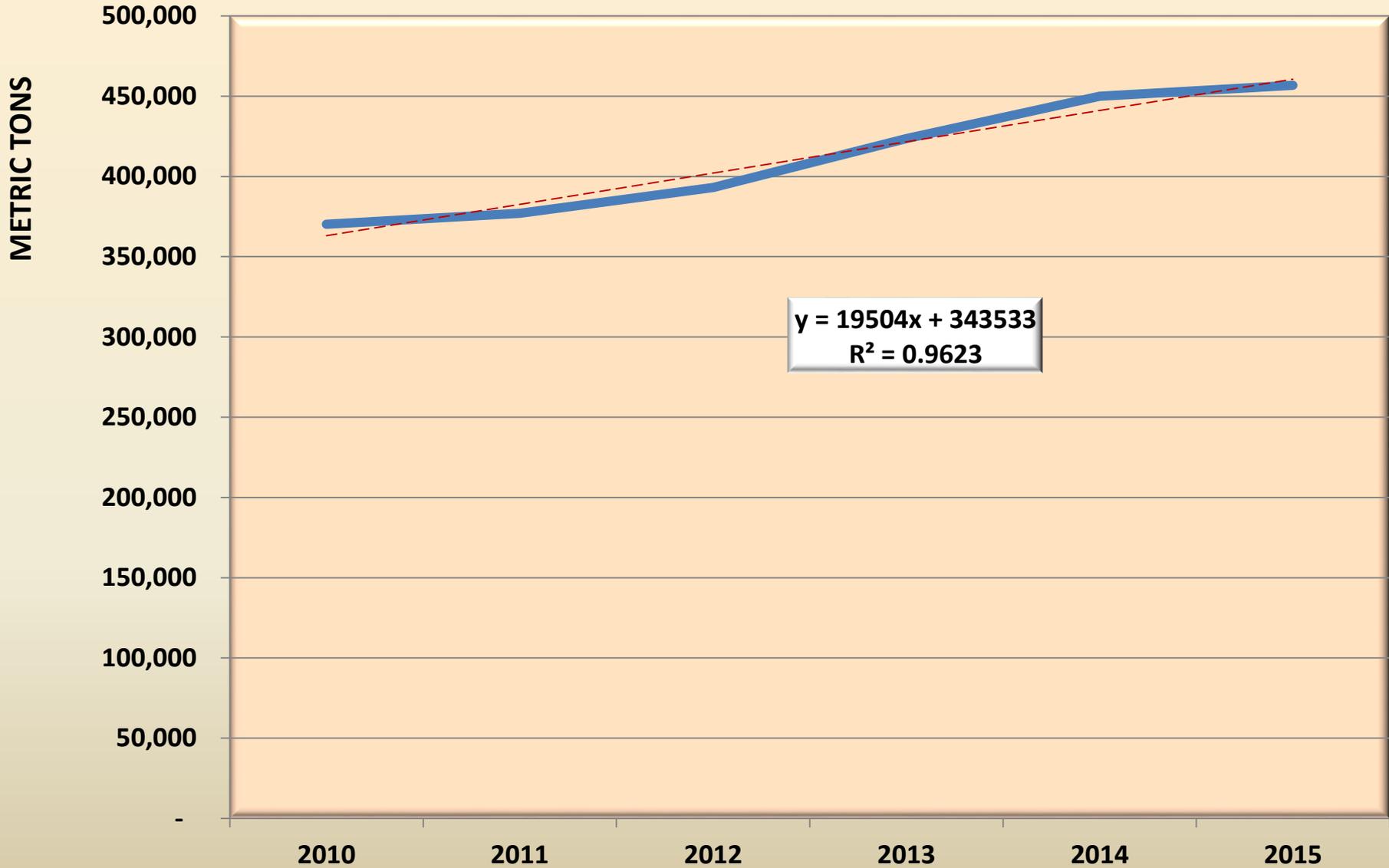
- ✓ **Statistics of Eastern honey export countries show a shocking abnormality that goes completely against world trends of lower productivity per hive.**
- ✓ **Statistics indeed reflect the honey production difficulties of the major honey producing countries of the American continent.**
- ✓ **The current drop in honey prices cannot be attributed to a significant global increase in the number of beehive nor to an increase of productivity.**



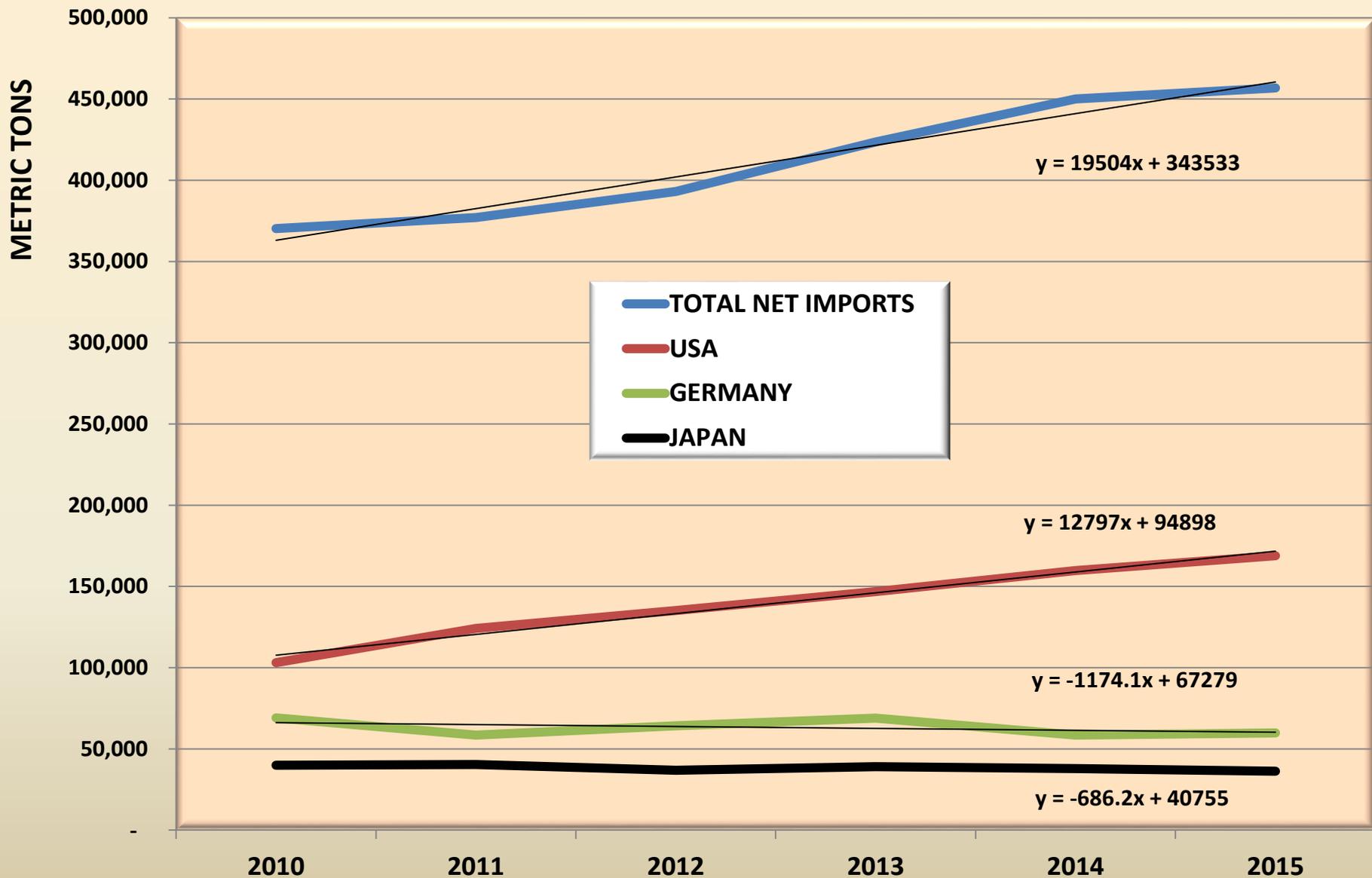
PART II: THE EVOLUTION OF WORLD HONEY DEMAND

TOTAL NET HONEY IMPORTS FOR THE PERIOD 2010/2015

(Calculations based on ITC-UNCOMTRADE data)



EVOLUTION OF TOTAL NET IMPORTS OF THE MAIN 3 IMPORT MARKETS (Calculations based on ITC-UNCOMTRADE data)



CONCLUSIONS OF PART II

- ✓ Global net honey imports grew at a rate of 19,504 tons per year since 2010.
- ✓ Considering the evolution of the three major markets of honey import, the United States led the demand growth at a rate of 12,797 tons/year. On the other hand, the honey demands of Germany and Japan showed a remarkable stability during that period.
- ✓ **The current drop in honey prices cannot be attributed to a decrease of a product's demand, which is indeed increasing !!!.**



PART III:

HONEY ADULTERATION



TYPES OF E.M.A IN HONEY

Economically Motivated Adulteration of Honey includes:

- ✓ Intentional dilution with cheap syrups (corn, rice, etc.).
- ✓ Any other addition or extraction of a substance to honey (e.g. Resin Technology)
- ✓ Feeding beehives during a nectar flow.
- ✓ Masking the true botanical or geographical origin to avoid tariffs or to increase the value of the price paid by consumers.

TYPES OF E.M.A IN HONEY

Unripe honey production encloses many different characteristics of Economically Motivated Adulteration:

- ✓ Unripe honey production implies faster and higher levels of production (economic gain) of a product that does not meet the definition of honey (fraud).
- ✓ Water honey adds another necessary actor: The Honey Factory.
- ✓ In The Honey Factory the product is dehumidified; residues are eliminated by Resin Technology; pollen may be removed or added to mask the country of origin; and syrups are added to meet the different market prices.
- ✓ The Honey Factory produces a product apt for circumvention and transshipment and very attractive for “competitive traders”.

RESIN TECHNOLOGY



HONEY DEHUMIDIFICATION

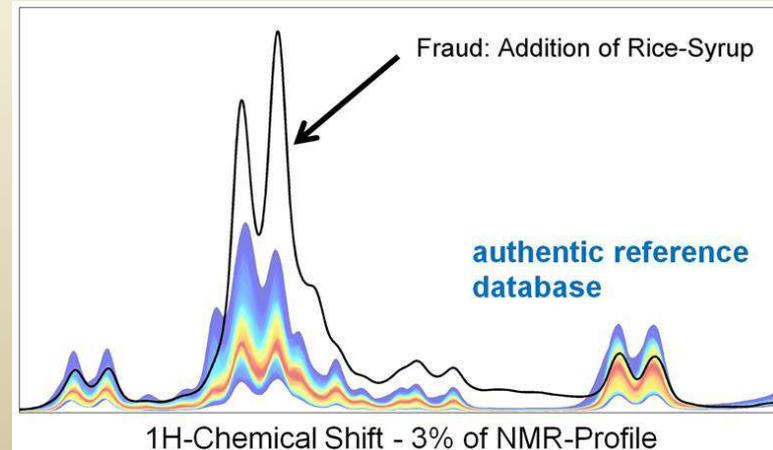


HIGH RESOLUTION NUCLEAR MAGNETIC RESONANCE

- ✓ **High Resolution Nuclear Magnetic Resonance is becoming an outstanding method to detect the addition of exogenous sugars to honey as well as to determine the origin of honey (geographic and botanical) and alterations due to honey processing.**
- ✓ **Databases starting to be shared by main labs.**
- ✓ **European supermarkets already require NMR testing.**
- ✓ **UK is still against but retail slowly focuses on honey.**
- ✓ **Many European labs test NMR in honey.**

NMR Test

- ✓ NMR analyses a spectrum that includes 36 different substances (sugars, amino and organic acids, etc.) and their proportions.
- ✓ The spectrum is compared with NMR Reference Database. 10,000 samples for 2017.
- ✓ Crosscheck using microscopic pollen analysis is recommended.
(Luellmann, 2017)



PREVALENCE OF HONEY ADULTERATION

- ✓ In December 2015 the European Union published the results of a plan to determine the prevalence of fraud in honey. 32% of samples were considered non-compliant, or suspected of non-compliance. Only conventional methods (IRMS, Pollen, Organoleptic, etc.) for the detection of adulteration were used in this study.
- ✓ During next months, the European authority will announce the results of a new study comprising 1,200 samples that are being tested by more advanced methods for the detection of honey adulteration.
- ✓ According to European laboratories, up to 60% of honey samples tested by NMR during 2016 are adulterated.
- ✓ Honey samples from Asia are considered of a high risk regarding adulteration.

CHINA – E.U. HONEY TRADE

- ✓ **AQSIQ (Chinese Sanitary Authority) is now severely controlling the quality of export honey, specially to the E.U. They test with SM-X before export.**
- ✓ **Currently, NMR seems hard to fool. Syrup factories are unwilling to develop a new product that passes NMR test as the investment is too high and very difficult to recover with current honey prices.**
- ✓ **After many years Chinese exporters cannot compete with pure honey at current prices.**
- ✓ **Most European buyers are now stopping their purchases of Chinese honey due to high cost and risk.**

LEGISLATION

✓ Removing substances via processing is not allowed according to the EU Honey Directive 2001/110/EC of 20 December 2001 relating to honey and the Codex Alimentarius.

1. **To remove water from honey:** The sugars are concentrated compared to raw material. Less water, ethanol and other volatile fermentation substances
2. **To remove antibiotics or pesticides through filtration with epoxide resin.**

(Luellmann, 2017).

CONCLUSIONS OF PART III

- ✓ The enormous and difficult-to-justify increase of honey exports from several countries of the Eastern Hemisphere, combined with the information coming from official surveys and private laboratories on the prevalence of adulteration of honey, lead us to conclude that fraud mechanisms are responsible for the injection of a very important volume of cheap diluted honeys to the market.
- ✓ This flood of diluted honey created a global oversupply of the product and a consequent fall of prices.
- ✓ NMR test requirement by European supermarkets is creating a barrier to adulterated honeys and a point of inflection in honey prices is being shown in many markets.

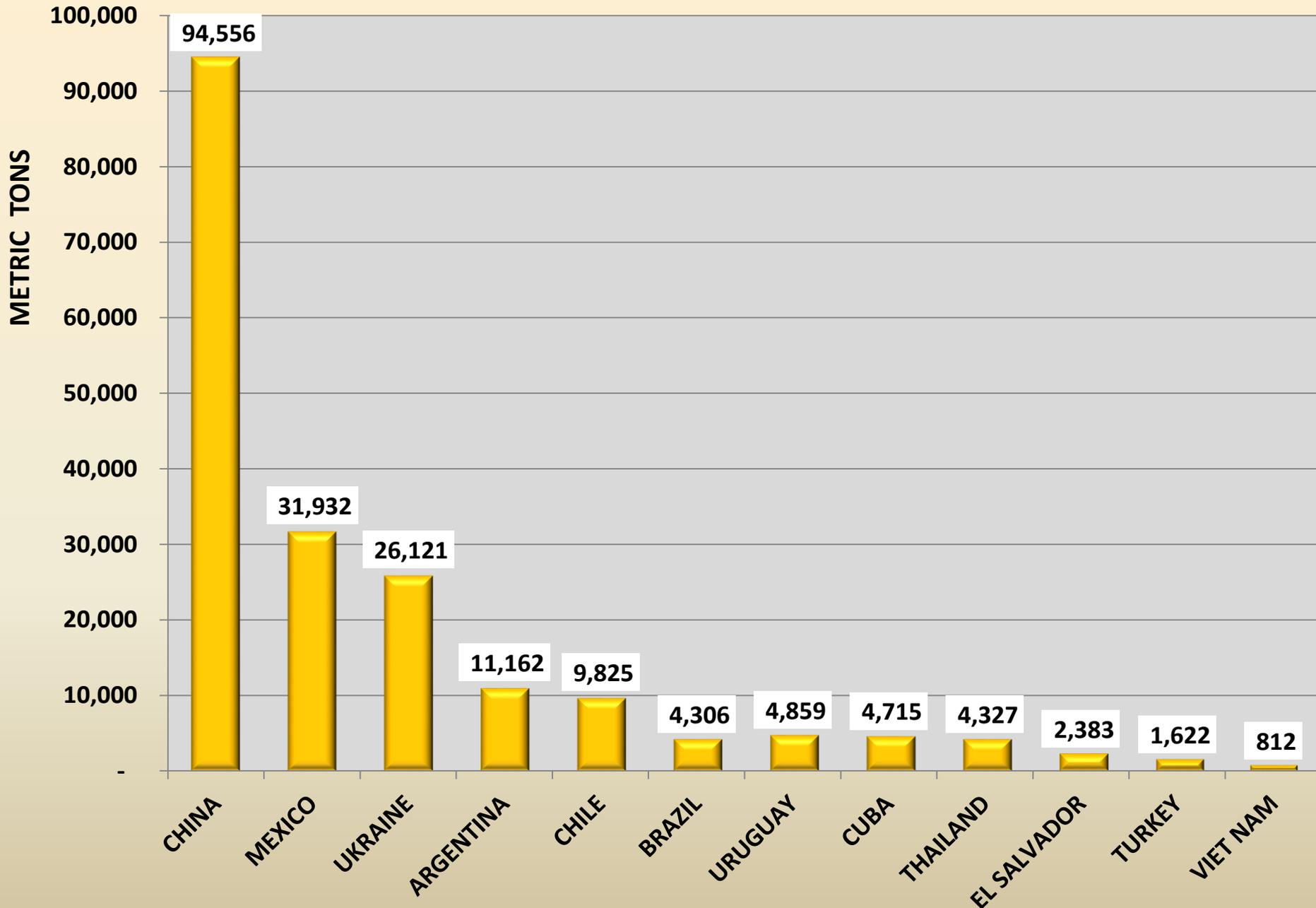
PART IV: MAIN HONEY IMPORT MARKETS



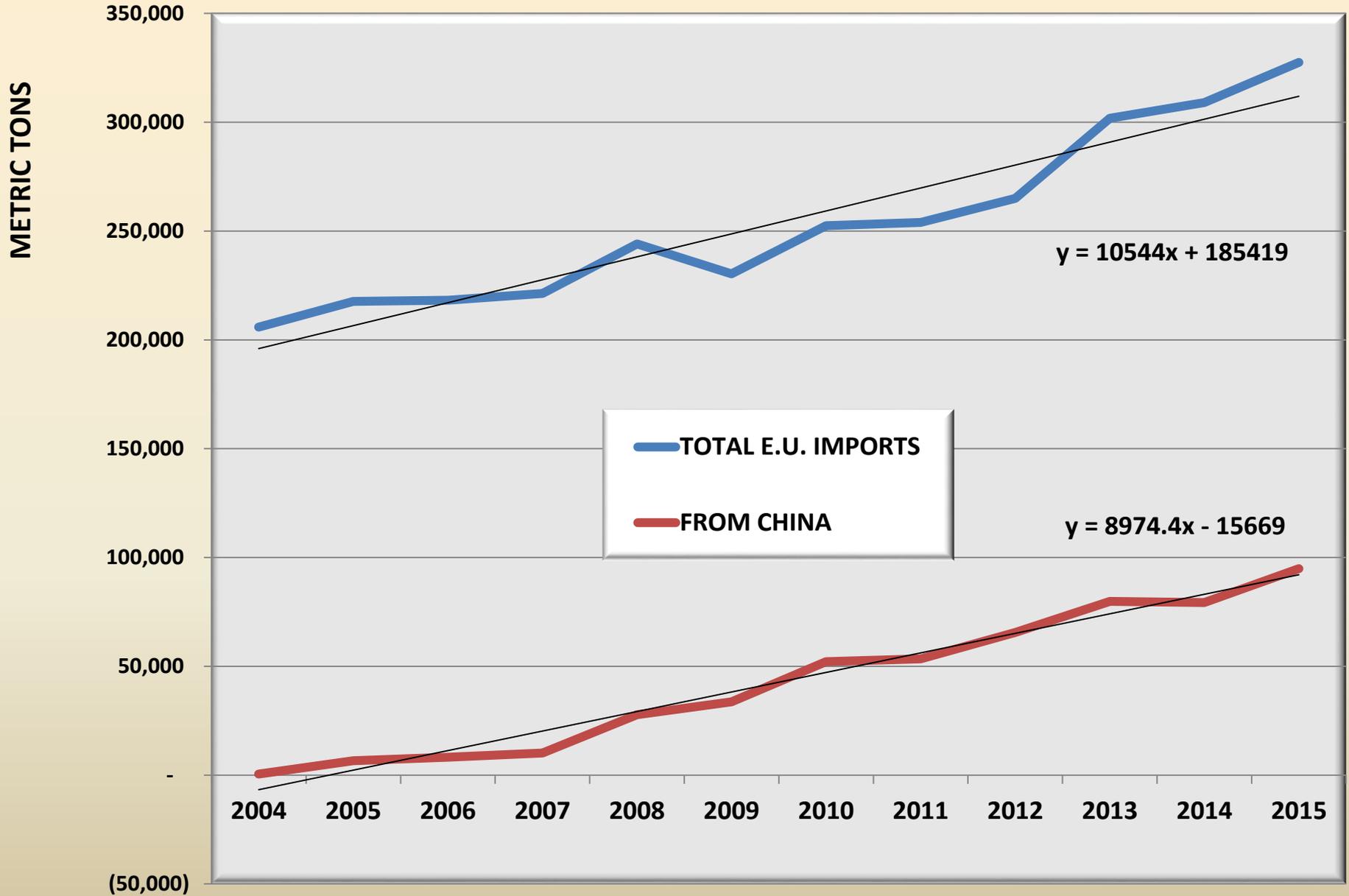
**INTERNATIONAL
HONEY
EXPORTERS
ORGANIZATION**

EUROPEAN AND JAPANESE HONEY IMPORTS

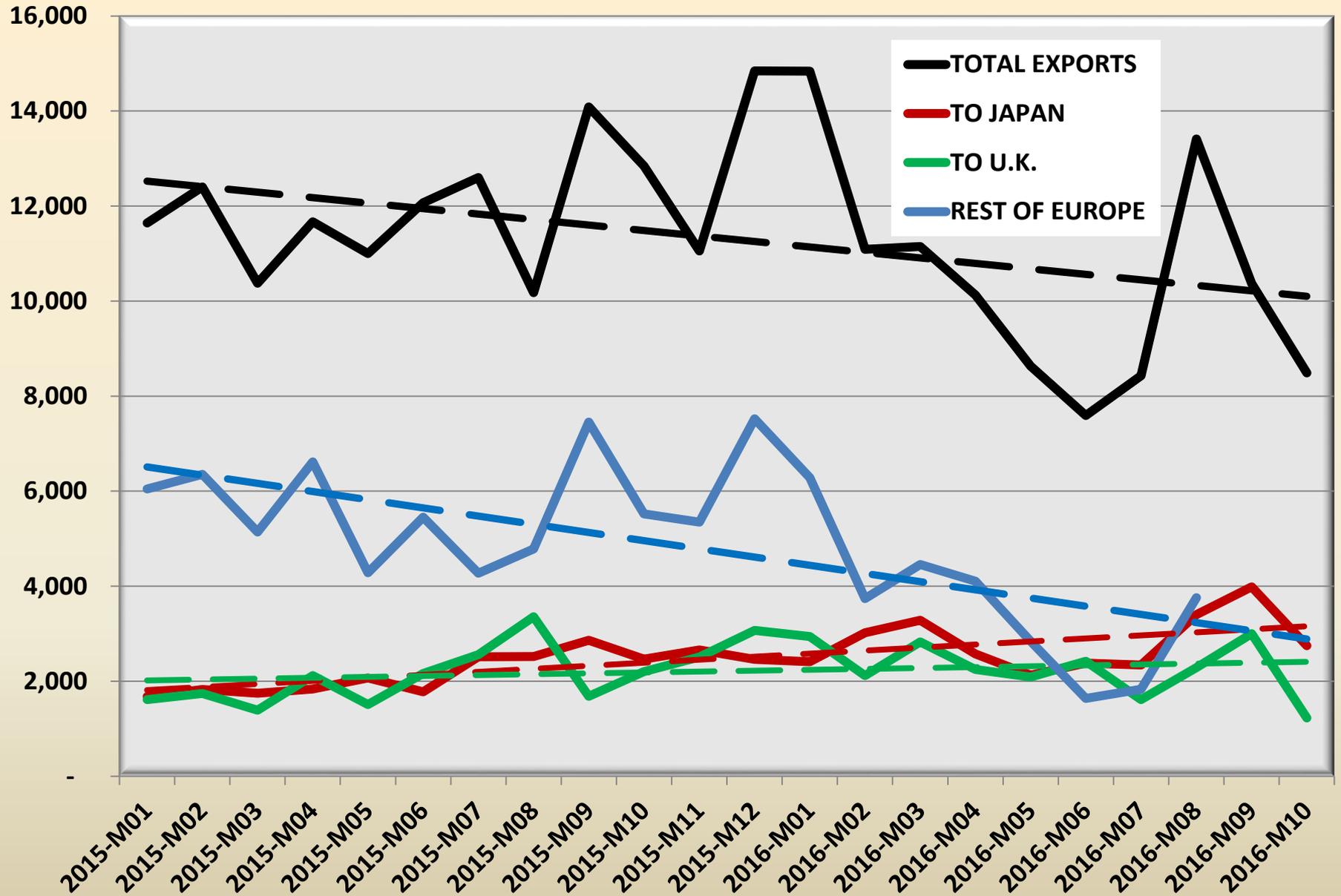
MAIN HONEY PROVIDERS TO THE E.U. IN 2015



EVOLUTION OF E.U. HONEY IMPORTS: TOTAL AND FROM CHINA (Source ITC-UNCOMTRADE)



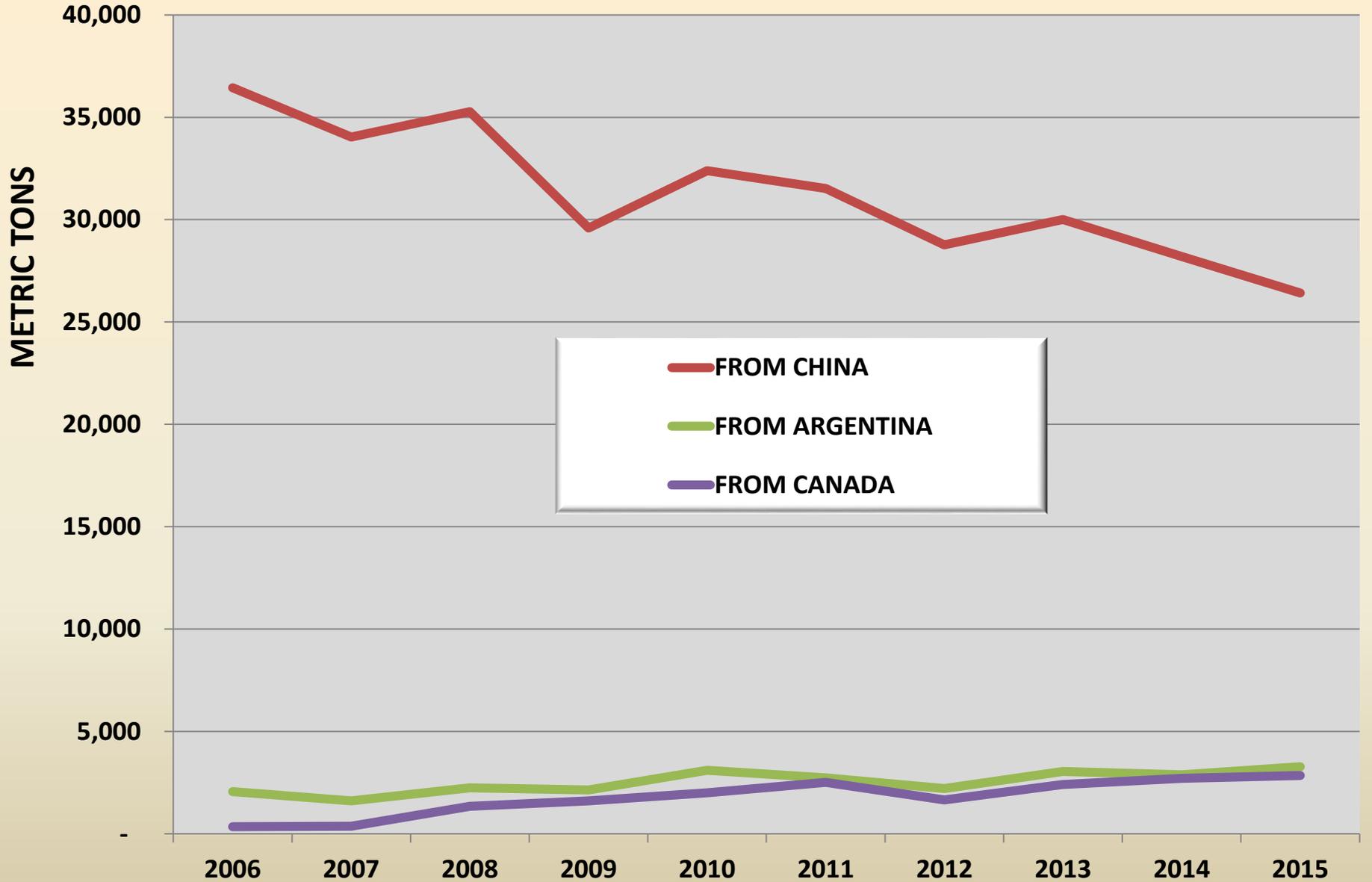
CHINA HONEY EXPORTS



Example of “NMR Quality” Honey Quotation

	Conventional Honey	NMR Quality
Polyflora Honey	USD 1,600/MT	USD 2,200/MT
Acacia Honey	USD 2,700/MT	USD 3,500/MT

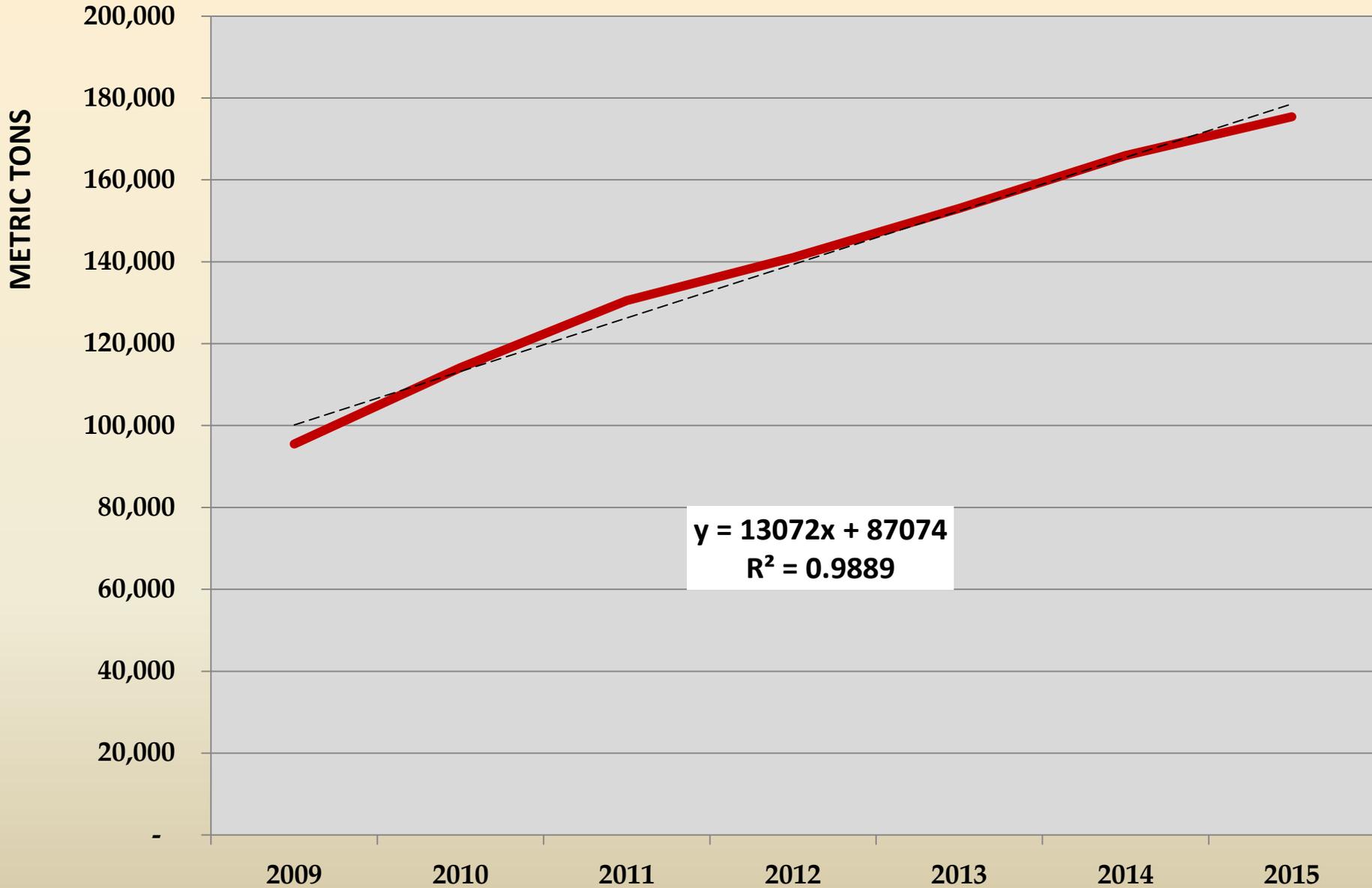
JAPAN HONEY IMPORTS



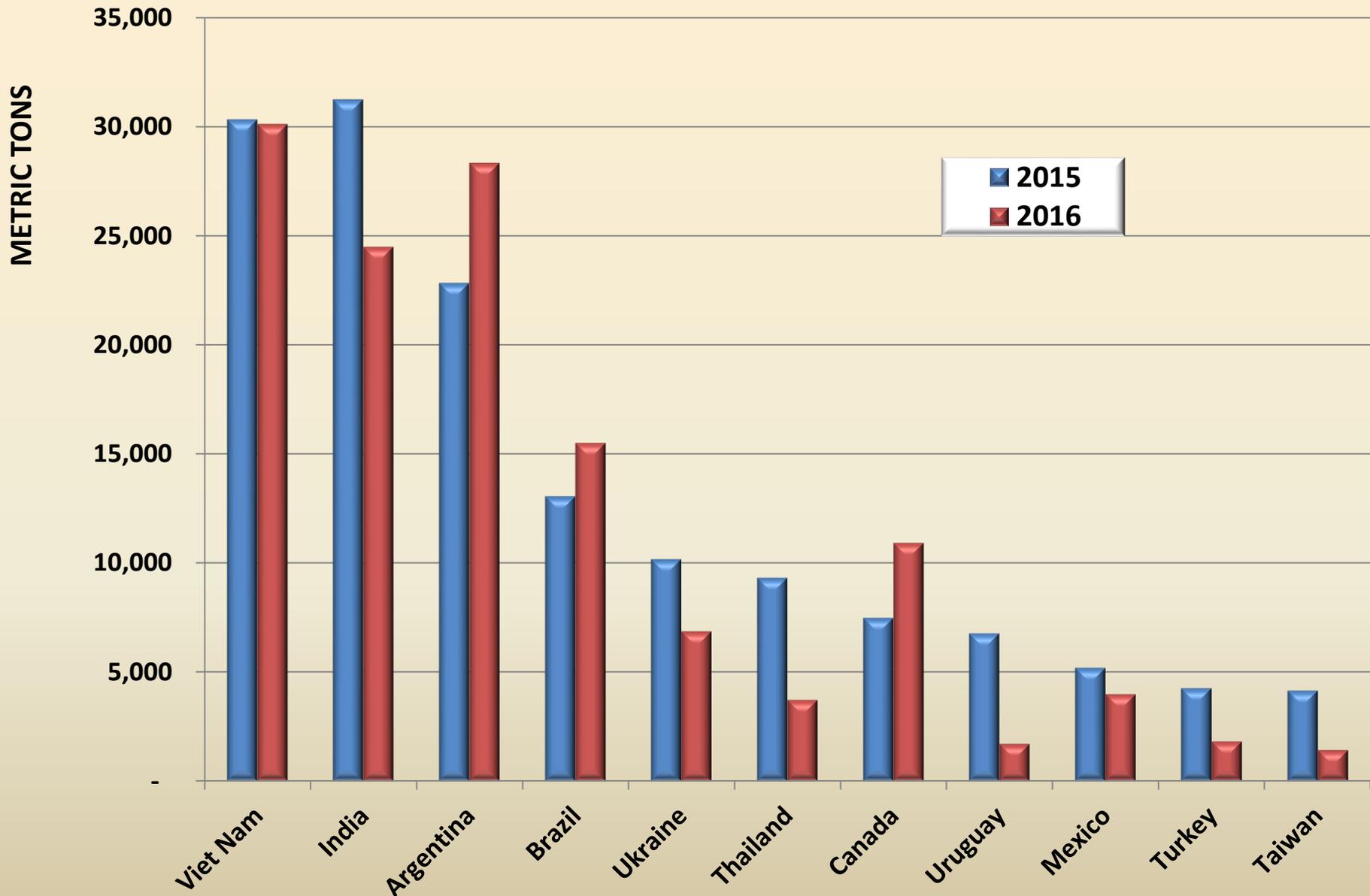


U.S. HONEY IMPORTS

U.S. HONEY IMPORTS



U.S. HONEY IMPORTS DURING THE FIRST 10 MONTHS OF 2015 AND 2016



2017 PROSPECTS

- ✓ **A Point of Inflection or turning point has been reached in global honey prices.**
- ✓ **The integration of the incentives to produce and consume honey is approaching (Phipps, 2017).**
- ✓ **Preparation of 2nd database version for NMR with approximately 10.000 samples**
- ✓ **Introducing further models for determination of geographical and botanical origins**
- ✓ **More models to detect adulteration (Luellmann, 2017).**

DATA SOURCE & REFERENCES

- ✓ **International Trade Centre (ITC) calculations based on U.N. COMTRADE Statistics.**
- ✓ **FAOSTAT Statistics.**
- ✓ **IHEO**
- ✓ **Dr. Cord Luellmann. QSI. Germany.**
- ✓ **Dr. Ron Phipps. CPNA, USA.**



THANK YOU !!!