(Not exhaustive) examples of potentially earliest developments (for release into the environment) in synthetic biology using genome editing or dsRNA based on patent or academic literature. I've chosen the intersection of genome editing/gene silencing with synthetic biology because of the strong push in many countries to specifically de-regulate these or similar uses.

Agriculture	Trait/product	Means (first to market)	Example
Pest control	Weed/volunteer crop herbicide susceptibility	dsRNA (topical, outdoor use)	*Crawford, M.J., Li, X., Kapoor, M., Williams, D.J., 2014. Methods and Compositions for Plant Pest Control. Monsanto Technology LLC. https://patentimages.storage.googleapis.com/b9/dc/de/c38d48ee9e7f1f/US20140215656A1.pdf* "the second polynucleotide could be essentially identical or essentially complementary to a transcript encoding a protein that confers resistance to a herbicide in a weed (such as an EPSPS encoding transcript) but would not be essentially identical or essentially complementary to a transcript encoding a protein that confers resistance to that same herbicide in a crop plant." *Sammons, R.D.; Ivashuta, S.; Liu, H.; Wang, D.; Feng, P.C.C.; Kouranov, A.Y.; Andersen, S. E. Method for controlling herbicide-resistant plants. Monsanto Technology LLC; 2011.* *https://patents.google.com/patent/US9121022B2/en* "the invention provides methods for: controlling herbicide-resistant volunteer plants; investigating reverse genetics by modulating an endogenous gene in a plant by applying onto tissue of a growing plant a composition for providing single-stranded RNA molecules in a plant cell for systemic regulation of genes; inducing systemic silencing of a target gene including topical application of polynucleotides to a plant; inducing systemic silencing of a target gene in a plant by (a) conditioning of a plant to permeation by polynucleotides and (b) topically applying polynucleotides to the plant; investigating reverse genetics by modulating an endogenous gene in a plant by topically applying onto a living plant a topically applied composition including polynucleotide molecules and an agent for conditioning of a plant to permeation by such polynucleotide molecules"

	Insecticide	dsRNA (topical, outdoor use)	*Van, B.E., Kubler, L., Raemaekers, R., Bogaert, T., Plaetinck, G., 2011. Methods for Controlling Pests Using RNAi. Devgen NV. https://www.google.co.nz/patents/EP2347759A2?cl=en* "the methods of the invention rely on uptake by the insect of double-stranded RNA present outside of the insect (e. g. by feeding)…the present invention also encompasses methods as described above wherein the insect is contacted with a composition comprising the double-stranded RNA."
	Null (negative) segregants: The product of two cycles of genetic engineering. May also be referred to as "DNA-free editing" or similar terms.	Genome editing nucleases, recombinases …	Review of cycle 1 (introduction of mRNA/gRNA using DNA constructs not expected to integrate or replicate or using nucleoprotein particles): https://doi.org/10.1007/s00438-023-01998-3 Examples of cycle 2 (removal of DNA insertions created by cycle 1): https://doi.org/10.1101/2023.03.02.530790 https://doi.org/10.1016/j.tibtech.2009.09.008
Packaging/food waste			
	Delaying senescence	dsRNA	*Deikman, J., Schwartz, S.H., Zheng, W., Gabriels, S.H.E.J., Hresko, M.C., Li, X., Tao, N., Williams, D.J., Xiong, H., 2017. Methods and Compositions for Delaying Senescence and Improving Disease Tolerance and Yield in Plants. Monsanto Technology LLC. https://patents.google.com/patent/US9840715B1/en* "Such plant parts can be sprayed either pre- or post-harvest to provide delayed senescence and/or improved yield in the plant part that results from suppression of EIN2 gene expression." *Fillatti, J., Froman, B., Garvey, G.S., Hemmes, J.C., 2012. Method for Improving Shelf Life by Regulating Expression of Polyphenol Oxidase. Monsanto Technology LLC. https://patents.google.com/patent/WO2014047623A1/en* "In some embodiments, methods for reducing or inhibiting discoloration of a plant or plant part following harvest comprising topically applying compositions comprising a polynucleotide and a transfer agent that suppress the target PPO gene"

Medicine, veterinary medicine, rodenticide			
		Genome editing nucleases	D.R.Liu, J.A.Zuris, D.C.Thomas, Delivery System for Functional Nucleases, President and Fellows of Harvard College, 2016. https://patents.google.com/patent/US9526784B2/en?oq=US+9%2c526%2c784+B2 "Compositions, methods, strategies, kits, and systems for delivery of functional effector proteins using cationic lipids and cationic polymers are also provided. Functional effector proteins include, without limitation, transcriptional modulators (e.g., repressors or activators), recombinases, nucleases (e.g., RNA-programmable nucleases, such as Cas9 proteins; TALE nuclease, and zinc finger nucleases), deaminases, and other gene modifying/editing enzymes. Functional effector proteins include TALE effector proteins, e.g., TALE transcriptional activators and repressors, as well as TALE nucleases"